



Ministry of Economic Affairs

Report to the European Commission on the implementation of Council Directive 2009/71/EURATOM

*First National Report of the Kingdom
of the Netherlands as required under
Article 9.1*

July 2014

Abstract

The Council Directive 2009/71/EURATOM established a community framework for the nuclear safety of nuclear installations. Article 9.1 of the Directive requires Member States to report in a three year cycle, on how they have fulfilled their obligations under the Directive.

This is the first National Report of the Kingdom of the Netherlands, describing how the Netherlands meets the obligations of the Directive.

The report closely follows the ENSREG guidelines HLG_p(2012-21)_108 regarding Member States Reports to the Council Directive.

List of Symbols and Abbreviations

Abbreviation	Full term	Translation or explanation (in brackets)
ALARA	As Low As Reasonably Achievable	
ANS	American Nuclear Society	
ANSI	American National Standards Institute	
ASME	American Society of Mechanical Engineers	
Bkse	Besluit kerninstallaties, splijtstoffen en ertsen	Nuclear installations, fissionable materials, and ores Decree
Bs	Besluit Stralingbescherming	Radiation Protection Decree
BV	Besloten Vennootschap	Private company with limited liability
Bvser	Besluit vervoer splijtstoffen, ertsen en radioactieve stoffen	Transport of fissionable materials, ores, and radioactive substances Decree
BWR	Boiling-Water Reactor	
BZK	(Ministerie van) Binnenlandse Zaken en Koninkrijksrelaties	(Ministry of) the Interior and Kingdom relations
Cmer	Commissie voor de m.e.r.	Commission for Environmental Impact Assessments
COVRA	Centrale Organisatie voor Radioactief Afval	Central organisation for interim storage of radioactive waste
CNS	Convention on Nuclear Safety	
CSNI	Committee on the Safety of Nuclear Installations	(OECD/NEA)
EIA	Environmental Impact Assessment	
ENSREG	European Nuclear Safety Regulators Group	
EOP	Emergency Operating Procedure	

Abbreviation	Full term	Translation or explanation (in brackets)
EPZ	NV Elektriciteits-Productiemaatschappij Zuid-Nederland	(Operator of Borssele NPP)
ETC	Enrichment Technology Group Ltd	Subsidiary of Urenco and Areva, focussing on enrichment technology (centrifuge technology)
ET-NL	Enrichment Technology Nederland B.V.	Subsidiary of ETC Ltd
EU	European Union	
EZ	(Ministerie van) Economische Zaken	(Ministry of) Economic Affairs
FTE	full-time equivalent	
GRS	Gesellschaft für Anlagen- und Reaktorsicherheit	(Nuclear safety experts organisation, Germany)
HABOG	Hoog Actief Afval Gebouw	Interim storage facility of COVRA for High Level Waste and Spent Fuel
HFR	High Flux Reactor	Research Reactor (Petten, tank in pool type, 45 MW _{th} , operated by NRG)
HOR	Hoger Onderwijs Reactor	Higher Education Reactor (Delft, open pool, 2 MW _{th} , operated by RID)
I&C	Instrumentation and Control	
IAEA	International Atomic Energy Agency	
ILT	'Inspectie Leefomgeving en Transport'	Inspectorate of the ministry of Infrastructure & the Environment. KFD is part of ILT.
IPSART	International PSA Review Team	(IAEA)
IRRS	International Regulatory Review Service	(IAEA)
JC	Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	

Abbreviation	Full term	Translation or explanation (in brackets)
JRC	Joint Research Centre of the European Community	
Kew	Kernenergiewet	Nuclear Energy Act
KCB	Kerncentrale Borssele	Borssele NPP
KFD	Kernfysische Dienst	Department for Nuclear Safety Security and Safeguards; inspectorate branch of the Dutch RB (part of ILT)
KWU	Kraftwerk Union	(Siemens nuclear power group, nowadaysAreva)
LH	Licence Holder, licensee	
LTO	Long Term Operation	
MER	Milieu-effect rapport	Environmental Impact Assessment (EIA) report
mSv	milliSievert	(Milli = 10^{-3}); see Sievert
μ Sv	microSievert	(Micro = 10^{-6}); see Sievert
MMI	Man Machine Interface	
MW _e	Megawatt electrical	
MW _{th}	Megawatt thermal	
NACp	National Action Plan	National plan of the implementation of post-stress test measures
NDRIS	National Dose Registration and Information System	
NEA	Nuclear Energy Agency	(OECD)
NERS	NETwork of Regulators of countries with Small nuclear programs	
NEA	Nuclear Energy Agency	(An OECD agency)
NPK	Nationaal Plan Kernongevallenbestrijding	National Nuclear Emergency Plan
NPP	Nuclear Power Plant	

Abbreviation	Full term	Translation or explanation (in brackets)
NRG	Nuclear Research and consultancy Group	Nuclear consultancy company and operator of the HFR
NUSS	Nuclear Safety Standards	(of the IAEA, old series)
NUSSC	Nuclear Safety Standards Committee	(IAEA)
NVR	Nucleaire Veiligheids-Richtlijn	Dutch transposition of IAEA Safety Standards
OECD	Organisation for Economic Cooperation and Development	
OSART	Operational Safety Review Team	(IAEA)
PSA	Probabilistic Safety Assessment	
PSR	Periodic Safety Review	
PWR	Pressurised-Water Reactor	
QA	Quality Assurance	
RASSC	Radiation Safety Standards Committee	(IAEA)
RB	Regulatory Body	In the nuclear safety Directive called 'Competent regulatory authority'
RID	Reactor Institute Delft	Operator of the HOR research reactor in Delft and part of the Delft Technical University
RIVM	Rijksinstituut voor Volksgezondheid en Milieu	National Institute for Public Health and the Environment (The Netherlands)
RR	Research Reactor	
SALTO	Safety aspects of Long Term Operation	
SAMG	Severe Accident Management Guidelines	
SAR	Safety Analysis Report	
SF	Spent Fuel	

Abbreviation	Full term	Translation or explanation (in brackets)
SR	Safety Report	A summary of the most relevant information of the SAR and a public document
Sv	Sievert	unit of ionizing radiation dose
SZW	(Ministerie van) Sociale Zaken en Werkgelegenheid	(Ministry of) Social Affairs and Employment
TRANSSC	Transport Safety Standards Committee	(IAEA)
URENCO	URanium ENrichment COrporation Ltd	
WANO	World Association of Nuclear Operators	
VWS	(Ministerie van) Volksgezondheid, Welzijn en Sport	(Ministry of) Health, Welfare, and Sport
WENRA	Western European Nuclear Regulators Association	

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Introduction

This is the first National Report of the Kingdom of the Netherlands as required under Article 9.1 of Council Directive 2009/71/EURATOM.

This section sets out the purpose of the present report. It then continues with an overview of the national nuclear programme including the nuclear installations, followed by a description of the national policy towards nuclear activities in the Netherlands and the main safety issues of the reporting period. The introduction finishes with a description of the structure of the report.

Nuclear Installations according to the definition of Article 3(1) of the Directive

Overview of installations

Table 1 lists all installations according to the definition of Article 3(1) of the Directive, present in the Netherlands. All radioactive waste in the Netherlands is stored at the national waste management facility operated by COVRA in the South-West of the country. Nuclear installations therefore do not have their own (long-term) waste storage facilities. Spent fuel from the Borssele Nuclear Power Plant (NPP) is reprocessed abroad and spent fuel from Research Reactors (RRs) is stored at COVRA.

Table 1 Nuclear installations, Article 3(1), in the Netherlands

Nuclear installation	Short description
Enrichment plants ¹	Urenco enrichment plant, Almelo
Nuclear fuel fabrication plants	<i>None</i>
NPPs	Borssele NPP, PWR, 485 MW _e Dodewaard NPP, BWR, in safe enclosure
Reprocessing plants	<i>None</i>
Research reactor facility(ies)	High Flux Reactor (HFR), Petten, 45 MW _{th} Low Flux Reactor (LFR), Petten, 30 kW _{th} permanent shutdown, preparing for decommissioning Technical University Delft research reactor (HOR), 2 MW _{th}
Spent fuel storage facility(ies)	HABOG facility, operated by National waste management authority COVRA

Somewhat more details about the installations are provided below.

Enrichment plant of Urenco in Almelo

Urenco, at the end of 2012, supplied 31% of world-demand for low-enriched uranium, of which its plant in Almelo, the Netherlands, provided one third.

Nuclear Power Plant: Borssele NPP

The Borssele NPP is a two-loop Siemens PWR that has been in commercial operation since 1973. As it is the only NPP now in operation in the Netherlands, the emphasis

¹ The company ET-NL in Almelo supplies all centrifuges for the enrichment plants of its parent companies Urenco and Areva – world-wide.

in the remainder of this report is on this plant. It has a net electrical output of about 485 MW_e. The NPP generates some 4% of the Netherlands' electricity demand.

In 1994 the Dutch Parliament decided to phase out the plant by 2003. The decision was legally challenged and taken back. Instead, in 2006 a Covenant was signed by the operator, the owners of the plant, and the government, allowing the plant to operate until end 2033 at the latest, under additional (safety- and non-safety related) conditions, next to the licence requirements. Following a specific safety assessment, a licence for Long Term Operation has been issued in 2013.

The operator and Licence Holder (LH) of Borssele NPP is the company EPZ. Delta and Essent/RWE are shareholders of EPZ, and own 70% respectively 30% of the shares.

Nuclear Power Plant: Dodewaard NPP, in safe enclosure

The Dodewaard NPP was a BWR-type 60 MW_e reactor that operated from 1968 until early 1997. In 2002 the LH obtained a licence for 'deferred dismantling' after 40 years of safe enclosure. In April 2003, all the spent fuel had been removed from the site and had been shipped to Sellafield. Also, the plant has been decontaminated, and a new ventilation system has been put into place. June 1st, 2005, the 40-years safe enclosure period started under a licence that requires the owner to commence dismantling activities in 2045.

Research Reactors: High Flux Reactor (HFR)

The HFR is a tank-in-pool type reactor commissioned in 1961 and is located in Petten in the province of North Holland. The owner is the Joint Research Centre (JRC) of the European Commission but since January 2005, the LH and operating organisation is the Nuclear Research and consultancy Group (NRG). The HFR is used not only as a neutron source for applied and scientific research, but also for the production of isotopes for medical and industrial applications.

Research Reactors: HOR in Delft

The HOR is an open pool-type research reactor with a thermal power of 2 MW_{th}. It is located in Delft. The owner is the Technical University of Delft. It services education and research purposes. Medical applications are getting more and more attention at the HOR and its associated facilities. Currently the HOR is being upgraded. The associated project is called OYSTER. The installation of a liquid hydrogen cold neutron source is an essential element in the project as well as a possible power increase.

Spent fuel and radioactive waste storage facility of COVRA

COVRA is the national waste management organisation in the Netherlands. On its (single) site of 25 ha, it operates several waste processing and storage facilities for radioactive waste and spent fuel. All high level waste is stored in the dedicated HABOG building, which is a modular vault with a passive cooling system. It stores spent fuel (SF) of research reactors, spent uranium targets from molybdenum production, vitrified waste and compacted end caps and hulls, from the reprocessing of power reactor Spent Fuel (SF).

More about waste management and COVRA can be found in the national report of the Kingdom of the Netherlands of the Joint Convention² (JC) on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

National Policy Regarding Nuclear Activities

Covenant

The Dutch government in 2006 signed an agreement (Covenant³) with the owners of the Borssele NPP which allows for operation until the end of 2033, if next to the requirements of the operating licence additional requirements specified in the Covenant are met. The legal status of the agreement is such, that it cannot easily be

² The last (fourth) report for the JC has been published in 2011.

³ <https://zoek.officielebekendmakingen.nl/stcrt-2006-136-p29-SC76083.pdf>

challenged by future policies on nuclear power. One requirement is that the Borssele NPP keeps belonging to the top-25% in safety of the fleet of water-cooled and water-moderated reactors in the European Union, Canada and the USA. To assess whether Borssele NPP meets this requirement, the Borssele Benchmark Committee has been established. The first report of the Commission has been published in September 2013⁴, and has been presented at the 6th Review Meeting of the Contracting Parties to the Convention on Nuclear Safety (CNS).

The Committee concluded that the Borssele nuclear power station belongs to the 25% safest NPPs of a similar type in the EU, U.S. and Canada, and thus complies with the safety requirement of the covenant.

Policy on new nuclear power

In the policy on nuclear power, guaranteeing nuclear safety has the highest priority. The minister of Economic Affairs⁵ published in February 2011 a letter to Parliament on several aspects of nuclear energy, among which are the preconditions for nuclear new build in the Netherlands. These preconditions present high-level requirements. Within the preconditions, it is up to commercial parties to invest in new nuclear power; in the liberalised energy market the government will not invest in power plants. The technical preconditions address issues on safety, waste management, decommissioning, mining, non-proliferation, and security.

Current policy also includes in particular the requirement to take into account lessons learnt from the Fukushima Daiichi accident, as well as the outcomes of the European 'stress test' for NPPs.

Policy on research reactors

Research in nuclear reactors takes place in the High Flux Reactor (HFR) in Petten operated by the Nuclear Research and Consulting Group (NRG) and in the only nuclear reactor for higher education ("Hoger Onderwijs Reactor": HOR) in the Netherlands operated by the Reactor Institute Delft (RID, part of the Technical University of Delft: TUD). The Netherlands government finances nuclear research by NRG through a research subsidy aimed at the fields of nuclear safety, radiation protection, waste and the transition to a CO₂-low energy supply.

In the past five years, the national and local government have taken several steps to facilitate the construction of a new research reactor, the PALLAS, to replace the HFR in Petten. In 2012, the government (both national and local) decided to support the preparations for PALLAS by a loan. Also in 2012, the financing of the upgrade of the research reactor of the TUD has been arranged with the support of the national government.

Policy on nuclear safety

A new policy paper on nuclear safety is about to be published. In it, the overriding mission is the protection of humans and the environment against the risks of radiation, now and in the future. The policy document states that the party that applies the ionizing radiation has primary responsibility for this protection. The relevant government and semi-government bodies also have responsibilities to this end. The government has four strategic objectives for achieving this protection:

1. Radiation protection: Any exposure to radiation must be justified, it must be as low as reasonably achievable, and it must remain under the prescribed levels.
2. Nuclear safety: Nuclear facilities must comply with safety requirements in accordance with the state-of-the-art and safety must be subject to continuous improvement.
3. Security and nuclear safeguards: The measures pertaining to security and nuclear safeguards must be up to date, proportional and realistic.

⁴ <http://www.rijksoverheid.nl/bestanden/documenten-en-publicaties/rapporten/2013/09/09/the-safety-of-borssele-nuclear-power-station/the-safety-of-borssele-nuclear-power-station.pdf>

⁵ At that time, the ministry had a different name: ministry of Economic Affairs, Agriculture and Innovation.

4. Competent authority: The competent authority for radiation protection and nuclear safety must meet international requirements in terms of expertise, transparency and independence, and it must subject its working methods to continuous improvement.

The ambition is that by optimizing its methods, an independent authority can continue to improve the way humans and the environment are protected and thus also build trust.

Decisions and decrees on radiation protection and nuclear safety are prepared and sanctioned as transparently as possible. The importance of public access and transparency is always balanced against the importance of securing nuclear facilities and radioactive sources on the one hand and the risks of disseminating 'dual-use' knowledge, information and technology on the other. The risks of ionising radiation are publicized via governmental websites and other means. Parliament is also regularly and actively brought up to date.

Policy on the safe management of spent fuel and nuclear waste

This topic is addressed only briefly in the present report. For more details, refer to the National Report for the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

According to the current policy all radioactive waste produced in the Netherlands will be stored at COVRA in buildings for a period of at least 100 years. During this period the deep geological disposal is prepared financially, technically and socially in such a way that it can be implemented after the storage period. In the current policy it is assumed the disposal facility will be ready to receive radioactive wastes in 2130.

The government policy on spent fuel management is that the decision on whether or not to reprocess spent fuel is in the first place a choice for the operator of a NPP. In the early days the operators have decided in favour of reprocessing their spent fuel for economic reasons, reuse of plutonium and reduction of the waste volume.

Reprocessing contracts have been concluded for all spent fuel generated by the current operating NPP until its end of operation. Bilateral treaties have been signed by the Republic of France and the Kingdom of the Netherlands regulating for Dutch spent fuel (SF) produced until the end of operation of Borssele NPP, its receipt by Areva NC in France, its reprocessing and the return of radioactive wastes from reprocessing to the Netherlands before 31 December 2052. The Parliamentary discussion of the enabling law for this treaty was finished end 2013.

Reorganisation of the Competent Regulatory Authority

At present responsibilities and tasks of the Regulatory Body (RB) are spread over several organisations and ministries. The Dutch Council of Ministers decided on January 24, 2014 that the RB's expertise in the area of nuclear safety, radiation protection and related security and safeguards, will be brought together in a single independent organisation in the Netherlands. The reorganisation will make it possible to increase the RB's efficiency and effectiveness in using available (budget and human) resources.

Currently it is foreseen that the new RB will pick up its duties starting from the beginning of 2015 accompanied by some legal steps. About one year later the final legal formalities should be completed.

The new RB will be responsible for regulating nuclear safety and radiation protection. The new organisation will have a staff of about 150 and will optimally unite and utilise the expertise and experience available within the various entities that currently constitute the RB, and exercise all of its regulatory functions. The new RB will be an Independent Administrative Authority (Dutch acronym: ZBO), it will be positioned at the ministry of Infrastructure and the Environment.

The new RB will meet international standards and will prepare legislation, draft technical regulations, develop safety requirements, issue permits, carry out

inspections and enforcement, participate in regulatory research programs and provide information. The new RB will also be (jointly) responsible for emergency preparedness and response in the event of accidents which could result in the release of radiation.

Most Important Safety Issues in this Report

- After Fukushima, the international communities have launched several interrelated initiatives to learn from the events in Japan and to initiate dedicated programs to further enhance nuclear safety. The Netherlands has participated fully in all of the Fukushima-related initiatives of the European Commission and ENSREG and those led by the IAEA. The safety of *all* nuclear facilities in the Netherlands has been evaluated in so called stress test reports and the measures strengthening nuclear safety are being implemented.
- The operating life of the Borssele NPP is to be extended with 20 years until 2034. The Licence Holder (LH) has finished a Long Term Operation (LTO) Justification project to ensure that safety and safety relevant systems, structures and components continue to perform their intended functions during LTO. The outcome of the project was used for the LTO-licence application. In 2013 the LTO-licence entered into force. The regulatory review of LH's LTO-programme has led to various licence requirements on top of the measures proposed by the LH.

Structure of the Report

The report closely follows the ENSREG guidelines HLG_p(2012-21)_108 regarding Member States Reports to Council Directive 2009/71/EURATOM. The numbering of the chapters reflects the numbering of the articles of the Council Directive, that according to Article 9.1 of this Directive need to be reported on.

Summary

Updated information on matters developed since previous report

Not applicable.

Important issues identified in previous report or arisen since past report

Not applicable.

ARTICLE 4 Legislative, regulatory and organizational framework

This chapter describes the legislative, regulatory and organisational framework as it is today. However, important changes to the organisation of the Competent regulatory authority have been decided upon. Some details about these changes can be found in the Introduction to the present report.

4.0 Text of Article and summary statements

Article 4 - Legislative, regulatory and organisational framework

1. Member States shall establish and maintain a national legislative, regulatory and organisational framework (hereinafter referred to as the 'national framework') for nuclear safety of nuclear installations that allocates responsibilities and provides for coordination between relevant state bodies. The national framework shall establish responsibilities for:

- (a) the adoption of national nuclear safety requirements. The determination on how they are adopted and through which instrument they are applied rests with the competence of the Member States;
- (b) the provision of a system of licensing and prohibition of operation of nuclear installations without a licence;
- (c) the provision of a system of nuclear safety supervision;
- (d) enforcement actions, including suspension of operation and modification or revocation of a licence.

2. Member States shall ensure that the national framework is maintained and improved when appropriate, taking into account operating experience, insights gained from safety analyses for operating nuclear installations, development of technology and results of safety research, when available and relevant.

The Guidelines of the Higher Level Group regarding Member States Reports request some summary statements, specified in their HLG_p(2012-21)_108 document. These are provided below in sections 4.0.a through 4.0.f. These sections provide a short introduction to the legislative, regulatory and organisational framework in the Netherlands, as far as they are relevant to nuclear safety.

4.0.a Overview of national legislative framework

The legal framework in the Netherlands with respect to nuclear installations can be presented as a hierarchical structure. Refer to the diagram in Figure 1.

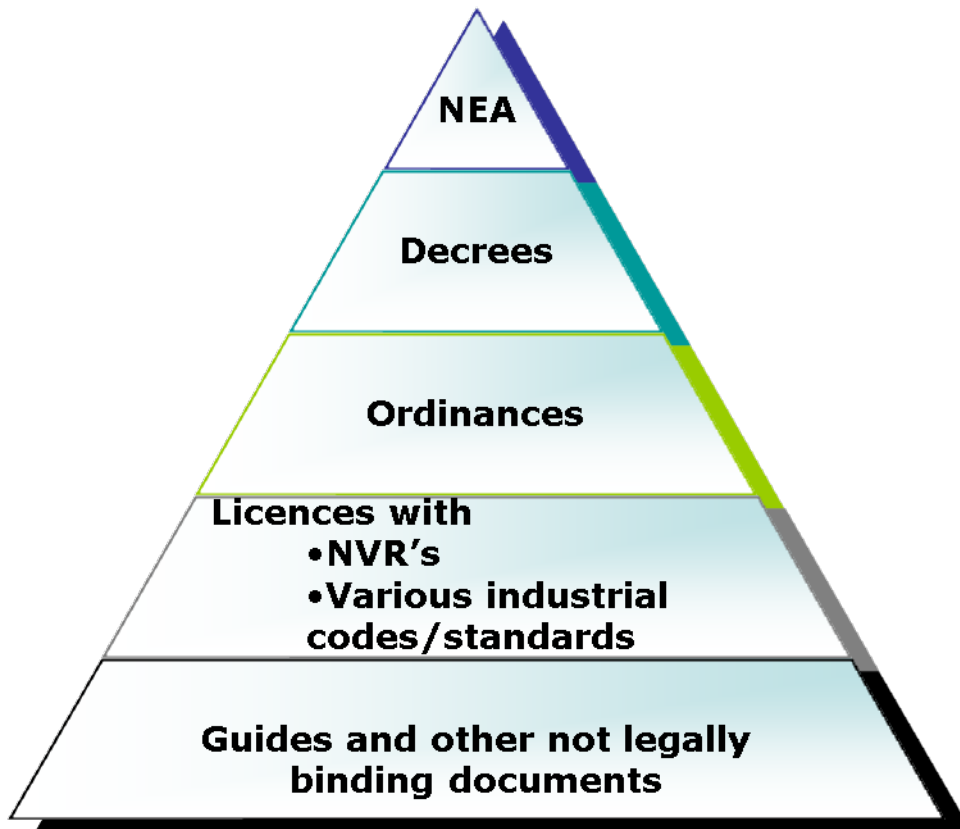


Figure 1 Simplified representation of the hierarchy of the legal framework for applications of nuclear technology

The Nuclear Energy Act (Kew) is the most prominent law governing nuclear activities. It is a framework law, which sets out the basic rules on the application of nuclear technology and materials, makes provisions for radiation protection, designates the competent authorities and outlines their responsibilities.

Subordinate to this act, a number of Decrees exist containing additional regulations related to the use of nuclear technology and materials. These continue to be updated in the light of ongoing developments. Notable is the recent update of the Decree on Radiation Protection (Bs).

At a lower level there are the Ordinances⁶. These can be issued by the minister responsible for conducting the regulatory process under the Nuclear Energy Act.

At a lower level there are regulations and guides issued by the Competent regulatory authority: the Nuclear Safety Rules (Dutch: NVRs⁷). The Nuclear Energy Act (Article 21.1) provides the basis for this system of more detailed safety regulations concerning the design, operation and quality assurance of (mainly) NPPs. Annex 2 provides a complete list of the current NVRs. In the NVRs the WENRA Reactor Safety Reference Levels published in 2008 have been implemented.

The Netherlands has a small but diverse nuclear programme. Because of this diversity and to allow maximum flexibility, specific requirements are listed in the licence, tailored to the characteristics of the installations, rather than in general ordinances. In the licences, NVRs can be referred to as well as to other codes and standards. See also section 4.0.d.

⁶ Dutch: 'Ministeriële Regelingen', MR

⁷ Dutch: 'Nucleaire Veiligheids Regels', NVRs

Transposition of Directive 2009/71/EURATOM

By a specific ordinance published⁸ in 2011, the Netherlands has brought Council Directive 2009/71/EURATOM of 25 June 2009 on nuclear safety into force. The Netherlands has reported its correct transposition of the Directive to the Commission, which after evaluation of the information presented to it, has accepted it⁹. Annex 1 presents the full text of the ordinance (translated into English).

The ordinance prescribes the systematic evaluation and investigation of the nuclear safety of nuclear installations during their operating life, possibly leading to changes in the installation. The ordinance requires at least 10-yearly Periodic Safety Reviews (PSRs) and report on these to the Minister (via the RB). This already was the current practice before the existence of the ordinance. If deemed necessary by the responsible Minister, he may require the LH to report earlier on the safety of the nuclear installation.

If the investigations and evaluations warrant it, the LH has the obligation to improve nuclear safety as far as reasonably achievable, notwithstanding the licence conditions. LHs are expected to establish and manage their management systems with priority to safety. LHs are also required to analyse their operating experience (including incidents) and those of other installations and findings of research programmes systematically. The lessons learnt may result in modifications in installations, procedures or the organisation of the LH.

The ordinance also addresses safety culture. Furthermore there is the requirement to have an education and training programme which needs to guarantee adequate qualification of staff working in the nuclear installation.

Licences under the Nuclear Energy Act have specific licence conditions addressing human resources. In addition, the ordinance gives the Minister mandate to define additional requirements regarding the human and financial resources of the LH.

4.0.b Overview of regulatory and organisational framework

Ministerial responsibilities

The minister of Economic Affairs (EZ) is the primarily responsible authority for conducting the regulatory process under the Nuclear Energy Act and for the main functions of the RB.

Several other ministers also have responsibilities in specific areas related to the use of radioactivity and radiation. The ministry of EZ is the coordinating ministry for all the issues related to the Nuclear Energy Act. The following list illustrates the responsibilities of the various ministers regarding the various areas of interest:

- Minister of Economic Affairs (EZ) for nuclear safety, radiation protection, physical protection of fissile materials and radioactive materials and wastes. Also coordinating minister for the Act; i.e. minister reporting to Parliament and responsible for the 'maintenance' of the Act. The coordination function has been recorded in a special Decree.
- Minister of Economic Affairs (EZ) for radiation protection in the mining industry.
- Minister of Social Affairs and Employment (SZW) for worker safety and health.
- Minister of Health, Welfare and Sports (VWS) for healthcare and patient safety.
- Minister of Infrastructure and the Environment (I&M¹⁰) for non-radiological emissions into surface water.
- Minister of Security and Justice (V&J) cooperating in the execution of the National Nuclear Emergency Management and Response Plan (NPK).
- Minister of Defence for applications of ionizing radiation by the military.
- Minister of Finance for liability issues, including nuclear accidents.

⁸ Government Gazette: Stcrt. 2011, 12517 and Stct. 2013 14320

⁹ ENER-D.1/SMI/cm Ares(2011)782852 July 12th 2011, and ENER.DDG2.D.1/SMI/cm(2013)803523 April 24th 2013

¹⁰ Dutch: 'Infrastructuur en Milieu', I&M.

- Minister of Foreign Affairs for the coordination of Dutch foreign policy, regarding to the Nuclear Energy Act especially focused on non proliferation and Euratom and IAEA affairs.

Regulatory body

The Competent regulatory authority, or 'Regulatory Body' is the authority designated by the government as having legal authority for conducting the regulatory process, including issuing authorizations, review and assessment, inspection, and enforcement and thereby regulating nuclear safety, radiation protection, radioactive waste management and transport safety.

At present the RB is composed of separate entities residing at different ministries, but a major reorganisation will be carried out in the next years, establishing one single new RB. For more information, please refer to the Introduction of the present report.

The separate entities of the RB operate with working agreements under the responsibility of the minister of Economic Affairs. Their responsibilities and tasks are summarized below:

- Within the ministry of EZ, the 'programmadiirectie voor Nucleaire Installaties en Veiligheid' (pdNIV), i.e. Nuclear Installations and Nuclear Safety Directorate, is responsible for the preparation of legislation, formulating policies (excluding energy policy), regulatory requirements, licensing and related review and assessment.
- Within the ministry of EZ, the 'Rijksdienst voor Ondernemers' (RvO), team Radiation Protection & Society¹¹ has been mandated to grant licences under the Nuclear Energy Act, excluding licences for nuclear installations and licences for the larger transports of nuclear fuel. Such licences are issued by the pdNIV.
- The nuclear inspectorate of the RB, the 'Kernfysische dienst' (KFD) is within the general responsibility of the Minister of EZ the organisation responsible for the independent supervision (review and assessment, inspection and enforcement) of compliance, by the Licence Holders (LHs) and other operators¹² with the requirements on the safety, security and non-proliferation¹³. The KFD is embedded in an organisational division of the Human Environment and Transport Inspectorate (ILT) of the ministry of Infrastructure and the Environment (I&M).
- It should be noted that in addition to the KFD, there are other authorities (national and local) contributing in a limited way to the supervision of the activities of the LHs.

Each of the entities pdNIV, RVO and KFD has its own set of responsibilities and tasks, related to the Nuclear Energy Act. Nevertheless, there are many projects of the RB in which the entities work together in project teams. Examples are the National Report for the European stress test and associated Peer Review, the National Report to the Convention on Nuclear Safety and associated activities, the present national report related to Council Directive 2009/71/EURATOM, and the upcoming IRRS mission and its preparation.

Supporting organisations

The RB can rely on various national and foreign organisations that regularly provide technical support. In this section the most important ones are introduced.

- *Governmental supporting organisation RIVM:*
The National Institute for Public Health and the Environment (RIVM) is a specialised Dutch government agency. Its remit is to modernise, gather, generate and integrate knowledge and make it usable in the public domain. By performing these tasks RIVM contributes to promoting the health of the population and the

¹¹ Dutch: 'Team stralingsbescherming en samenleving'

¹² Operators includes in this context users of radioactive materials and radiation, for which a license is not required

¹³ These requirements apply to activities and facilities (including nuclear facilities).

environment by providing protection against health risks and environmental damage.

The RIVM among others coordinates the back-office of the National Nuclear Assessment Team for radiological analyses and information (BORI). The RIVM supports the Ministries with scientific studies and independent analyses of samples of emitted radio isotopes (e.g. from the nuclear installations). RIVM also maintains the National Radioactivity Monitoring Network, that includes a network of measuring posts. RIVM works together with other (governmental) expert organisations as the Royal National Meteorological Institute (KNMI) with models for the prediction of the effects of discharges of radioactive material in the air.

- **Technical Support Organisations (TSO):**
To date there is no dedicated national TSO. Organisations are contracted on ad hoc basis to support the RB with various tasks. Support is provided by foreign TSOs and national and international consultancy organisations. Some major supporting organisations are listed below:
 - *GRS, Germany.* The Dutch RB cooperates with a Technical Support Organization (TSO) from Germany, GRS. This is a TSO for the German national regulator and one of the large German TSOs. In the Netherlands it evaluates safety cases and provides other types of consultancy to the RB. In addition GRS provides associated education and training for governmental and commercial organisations. GRS currently has major framework contracts with both the licensing and inspection branche of the RB.
 - *The Nuclear Research & consultancy Group (NRG)* in Petten and Arnhem provides consultancy & educational services to government and industry. The company has implemented 'Chinese Wall' procedures to protect the interests of its various clients and avoid conflicts of interest. NRG also is a LH. NRG currently has a framework contract with the licensing branche of the RB.
- **Education and training organisations:**
The RID organisation at the Technical University in Delft provides education and training in nuclear technology and radiation protection. For the education on radiological protection and for dedicated trainings, the RB also contracts universities and institutes and Technical Support Organisations like NRG and GRS.

4.0.c Implementation of the national framework by the RB and other organisations

Nuclear installations operate under licence, awarded after a safety assessment has been carried out. The licence is granted by the RB under the Nuclear Energy Act. The licensing branch (pdNIV) is responsible for handling the licence applications and performing related review and assessment.

The inspectorate branch KFD is responsible for review and assessment activities in relation with its oversight activities.

Both pdNIV and KFD may seek expertise by contracting expertise from TSOs and other expert organisations; this is a common practice.

4.0.d Differences in implementation between nuclear installations

The national legislative framework provides the generic nuclear safety and radiation protection objectives that apply to all nuclear installations.

The Netherlands has a small but diverse nuclear programme. There are many different nuclear installations; a power reactor, a permanently shut down power reactor in safe enclosure, three research reactors, hot cell facilities, radiological laboratories, an enrichment plant and a central national radioactive waste storage facility. Because of the diversity present, and in order to allow maximum flexibility, specific requirements are listed in the licence, tailored to the characteristics of the installations, rather than in general ordinances. In the licences, the Nuclear Safety Rules (NVRs) can be referred to as well as other nuclear codes and standards.

4.0.e Allocation of national responsibilities and coordination

The separate entities of the RB operate with working agreements under the responsibility of the minister of Economic Affairs. Their responsibilities and tasks have been explained in section 4.0.b. The mandates of the several entities and of their managers have been laid down in General Decisions.

4.0.f Ratification of relevant international conventions and other legal instruments

The Netherlands is party to many Treaties and Conventions related to the use of nuclear technology and materials.

- *Non-proliferation*: The Netherlands is party to the Treaty on the Non-Proliferation of Nuclear Weapons' (NPT). Related are guidelines of the Nuclear Suppliers Group that prescribe limitations to the transfer of sensitive nuclear technologies like the enrichment and the reprocessing technologies. In addition, the Netherlands has joined the 'Proliferation Security Initiative' (PSI), which is based on a UN Security Council Resolution 1540 (UNSCR 1540) for the non-proliferation of Weapons of Mass Destruction (WMD).
- *Liability*: The Netherlands is party to several Conventions on liability, like the 'Paris Convention on Third Party Liability in the Field of Nuclear Energy' and the 'Brussels Convention' supplementary to the 'Paris Convention', and the 'Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention'.
- *Nuclear safety*: The Netherlands is party to the Convention on Nuclear Safety (CNS).
- *Waste management*: The Netherlands is party to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.
- *Physical protection*: The Netherlands is party to the Convention on Physical Protection of Nuclear Material and Nuclear Installations.

In addition, the Netherlands has expressed its support for the following Codes of Conduct:

- Code of Conduct on Safety and Security of Sources (published 2004, IAEA)
- Code of Conduct on the Safety of Research Reactors (published 2004, IAEA)

4.1 Established and maintained national framework for nuclear safety

4.1.a Responsibilities for adoption of national nuclear safety requirements

4.1.a.1 Responsibility for preparing and issuing national nuclear safety requirements

The minister of Economic Affairs is the primarily responsible authority for conduction of the regulatory process and law-making under the Nuclear Energy Act and for the main functions of the RB.

4.1.a.2 Process of establishing and revising national nuclear safety requirements

The Constitution of the Kingdom of the Netherlands describes how laws are made and how the Constitution itself can be amended. The members of the Senate and the House of Representatives (together: the Parliament) scrutinise the work of the Government.

The Government comprises the King, the Prime Minister, the other Ministers and the State Secretaries. The cabinet is the Government, excluding the King. The government is accountable for its policies to Parliament.

The national legislative framework consists of Acts, Decrees, Ordinances, and regulations & guides issued by the government. These are prepared by the RB as far as they relate to nuclear safety and radiation protection. They have been described to some detail in section 4.0.b, as far as they are relevant to nuclear safety.

Most bills (proposals for new laws) are introduced in Parliament by the Government. The House of Representatives can adopt, reject or amend a bill. The main task of the Senate is to assess the bills that the House has approved of. The legislature can create 'framework laws' (like the Nuclear Energy Act) and delegate the creation of detailed rules to ministers or specific bodies (like the RB).

The Dutch Council of State¹⁴ provides the government with independent advice on proposals for new regulation. During the drafting of new regulation, the RB also seeks the involvement of stakeholders like the LHs, NGOs and the public. The traditional approaches have increasingly been paralleled by novel forms of consultation. A range of processes to capture (citizen) concerns are deployed, including seminars and workshops, citizen's panels, and Internet consultation.

Currently, the RB has the lead in preparing the new and detailed 'Dutch Safety Requirements' (DSR) and various guidelines based on post-Fukushima lessons learnt.

As part of the process a check is performed by the Inspectorate branch of the RB in order to assess the practicability, enforceability and susceptibility to fraud of the proposed regulations/requirements.

4.1.b Provision of a system of licensing and prohibition of operation of installations without a licence

4.1.b.1 Licensing process and system

Principal responsible authority

The minister of Economic Affairs (EZ) is the primarily responsible authority for conduction of the regulatory process under the Nuclear Energy Act and for the main functions of the RB.

However, in addition to the Nuclear Energy Act, several types of regulation may apply to a nuclear facility and the activities conducted in it and/or supporting it. Therefore often there are several authorities, sometimes at several levels in the governmental organisation involved in the licencing procedures.

The Nuclear Energy Act stipulates (in Article 15, sub b) that a licence must be obtained to construct, commission, operate, modify or decommission a NPP. Similarly, the Act states (in Article 15, sub a) that a licence is required to import, export, possess or dispose of fissionable material.

The proper management of the (nuclear) licensing process is tasked to the Competent regulatory authority or 'Regulatory Body' (IAEA definition).

Procedures

The procedures to obtain a licence under the Nuclear Energy Act (and other acts), follow the guidelines specified in the General Administrative Act (Awb), division 3.4. These procedures provide for public involvement in the licensing process. Any stakeholder is entitled to express his views regarding a proposed activity. The RB shall take notice of all views expressed and respond to them with careful reasoning. If the reply is not satisfactory, the RB can be challenged in court.

Coordination Law

For projects related to large scale energy generation, a special Coordination Law applies. Large scale projects that could be impacted by this law are for instance the construction of power plants with an electrical power greater than 500 MWe,

¹⁴ The Advisory Division, as its name implies, advises the government and Parliament on legislation and governance, while the Administrative Jurisdiction Division is the country's highest general administrative court.

investment in the power grid, etc. According to the Coordination Law the ministry of Economic Affairs (EZ) is charged with the task of coordinating the activities, organising the interaction between the many authorities involved, each of which will perform its duties. Typical of such projects is the involvement of many levels of governmental organisations; from the ministries down to the municipal level.

Environmental Impact Assessment, Safety Assessment, and processing comments of stakeholders

Within a licence application for a nuclear installation, it is often compulsory to conduct an Environmental Impact Assessment or EIA (Dutch: milieu-effectrapportage, m.e.r.). Such an assessment is compulsory for all reactors with a thermal power higher than 1 kW¹⁵. A permanent commission, the Commission for the Environmental Assessment ('Commissie voor de m.e.r.', Cmer) advises the competent authorities on the requirements of all EIAs conducted in the Netherlands. This applies in particular to EIAs related to nuclear installations within licence procedures regulated by the RB.

The EIA procedure (chapter 7 of the Environmental Management Act) is:

- The initiator notifies the competent authority of his intention.
- The public can express its view on the scope of the envisaged EIA.
- An independent external committee advises on the content of the EIA for the initiative, taking into account the views of the public.
- The competent authority draws up a memorandum on the scope and the level of detail to be developed in the EIA, taking into account the views of the public.
- The initiator draws up the EIA.
- The independent external committee advises on the environmental report in relation to the memorandum on the scope and level of detail and the views of the public.

Prior to the formal application, the RB and the initiator enter into a stage of informal dialogue. During this stage, the draft of the application, the EIA if applicable, and the Safety Assessment Report are reviewed.

The initiator submits the application and the documents (including the EIA if applicable) and information pertaining to it. The RB assesses the application and draws up a draft decision. The public can express its views on the draft, and if applicable the EIA. Subsequently the competent authority draws up the final decision taking into account the submitted views. Finally, interested parties can lodge an appeal at the Administrative Law Judicial Division of the Council of State.

Furthermore, the applicability and enforceability of the licence is evaluated by the inspectorate branche of the RB, the KFD.

The RB will consider all views expressed by the public. When appropriate, it will group the views into a number of unique topics/views. The RB then will respond to all unique views and all responses are recorded with the documentation of the definite licence. Common responses of the RB include elaborations on policies, (assessment) techniques or other issues that need clarification.

Licence conditions

The national legislative framework provides the generic nuclear safety and radiation protection objectives that apply to all nuclear installations.

Specific requirements, tailored to the characteristics of the installations, are included in the licence. Refer to section 4.0.d for more information on the Dutch approach to licence conditions.

¹⁵ This is specified in the EIA Decree, Annexes C and D

4.1.b.2 Process and system for relicensing / licence renewal

Some changes in installations and procedures do not require a licence renewal, and others do.

In the case of minor modifications, a special provision in the Act (Article 17) applies that allows such modifications to be made with a minor licence change. This instrument can only be used if the consequences of the licence modification do not lead to different or greater environmental impact than under the current licence is permitted. The notification is published and is open to appeal. Furthermore, there may be licence conditions in the licence, that require the LH to present changes for verification to the RB. These are foreseen modifications within the scope of the licence that do not require an Article 17 notification. Also refer to section 4.1.c.1 on supervision.

With modifications that are not considered minor by the RB, licence renewal is needed. The LH will have to update its Safety Analysis Report and supporting documents and submit these to the RB for regulatory review. Under certain circumstances described in the annexes C and D of the EIA Decree, there is also an obligation to conduct an EIA. Like with any licence application, public can express its views like with 'normal' licence applications described above.

A special possibility for the Minister provided for by art 18a of the law, is to change the conditions in a licence because of numerous technical advances or new possibilities to protect the population that have become available since the original licence was issued.

4.1.b.3 Legal provisions to prevent operation of a nuclear installation without a valid licence

Article 15 of the Nuclear Energy Act states that it is forbidden to operate a nuclear installation without a valid licence.

4.1.c Provision of a system of nuclear safety supervision

4.1.c.1 System of safety supervision of nuclear installations

Article 58 of the Nuclear Energy Act states that the responsible minister should entrust designated officials with the task of performing supervision: safety assessment, inspection and enforcement. For nuclear installations this is the task of the inspectorate of the RB (KFD) in the Netherlands. The responsible Ministers have issued a General Decision¹⁶ that specifies the designation of inspectors and their tasks.

The LH must act in compliance with the Nuclear Energy Act, the licence and the associated Safety Analysis Report (SAR). The compliance is verified by KFD with a system of inspections (announced and unannounced), audits, assessment of periodical operational reports, and evaluation of operational occurrences and incidents. Furthermore, KFD assesses documents submitted by LHs like those for plant modifications that do not affect the licence, modifications of technical specifications, changes to certain plant procedures and the organisation. Inspection activities are supplemented by international peer review missions¹⁷. For the NPP an important document for inspection is the two-yearly safety evaluation report, in which the LH presents its own assessment of performance with respect to the licence base on technical, organisational, personnel and administrative provisions. There are also the ten-yearly Periodic Safety Reviews (PSRs) that KFD reviews. These PSRs are major undertakings for the licensees. In it they perform a self assessment of their past performance, and present proposals for adaptations to further improve their (safety) performance.

¹⁶ 'Besluit aanwijzing en taakvervulling toezichthouders Kernenergiewet 2013'

¹⁷ Mainly IAEA missions like OSART and INSARR

The management of inspections is supported by a yearly planning, the reporting of the inspections and the follow-up actions. About once or twice a year there are meetings of the management of the LH and the management of the inspectorate of the RB (KFD). The discussions are mainly about general issues relating to supervision activities. More often technical or project meetings between plant staff and inspectorate staff are held, discussing issues or progress in relation with inspection findings or assessment activities. There are also regular inspections of the plant's incident analysis group activities. Once a year a special meeting about human and organisational factors is held with a number of LHs.

Technical inspections are performed investigating whether the LH is acting in accordance with the terms of the licence. Other inspections focus on organisational aspects and safety culture. These inspections aim at scrutinizing the way the LH has fulfilled its responsibility for safety and ascertaining whether the LH's attitude shows a sufficient awareness of safety aspects.

During the yearly refuelling outage at Borssele NPP, extra supervision activities are performed.

Noticing the project PALLAS which aims to establish a new Research Reactor (RR) to replace the HFR, the inspectorate branch of the RB has started to develop a supervisory strategy for RR new build projects.

4.1.c.2 *Responsible bodies for implementing the elements of the system of safety supervision of nuclear installations*

The inspectorate branch of the RB (KFD) is the responsible body for implementing the system of safety supervision. However, it can and will seek or contract suitable support if and when necessary.

For safety assessments, KFD can rely on a contracted TSO (GRS), with which it has a Framework agreement for the period 2013 – 2017. For radiological issues, support is provided by RIVM.

Upon request of the RB, in-depth international team reviews are also carried out by the IAEA. Examples are AMAT, OSART, Fire Safety, IPERS, ASSET, IPPAS, INSARR, SALTO and other dedicated reviews.

In addition, the Borssele NPP itself carries out self-assessments at regular intervals and invites others like WANO to perform assessments and support. Although WANO reports are not published, the RB has access to the results of these assessments.

4.1.d *Enforcement actions, including suspension of operation and modification or revocation of a licence*

4.1.d.1 *Legal powers and responsibilities for implementing enforcement measures*

In the event of deviation from or non compliance with the regulatory conditions and requirements, the RB (inspectorate branch KFD) takes enforcement actions. These actions could lead to shutting down the nuclear installation and/or revoking the licence. Enforcement procedures have been established describing how the KFD reacts in cases of non compliance. Staff of KFD can prepare an official report for the public prosecutor, should the need occur. The legal power to take these action is based on, among others, Article 83a of the Nuclear Energy Act and on the Economic Offenses Act.

Article 19.1 of the Nuclear Energy Act empowers the Minister to modify, add or revoke restrictions and conditions in the licence in order to protect the interests specified in article 15b of the Act on which the licence is based. Article 20a of the Act stipulates that the RB is empowered to withdraw the licence, if this is required in order to protect those interests. Those interests are:

- a) the protection of people, fauna, flora and property;

- b) the security of the state;
- c) the security and safeguarding of nuclear materials (fissile materials and ores) and the security of nuclear installations;
- d) the supply of energy¹⁸;
- e) the liability for damage or injury caused to third parties;
- f) the compliance with international obligations.

4.1.d.2 System of enforcement for the safety of nuclear installations

The system of enforcement for the safety of nuclear installations is managed by the inspectorate branch of the RB, the KFD. Enforcement decisions are based on the findings of the safety supervision (by KFD), described in section 4.1.c.1 of the present report.

The enforcement strategy of KFD has been laid down in a enforcement strategy document¹⁹. A set of procedures exists, describing measures like discussions with LHs, sending warning letters, director meetings, administrative enforcement, and legal enforcement. The type of measure to choose depends on the context of a case and the gravity of the non-compliance identified.

4.1.d.3 Enforcement measures available

The enforcement measures are not limited to suspension of operation. Refer to section 4.1.d.2 for various options.

4.2 Ensuring the national framework is maintained and improved when appropriate

4.2.a Arrangements

4.2.a.1 Arrangements for ensuring the national framework for nuclear safety remains effective, and for improvement of the framework

Refer to section 4.0.a for a description of the national regulatory framework.

Although not explicitly legally required, current practice provides for periodic review of the expertise and effectiveness of the authorities in performing their duties and associated followup actions to guarantee the national framework remains effective.

The Netherlands is a EU Member State and timely implements EU Directives (i.e. 'transposition'). In addition, the Netherlands is party to various Conventions requiring a proper national framework. Periodically the Netherlands reports its self-assessment in its national reports and discusses its findings in the various Review Meetings.

Article 18a.1 of the Nuclear Energy Act states that the minister of Economic Affairs (EZ) regularly considers if the scope of the licence issued and licence conditions associated with it, are still adequate, considering the present technical possibilities to protect the people, fauna, flora and goods. There are several instruments that the RB uses to implement this requirement, some of which have been named in sections 4.1.c (safety supervision) and 4.1.d (enforcement actions) of the present report. Other instruments are listed below.

Periodic Safety Reviews

The Netherlands has a decades long history of Periodic Safety Reviews (PSRs).

Since about 20 years one of the conditions of the licence is that the safety of the nuclear installation is to be periodically reviewed in the light of operating experience

¹⁸ A modification of the law is being prepared by which "supply of energy" no longer will be on the list of interests.

¹⁹ Document: 'Handhavingsbeleid ILT-KFD'. This in turn is based on the inspection policy of the Human Environment and Transport Inspectorate (ILT), the KFD is embedded in.

and new safety insights. A review of operational safety aspects must be performed once every two years, whilst a more comprehensive safety review must be conducted once every 10 years. The latter involves a review of the plant's design basis in the light of new developments in research, safety thinking, risk acceptance, etcetera. The policy on back-fitting was first formulated in 1989 ('Policy Document on Backfitting'). It should be noted that this policy has not been formally adopted, but is used by the RB as guidance and has been accepted by the LH. In 2010 the NVRs were updated. Then also a new NVR on PSR came into force, based on the corresponding IAEA safety standard. Also the adopted WENRA policy on PSR is a further guidance today and the WENRA Safety Reference Levels for existing reactors have been included in the PSR.

In 2011, the Netherlands has brought Council Directive 2009/71/EURATOM of 25 June 2009 on nuclear safety into force by a specific ordinance²⁰.

The ordinance prescribes i.a. the systematic evaluation and investigation of the nuclear safety of nuclear installations during their operating life possibly leading to changes in the installation ('continuous improvement'). Also, the ordinance prescribes inter alia that:

- LHs should give sufficient priority to nuclear safety systems;
- LHs must provide adequate human and financial resources to meet the obligations on the nuclear safety of a nuclear installation;
- All parties, including the LH, are required to provide a mechanism for educating and training their staff responsible for the safety of nuclear plants.

For more information on the ordinance refer to section 4.0.a.

Peer Review Missions

The RB regularly initiates peer review missions to the NPP, like SALTO, IPSART and OSART. Currently the RB is in a process of self assessment in preparation for the IRRS mission which will visit the RB in the autumn of 2014.

Sharing of important operating experience – Licence Holders

A standing task force at the NPP Borssele assesses incidents. The establishment of this task force is required under the licence. A second standing task force assesses ageing issues.

The NPP operates databases for its own use and these contain data on incidents from various sources, including the plant itself, WANO, IAEA and OECD/NEA IRS, IAEA News, VGB, AREVA, USNRC, GRS, etc.

The NPP reports relevant incidents to WANO and VGB. Operational measures obtained from WANO (Good Practices and Performance Objectives & Criteria) are implemented by Borssele NPP. Information is regularly exchanged on a bilateral basis with operators in neighbouring countries, plus a number of other countries. Personnel of Borssele actively participates in WANO-, OSART-, AMAT and other missions at foreign NPPs.

Research reactors and fuel cycle facilities (uranium enrichment and nuclear waste storage) have organisational structures and expertise to share important experience between facilities. All of them have standing task forces for the assessment of incidents.

All facilities have specific international contacts within their scope of work.

Sharing of important operating experience – Regulatory Body

There are frequent regulatory contacts with many European countries and the USA. Within the framework of the NEA, the Netherlands participates in a working group dealing on a regular basis with operational events. The Netherlands is a member of the OECD/NEA and IAEA mechanisms for sharing key operational experience, the Working Group on Operational Experience (WGOE) of the OECD/NEA Committee for

²⁰ Government Gazette: Stcrt. 2011 - 12517, and Stcrt. 2013 - 14320

the Safety of Nuclear Installations (CSNI), and the international incident reporting systems (IAEA and OECD/NEA IRS, IRSRR and FINAS). Further the Netherlands is a member of the EU Clearing House.

The RB closely monitors the lessons learned from the Fukushima Daiichi accident (special project created). The inspectorate branch of the RB also contributed to the NEA/CNRA Special Task Group Fukushima Lessons Learned. It also participates in international expert teams for nuclear topics. A recent example is the international review team related to the Doel-issue (flaws in reactor vessel).

4.2.a.2 Specific examples of improvements to the national framework

Decommissioning

Article 15f of the Nuclear Energy Act regulates LH's obligations regarding having financial provisions for the decommissioning costs. In April 2011 the Nuclear Installations, Fissionable Materials and Ores Decree (Bkse) was amended.

The updated Bkse requires the LH to have and periodically (every five years) update a decommissioning plan during the lifetime of the facility. The plan shall be approved by the authorities every time it is updated. In addition to this, minimum-requirements on the content of a decommissioning plan are defined. The decommissioning plan serves as the safety-basis for all the activities carried during the decommissioning phase, and it provides the basis for the financial provisions for the decommissioning costs. During decommissioning, the LH is obliged to act according to the decommissioning plan.

Furthermore, the LH is required to have a financial provision to cover the costs of decommissioning, which will have to be updated and approved by the authorities every time the decommissioning plan is updated. The LH is in principle free to choose the form of the financial provision. Upon approval, the authorities will assess whether the financial provision offers sufficient security that the decommissioning costs are covered at the moment of decommissioning.

New safety requirements (post-Fukushima)

A current major regulatory project is the drafting of the Dutch Safety Requirements, providing a new set of requirements for the design, construction and operation of new nuclear reactors. In the DSR post-Fukushima lessons learnt are incorporated as far as possible. They are also intended to be used as a reference for the concept of "continuous improvement" of existing installations, in particular within the framework of periodic safety reviews.

New RB

An other major project is the ongoing complete reorganisation of the RB, developing it into one entity. For more details on this topic, refer to the Introduction to the present report.

ARTICLE 5 Competent regulatory authority

This chapter describes the Competent regulatory authority (or: Regulatory body, RB) as it is today.

However, important changes to the organisation of the RB have been decided upon. The implementation of these changes will be too late to be reported in the present report. In the Introduction, some information on the planned changes is provided.

In our next report for Article 9(1) of Council Directive 2009/71/EURATOM, the description of the RB will be much different.

5.0 Text of Article

Article 5 - Competent regulatory authority

1. Member States shall establish and maintain a competent regulatory authority in the field of nuclear safety of nuclear installations.
2. Member States shall ensure that the competent regulatory authority is functionally separate from any other body or organisation concerned with the promotion, or utilisation of nuclear energy, including electricity production, in order to ensure effective independence from undue influence in its regulatory decision making.

5.1 Establishment and maintenance of a competent regulatory authority

5.1.a Legal foundations of the competent regulatory authority

The minister of Economic Affairs (EZ) is the primarily responsible authority for conducting the regulatory process under the Nuclear Energy Act and for the main functions of the RB. The entities of the RB operate under the responsibility of the minister of EZ. The RB is the authority designated by the government as having legal authority for conducting the regulatory process, including issuing licences, review and assessment, inspection and enforcement, and thereby regulating nuclear, radiation, radioactive waste and transport safety, nuclear security and safeguards.

In particular, the legal basis for the supervisory functions of the RB can be found in the Nuclear Energy Act, Article 58. The functions and mandates of the various entities performing the different tasks have been laid down in subordinate regulation.

5.1.b Authorities and their responsibilities

Refer to section 4.0.b, 'Overview of regulatory and organisational framework'.

5.2 Independence of the competent regulatory authority

5.2.a Position of the RB in the national administration and legal system

As described in section 5.1.b, the RB for Nuclear Energy Act issues has three main components: the pdNIV (developing nuclear safety and radiation protection policies and issuing licences), RVO (supporting licencing activities) and the inspectorate of the RB (KFD) performing supervision, inspection and enforcement. The three main entities of the RB are embedded in organisational divisions of two ministries.

5.2.b Separation of RB from bodies responsible for promotion and/or utilization of nuclear energy

The RB is not in any way involved in energy policies. The different entities forming the RB are effectively separate from other bodies dealing with energy policies. The RB's involvement with nuclear power is restricted to nuclear safety and radiation protection and associated security issues. The entities of the RB that are embedded in organisational divisions of the ministry of Economic Affairs (pdNIV and RVO), are kept separate from divisions associated with energy policies. The inspectorate branche of the RB is part of another ministry but operates under the responsibility of the Minister of Economic Affairs, who also determines its budget.

5.2.c Ensuring effective independence of regulatory decision making

Due to the effective separation described in section 5.2.b, decisions are taken by the RB independently from energy policy and LH. The RB is transparent in its decision making. The reporting arrangements (described in section 5.2.d.) are instrumental in achieving perception of independence in decision making.

5.2.d Reporting arrangements of the RB, illustrating its independence

The different entities forming the RB report to the minister of Economic Affairs (EZ) being the primarily responsible authority for conducting the regulatory process under the Nuclear Energy Act. The minister of EZ reports regularly to Parliament on nuclear safety, radiation protection, and other Nuclear Energy Act issues. Results of major studies, conducted under the authority of the RB are presented by the minister of EZ to Parliament. In addition, Parliament can require the minister to report to Parliament on specific issues.

Every year the Human Environment and Transport Inspectorate (ILT) prepares a report about its inspection activities, including those of its subdepartment the KFD. This publication is made available to the public on the I&M²¹ ministry's website. In addition KFD prepares an annual report on nuclear incidents to be sent to the Dutch Parliament. KFD is also further developing its own part of the ILT-website.

The ministry of EZ has extensive dossiers on many issues published on its website, featuring many in-depth studies on issues related to nuclear-related activities. Information on all major LHs can be found online too. This is part of the ministry's policy on transparent governance.

Also, the licensing procedures provide for timely publication of documents (refer to section 4.1.b.1).

5.3 Legal powers and human and financial resources of the competent regulatory authority

This section 5.3 shows how the Netherlands ensures that the Competent regulatory authority or RB can fulfil its obligations in connection with the national framework described in Article 4(1) with due priority to safety. In the successive subsections 5.3.a through 5.3.d, the focus is on legal powers entirely. However, this section 5.3 starts with the legal basis for the activities of the RB (i), and the ensurance of adequate human (ii) and financial (iii) resources. The information on *resources* is not repeated in the sections 5.3.a through 5.3.d.

(i) General legal basis for the activities of the RB

Refer to section 5.1.a.

(ii) Ensuring adequate human and financial resources

The allocation of financial resources to the ministries is provided yearly by the general budget of the government. Organisations like KFD, RIVM and RVO receive funding from the ministry of EZ.

²¹ Dutch: 'Infrastructuur & Milieu', i.e. Infrastructure & Environment

Budget rules for the ministries are set by the government's budget rules for the period 2013-2017. In addition there are (legal) government-wide regulations that are important for the budget process within each ministry.

Annually the workload is programmed and distributed among the available personnel, based on the available FTEs. The RB has a regular planning and control cycle. In it the RB balances the tasks at hand with the available (human) resources, setting priorities where and when necessary.

As a part of the formation of the new RB, based on the experience of the constituent parts of the RB (including the self-assessment for the IRRS mission in November 2014), at the moment an investigation is in progress to assess the resources (people and money) needed for the expected workload in the future.

When and if needed, support is contracted with Dutch and foreign organisations, some of which have been listed in section 4.0.b.

There are adequate financial resources available to the RB to hire its staff and contract TSO services and education & training. Office space and IT structure and the like is provided by the ministries that house the several entities that comprise the RB.

A small part of the costs of oversight and licensing are covered by annual fees and fees for individual licensing activities, to be paid by the LHs. The basis for this reimbursement is founded in a Decree on Reimbursement²².

5.3.a Power to require Licence Holder to comply with national safety requirements and licence conditions

5.3.a.1 Legal provisions by which the RB can require compliance

Many articles in the Nuclear Energy Act require compliance with safety and radiation protection requirements and the demonstration thereof. In various Decrees and Ordinances more provisions can be found to which LHs are bound. Furthermore, with the issuance of a licence, the RB will define licence conditions, to which the licensee must comply too. The licence conditions may refer to NVRs or other standards to include these in the licence base of the facility of the LH.

5.3.a.2 Examples of implementation of these powers of the RB

For examples refer to section 5.4.

5.3.b Power to require demonstration of compliance

5.3.b.1 Legal provisions in place to require demonstration of compliance by the LH

Several articles in the Nuclear Energy Act and subordinate regulation require demonstration of compliance by the LH and specify the information to provide to the RB when applying for a licence or licence renewal.

Article 58 of the Nuclear Energy Act states that the responsible minister should entrust designated officials with the task of performing supervision: safety assessment, inspection and enforcement. This is mainly the task of the inspectorate of the RB (KFD) in the Netherlands. During operation, compliance shall be demonstrated to the KFD. During (announced and unannounced) inspections, compliance shall be demonstrated to the inspectors visiting the installation.

Compliance is also shown during Periodic Safety Reviews (PSRs), although these are more aimed at supporting continuous improvement. The requirement of conducting PSRs is set in regulations and is also documented in the licence requirements of the NPP and the RRs.

²² In Dutch: 'Besluit vergoedingen Kernenergiwet'

5.3.b.2 *Examples of implementation of these powers of the RB*

For examples refer to section 5.4.

5.3.c *Verification of compliance through regulatory assessments and inspections*

5.3.c.1 *Legal arrangements in place for the RB for verification*

Refer to section 5.3.b.1 for this basis.

5.3.c.2 *Examples of implementation of these powers of the RB*

For examples refer to section 5.4.

5.3.d *Regulatory enforcement actions*

5.3.d.1 *Legal arrangements in place for the RB to ensure the enforcement process*

For a legal basis, refer to section 5.3.b.1. The system of enforcement for the safety of nuclear installations is managed by the inspectorate branch of the RB, the KFD.

Enforcement decisions are based on the findings of the safety supervision (by KFD), described in section 4.1.c.1 of the present report.

5.3.d.2 *Examples of implementation of these powers of the RB*

For examples refer to section 5.4.

5.4 *Examples of implementation*

5.4.a *Example of licencing*

The Borssele NPP (KCB) has started operation in 1973.

Around the year 2006 the KCB made plans to extend its operating life with 20 years until 2034. This required a licence for Long Term Operation (LTO). The LH (EPZ) started the project LTO in order to meet the requirements of the Dutch RB. The outline of the project was based on IAEA Safety Report 57 "Safe Long Term Operation of Nuclear Power Plants" (SR-57). As a result of comments in the first IAEA SALTO peer review in 2009, the scope of the project was extended with the assessment of active components. The goal of the project LTO was to ensure that safety and safety relevant Systems, Structures and Components continue to perform their intended functions during long term operation. The outcome of the project LTO was used for a licence change application and this has been submitted to the Dutch RB for approval of prolonged operation of KCB after 2013.

The RB stated additional requirements for organisational and managerial aspects and human factors, based on IAEA Safety Guide NS-G-2.10 'Periodic Safety Review of Nuclear Power Plants' (2003), notably Safety Factors 10 (Organisation, management system and safety culture) and 12 (Human Factors). However these non-technical requirements were addressed separately in the PSR project.

In 2013 the renewed licence entered into force with new licence conditions as a result of the LTO assessments. As a basis for its decision making, the RB reviewed the LTO assessment with support of GRS, a German TSO. The IAEA SALTO mission of 2012 was in support of and reviewed details related to the LTO assessment. Before the end of 2013 various licence requirements had to be fulfilled, including the completion of the recommendations from the regulatory evaluation of the LTO programme of the LH. In these recommendations the results of the SALTO mission of May 2012 were considered.

5.4.b Examples of inspection

5.4.b.1 Inspection: Regular compliance verification

The inspectorate branch of the RB (KFD) carries out a large variety of inspections and audits at nuclear installations. The KFD works according to its annual compliance verification plan. This covers several types of compliance verification activities, like:

- assessment and verification of *adjustments* at nuclear installations and physical inspections of the correct practical implementation of these changes;
- assessment and evaluation of the *technical failures* and interruptions at the installations and ensure the follow up of the points of improvements originating from the evaluations by the 'failure working group';
- monitoring of *safety culture* at the nuclear installations;
- physical and administrative inspections of execution of installation *maintenance* with special attention for the nuclear fuel replacement period (outages);
- monitoring and auditing of *radiation protection* and permitted discharges;
- assessment and judgment of the composition and use of the *nuclear fuel* in the core of nuclear installation (nuclear physics assessment);
- assessment and (administrative) inspections of the maintenance and inspection schedule and certification of *systems, structures and components* (SSC);
- effectiveness of internal *quality assurance* systems;
- inspections with a focus on *ageing and long term operations*;
- assessments and inspections of LH's arrangements for *emergency preparedness and response*, inspectors also are present at emergency exercises to judge the adequacy of these arrangements.

5.4.b.2 Inspection: Ensuring measures are in place to prevent accidents and incidents and mitigate consequences of accidents

For all operational states of the NPP, including outages, the minimum number of SSCs required to be in operational condition is given in the technical specifications document of the NPP. The document reflects the NPP's Defence-in-Depth concept. The technical specifications document is part of the licence. Therefore the inspectorate branch of the RB regularly verifies whether the operation of the NPP (in all operational states) remains within the limits set in the specifications document. During verifications, the focus can be on SSC-related subjects like testing, maintenance, overhaul, calibration, replacement, repairs and modifications. By referring to the technical specifications, the RB ensures that the Defence-in-Depth concept of the NPP is adhered to during all operational states.

5.4.b.3 Inspection: Management system of the LH that shall ensure nuclear safety and include continuous improvement

All Dutch LHs of nuclear installations are obliged to develop and implement a management system that ensures safe operation of their installations. This requirement is part of their permit under the Dutch Nuclear Energy Act. The KFD checks the management system on a regular basis and takes corrective actions if there is an unwanted deviation or omission that can affect nuclear safety. The inspections and audits can be targeted on the management system as a whole being up-to-date and/or its scope adequate. In more detailed assessments it is possible to focus on specific compliance topics.

5.4.c Example of enforcement

The inspectorate branch of the RB uses a graded approach regarding compliance verification and enforcement. This approach is common for authorities in the Netherlands with enforcement tasks. The approach used is based on a national compliance verification strategy and has been developed by the Dutch authorities

using six principles as starting points: selective, agile, cooperative, independent, transparent and professional. This strategy²³ covers various options for action.

There are mild enforcement measures such as presenting suggestions to LHs, but also more severe ones like administrative- and criminal law based enforcement measures. When a LH is violating its licence conditions or other regulations, when nuclear safety or the environment is at risk, the KFD will take enforcement measures. Recently (status June 2014), KFD imposed three administrative enforcement penalties at two nuclear installations. Furthermore, there is another administrative penalty in preparation. All of these penalties are related to nuclear safety. These penalties allow the LH to reverse the non-compliance situation within a strict time frame. If this requirement is not met, a substantial financial penalty has to be paid. The three enforcement actions are:

1. enforcement case number H73884 (bottom plug)

The failure of a component without a compulsory maintenance programme. The licence was enforced - all maintenance programs for safety relevant SSCs had to be reviewed.

2. enforcement case number H82025 (gas monitors)

An unauthorised lack of redundant gas monitoring systems during operation. A penalty was announced for the next case of lack of redundancy.

3. enforcement case number H75550 (crane)

A measure resulting from a periodic safety review was not implemented timely. A penalty was announced for the case that the implementation will not be completed before a certain date.

²³ Ref 27 831, October 12th 2005 'Kaderstellende visie op toezicht'- only available in Dutch

ARTICLE 6 Licence holders

This chapter describes how the Netherlands ensure that Licence Holders fulfil their obligations with respect to nuclear safety of their nuclear installations.

6.0 Text of Article

Article 6 – Licence holder

1. Member States shall ensure that the prime responsibility for nuclear safety of a nuclear installation rests with the licence holder. This responsibility cannot be delegated.
2. Member States shall ensure that the national framework in place requires licence holders, under the supervision of the competent regulatory authority, to regularly assess and verify, and continuously improve, as far as reasonably achievable, the nuclear safety of their nuclear installations in a systematic and verifiable manner.
3. The assessments referred to in paragraph 2 shall include verification that measures are in place for prevention of accidents and mitigation of consequences of accidents, including verification of the physical barriers and licence holder's administrative procedures of protection that would have to fail before workers and the general public would be significantly affected by ionizing radiations.
4. Member States shall ensure that the national framework in place requires licence holders to establish and implement management systems which give due priority to nuclear safety and are regularly verified by the competent regulatory authority.
5. Member States shall ensure that the national framework in place requires licence holders to provide for and maintain adequate financial and human resources to fulfil their obligations with respect to nuclear safety of a nuclear installation, laid down in paragraphs 1 to 4.

6.1 Ensuring prime responsibility for nuclear safety rests with Licence Holders

The Netherlands have implemented European Council directive 2009/71/EURATOM. While not explicitly mentioned in the regulation that implements the Directive, the responsibility of the LH stems from the systematics of the Dutch legal system including the Nuclear Energy Act and subordinate regulation, and the duties of the LH described therein. This is explained to some detail below.

Nuclear Energy Act

The Nuclear Energy Act contains a number of articles, which deal with criteria, interests and conditions under which a licence can be awarded.

Article 70 of the Nuclear Energy Act also states that a licence issued pursuant to this Act is personal to the holder. As such this person is responsible for the safety requirements related to the licence of the installation. The LH can transfer all or part of the licence to a third party, provided he has approval to do so from the licensing authority (Minister of Economic Affairs). Conditions may be attached to such approval. The explanatory memorandum on Article 70 of the Nuclear Energy Act, which states that a licence is to be awarded to a corporate body (legal person), refers to guarantees of necessary expertise and trustworthiness in relation to safety. Trustworthiness in relation to safety can amongst other things also be associated with financial solvability.

Radiation Protection Decree

Further elaboration can be found in the Radiation Protection Decree (Besluit stralingsbescherming; Bs) especially the duty of care provisions of Article 5. There are many provisions in the Radiation Protection Decree that prescribe specific duties of the LH. These provisions are also applicable to nuclear installations and facilities. The Radiation Protection Decree also describes competence requirements regarding radiation protection.

6.2 Ensuring regular assessment and verification of nuclear safety

6.2.a Regulatory requirements

6.2.a.1 Perform systematic safety assessments within the licencing process

The Nuclear Energy Act (section 15b) prescribes the requirement to acquire a licence for building, operating and decommissioning of nuclear installations – so for all stages of the lifetime of the facility. The type of safety assessments required (deterministic as well as probabilistic) for nuclear installations is described in Decree Bkse²⁴ (Article 6).

Bkse section 7.2(i) provides specific guidance on specific decommissioning issues.

6.2.a.2 Perform regular verification of nuclear safety and promote continuous improvement as far as reasonably achievable

At the level of the licence, requirements for the regular verification of nuclear safety are defined, with elements like in-service inspection, surveillance and functional testing. These are supported by references to the Dutch Nuclear Safety Rules (NVRs), which are based on IAEA Safety Guides. Article 21.1 of the Nuclear Energy Act provides for this system of more detailed regulations in NVRs regarding the design, operation and quality assurance of (mostly) power plants.

Nuclear facilities shall have a proper management system documenting among others verification procedures. There is also an NVRs addressing this requirement in general terms (based on IAEA GS-R-3) and other NVRs addressing more specific requirements regarding regular verification, like NVR NS-G-2.6 for maintenance, control and in-service inspections in NPPs.

The Regulation implementing the Directive 2009/71/EURATOM prescribes the systematic evaluation and investigation of the nuclear safety of nuclear installations during their operating life possibly leading to changes in the installation ('continuous improvement'). These requirements of this Directive have been strictly implemented in an ordinance²⁵ (July 2011 requiring Periodic Safety Reviews (PSRs)). If the examinations and assessments warrant it, the LH has the obligation, to take measures to improve nuclear safety.

Furthermore, long before the ordinance was established, the licences of nuclear installations required such PSRs. Such self-assessments are subject to review by the RB. The Netherlands has a long history of PSRs and consecutive packages of improvement measures. Refer to Annex 3 for information on the PSRs conducted by the LH of the Borssele NPP. In recent years these have coincided with (for the Borssele NPP) with a Long Term Operation (LTO) evaluation and implementation programme.

Requirements to the PSR can be found in NVRs referenced in the licence, like NVR NS-G-2.10 'Periodic Safety Review of NPPs'.

²⁴ Bkse, Nuclear installations, fissionable materials and ores Decree

²⁵ 'Tijdelijke regeling implementatie richtlijn nr. 2009/71/Euratom inzake nucleaire veiligheid, nr. WJZ/11014550'

Examples of major PSRs in the Netherlands are those of Borssele NPP (full scope 10-yearly and of limited scope version 2-yearly) and of the HFR in Petten (full scope 10-yearly and of limited scope 5-yearly).

6.2.b Examples of how LHs address the aforementioned requirements

6.2.b.1 Arrangements of the LHs to perform systematic safety assessments on their installations

At the NPP Borssele, the LH's own management system and internal verification organisation are important mechanisms enabling the LH to adhere to the licence and achieve its corporate safety objectives.

Relevant self assessments performed by the LH include:

- Yearly evaluations and reporting on plant functions such as operational experience feedback, surveillance and in-service-inspections, ageing management, radiation protection, radiological releases, and radwaste (some of them are licence conditions);
- Two-yearly evaluation of the current licensing basis as part of the two-yearly Periodic Safety Review (PSR);
- Ten-yearly PSR;
- Inspections and audit program of internal department for nuclear safety and quality assurance;
- Self assessments in preparation for WANO peer review missions;
- Self assessments in preparation for IAEA missions, invited by the RB;
- Self assessments in accordance with WANO SOERs and SERs.

Refer to Annex 3, for the history of PSRs and associated backfittings.

6.2.b.2 Arrangements by the LH for continuous improvement in nuclear safety

For the Borssele NPP, event analyses are centrally coordinated and discussed in the Internal Reactor Safety Commission.

Corrective actions resulting from safety assessments or event analyses are collected in a central database, subject to periodical review in plant management meetings.

Since 2013 the continuous improvement process itself is subject of optimization (lean/six sigma method).

Especially the 10-yearly PSRs are major safety assessment efforts. Borssele NPP has a history of several decades of PSRs that have led to many improvements including major modification projects.

6.2.b.3 Main elements of programmes of verification of safety

The systematic safety assessments mentioned in 6.2.b.1 are an essential element in LH's verification of safety.

Participation in international bodies, conferences, WANO and IAEA missions serve as an important vehicle to compare with and learn from other LHs.

The LH uses risk informed decision making in daily operations as well as for outage preparation and execution. The so-called Safety Monitor, a user friendly tool based on the living PSA, is used to minimize the impact on the Total Core Damage Frequency (TCDF). The actual TCDF is evaluated on a monthly basis.

The internal oversight department verifies safety through inspections and audits.

6.2.b.4 Periodic safety assessments performed on nuclear installations

See also 6.2.a.2 and 6.2.b.1.

The two-yearly PSRs of the Borssele NPP evaluate against the current licence base and the WANO Performance Objectives and Criteria.

The ten-yearly PSRs of Borssele NPP evaluate the licence base itself against international developments. Prior to the evaluation the scope and framework of the PSR is defined and approved by the regulator. The living PSA is used to gain probabilistic insights, as part of the evaluation but also to determine impact of proposed corrective actions.

6.3 Verification of measures in place for prevention of accidents and the mitigation of their potential consequences

6.3.a Regulatory requirements establishing the basis for the verification of the measures for the prevention of accidents and mitigation of consequences

6.3.a.1 Requirements during design stage

The Bkse Decree describes the safety assessments (deterministic as well as probabilistic) that have to be performed and documented (Safety Assessment Report, SAR) with the licence application and the criteria which have to be met. Adopted or adapted IAEA guides are SSG-3 (Level-1 PSA) and SSG-4 (Level-2), in addition there is a national guide on Level-3 PSA.

The prescribed analyses extend to the assessment of severe accidents.

Specific requirements to the design are stated in NVRs and other codes and standards, that are referenced in the licence. Refer to section 4.0.a for more information on NVRs. Refer to section 4.1.a.2 for information on the development of the new Dutch Safety Requirements.

6.3.a.2 Requirements during operation

The explanatory memorandum on Article 37b of the Nuclear Energy Act states that the LH must operate a nuclear facility in a manner that reflects the most recent safety insights. The SAR and PSA are continually updated and are in fact 'living documents'. In addition the periodic performance of PSRs (requirement laid down in NVRs referenced in the licence) provide for periodic reassessment during the operating life of the facility, addressing all safety relevant issues like safety assessments, PSA, LTO, Human Factors, safety culture, etcetera.

Specific requirements to operation are stated in NVRs, that are referenced in the licence. Refer to section 4.0.a for more information on NVRs. Refer to section 4.1.a.2 for information on the development of the new Dutch Safety Requirements.

The inspectorate branche of the RB, the KFD, verifies if adequate measures are in place at the LH to guarantee the safety of employees and the public in the Netherlands. This covers for example the assessment of (radiation protection) reports, certification of SSCs, inspections and whitnensing of periodic tests and maintenance on site and second opinion reviews of discharges by an independent research institute. These activities have been integrated in the compliance verification plans of the KFD.

For a more detailed description of compliance verification activities of the KFD refer to section 5.4.b.

6.3.a.3 Requirements for mitigation of consequences of accidents

The radiation protection Decree (Bs) prescribes requirements to the LH and the Government to have available means to mitigate the consequences of accidents.

In the licence of the NPP, reference is made to several NVRs with requirements regarding mitigation of consequences of accidents. Some examples, highly relevant for on-site emergency preparedness are:

- NVR NS-G-2.15 'Severe Accident Management Programmes for NPPs'
- NVR GS-R-2 'Preparedness and Response for a Nuclear or Radiological Emergency'
- NVR GS-G-2.1 'Arrangements for Preparedness and Response for a Nuclear or Radiological Emergency'.

A licence condition of the Borssele NPP requires its LH to establish and maintain an emergency plan and an emergency organisation.

6.3.b Examples of how LHs address the aforementioned requirements

6.3.b.1 Measures to prevent incidents becoming accidents and minimization of consequences

The design of the Borssele NPP is based on the Defence-in-Depth concept. This is a safety philosophy consisting of a set of diverse and overlapping strategies and/or measures, known as 'levels of defence'. It creates independent and redundant layers of defence to compensate for potential human and mechanical failures. An important principle is that the means provided on one level of defence should be independent from those of other levels. This assures that the failure of one system will not affect more than one level of defence. Defence-in-Depth includes the use of access controls, physical barriers, redundant and diverse key safety functions, and emergency response measures.

- The first level of defence shall prevent abnormal operation and failures. Operational experience, especially as indicated by collected plant-specific component failure data, data resulting from the non-destructive testing of the primary pressure boundary, as well as the programmes for inspection, maintenance, testing, ageing etc. applied to plant systems and components, has shown that the first level of defence is adequately preserved.
- The second level of defence shall control abnormal operation and timely detect failures. In the Operational Limits and Conditions (OLC) document the limits are defined within which the Borssele NPP must operate. In order to ensure that the limits are not exceeded, the safety systems are subject to an extensive set of in service inspection, surveillance and maintenance procedures. These procedures together with the Operational Limits and Conditions document form the second level of defence.
- The third level of defence shall control accidents within the design basis. The essential means provided consist of the safety systems and other measures to control Postulated Initiating Events (PIEs) including Limiting Design Basis Events. The safety analyses that are reported in the Safety Report have to prove that the radiological consequences of design-basis events meet the radiological criteria. These radiological criteria specify smaller acceptance doses if the assumed frequency of the PIEs increases.
- The fourth level of defence shall control severe plant conditions. This is realised by the symptom-based Emergency Operating Procedures (EOPs) and the Severe Accident Management Guidelines (SAMGs), that need to prevent or mitigate consequences of severe accidents should they happen despite the presence of levels 1-3.
- The fifth level of defence shall mitigate the radiological consequences of significant releases of radioactive materials in the unlikely event that they would occur. It is covered by the strategies for off-site emergency preparedness.

At the Borssele NPP, the LH has conducted complete Level 1, 2 and 3 PSAs, which include external hazard initiators and all operational states. The full scope Level 3 PSA results in estimated risk levels compliant with the regulatory criteria. These are "living" PSAs, i.e. they are updated yearly. They also provide input to the surveillance and maintenance strategies, modification planning and execution, and periodic safety assessments, the so-called "risk monitor".

The full scope Level 3 PSA has been used to derive LH's (EPZ) SAM strategy. The on-site emergency plan includes a specific emergency response organisation with adequate staff, instructions and resources. The emergency response plan has three principal goals:

- to ensure that the operating organisation of the NPP is prepared for any on-site emergency situation;
- to mitigate as much as possible the effects on the operating personnel of the NPP and on the environment in the vicinity of the plant;
- to inform the relevant governmental bodies timely to support as effectively possible on off site emergency actions.

Severe Accident Management Guidelines (SAMGs) have been in operation at Borssele NPP since 2000 as an outcome from the PSR at the plant in 1993. Their scope was expanded following the 2003 PSR to include shutdown conditions. The SAMGs are based on the generic SAMGs produced by the Westinghouse Owners Group and were considered state of the art in 2003. They are intended to address scenarios deriving from severe external hazards, such as earthquakes and floods, where there is the imminent potential for core melt.

The SAMGs include guidance for using the pressure relief valves and various pressuriser spray options to control the Reactor Pressure Vessel (RPV) pressure. For an ex-vessel event the containment (37,100m³) has filtered venting, a spray system, air coolers, a filtered recirculation system and Passive Autocatalytic Recombiners (PARs). The containment is designed for overpressures of 3.8 bar.

Borssele has standard arrangements for controlling the plant in the event of a severe accident. The Main Control Room (MCR) has a filtered air supply and, following a Station Black Out (SBO) event, compressed air and respirators are available. There is also an alternative Emergency Control Room (ECR, which is bunkered and has gas-tight doors, but which does not have a filtered air supply) for managing a controlled shutdown, core cooling and spent fuel pool cooling. Both the MCR and ECR have suitable and robust access to plant measurements needed to control a severe accident.

There are seven operations shift teams at Borssele, each managed by a shift supervisor and each composed of at least eight operators. It is the shift supervisor's responsibility to decide on the extent of the LH's Emergency Response Organisation (ERO) that needs to be activated. Once the ERO is operational, the site emergency director takes over responsibility for the emergency. Based on data from exercises, the ERO will be set up within 45 minutes (also outside normal working hours) and then requires a further 30 minutes to become operational.

The ERO is a scalable organisation: the number of staff called in (by pagers, phone calls) will depend upon the scale of the emergency being addressed. The ERO will be located in the plant's Alarm Coordination Centre (ACC). This is a purpose-built facility designed for internal events and emergencies. Though bunkered (like the ECR), it is not designed to withstand severe events such as a major earthquake, flood or aircraft crash. If damaged, ERO has to use an other room, but consequently lose some of the dedicated ERO-facilities.

Details of the SAM facilities at the LH can be found amongst others in the National Report of the Netherlands on the evaluation of the complementary safety assessment of the Borssele NPP, published in 2011.

Realtime data and process information is available at both crisis centers of the original equipment manufacturer (OEM) of the power plant. Support from the OEM in case of an emergency is contractually assured.

6.3.b.2 Measures for mitigation of consequences

Off site emergency preparedness and response (EP&R) and post accident management (PAM) mainly is a national responsibility. Nevertheless utility's

responsibility is also important especially regarding providing technical information on plant conditions and the potential risk for emissions.

If an emergency occurs, the plant management must inform the relevant authorities immediately, advise them of the classification of the accident, and provide whatever information is required in order to assist the KFD to assess the nature and potential consequences of the accident, to determine the potential for mitigating its effects and to make a prognosis of potential radioactive discharges. Realtime data and process information is available to the inspection branch of the RB, the KFD. This is part of the plant information supplied to the KFD during an emergency. The RB has a strict 24/7 schedule to secure its availability during any actual or potential accident or serious incident.

6.4 Ensuring the establishment and implementation of management systems at the Licence Holders

NVR GS-R-3 'The Management System for Facilities and Activities' requires any LH to establish a management system where priority to safety is paramount. The requirements in this NVR apply to all nuclear facilities.

In the licence of a nuclear installation, reference is made to additional NVRs with more detailed requirements to the management system, tailored to the needs of these installations.

The KFD verifies the management systems of LHs on a regular basis. For a more detailed information on compliance verification activities, refer to section 5.4.b.

6.5 Requiring Licence Holders to provide for adequate financial and human resources

6.5.a Regulatory requirements to provide for adequate financial and human resources

6.5.a.1 Financial resources

Refer to section 6.1 of the present report for requirements in the Nuclear Energy Act related to financial solvability.

In the licence of the Borssele NPP several NVRs are referenced, all applicable to the management system of the LH. These NVRs (like NVR GS-R-3²⁶) also address financial resources. For instance, it is stipulated that the management of the NPP must act promptly to provide adequate facilities and services during operation and in response to emergencies. The personnel involved in reviewing activities must have sufficient independence from cost and scheduling considerations. This applies to reviews of all safety-related activities.

6.5.a.2 Human resources

The Nuclear Energy Act states that an application for a licence must contain an estimate of the total number of employees plus details of their tasks and responsibilities, and, where applicable, their qualifications. This includes supervisory staff.

In addition, in the licence of the NPP, relevant NVRs are referenced: NVR NS-G-2.8 'Recruitment, Qualification and Training of Personnel' and the specific Safety Guide NVR 3.2.1²⁷ for control room personnel. NVR NS-G-2.8 also makes it clear that the

²⁶ NVR GS-R-3 'The Management System for Facilities and Activities', section 4 states: "Senior management shall determine the amount of resources necessary and shall provide the resources (9) to carry out the activities of the organisation and to establish, implement, assess and continually improve the management system". In footnote (9) NVR-GS-R-3 states: "Resources includes individuals, infrastructure, the working environment, information and knowledge, and suppliers, as well as material and financial resources."

²⁷ NVR 3.2.1 'Voorschriften Opleiding Bedieningspersoneel van Kernenergiecentrales', i.e. Requirements to the education of control room personnel.

responsibility for ensuring that individuals are appropriately qualified and remain so rests with the operating organisation. NVR-GS-R-3 requires management to provide all the resources necessary.

6.5.b ***Description of the process of verification by the RB of the financial and human resources of the LH***

When a LH does not meet the set safety requirements or any deadline specified by the RB, the inspectorate branche KFD can take a more strict approach to verify whether the LH has sufficient financial and human resources. The managers of the KFD and the directors of the LHs discuss this matter on a regular basis to ensure nuclear safety. Furthermore, the inspectors use a questionnaire that covers this item with questions about among others workload, management support for employees, education & training, qualification and the (safety) culture in organisations.

ARTICLE 7 Expertise and skills in nuclear safety

The national framework in place requires arrangements for education and training to be made by all parties for their staff having responsibilities relating to the nuclear safety of nuclear installations in order to maintain and to further develop expertise and skills in nuclear safety. This chapter describes these arrangements.

7.0 Text of Article

Article 7 - Expertise and skills in nuclear safety

Member States shall ensure that the national framework in place requires arrangements for education and training to be made by all parties for their staff having responsibilities relating to the nuclear safety of nuclear installations in order to maintain and to further develop expertise and skills in nuclear safety.

7.1 Implementation at the Licence Holders

The Borssele NPP has a training department that is responsible for: maintaining the personnel qualification register, qualification activities, coordination of training activities, training records keeping, and delivering of in-house developed training courses; and organizing training courses that are delivered by contractors. For conduct of the in-house developed training, subject matter experts are extensively used. Training responsibilities for conduct of practical (on-the-job) training are distributed among respective plant departments.

Training and personal development programmes are developed based on competency analysis and consequent training matrix for each job position. Nuclear safety, ALARA principles, industrial safety, operating experience (domestic and international) are included and re-enforced during general employee training, during conduct of initial training programmes and during refresher courses.

Training programmes are structured to cover required theoretical knowledge, practical training and on-the-job training. Training material for the basic course is maintained under a QA review scheme.

Control room operators, emergency support staff and several others use the full scope, plant specific training simulator. This simulator is based in the simulator school in Essen (Germany). Training is given by professional teachers of the simulator school. The contracted staff for running the simulator training programme is of appropriate size and comparable to general industry practice.

External organizations are extensively used for delivering training. For specialized training on specific equipment vendor facilities are used. For safety related subjects, equipment vendors or recognized institutions in the nuclear field are used, for example Westinghouse, Areva, WANO, and NRG.

7.2 Implementation at the Competent regulatory authority

The expertise of the RB spans disciplines like radiation protection, nuclear safety, risk assessment, security and safeguards, emergency preparedness, legal and licensing aspects.

The RB provides tailor-made training for its staff.

Apart from the general courses, training dedicated to the technical discipline is provided. This includes international workshops, but also conferences and visits to other regulatory bodies. In addition there is information exchange through the international networks of OECD/NEA, IAEA, EU etc. To be mentioned are the

contributions to WENRA, ENSREG, TRANSSC, NUSSC, RASSC, NERS, NEA/CNRA and several of its Working Groups.

Experts have to keep up to date with developments in their discipline and are also responsible for maintaining a network for a number of other disciplines that are not permanently available. It is the policy of the RB that the core experts have sufficient knowledge to specify and assess work done by external experts.

For areas in which its competence is not sufficient or where a specific in-depth analysis is needed, the RB has a budget at its disposal for contracting external specialists. This is considered one of the basic policies of the RB: the core disciplines should be available in-house, while the remaining work is subcontracted to third parties or Technical Support Organisations (TSOs).

ARTICLE 8 Information to the public

This chapter describes how the Netherlands satisfies the requirements of Article 8 regarding providing information to the public and the workers on the regulation on nuclear safety.

8.0 Text of Article

Article 8 - Information to the public

Member States shall ensure that information in relation to the regulation of nuclear safety is made available to the workers and the general public. This obligation includes ensuring that the competent regulatory authority informs the public in the fields of its competence. Information shall be made available to the public in accordance with national legislation and international obligations, provided that this does not jeopardise other interests such as, *inter alia*, security, recognised in national legislation or international obligations.

8.1 Implementation

The different entities of the RB such as EZ/pdNIV and KFD have strategies for external communication which broadly follow the ENSREG guidance on communication strategies. However, in preparing for the new organisation that will bring together the various entities of the RB, a new integrated strategy will be developed.

8.1.a Legal basis for providing information

The General Administrative Act (Awb) is the body of law that governs the activities of administrative agencies of government and the interaction of the public in the procedures (i.e. objections and appeals). Also refer to section 4.1.b.1. The Awb applies to virtually all procedures under any law. The Awb also provides for procedures regarding publication of information of draft decisions, like those to award a licence. These need to be published in the Government Gazette, and in the national and local press. Under the Awb, documents provided with an application for a licence are to be made available for inspection by members of the public. All members of the public are free to lodge written opinions on the draft decision and to ask for a hearing.

Specific requirements for the publication of new regulations are also laid down in the Publication Act (Bekendmakingswet). All new legislation is published on the Internet²⁸ and in the Government Gazette after enactment by the parliament. Beyond this, ministries may make their own arrangements to provide greater accessibility to their regulations. Announcements of new regulations have to be published in the "Staatscourant".

Under the Dutch Government Information (Public Access) Act (Wob), as a basic principle, information held by public authorities is public, excluding information covered by the exceptions enumerated in the Act in its Article 10. The act requires authorities to provide information unsolicited as it is in the interest of good and democratic governance, without prejudice to provisions laid down in other statutes. According to Article 3, any person can request information related to an administrative matter as contained in documents held by public authorities or companies carrying out work for a public authority.

²⁸ www.overheid.nl

The Nuclear Energy Act states requirements regarding providing information to the public in case of accidents and to staff mitigating the consequences of such accidents.

Stakeholder involvement is embedded by public consultation during the licencing process under the General Administrative Act (Awb) and if applicable in the process of the Environmental Impact Assessment (EIA) under the Environmental Protection Act. This process also involves meetings of RB, LH and the public. The RB is transparent in its communication of regulatory decisions to the public (e.g. on licence applications and adequacy of 'stress tests'); these are published with supporting documentation.

The RB reports to the minister of Economic Affairs (EZ) being the primarily responsible authority for conducting the regulatory process under the Nuclear Energy Act. The minister of EZ reports regularly to Parliament on nuclear safety, radiation protection, and other Nuclear Energy Act issues. Results of major studies, conducted under the authority of the RB are presented by the minister of EZ to Parliament. In addition the Parliament can require the minister to report to Parliament on specific issues.

8.1.b *How the regulatory authority provides information and communicates in its fields of competence to the general public and to workers*

Information in relation to the regulation of nuclear safety is made available to the workers and the general public in various ways.

Legislative information is available on governmental websites, including laws, ordinances, guidelines and texts of licence conditions. Increasingly, many kinds of data, policies, decisions, findings, analyses, et cetera are being actively published on government websites. Where necessary, reports in English are translated or a Dutch summary is provided. Inspectorates also publish information about their activities and in some cases summaries of their findings on the Internet. On several occasions, there are information meetings and also hearings, at which anyone can express his opinion on the issue at hand.

Parliament is actively informed by the RB via the minister of Economic Affairs. All national and EU reports related to the 'stress test' analysis and Peer Review have been sent to Parliament and are also available on the government website. This is also true for the reports associated with the Convention on Nuclear Safety and the Joint Convention on the Safe Management of Spent Fuel and the Safe Management of Radioactive Waste. In addition to the English versions of the reports, a Dutch translation or Dutch summary often is provided. Accompanying explanatory letters to the Parliament always are in Dutch. Early 2012 in the Netherlands a public meeting was organised, focused on the results presented in the National Report on the stress test of the Dutch NPP.

The RB is aware of the different backgrounds of informed groups and the general public. The ministries, of which the RB is part of, often produce easy to understand press releases, as well as detailed reports. Of some reports, there are detailed as well as summary versions (in the Dutch language). Most information targeted at the Dutch audience (general public, staff of governmental bodies, Parliament etcetera) is published in Dutch. Information targeted at informed groups (experts) and peers in other countries is mainly published in English, usually with a summary in Dutch.

8.1.c *Frequency of information provision including arrangements for ensuring that the information provided is up to date and easily accessible*

Information on laws and other regulation, as well as licences and regulatory decisions related to licensing, are published on the governmental website, as soon as available. This information is kept up to date.

Starting licensing processes, and associated information meetings are timely announced in major newspapers and on the Internet.

Every reportable incident is published on the website of the inspectorate. On a yearly basis the supervision branch of the RB reports to Parliament about the incidents at nuclear installations.

8.1.d Particular arrangements for providing information in emergency situations

Chapter VI of the Nuclear Energy Act also addresses (in Article 43) the provision of information to those members of the population who might be affected by a nuclear accident. Consistent with its responsibility for managing the response to a (potential) nuclear accident, national government also is responsible for informing the public. This will be done in close cooperation with the local authorities in the threatened or affected area.

In case of a threat or emergency that needs national coordination, and needs the involvement of various ministries, the National Crisis Center will set up a national crisis communication centre to inform the public. Experts from the various ministries will help and support the local and regional Public Information Units based on the recently developed Communication Strategy for Nuclear and Radiological Emergencies. Public information about the potential risks of NPPs and the existing emergency plans is provided by the municipalities. The material needed for the information may be provided by central government, as has been the case for the municipalities in the vicinity of the Borssele and Doel NPPs, the latter being in Belgium but close to the Dutch border.

In addition, the governmental websites have a link to the topic of 'crises', where information can be found on numerous aspects of nuclear accidents. Another part of the site, to be open to the public only in emergency situations, contains a more comprehensive set of relevant questions and answers.

8.1.e Categories of information that are not being provided and the legal basis that is limiting access to information and appeal mechanisms

Under the Dutch Government Information (Public Access) Act (Wob), any person can request information related to an administrative matter as contained in documents held by public authorities or companies carrying out work for a public authority. As a basic principle, information held by public authorities is public, excluding information covered by the exceptions enumerated in Article 10 of the Act. Such exceptions may be based on concern for security of the state, major commercial interests that may be harmed by publication of some company data, etcetera.

8.1.f Information provided by Licence Holders

The operators and LHs of nuclear facilities present their activities to the general public via local presentations at meetings, dedicated websites and publicly available reports.

ARTICLE 9 Reporting

This chapter describes how the Netherlands satisfies the requirements of Article 9 on reporting and regulatory self-assessment.

9.0 Text of Article

Article 9 - Reporting

1. Member States shall submit a report to the Commission on the implementation of this Directive for the first time by 22 July 2014, and every three years thereafter, taking advantage of the review and reporting cycles under the Convention on Nuclear Safety.
2. On the basis of the Member States' reports, the Commission shall submit a report to the Council and the European Parliament on progress made with the implementation of this Directive.
3. Member States shall at least every 10 years arrange for periodic self-assessments of their national framework and competent regulatory authorities and invite an international peer review of relevant segments of their national framework and/or authorities with the aim of continuously improving nuclear safety. Outcomes of any peer review shall be reported to the Member States and the Commission, when available.

9.1 Periodic reporting

According to the Directive in Article 9(1): "*Member States shall submit a report to the Commission on the implementation of this Directive for the first time by 22 July 2014, and every three years thereafter, taking advantage of the review and reporting cycles under the Convention on Nuclear Safety.*"

The present report is a first in a series of such reports to the Commission. The Netherlands will respect the agreed reporting cycles.

9.2 Reporting by the Commission

According to the Directive in Article 9(2): "On the basis of the Member States' reports, the Commission shall submit a report to the Council and the European Parliament on progress made with the implementation of this Directive."

To facilitate the Commission's abovementioned task, the Netherlands will follow the guidelines for national reports, provided by the European Nuclear Safety Regulators Group (ENSREG).

9.3 Periodic self assessment of the national framework and the Competent regulatory authority

According to the Directive in Article 9(3): "*Member States shall at least every 10 years arrange for periodic self-assessments of their national framework and competent regulatory authorities and invite an international peer review of relevant segments of their national framework and/or authorities with the aim of continuously improving nuclear safety. Outcomes of any peer review shall be reported to the Member States and the Commission, when available.*"²⁹

The Netherlands' RB has invited an (IAEA) IRRS mission. The final mission will visit the RB in November 2014. In preparation for this mission, the RB is in the process of an extensive self assessment. The findings of the mission will be shared with the

²⁹ A similar requirement is also included in the 'Waste Directive', DIRECTIVE 2008/98/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

Commission and the Member States. The Netherlands will respect the periodicity for such self assessments, as required by the Nuclear Safety Directive.

Annex 1 Transposition of Directive 2009/71 Euratom

This Annex presents the original Dutch text of the regulation as well as an unofficial 'courtesy' translation into English.

ORIGINAL DUTCH TEXT:

STAATSCOURANT NR.12517, 19 JULI 2011

Regeling van de Minister van Economische Zaken, Landbouw en Innovatie en de Staatssecretaris van Sociale Zaken en Werkgelegenheid van 18 juli 2011, nr. WJZ/11014550, houdende de implementatie van richtlijn nr. 2009/71/Euratom van de Raad van de Europese Unie van 25 juni 2009 tot vaststelling van een communautair kader voor de nucleaire veiligheid van kerninstallaties (PbEU L 172/18) (Tijdelijke regeling implementatie richtlijn nr. 2009/71/Euratom inzake nucleaire veiligheid).

De Minister van Economische Zaken, Landbouw en Innovatie en de Staatssecretaris van Sociale Zaken en Werkgelegenheid,

Gelet op richtlijn nr. 2009/71/Euratom van de Raad van de Europese Unie van 25 juni 2009 tot vaststelling van een communautair kader voor de nucleaire veiligheid van kerninstallaties (PbEU L 172/18) en de artikelen 18a, derde lid, 21, eerste lid, en 76, vierde lid, van de Kernenergiewet;

Besluiten:

Artikel 1

In deze regeling wordt verstaan onder:

- kerninstallatie: inrichting als bedoeld in artikel 15, onderdeel b, van de wet;
- Minister: Minister van Economische Zaken, Landbouw en Innovatie;
- nucleaire veiligheid: de toestand van deugdelijke bedrijfsomstandigheden en de aanwezigheid van preventie- en beschermingsmechanismen ter voorkoming van ongevallen en de beperking van de gevolgen van ongevallen, die ervoor zorgen dat werknemers en bevolking beschermd worden tegen de aan ioniserende straling van een inrichting als bedoeld in artikel 15, onder b, van de wet verbonden gevaren;
- vergunninghouder: natuurlijke persoon of rechtspersoon die een vergunning als bedoeld in artikel 15, onderdeel b, van de wet houdt;
- wet: Kernenergiewet.

Artikel 2

1. De vergunninghouder zorgt dat de nucleaire veiligheid van de onder zijn beheer zijnde kerninstallatie continu op systematische en verifieerbare wijze wordt onderzocht en geëvalueerd.
2. De vergunninghouder betreft bij de onderzoeken en evaluaties de voor de desbetreffende kerninstallatie:
 - a. relevante ontwikkelingen en inzichten inzake de nucleaire veiligheid van vergelijkbare installaties in binnen- en buitenland;
 - b. de mogelijkheden de nucleaire veiligheid te verbeteren.
3. De vergunninghouder houdt de weerslag van de onderzoeken en evaluaties systematisch bij en zorgt dat deze op toegankelijke wijze bewaard blijven.

4. De vergunninghouder doet iedere tien jaar verslag aan de Minister inzake de nucleaire veiligheid van de onder zijn beheer zijnde kerninstallatie op basis van de onderzoeken en evaluaties.
5. Onverminderd het vierde lid kan de Minister de vergunninghouder opdragen tussentijds verslag te doen indien dat naar zijn oordeel met het oog op de nucleaire veiligheid wenselijk is.

Artikel 3

1. Zodra de onderzoeken en evaluaties daartoe aanleiding geven neemt de vergunninghouder, onverminderd het bepaalde in de vergunningvoorschriften, de maatregelen die redelijkerwijs van hem gevegd kunnen worden om de nucleaire veiligheid te verbeteren.
2. Indien maatregelen ter verbetering van de nucleaire veiligheid aanpassing van vergunningvoorschriften vergen, doet de vergunninghouder bij de Minister onverwijld een aanvraag tot wijziging van de vergunningvoorschriften.

Artikel 4

Een verslag als bedoeld in artikel 2, vierde lid, bevat in elk geval:

- a. een evaluatie van de technische, organisatorische en personele voorzieningen ter waarborging van de nucleaire veiligheid van de kerninstallatie;
- b. een evaluatie van de maatregelen die zijn genomen ter voorkoming van ongevallen en de verdere beperking van de gevolgen daarvan, waaronder in elk geval een evaluatie van de fysieke beschermingsmechanismen en administratieve beschermingsprocedures;
- c. een analyse van de eigen bedrijfservaringen, inclusief storingen, en informatie verkregen bij andere kerninstallaties en relevante onderzoeksprogramma's voor zover van toepassing op de nucleaire veiligheid van de kerninstallatie;
- d. een verantwoording van de gevolgde meet- en onderzoeksmethodes, alsmede de registratie daarvan.

Artikel 5

De vergunninghouder zorgt dat de beheerssystemen van de kerninstallatie zodanig wordt ingericht en uitgevoerd dat voldoende prioriteit wordt gegeven aan nucleaire veiligheid.

Artikel 6

1. De vergunninghouder beschikt over een opleidingsplan voor de opleiding en training van het personeel met het oog op de nucleaire veiligheid van de onder zijn beheer zijnde kerninstallatie en geeft uitvoering aan dit opleidingsplan.
2. Een opleidingsplan als bedoeld in het eerste lid bevat in elk geval:
 - a. het benodigde opleidingsniveau van personeelsleden, gedifferentieerd naar functie;
 - b. trainingen gericht op de actualisatie van de deskundigheid van het personeel;
 - c. instructies en praktijkoefeningen voor het personeel.

Artikel 7

1. De vergunninghouder beschikt over voldoende financiële en personele middelen om te voldoen aan de verplichtingen inzake de nucleaire veiligheid van de onder zijn beheer zijnde kerninstallatie.
2. De Minister kan een vergunninghouder een aanwijzing geven inzake een aanpassing in de omvang of de beschikbaarheid van bepaalde financiële of personele middelen.
3. Een aanwijzing als bedoeld in het tweede lid bevat een redelijke termijn van tenminste een maand waarbinnen aan de aanwijzing gevolg moet zijn gegeven.

Artikel 8

Deze regeling treedt in werking met ingang van 22 juli 2011 en vervalt op 1 juli 2013.

Artikel 9

Deze regeling wordt aangehaald als: Tijdelijke regeling implementatie richtlijn nr. 2009/71/Euratom inzake nucleaire veiligheid.

Deze regeling zal met de toelichting in de Staatscourant worden geplaatst.

Den Haag, 18 juli 2011

*De Minister van Economische Zaken, Landbouw en Innovatie,
M.J.M. Verhagen.*

*De Staatssecretaris van Sociale Zaken en Werkgelegenheid,
P. de Krom.*

UNOFFICIAL 'COURTESY' TRANSLATION:

Ordinance of the Minister of Economic Affairs, Agriculture and Innovation and the State Secretary for Social Affairs and Employment of 18 July 2011, no. WJZ/11014550, concerning the implementation of Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations (OJEU L 172/18) (Temporary ordinance implementing Directive No. 2009/71/Euratom on nuclear safety)³⁰.

The Minister of Economic Affairs, Agriculture and Innovation, and the Secretary of State for Social Affairs and the Employment,

Having regard to Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations (PbEU L 172/18) and sections 18a (3), 21 (1), and 76 (4), of the Nuclear Energy Act;

Hereby order:

Article 1

In this regulation the following terms are defined as follows:

- *nuclear installation*: a nuclear facility as referred to in section 15 (b) of the Act;
- *Minister*: Minister of Economic Affairs, Agriculture and Innovation;
- *nuclear safety*: the achievement of proper operating conditions and the presence of prevention and protection mechanisms to prevent accidents and mitigate the

³⁰ Please note that this temporary ordinance has been made permanent in 2013.

consequences of accidents, resulting in protection of workers and the general public from dangers arising from ionising radiations from a facility as referred to in section 15 (b) of the Act;

– *licence holder*: a natural or legal person who has a licence as provided for in section 15 (b) of the Act;

– *Act*: Nuclear Energy Act.

Article 2

1. The licence holder shall ensure that the nuclear safety of the nuclear installation under its management is continuously inspected and evaluated in a systematic and verifiable manner.
2. When inspecting and evaluating the nuclear installation concerned, the licence holder shall take account of the following:
 - a. relevant developments and insights concerning nuclear safety at comparable installations in the Netherlands and abroad;
 - b. opportunities for improving nuclear safety.
3. The licence holder shall keep systematic records of the inspection and evaluation results and ensure that they are stored in such a way as to be accessible when needed.
4. Every ten years the licence holder must submit to the Minister responsible for nuclear safety a report based on the results of the inspections and evaluations of the nuclear installation under its management.
5. Without prejudice to paragraph 4, the Minister may instruct the licence holder to submit an interim report if he believes this would be desirable in the interests of nuclear safety.

Article 3

1. As soon as the inspections and evaluations so require, the licence holder, without prejudice to the provisions of the licence requirements, shall take such measures as can reasonably be expected of it to improve the nuclear safety of the installation.
2. If measures to improve nuclear safety require amendment of licence requirements, the licence holder shall immediately submit an application to the Minister to amend the licence requirements.

Article 4

A report as referred to in article 2, paragraph 4, must in any event contain:

- a. an evaluation of the technical, organisational and human resources to ensure the nuclear safety of the nuclear installation;
- b. an evaluation of the measures taken to prevent accidents and mitigate their consequences, including in any event an assessment of the physical protection mechanisms and administrative protection procedures;
- c. an analysis of the own operational experiences, including abnormal situations, and operational experiences from other installations and relevant research programs to the extent applicable to the nuclear safety of the own nuclear installation;

- d. a justification of the measurement and research methods used, as well as their registration.

Article 5

The licence holder must ensure that the management systems of the nuclear installation are organised and implemented in such a way that sufficient priority is given to nuclear safety.

Article 6

1. The licence holder shall have a training plan for the education and training of staff with a view to ensuring the nuclear safety of the nuclear installation under its management and must implement this plan.
2. A training plan as referred to in paragraph 1 must in any event contain:
 - a. the required levels of training for staff, differentiated by function;
 - b. training sessions focused on updating the expertise of staff;
 - c. instructions and practice exercises for staff.

Article 7

1. The licence holder shall have sufficient financial and human resources to fulfil its obligations with regard to the nuclear safety of the nuclear installation under its management.
2. The Minister may give a licence holder an instruction about adjusting the scale or availability of certain financial or human resources.
3. An instruction as referred to in paragraph 2 must allow a reasonable period of at least one month for compliance with the instruction.

Article 8

This ordinance will enter into force on 22 July 2011³¹.

Article 9

This ordinance may be cited as the Regulation on the Implementation of Directive 2009/71/Euratom on Nuclear Safety.

This ordinance will be published with its explanatory notes in the Government Gazette.

The Hague, 18 July 2011

*The Minister of Economic Affairs, Agriculture and Innovation,
M.J.M. Verhagen.*

*The State Secretary for Social Affairs and Employment,
P. de Krom.*

³¹ Please note that this temporary ordinance has been made permanent in 2013.

Annex 2 Nuclear Safety Rules (NVRs)

No.	Title
NVR NS-R-3	'Beoordeling van de vestigingsplaats voor kernenergiecentrales' Adaptation of: IAEA Safety Requirements Safety Standard Series No. NS-R-3, Site Evaluation for Nuclear Installations Safety Requirements
NVR NS-G-3.1	'Externe door de mens veroorzaakte gebeurtenissen bij de beoordeling van de vestigingsplaats voor kernenergiecentrales' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-3.1, External Human Induced Events in Site Evaluation for NPPs
NVR NS-G-3.2	'Verspreiding van radioactieve stoffen in lucht en water en beschouwing van de verdeling van de bevolking bij de beoordeling van de vestigingsplaats voor kernenergiecentrales' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-3.2, Dispersion of Radioactive Material in Air and Water and Consideration of Population Distribution in Site Evaluation for NPPs
NVR NS-G-3.3	'Beoordeling van seismische gebeurtenissen van invloed op de veiligheid van kernenergiecentrales' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-3.3, Evaluation of Seismic Hazards for NPPs
NVR NS-G-3.4	'Meteorologische gebeurtenissen bij de beoordeling van de vestigingsplaats voor kernenergiecentrales' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-3.4, Meteorological Events in Site Evaluation of NPPs
NVR NS-G-3.5	'Beoordeling van overstromingsgevaar voor kernenergiecentrales met vestigingsplaats aan de kust of aan een rivier' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-3.5, Flood Hazard for NPPs on Coastal and River Sites
NVR NS-G-3.6	'Geotechnische aspecten bij de beoordeling van de vestigingsplaats en funderingen voor kernenergiecentrales' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-3.5, Geotechnical Aspects of Site Evaluation and Foundations for NPPs
NVR NS-R-1	'Veiligheid van kernenergiecentrales: veiligheidseisen voor het ontwerp' Adaptation of: IAEA Safety Requirements Safety Standard Series No. NS-R-1, Safety of Nuclear Power Plants: Design Safety Requirements
NVR NS-G-1.1	'Programmatuur voor computergestuurde veiligheidsrelevante systemen voor kernenergiecentrales' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-1.1, Software for Computer Based Systems Important to Safety in NPPs
NVR NS-G-1.2	'Veiligheidsbeoordeling en -verificatie voor kernenergiecentrales' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-1.2, Safety Assessment and Verification for NPPs
NVR NS-G-1.3	'Veiligheidsrelevante meet- en regelsystemen voor kernenergiecentrales' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-1.3, Instrumentation and Control Systems Important to Safety in NPPs

No.	Title
NVR NS-G-1.4	' <i>Ontwerp van splijtstofhantering en -opslag systemen in kernenergiecentrales</i> ' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-1.4, Design of Fuel Handling and Storage Systems in NPPs
NVR NS-G-1.5	' <i>Externe gebeurtenissen met uitzondering van aardbevingen in het ontwerp van kernenergiecentrales</i> ' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-1.5, External Events Excluding Earthquakes in the Design of NPPs
NVR NS-G-1.6	' <i>Seismisch ontwerp en kwalificatie voor kernenergiecentrales</i> ' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-1.6, Seismic Design and Qualification for NPPs
NVR NS-G-1.7	' <i>Bescherming tegen interne branden en explosies in het ontwerp van kernenergiecentrales</i> ' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-1.7, Protection Against Internal Fires and Explosions in the Design of NPPs
NVR NS-G-1.8	' <i>Ontwerp van noodstroom systemen voor kernenergiecentrales</i> ' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-1.8, Design of Emergency Power Systems for NPPs
NVR NS-G-1.9	' <i>Ontwerp van het reactor koel- en aanverwante systemen in kernenergiecentrales</i> ' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-1.9, Design of the Reactor Coolant System and Associated Systems in NPPs
NVR NS-G-1.10	' <i>Ontwerp van reactor insluiting systemen voor kernenergiecentrales</i> ' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-1.10, Design of Reactor Containment Systems for NPPs
NVR NS-G-1.11	' <i>Bescherming tegen interne gevaren anders dan branden en explosies in het ontwerp van kernenergiecentrales</i> ' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-1.11, Protection Against Internal Hazards other than Fires and Explosions in the Design of NPPs
NVR NS-G-1.12	' <i>Ontwerp van de reactor kern voor kernenergiecentrales</i> ' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-1.12, Design of the Reactor Core for NPPs
NVR NS-G-1.13	' <i>Stralingsbescherming aspecten in het ontwerp voor kernenergiecentrales</i> ' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-1.13, Radiation Protection Aspects of Design for NPPs
NVR NS-R-2	' <i>Veiligheid van kernenergiecentrales: veiligheidseisen voor de bedrijfsvoering</i> ' Adaptation of: IAEA Safety Requirements Safety Standard Series No. NS-R-2, Safety of Nuclear Power Plants: Operation Safety Requirements
NVR NS-G-2.1	' <i>Brandveiligheid in de bedrijfsvoering van kernenergiecentrales</i> ' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-2.1, Fire Safety in the operation of NPPs
NVR NS-G-2.2	' <i>Bedrijfslimieten en -voorwaarden en bedrijfsvoeringsprocedures voor kernenergiecentrales</i> ' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-2.2, Operational Limits and Conditions and Operating Procedures for NPPs
NVR NS-G-2.3	' <i>Wijzigingen aan kernenergiecentrales</i> ' Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-2.3, Modifications to NPPs

No.	Title
NVR NS-G-2.4	<i>'De bedrijfsvoeringsorganisatie voor kernenergiecentrales'</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-2.4, The Operating Organization for NPPs
NVR NS-G-2.5	<i>'Beheer van de kern en splijstof hantering voor kernenergiecentrales'</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-2.5, Core Management and Fuel Handling for NPPs
NVR NS-G-2.6	<i>'Onderhoud, toezicht en in-service inspecties in kernenergiecentrales'</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-2.6, Maintenance, Surveillance and In-service Inspection in NPPs
NVR NS-G-2.7	<i>'Straling bescherming en radioactief afval tijdens het bedrijven van kernenergiecentrales'</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-2.7, Radiation Protection and Radioactive Waste Management in the Operation of NPPs
NVR NS-G-2.8	<i>'Werving, kwalificatie en training van personeel voor kernenergiecentrales'</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-2.8, Recruitment, Qualification and Training of Personnel for NPPs
NVR NS-G-2.9	<i>'Inbedrijfstelling voor kernenergiecentrales'</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-2.9, Commissioning for NPPs
NVR NS-G-2.10	<i>'Periodieke veiligheidsbeoordeling voor kernenergiecentrales'</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-2.10, Periodic Safety Review of NPPs
NVR NS-G-2.11	<i>'Een systeem voor de terugkoppeling van ervaringen van gebeurtenissen in nucleaire installaties'</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-2.11, A System for the Feedback of Experience from Events in Nuclear Installations
NVR NS-G-2.12	<i>'Verouderingsbeheer voor kernenergiecentrales'</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-2.12, Ageing Management for NPPs
NVR NS-G-2.13	<i>'Beoordeling van seismische veiligheid voor bestaande nucleaire installaties'</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-2.13, Evaluation of Seismic Safety for Existing Nuclear Installations
NVR NS-G-2.14	<i>'Bedrijfsvoering van kernenergiecentrales'</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-2.14, Conduct of operations at NPPs
NVR NS-G-2.15	<i>'Beheer van zware ongevallen voor kernenergiecentrales'</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. NS-G-2.15, Severe Accident Management Programmes for NPPs
NVR GS-R-3	<i>'Het managementsysteem voor faciliteiten en activiteiten'</i> Adaptation of: IAEA Safety Requirements Safety Standard Series No. GS-R-3, The Management System for Facilities and Activities
NVR GS-G-3.1	<i>'Toepassing van het managementsysteem voor faciliteiten en activiteiten'</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. GS-G-3.1, Application of the Management System for Facilities and Activities
NVR GS-G-3.5	<i>'Het managementsysteem van nucleaire installaties'</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. GS-G-3.5, The Management System of Nuclear Installations

No.	Title
NVR GS-R-4	' <i>Veiligheidsbeoordeling voor faciliteiten en activiteiten</i> Adaptation of: IAEA Safety Requirements Safety Standard Series No. GS-R-4, Safety Assessment for Facilities and Activities
NVR GS-G-4.1	' <i>Vorm en inhoud van het veiligheidsrapport voor kernenergiecentrales</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. GS-G-4.1, Format and Content of the Safety Analysis Report for NPPs
NVR SSG-9	' <i>Seismische gevaren bij de beoordeling van de vestigingsplaats voor nucleaire installaties</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. SSG-9, Seismic Hazards in Site Evaluation for Nuclear Installations
NVR SSG-2	' <i>Deterministische veiligheidsanalyse voor kernenergiecentrales</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. SSG-2, Deterministic Safety Analysis for NPPs
NVR SSG-3	' <i>Ontwikkeling en toepassing van niveau 1 probabilistische veiligheidsanalyse voor kernenergiecentrales</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. SSG-3, Development and Application of Level 1 Probabilistic Safety Assessment for NPPs
NVR SSG-4	' <i>Ontwikkeling en toepassing van niveau 2 probabilistische veiligheidsanalyse voor kernenergiecentrales</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. SSG-4, Development and Application of Level 2 Probabilistic Safety Assessment for NPPs
NVR GS-R-2	' <i>Gereedheid voor en bestrijding van een nucleaire of radiologische noodsituatie</i> Adaptation of: IAEA Safety Requirements Safety Standard Series No. GS-R-2, Preparedness and Response for a Nuclear or Radiological Emergency
NVR GS-G-2.1	' <i>Vorbereiding voor de gereedheid voor en bestrijding van een nucleaire of radiologische noodsituatie</i> Adaptation of: IAEA Safety Guide Safety Standard Series No. GS-G-2.1, Arrangement for Preparedness and Response for a Nuclear or Radiological Emergency
NVR 2.1.1	' <i>Safety functions and component classification for BWR, PWR and PTR</i> Adaptation of: IAEA Safety Guide Series No. 50 SG-D1
NVR 3.2.1	Voorschriften Opleiding van Bedieningspersoneel van Kernenergiecentrales

Annex 3 Periodic Safety Reviews (PSRs)

The LH of the Borssele NPP conducts and reports a Periodic Safety Review every 2 and 10 years. The requirements of the PSRs have been laid down in the licence. The 2-yearly safety review considers the safety performance against existing codes and standards. The objective of this review is to evaluate the technical, operational, human and administrative facilities with regard to nuclear safety and radiation protection, and to take appropriate action if consistency with the design basis cannot fully be demonstrated. The 10-yearly safety review evaluates developments in technological and regulatory insights to ensure that plant remains in compliance with the "state of the art".

Before the official introduction of PSRs, a major upgrade was established in 1986 with the introduction of the 'bunker concept'. This is a 'two-train'-bunker concept, protected against high flood level and earthquakes. It contains two 100% trains of diverse systems for primary make-up and emergency feedwater supply and two 100% Emergency Diesels.

First PSR and associated modifications

In the late 1980s, mainly as a result of the Chernobyl accident, the Dutch government formulated an accident management and back-fitting policy. The LH of Borssele NPP was asked to upgrade the safety of its plants by incorporating state-of-the-art features.

In the early 1990s, with the aid of the reactor supplier, the LH developed a new safety concept for its plant. The utility operating the Borssele NPP (which was 20 years old at the time) embarked on a € 200 million modification programme.

The basis was the first 10-yearly safety review of 1993. A comparison of the plant's then current design basis with national and international deterministic nuclear safety rules was made. Additional input for the new safety concept were plant insights gained from similar designs; operating experience and the German Risk Study (DRS-B). A plant-specific PSA was performed in parallel with the activities for the conceptual design. This PSA played a major role in later stages of the modification programme. Once the safety concept had been finalised, it was translated into a 'safety plan', consisting of a package of modification proposals for the plant systems, structures and components.

Safety improvements were:

- Extensive improvement of functional and physical separation of redundant systems and increase of redundancies and some diverse systems;
- Improvement of protection against external events. E.g.: reserve ultimate heat sink by eight 17% deep wells, emergency control room in hardened building, emergency response center in bunker;
- Improve protection against LOCA, SB-LOCA, MSLB, SGTR and SBO – expansion of emergency power system to 3x 100% EDGs in different locations around the plant;
- Improve AM and SAM: introduction of SAMG's, Passive Autocatalytic Recombiners (PARs) and filtered containment venting, bleed and feed, adoption of the WOG Generic SAMGs (in operation since 2000);
- Introduction of 30 minutes grace time for all design base events, 10 hours autarky time and 24 hour autonomy time for design base external events;
- Modernisation of control room and introduction of full scope simulator;

Second PSR and associated modifications

The second 10-yearly safety review finalized in 2003, resulted in the project "Mod2Go". The safety-interests of improvement-issues had been estimated, from a

nuclear safety point of view as well as from a radiation protection point of view using both deterministic and probabilistic considerations. Again, the plant-specific living Probabilistic Safety Assessment (PSA) model was a major tool.

Some major measures were:

- Increasing the supply of diesel oil in the bunker systems from 24 hours to 72 hours;
- Possibility to supply the bunkered systems by the primary (large capacity) EDGs;
- Extension of the autonomy time to 72 hours for design base external events;
- Protection against hazardous gases from river Westerschelde shipping accidents (toxic, combustible);
- Increasing the flooding margin of the bunkered systems by raising the SBO EDG's air intakes;
- Installation of a second reserve cooling water (TE) pump;
- Automatic starting of the bunkered primary reserve injection system if the level in the RPV becomes too low during midloop operation;
- Improvement of the emergency Operating Procedures (EOPs) with regard to avoiding dilution of the primary coolant after start-up of a main coolant pump;
- Extension of the SAMGs to low-power and shut-down modes of operation;
- Implementation of an E-0 optimal recovery guideline for low-power and shut-down modes of operation (E-0 = reactor trip and safety injection, diagnostics).

Third PSR and associated modifications – implementation 2014 - 2017

The third PSR was finished in 2013. A part of the third PSR coincided with the LTO programme and the European 'stress test'. The implementation of the stress test at the LH was also known as a Complimentary Safety Assessment (CSA).

First half of 2014 the KFD conducted its review of the PSR. Second half of 2014 the LH submitted its improvement plan to the RB.

The highlights of potential measures are:

- Technical measures: management of core melt, extension of autarky and autonomy, protection of electrical components and digital I&C.
- Operational measures: safety culture actions, further strengthening of the emergency response organization.

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