Ministry of Economic Affairs

Netherlands' NAcP - edition 2014

2nd National Action Plan (NAcP) for the follow-up of post-Fukushima Dai ichi related activities

Report for the ENSREG-led Peer Review Meeting to be held in April 2015

December 2014

Abstract

This is the 2nd version of the National Action Plan (NAcP) of the Kingdom of the Netherlands for the follow up of Fukushima Dai ichi related activities at the single NPP in the Netherlands as well as at the governmental bodies involved. In April 2015 there will be an ENSREG-led NAcP Peer Review Workshop where the results of the National Action Plans will be discussed.

This National Action Plan reflects the intended focus of aforementioned meeting. It is structured along six main topics identified by ENSREG and the Contracting Parties to the Convention on Nuclear Safety. For each topic it presents an update and status of the analyses conducted, activities performed by the operator and those performed by the regulator. It also provides for a tabled summary of the planning of activities at the Licensee (EPZ of NPP Borssele).

In addition the Netherlands made a first verification of the status of implementation in Dutch regulations and at the NPP Borssele of the recently published WENRA RLs for existing reactors (Fukushima related changes). The results are presented in chapter 8.

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List of Symbols and Abbreviations

AC	Alternating Current
ANVS	Autoriteit Nucleaire Veiligheid en Stralingsbescherming, (Authority for Nuclear Safety and Radiation protection), the new Regulatory Body
BORI	'Back Office Radiologische Informatie'; back-office of the National Nuclear Assessment Team for radiological analyses and information during accidents
CNRA	Committee on Nuclear Regulatory Activities (of the OECD/NEA)
CNS	Convention on Nuclear Safety
CP	Contracting Parties
CSA	Complementary Safety margin Assessment, a.k.a. 'stress test'
CSNI	Committee on the Safety of Nuclear Installations (of the OECD/NEA)
DBA	Design Basis Accident
DBE	Design Basis Earthquake
DBF	Design Basis Flood
DC	Direct Current
DG	Diesel Generator
EDG	Emergency Diesel Generator
EDMG	Extensive Damage Mitigation Guidelines
EIA	Environmental Impact Assessment
EL&I	Former 'Ministerie van Economische zaken, Landbouw & Innovatie'; Ministry of Economic Affairs, Agriculture & Innovation, now 'Ministry of Economic Affairs' (EZ).
ENSREG	European Nuclear Safety Regulators Group
EOP	Emergency Operating Procedure
EPRI	Electric Power Research Institute
EPZ N.V.	Elektriciteits-Produktiemaatschappij Zuid-Nederland EPZ, licensee of the Borssele NPP
ERO	Emergency Response Organisation
EU	European Union
EUROSAFE	Forum organized by European TSOs
EZ	'Ministerie van Economische Zaken'; Ministry of Economic Affairs
10EVA13	Current 10 yearly safety evaluation; periodic safety review (PSR)
HERCA	Heads of the European Radiological protection Competent Authorities
HF	Human Factors
HOF	Human and Organisational Factors
ICMS	'Intensivering Civiel-Militaire Samenwerking'; intensifying civil-military cooperation

IenM	'Ministerie van Infrastructuur & Milieu'; Ministry of Infrastructure & the Environment
IAEA	International Atomic Energy Agency
ILT	Human Environment and Transport Inspectorate
IPPAS	International Physical Protection Advisory Service
IRRS	Integrated Regulatory Review Service
KCB	Kerncentrale Borssele; NPP Borssele
KFD	Kernfysische Dienst; Department for Nuclear Safety, Security, Safeguards, and Radiation Protection of ILT
KNMI	'Koninklijk Nederlands Meteorologisch Instituut'; Royal Netherlands Meteorological Institute
KWU	Kraftwerk Union
LH	Licence Holder, licensee
LOCC	'Landelijk Operationeel Coördinatiecentrum', national operational coordination centre for operational and logistic assistance and support
LOOP	Loss Of Offsite Power
LUHS	Loss of Ultimate Heat Sink
MCR	Main Control Room
NAcP	National Action Plan (for post-fukushima Dai ichi activities)
NCS	'Nationaal Crisisplan Stralingsincidenten', i.e. National Plan for Nuclear and Radiological Emergencies
NEA	Nuclear Energy Agency of the OECD
NERIS	European Platform on Preparedness for Nuclear and Radiological Emergency Response and Recovery
NIV	'Projectdirectie voor Nucleaire Installaties en Veiligheid'; directorate for nuclear installations and nuclear safety
NL	Netherlands
NMR	'Nationaal Meetnet Radioactiviteit'; national radiological monitoring network
NPK	'Nationaal Plan Kernongevallenbestrijding'; national plan for nuclear emergency management and response
NPP	Nuclear Power Plant
NRC	Nuclear Regulatory Commission (in the USA)
NRG	Nuclear Research & consultancy Group (in the Netherlands)
OECD	Organisation for Economic Cooperation and Development
PAR	Passive Autocatalytic Recombiner
PGA	Peak Ground Acceleration
PORV	Power-Operated Relief Valve
PSA	Probabilistic Safety Analysis
PWR	Pressurised Water Reactor

RB	Regulatory Body or 'regulator'
RIVM	'Rijksinstituut voor Volksgezondheid en Milieu'; National Institute for Public Health and the Environment
SALTO	Safety Aspects of Long Term Operation
SAM	Severe Accident Management
SAMG	Severe Accident Management Guidelines
SBO	Station Blackout
SFP	Spent Fuel Pool
SMA	Seismic Margin Assessment
SOER	Significant Operating Experience Report (WANO)
SSCs	Structures, Systems and Components
TSO	Technical Support Organisation, in this NAcP organizations supporting Regulatory Bodies.
UPS	Uninterrupted Power Supply
USA	United States of America
WANO	World Association of Nuclear Operators
WENRA	Western European Nuclear Regulators Association
xCNS	Extraordinary Meeting of the Contracting Parties to the Convention on Nuclear Safety – in this NAcP reference is made to the 2nd xCNS

Introduction

This section starts with the background of the National Action Plan (NAcP) Peer Review Workshop to be organised by ENSREG from 20 to 24 April 2015 and then sets out the purpose and scope of this document: '2nd *Netherlands' Action Plan edition 2014 for post-Fukushima Dai ichi related activities'*. It then continues with the intended audience, links to detailed information on the single operating Dutch Nuclear Power Plant (NPP), and introduction to the Regulatory Body. The introduction finishes with a description of the structure of the present report.

Background

In 2011 the licensees of NPPs in the EU produced their reports ('Licensee Reports') on the 'stress test' of their facilities, in accordance with the ENSREG specifications. In a second step, the regulatory bodies evaluated these reports, and reported their findings in 'National Reports' and submitted these to ENSREG. Later in a third step there was a Peer Review of these reports. This yielded a set of so-called Country Reports and a Summary Report with recommendations for consideration by the participating countries, which was endorsed by ENSREG in April 2012. This publication was one of the actions of the ENSREG action plan to assist the member states.

In parallel with the European efforts, the international community took important steps. On the 5th regular review conference of the CNS (4 – 14 April 2011) it was decided to organize from 27 – 31 August 2012 a 2nd CNS Extraordinary Meeting[1] on the lessons learnt after 'Fukushima Dai-ichi'. In May 2012, all participating countries submitted a National Report to the CNS secretariat, dedicated to the purposes of this 2nd Extraordinary Meeting ('xCNS'). A summary of the findings of the meeting was published in a CNS summary report[2]. In 2014 the 6th CNS peer review meeting was held, which reaffirmed the findings of the 2th Extraordinary meeting.

ENSREG has pursued continuation of the efforts of European countries in strengthening nuclear safety. Among others it published a 'Compilation of recommendations and suggestions'[3] (July 2012).

In December 2012 National Action Plans (NAcPs) on the follow-up of post-Fukushima actions, were submitted to ENSREG to be discussed in a dedicated ENSREG National Action Plan Peer Review workshop in April 2013. The NAcP Review Workshop was a focused review meeting, concentrating on actions and their implementation, responses and new developments that have been initiated or influenced by the accident at the Fukushima Dai-ichi Nuclear Power Plant in Japan, and have been presented earlier in National Reports to ENSREG and the 2nd Extraordinary Meeting of the CNS.

The 2013 workshop concluded that an additional Peer Review workshop should be undertaken in 2015 and would provide added value in understanding of the extend and the nature of measures to be implemented and a valuable opportunity for exchange of information among participants.

Purpose and Scope of this updated and 2nd National Action Plan

This NAcP has been drafted observing the requirements of ENSREG[4] and aims to present the current status of implementation of most actions reported earlier in the first NAcP.

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[1] The first Extraordinary Meeting of the CNS on 28 September 2009 was dedicated to the revision of the Guidelines regarding National Reports and rules of procedure and guidelines for training purposes.

[2] Mr Li Ganjie, Mr William Borchardt, Mr Patrick Majerus, '2nd Extraordinary Meeting of the Contracting Parties to the Convention of Nuclear Safety 27-31 August 2012 – Final Summary Report', IAEA, CNS/ExM/2012/04/Rev.2, August 2012.

[3] 'Compilation of recommendations and suggestions – Peer review of stress tests performed on European nuclear power plants', ENSREG, 26 July 2012

Like with the first NAcP, the present NAcP addresses the six topics identified in the 'Guidance for National Reports' of the 2nd Extraordinary Meeting of the CNS[1]. For the first three topics the elaboration is in line with those of the ENSREG-led Complementary Safety Assessment (CSA, a.k.a. 'stress test').

The ENSREG secretariat in the past provided detailed guidance on the structuring of the first NAcP. This guidance is also observed for the present second NAcP. Since then, ENSREG issued further guidance[5] for the 2nd NAcP which the present report adheres to. Per ENSREG guidance, the NAcP features four main parts.

Part I

This part features the topics of the ENSREG-led CSA.

- Topic 1: External Events
- Topic 2: Design Issues
- Topic 3: Severe Accident Management and Recovery (On-Site)

Part II

This part features the remaining topics of the Extraordinary Meeting of the CNS.

- Topic 4: National Organisations
- Topic 5: Emergency Preparedness and Response and Post-Accident Management (Off-Site)
- Topic 6: International Cooperation

Part III

- Generic activities and conclusions from National Review and related discussions.

Part IV

- National implementation of activities, with schedules.

Further explanation of the Dutch approach to the reporting in the NAcP can be found in the last section of the Introduction; 'Structure of the Dutch National Action Plan (NAcP)'.

Intended Audience

This National Action Plan (NAcP) is mainly targeted at regulatory bodies of other states that have participated in ENSREG-led Complementary Safety Assessments (a.k.a. 'stress tests') and related Peer Review, to enable them to perform a peer review of the present NAcP. As agreed the report is written in English. Nevertheless, it will be made available to the general public. The report will also be sent to the Dutch Parliament.

Detailed information on the Borssele NPP and its robustness

Detailed information on the Borssele NPP and assessment of its robustness can be found in:

- The self assessment by utility EPZ, also called 'Complementary Safety margin Assessment' (CSA), following the format prescribed by ENSREG, can be found at: http://www.rijksoverheid.nl/bestanden/documenten-en-publicaties/rapporten/2011/11/02/final-report-complementary-safety-margin-assessment/complementary-safety-margin.pdf
- The regulatory body's evaluation of the CSA performed by utility EPZ: http://www.rijksoverheid.nl/bestanden/documenten-en-

[4] National Action Plan (NAcP) Guidance as directed within the ENSREG Stress test Action Plan, HLG_p(2012-21), ENSREG, 2012

[5] Among others: ENSREG 2nd National Action Plan Workshop 2015 Information Pack Final, HLG_p(2014-28)_140, ENSREG, 2014

publicaties/rapporten/2011/12/20/netherland-s-national-report-on-the-post-fukushima-stress-test/netherland-s-national-report-on-the-post-fukushima-stress-test.pdf

Regulatory Body or Regulator

All nuclear facilities in the Netherlands, including the NPP of Borssele, operate under licence, awarded after a safety assessment has been carried out.

The licence is granted by the Regulatory Body (RB) under the Nuclear Energy Act. The 'Regulatory Body' is the authority designated by the government as having legal authority for conducting the regulatory process, including issuing licences, and thereby regulating nuclear, radiation, radioactive waste and transport safety, nuclear security and safeguards.

For more information on the RB, refer to chapter 4.

Structure of the Dutch National Action Plan (NAcP)

The present NAcP (version 2014) is designed to be a 'stand alone' document to facilitate the international review by other RBs. On the other hand it refers to publicly available material.

The information is presented largely in tables to provide maximum clarity.

The present NAcP has four main parts, per ENSREG-guidance.

PART I

Chapter 0 'General' addresses general conclusions as described in the ENSREG document 'Compilation of recommendations and suggestions' and the way these apply to the situation in the Netherlands.

Chapter 1 on 'External Events' addresses conclusions and activities related to External Events, as described in the ENSREG document 'Compilation of recommendations and suggestions'. Actions proposed are described to limited detail.

Chapter 2 on 'Design Issues' focuses on actions to prevent severe damage to the reactor and the spent fuel pool, including any last resort means, as well as an evaluation of the time available to prevent severe damage. The focus is on LOOP-SBO events and LUHS events.

Chapter 3 addresses the 'Severe Accident Management' (SAM) and Recovery on site. It focuses on actions to improve the capability in terms of mitigating actions taken if severe reactor or spent fuel pool damage occurs, in order to prevent large radioactive releases.

PART II

Chapter 4 'National Organisations' reviews actions taken by the organisations involved in maintaining and enhancing nuclear safety, and on the strength of these organisations. This review extends past governmental organisations, incorporating vendors and Technical Support Organisations cooperating with the governmental organisations in maintaining a high level of safety.

Chapter 5 is about 'Emergency Preparedness and Response and Post Accident Management off site'. These are essential to prevent or reduce the potential health effects of a release of radioactive materials.

Chapter 6 'International Cooperation' considers just that. The present report considers the actions taken to strengthen the global nuclear safety regime and reports on actions that have been taken or are being planned to enhance international cooperation.

PART III

Chapter 7 'Additional Topics' addresses generic activities and conclusions from the National Review and related discussions that have not been addressed in Parts I and II.

PART IV

Chapter 8 'Implementation of Activities' identifies timelines and key milestones of each improvement activity in the Netherlands, at the licensee and at the Regulatory Body. In the tables in the chapters 0 through 7, in many cases reference is made to numbered activities ('Actions') specified in the tables in chapter 8 for detailed explanation of their statuses.

In addition, chapter 8 also briefly addresses the status of implementation of the recently updated WENRA Reference Levels in Dutch regulation and at the NPP Borssele.

PART I Topics 0, 1, 2 and 3

Part I of this National Action Plan (NAcP) consists of the Chapters 0, 1, 2 and 3. Activities in the domain of Part I mostly are the responsibility of the licensee. However governmental bodies have many associated tasks like assessing actions proposed by the licensee, reviewing the progress of actions agreed, imposing actions and overseeing their correct implementation.

0. General

0.0 Introduction

This chapter of the present NAcP addresses issues of a general nature that do not fit in one of the categories 'natural hazards', 'design issues' and 'severe accident management' or apply to more than one category.

The items reported have been listed in a table, refer to section 0.1.

0.1 Tabled summary of items reported

Table 0-1 **Tabled summary of items reported for Topic 0 'General'**.
In the first column, the original numbering of ENSREG observations (items) is found between parentheses, combined with a code with the format '0.x' which results from a renumbering per theme by the Dutch RB.
The second column presents the ENSREG observations, the third column gives the associated Theme, and the fourth the source of the observation. The fifth column presents the reflections of the Dutch RB on the ENSREG observations, the Action numbers mentioned in the reflections refer to Part IV of this NAcP, in which these national Actions can be found with their planning. The sixth column summarizes the status of actions.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
0.1 (1)	a. The peer review Board recommends that WENRA, involving the best available expertise from Europe, develop guidance on natural hazards assessments, including earthquake, flooding and extreme weather conditions, as well as corresponding guidance on the assessment of margins beyond the design basis and cliff-edge effects.	general	ENSREG Compilation of Recommendations, xCNS	a.1. Several studies contracted by the Regulatory Body (RB) have been performed to develop guidance on external hazards. a.2. A final guidance document has not been established yet a.3. The RB participates in the WENRA T1 task force.	On schedule Rescheduled (from 2014 to 2015) The requirements will be documented in the so-called Dutch Safety Requirements document (DSR). (Action RB-4.002). Completed

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
0.1 (1)	b. Thereby the harmonization of licensing basis methods, the use of deterministic and probabilistic methods, the definition of probabilistic thresholds and clarification of the BDBA/DEC scenarios considered in the safety assessment should be integrated. Further studies should use state-of-the-art data and methods and address trends in hazard data.	general		b.1 The RB notes the use of deterministic & probabilistic methods is an established practice in the Netherlands. BDBAs are part of the safety assessments, but the stress test may have an influence on the future scope of these studies. The use of state-of-the-art data is compulsory. The NL expertise on magnitudes and frequency of earthquake and flooding hazards rests with several governmental bodies. [also note b.2 below]	Completed
0.1(1)	b. (continued)			b.2 The Dutch RB has required the NPP to specify a list of SSCs that are necessary for (severe) accident management and assign to these SSCs the required qualifications and availability under accident conditions. This is related to Action 27 (refer to Part IV of this NAcP): "Assessment of the need to upgrade equipment and/or instrumentation dedicated to SAM purposes".	Study completed Refer to Action 27 As a result of the study it was decided to upgrade the robustness of the SFP level measurement

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
0.1 (1)	c. It should be stated, that safety assessments should benefit from timely operational experience feedback and include organizational and human aspects, and that regulations and regulatory guidance should be regularly updated. In order to avoid blind spots, a peer review of assessments should be considered.	general		c.1. The current practice is that operational experience and maintenance status is fed into the PSA model. HF aspects are mandatory aspects to be considered by the licensee. c.2.1. The Dutch regulations and guides for existing reactors have been updated recently, taking into account the WENRA RLs. c.2.2. A project is underway to define regulations for new (research)reactors (RB-4.001), considering its application for the existing ones as well. c.3. Major safety assessments generally are reviewed and assessed by or together with the TSO.	Continued practice Completed Rescheduled from 2014 to 2015 Continued practice
0.2 (2)	a. The peer review Board recommends that ENSREG underline the importance of periodic safety review. In particular, ENSREG should highlight the necessity to reevaluate natural hazards and relevant plant provisions as often as appropriate but at least every 10 years.	general	ENSREG Compilation of Recommendations, xCNS	a. The NL has a practice of PSRs for NPPs. There are 10-yearly PSRs and 2-yearly smaller exercises. Natural hazards are part of the 10-yearly PSRs. At this moment the 4th PSR is ongoing at Borssele NPP. PSRs are mandatory in the NL.	Continued practice

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	b. External hazards and their influence on the licensing basis should be reassessed periodically using state-of-the-art data and methods. PSR was identified as one good tool.			b. External hazards are included in the PSR.	Continued practice
0.3 (3)	Urgent implementation of the recognised measures to protect containment integrity is a finding of the peer review that national regulators should consider.	general	ENSREG Compilation of Recommendations, xCNS	In the NL there is one water cooled reactor (PWR) type. The necessary facilities are in place like autocatalytic recombiners, means to depressurize and to lower H2 concentrations, associated procedures, (filtered) containment venting facilities and associated procedures, etc. In addition, the RB has demanded the licensee to perform additional studies to establish the reliability of the facilities present. Depressurisation of primary system and procedures (EOPs and SAMGs) are implemented fully with special SA-proof valves. One of the identified measures from the stresstest is ensuring the availability of the filtered containment venting system under seismic conditions (Action 14 / M10).	Study completed Study showed no modification necessary.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
0.4 (4)	Necessary implementation of measures allowing prevention of accidents and limitation of their consequences in case of extreme natural hazards is a finding of the peer review that national regulators should consider.	general	ENSREG Compilation of Recommendations	SAMGs are present at the NPP since the 1990s. Currently they are available for all plant states. Also see Action 6 (M3) on refilling the SFP. Various measures have been proposed by licensee and endorsed by the RB. In addition the RB has demanded compliance with some extra post-stress test requirements. E.g. ensure availability of venting systems and others after seismic events etc.	Completed

1. External Events (Natural Hazards)

1.0 Introduction

This chapter focuses on the natural external hazards earthquakes, flooding and extreme weather conditions. The items reported have been listed in a table, refer to section 0.

The phenomena loss of electrical power and loss of ultimate heat sink may be caused by natural or man-made extreme events. In the present NAcP, these topics are addressed in chapter 2 'Design Issues'.

1.1 Tabled summary of items reported

Table 1-1 **Tabled summary of items reported for Topic 1 – External Events / Natural Hazards**.
In the first column, the original numbering of ENSREG observations (items) is found between parentheses, combined with a code with the format '1.x' which results from a renumbering per theme by the Dutch RB.
The second column presents the ENSREG observations, the third column gives the associated Theme, and the fourth the source of the observation. The fifth column presents the reflections of the Dutch RB on the ENSREG observations, the Action numbers mentioned in the reflections refer to Part IV of this NAcP, where these national Actions can be found with their planning. The sixth column summarizes the status of actions.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
1.1 (5)	Deterministic methods should form the basis for hazard assessment. Probabilistic methods, including probabilistic safety assessment (PSA), are useful to supplement the deterministic methods.	natural hazards	xCNS	This is the long standing practice in the NL. The licensee has a full scope PSA (PSA 1, 2 and 3) for all operational states, which is continuously updated with operating and maintenance data.	Continued practice
1.2 (6)	Hazard Frequency The use a return frequency of 1E-4 per annum (0.1g minimum peak ground acceleration for earthquakes) for plant reviews/back-fitting with respect to external hazards safety cases.	natural hazards	ENSREG Compilation of Recommend ations, xCNS	a. *Earthquake*: A new seismic safety assessment is being conducted (SMA). The DBE has a PGA 0.06 g at ground level and 0.075 at pile foundation level corresponding with a return period > 1 E4. However according to the stress test analysis it is judged that there is a safety margin up to at least 0.15 g. Post-stresstest, the PSR will consider a DBE 0.1 g at free field, as per IAEA guidance. Links with Action 33	Study ongoing Refer to Action 33 for details New implementations defined and on schedule, refer to Action 33 (S3) in Part IV.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				b. *Flood*: KCB has the wet side concept which can withstand high tides with a return period of longer than 1M years (DBF). There is also protection by dykes which is not part of the NPP design, but protects the plant against waves with a return frequency of 10^{-4} per annum. The seadyke was improved in 2012. The NPP KCB has to analyze if the multiple layer concept of IAEA-regulation is fulfilled. Links with Actions 18 and 30.	Finished
1.3 (7)	Secondary Effects of Earthquakes The possible secondary effects of seismic events, such as flood or fire arising as a result of the event, in future assessments.	natural hazards	ENSREG Compilation of Recommend ations	Flood as a result of a local earthquake is not a likely scenario for the Netherlands. Floods from other origins are more likely. Fire from earthquakes is a possible scenario. Fire fighting systems (and some other not seismically qualified systems) and their resistance against seismic impact are subject of a study that is being conducted; Action 12 (M8): Ensuring the ability of fire annunciation and suppression systems after seismic events.	Study finished. Implementation measures: proposed rescheduling from 2016 to mid 2017.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				Action 33 (S3): Study Seismic Margin Assessment (SMA)	Study ongoing Refer to Action 33in Part IV for details
1.4 (8)	Protected Volume Approach The use of a protected volume approach to demonstrate flood protection for identified rooms or spaces.	natural hazards	ENSREG Compilation of Recommend ations	The Protected Volume Approach has been implemented since 1984 and modified in the PSRs of 1993 and 2006. It is known at EPZ as "beveiligde zone". Measures are being implemented to increase the margin within which certain volumes will remain 'dry', e.g.: a. Action 18 (M11): Wave protection beneath entrances. b. Action 2 (M2): Storage facilities for portable equipment - enhancing robustness warehouse for SAM equipment	Completed Study showed no extra actions needed. Delayed. Proposed rescheduling from 2014 to 2017. Temporary solution implemented in 2013. Final solution coupled to final solution ERC. Refer to Action 2 in Part IV.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				c. Action 1 (M1): Emergency Response Centre (ERC) - study and consider options to better protect ERC like alternative location ERC, new building, strengthening current building etcetera.	Final solution delayed, proposed rescheduling from 2014 to 2017. Alternative ERC locations implemented in 2013. Refer to Action 1 in Part IV.
1.5 (9)	Early Warning Notifications The implementation of advanced warning systems for deteriorating wheather, as well as the provision of appropriate procedures to be followed by operators when warnings are made.	natural hazards	ENSREG Compilation of Recommend ations	Early warning and appropriate procedures for high tide exist and are in preparation for extreme weather. Action 23 (P3) ' Develop check-lists for plant walk-downs and the necessary actions after various levels of the foreseeable hazards', will assure adequate preparation in case of extreme weather.	Completed
1.6 (10)	Seismic Monitoring The installation of seismic monitoring systems with related procedures and training.	natural hazards	ENSREG Compilation of Recommend ations	Seismic monitoring systems will be operational from June 2013. This measure was planned before the Fukushima Dai ichi accident.	Completed
1.7 (11)	Qualified Walkdowns The development of standards to address qualified plant walkdowns with regard to earthquake, flooding and extreme weather – to provide a more systematic search for non-conformities and correct	natural hazards	ENSREG Compilation of Recommend ations	Periodic walkdowns to check availability and correct storage of ERO equipment exist. Walkdowns as reaction to early warnings (severe weather approaching) are under development. Action 23 (P3) ' Develop check-lists for plant walk-downs and the necessary actions after various levels of the foreseeable hazards'.	Completed

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	them (e.g. appropriate storage of equipment, particularly for temporary and mobile plant and tools used to mitigate beyond design basis (BDB) external events).			The Dutch RB has the opinion standards for such checklists should be developed by international expert groups which will also contribute to harmonisation of such standards.	
1.8 (12)	Flooding Margin Assessments The analysis of incrementally increased flood levels beyond the design basis and identification of potential improvements, as required by the initial ENSREG specification for the stress tests.	natural hazards	ENSREG Compilation of Recommend ations	This is the current practice. The flooding margin assessment was performed by incrementally increasing the flood levels beyond the DBF levels in the flooding studies performed in the frame work of the past stress test.	Continued practice
1.9 (13)	External Hazard Margins In conjunction with recommendation 1 and 17, the formal assessment of margins for all external hazards, including seismic, flooding and severe weather, and identification of potential improvements.	natural hazards	ENSREG Compilation of Recommend ations, xCNS	Margin assessments were part of the stress test performed in 2011. Licensee has to perform additional studies on seismic (SMA, e.g. Action 33 S3), flooding and extreme weather hazards. E.g.: Action 33 (S3): Study Seismic Margin Assessment (SMA);	Ongoing Refer to Action 33 for details New implementations defined and on schedule, refer to Action 33 in Part IV.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	Licensing basis protection against external hazards (e.g. flood seals and seismic supports) should be verified to be effective. Margin assessments should be based on periodic re-evaluation of licensing basis for external events considering possible cliff-edge effects and grace periods.			Action 30 (S2): Investigate measures to further increase safety margin in case of flooding - this includes study of flooding (Action 31) and superstorms (Action 32).	Study completed No measures necessary.

2. Design Issues

2.0 Introduction

This chapter 'Design Issues' focuses on the hazards loss of electrical power and loss of ultimate heat sink. These may be caused by natural or man-made extreme events. In general these topics are referred to in terms of Loss Of Offsite Power (LOOP), Station Blackout (SBO) and Loss of Ultimate Heat Sink (LUHS). These are all considered to be within the design basis of the NPP. In addition loss of all AC power is considered.

The items reported have been listed in a table, refer to section 2.1.

2.1 Tabled summary of items reported

Table 2-1 **Tabled summary of items reported for Topic 2 – Design Issues**.
In the first column, the original numbering of ENSREG observations (items) is found between parentheses, combined with a code with the format '2.x' which results from a renumbering per theme by the Dutch RB.
The second column presents the ENSREG observations, the third column gives the associated Theme, and the fourth the source of the observation. The fifth column presents the reflections of the Dutch RB on the ENSREG observations, the Action numbers mentioned in the reflections refer to Part IV of this NAcP, in which these national Actions can be found with their planning. The sixth column summarizes the status of actions.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
2.1 (14)	Alternate Cooling and Heat Sink The provision of alternative means of cooling including alternate heat sinks.	design issues	ENSREG Compilation of Recommendations, xCNS	Ample means of alternate cooling and heat sink are available. Borssele has ground water pumps, fire water pool and can apply feed and bleed. Refer to National Report on the stress test of the Netherlands (2011) for details.	Continued practice However, additional measures to strengthen the availability of the SFP have been studied and are being implemented (Act's 7 and 29)
2.2 (15)	AC Power Supplies The enhancement of the on-site and off-site power supplies.	design issues	ENSREG Compilation of Recommendations, xCNS	Examples are: Action 9 (M5): Reduction of time to connect mobile diesel generator to 2 hrs,	Completed

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				Action 10 (M6): Establishing ability to transfer diesel from any of the storage tanks to active diesels;	Completed
				Action 36 (S4): Study regarding strenghtening off-site power supply;	Study completed. Implementation of a new measure is ongoing.
				Action 37 (S5): Study for more extensive use of steam for powering emergency feed water pump;	Study completed. Decided not to make extended use of steam, mobile pumps preferred.
				Action 43: Reassessment of alternative power sources (alternative to emergency grids) including reassessment of the possibility of having extra fixed external connections for mobile diesel generator.	Study completed. Additional connection points to mobile power being implemented.
2.3 (16)	DC Power Supplies The enhancement of the DC power supply.	design issues	ENSREG Compilation of Recommendations, xCNS	Action 43: Reassessment of alternative power sources (alternative to emergency grids);.	Study completed 2013. Implementation ongoing (2017).
				Action 44: Better arrangements for mobile diesel generator and batteries; This includes studies of small mobile	Study completed. Implementation rescheduling

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				emergency power facilities for recharging purposes or as backup facility, as well as drafting of instructions for using such facilities Action 16 (M9): Increasing autarky time beyond 10h.	proposed from 2013 to mid 2017 to align with PSR. Study completed. Implementation ongoing, rescheduling proposed from 2016 to mid 2017.
2.4 (17)	Operational and Preparatory Actions Implementation of operational or preparatory actions with respect to the availability of operational consumables.	design issues	ENSREG Compilation of Recommendations	Examples are: Action 10 (M6) - Establishing ability to transfer diesel fuel from all storage tanks to active diesels Action 42 - Study amount of lubrication oil in crisis situations Action 19 (P1) Also the introduction of EDMGs to restore equipment in case of extreme external events	Completed Completed Always enough lubricant available for 1 week. Phase 1 completed, Phase 2 (purchases): rescheduling proposed from 2013 to mid 2017.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				Action 27 Assessment of the need to upgrade equipment dedicated to SAM purposes.	Completed
2.5 (18)	Instrumentation and Monitoring The enhancement of instrumentation and monitoring.	design issues	ENSREG Compilation of Recommendations, xCNS	Action 27: Assessment of the need to upgrade equipment and/or instrumentation dedicated to SAM purposes (increasing robustness of existing equipment/instrumentation, protection of equipment/instrumentation against BDB hazards, periodic test/inspection program of those equipment/instrumentation, well defined and trained procedures to use those equipment / instrumentation).	Completed
2.6 (19)	Shutdown Improvements The enhancement of safety in shutdown states and mid-loop operation.	design issues	ENSREG Compilation of Recommendations	There are several measures being implemented, related to this topic, e.g.: Action 21 (P2): Training of the procedure to ensure water supply during midloop operation and loss of AC power Action 22: Prepare and validate the capabilities to cope with SBO during midloop operation Possibility of remote control should be investigated	Completed Completed Implementation rescheduling proposed to mid 2017.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				Action 29 (S1): A reserve SFP cooling system independent of power supply	Study completed 2013, chosen modification aligned with PSR, implementation 2017
2.7 (20)	Reactor Coolant Pump Seals The use of temperature-resistant (leak-proof) primary pump seals. Study of RCP pump seal leakage following long term AC power failure.	design issues	ENSREG Compilation of Recommendations, xCNS	The licensee states that the Sulzer MCPs have a sealing concept that is not dependent on AC (once MCPs stopped).	Continued practice
2.8 (21)	Ventilation The enhancement of ventilation capacity during SBO to ensure equipment operability.	design issues	ENSREG Compilation of Recommendations	The licensee states that: Equipment required to be operational under SBO conditions are supplied by the SBO diesels. This includes the required ventilation systems. In case of complete loss of AC, no forced ventilation is required for operable equipment.	Continued practice
2.9 (22)	Main and Emergency Control Rooms The enhancement of the main control room (MCR), the emergency control room (ECR) and emergency control centre (ECC) to ensure continued operability and adequate habitability conditions in the event of a station black-out	design issues	ENSREG Compilation of Recommendations, xCNS	There are several measures being implemented that are related to this topic, e.g.: Action 1 (M1) and Action 4 : Realization of a emergency response centre facility that can give shelter to the emergency response organization after all foreseeable hazards, including habitability (analysis of the potential doses to workers during severe accident management activities, including habitability of MCR and	Ongoing. Alternative ERC locations arranged (2013). New ERC scheduled for end 2017 (proposed).

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	(SBO) and in the event of the loss of DC (this also applies to Topic 3 recommendations). Habitability of control rooms/emergency centers under DEC conditions.			ECR). Action 43: Reassessment of alternative power sources (alternative to external grid) Action 44: Better arrangements for mobile diesel generator and batteries This includes studies of small mobile emergency power facilities for recharging purposes or as backup facility, as well as drafting of instructions for using such facilities.	 Study completed 2013. Implementation ongoing, to be finished in 2017. Study completed. Implementation rescheduling proposed from 2013 to mid 2017.
2.10 (23)	Spent Fuel Pool The improvement of the robustness of the spent fuel pool (SFP).	design issues	ENSREG Compilation of Recommendations, xCNS	Action 6 (M3) Possibility for refilling the SFP without entering containment, design & implementation of coupling to system that provides water for fire fighting (UJ); Action 7 (M4) Additional possibilities for refilling the SFP (and sustaining cooling), design & implementation; Action 29(S1) Reserve SFP cooling system independent of power supply;	Completed Completed Study completed 2013 Chosen modification aligned with PSR,

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				Action 33 (S3) Study SMA will also contribute to more certainty of the robustness of the SFP. Also refer to ENSREG point 2.17 (30) of this table.	implementation rescheduling proposed from 2016 to mid 2017. Ongoing Refer to Action 33 for details. New implementations defined and on schedule, refer to Action 33 in Part IV.
2.11 (24)	Separation and Independence The enhancement of the functional separation and independence of safety systems.	design issues	ENSREG Compilation of Recommendations	Separation & independence are part of the design basis. However several measures will enhance these. Refer to other topics in this table.	Continued practice
2.12 (25)	Flow Path and Access Availability The verification of assured flow paths and access under SBO conditions. Ensure that the state in	design issues	ENSREG Compilation of Recommendations	The operability of the major safety valves has been checked (2012). The PORVs need DC power.	Completed

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	which isolation valves fail and remain, when motive and control power is lost, is carefully considered to maximise safety. Enhance and extend the availability of DC power and instrument air (e. g. by installing additional or larger accumulators on the valves). Ensure access to critical equipment in all circumstances, specifically when electrically operated turnstiles are interlocked.			Further analysis is ongoing.	Completed. This refers to Actions 3 and 44 of the LH.
2.13 (26)	Mobile Devices The provision of mobile pumps, power supplies and air compressors with prepared quick connections, procedures, and staff training with drills.	design issues	ENSREG Compilation of Recommendations, xCNS	Several measures are implemented that are related to this topic, e.g.: Action 44 : Better arrangements for mobile diesel generator and batteries This includes studies of small mobile emergency power facilities for recharging purposes or as backup facility, as well as drafting of instructions for using such facilities. Action 9 (M5), Reduction of the time to connect mobile diesel generator to 2 hours Action 19: Further development of EDMGs.	Study completed. Implementation proposed rescheduling from 2013 to mid 2017 to align a.o. with PSR. Completed Phase 1 completed, Phase 2 (purchases) proposed rescheduling from

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
					2013 to 2017.
2.14 (27)	Bunkered/Hardened Systems The provision for a bunkered or "hardened" system to provide an additional level of protection with trained staff and procedures designed to cope with a wide variety of extreme events including those beyond the design basis (this also applies to Topic 3 recommendations).	design issues	ENSREG Compilation of Recommendations	The NPP has bunkered systems, however some measures will be implemented that will further enhance nuclear safety, e.g.: Action 1 (M1), Emergency Response Centre (ERC) - study and consider options to better protect ERC like alternative location ERC, new building, strengthening current building etc Action 2 (M2), Storage facilities for portable equipment - enhancing robustness warehouse for SAM equipment. Action 19B (P1) addresses training; 'Develop set of EDMGs and implement training program'.	Final solution delayed, proposed rescheduling from 2014 to 2017. Alternative ERC locations implemented in 2013. Refer to Action 1 in Part IV. Delayed. Proposed rescheduling from 2014 to 2017. Temporary solution implemented in 2013. Final solution coupled to final solution ERC. Refer to Action 2 in Part IV. Completed

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
2.15 (28)	Multiple Accidents The enhancement of the capability for addressing accidents occurring simultaneously on all plants of the site and consideration of the site as a whole for a multi-units site in the safety assessment.	design issues	ENSREG Compilation of Recommendations, xCNS	The Borssele site features one NPP and a coal fired plant. Effects of the coal fired plant and other nearby industry on NNP risk has been studied during the CSA and in preparing the Safety Analysis Report; no specific issues have been identified.	Continued practice
2.16 (29)	Equipment Inspection and Training Programs The establishment of regular programs for inspections to ensure that a variety of additional equipment and mobile devices are properly installed and maintained, particularly for temporary and mobile equipment and tools used for mitigation of BDB external events. Development of relevant staff training programmes for deployment of such devices.	design issues	ENSREG Compilation of Recommendations	Equipment and training programs are in place. However enhancement of these is part of the focus of several measures like: Action 27B, Study regarding the need to upgrade equipment dedicated to SAM purposes, Action 19 (P1) Further development of EDMGs and associated training programme.	Completed (2013) Phase 1 completed, Phase 2 (purchases) proposed rescheduling from 2013 to mid 2017
2.17 (30)	Further Studies to Address Uncertainties The performance of further studies in areas were there are uncertainties. Uncertainties may exist in the following areas:	design issues	ENSREG Compilation of Recommendations		

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	a. The integrity of the SFP and its liner in the event of boiling or external impact.			a. Integrity of the SFP is part of the SMA. Impact on liner of boiling effects is under consideration.	Completed. Research has established that boiling does not pose a threat to the integrity of the SFP.
	b. The functionality of control equipment (feedwater control valves and SG relief valves, main steam safety valves, isolation condenser flow path, containment isolation valves as well as depressurisation valves) during the SBO to ensure that cooling using natural circulation would not be interrupted in a SBO.			b. Refer to ENSREG point 25.	
	c. The performance of additional studies to assess operation in the event of widespread damage, for example, the need different equipment (e.g. bulldozers) to clear the route to the most critical locations or equipment. This includes the logistics of the external support and related arrangements (storage of equipment, use of national defence			c. Action 19(P1) Develop set of EDMGs and implement training programme, the licensee was in the process of developing EDMGs before the start of the ENSREG-led CSA.	Phase 1 completed, Phase 2 (purchases) proposed rescheduling from 2013 to 2017.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	resources, etc.).				

3. Severe Accident Management and Recovery (on site)

3.0 Introduction

This chapter focuses on SAM and Recovery on site.

The items reported have been listed in a table, refer to section 3.1.

3.1 Tabled summary of items reported

Table 3-1 **Tabled summary of items reported for Topic 3 – Severe Accident Management (SAM)**.
In the first column, the original numbering of ENSREG observations (items) is found between parentheses, combined with a code with the format '3.x' which results from a renumbering per theme by the Dutch RB.
The second column presents the ENSREG observations, the third column gives the associated Theme, and the fourth the source of the observation. The fifth column presents the reflections of the Dutch RB on the ENSREG observations, the Action numbers mentioned in the reflections refer to Part IV of this NAcP, where these national Actions can be found with their planning. The sixth column states the status of the actions.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
3.1 (31)	WENRA Reference Levels The incorporation of the WENRA reference levels related to severe accident management (SAM) into their national legal frameworks, and ensure their implementation in the installations as soon as possible.	severe accident management	ENSREG Compilation of Recommendations	WENRA RLs have been implemented fully into the regulations. This has been verified in the WENRA RH project dating from 2005-2008. The implementation in NPP KCB was complete too. The issue of molten corium stabilization /in vessel retention has been analyzed in PSRs before and will be analyzed again in the upcoming PSR 2013. Action 39 (S7) In previous periodic safety reviews an extensive set of formal analyses has been performed to address the threats of hydrogen to the containment. In 10EVA13 these studies will be reviewed and where necessary renewed and extended, e.g. the management of hydrogen from the SFP, into the filtered containment venting system and into the neighbouring buildings.	Completed Completed

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				Action 14 (M10) Ensuring the availability of the containment venting system TL003 after seismic events would increase the margin in case of seismic events.	Completed. Study showed no modification was necessary.
3.2 (32)	SAM Hardware Provisions Adequate hardware provisions that will survive external hazards (e.g. by means of qualification against extreme external hazards, storage in a safe location) and the severe accident environment (e.g. engineering substantiation and/or qualification against high pressures, temperatures, radiation levels, etc), in place, to perform the selected strategies.	severe accident management	ENSREG Compilation of Recommendations	Action 1 (M1), Action 2 (M2), . Action 3, Action 4, Action 12 (M8), Action 14 (M10), Action 19 (EDMGs) Action 27. Also refer to ENSREG No. 2.14 (27) in	In progress, Proposed rescheduling from 2014 to 2017, refer to Actions 1 & 2 in Part IV. Completed Studies completed 2013. Implementation proposed rescheduling from 2016 to mid 2017 Completed Phase 1 completed, Phase 2 implementation proposed rescheduling from 2013 to mid 2017. Completed

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				Table 2-1 of section 2.1 of this NAcP	
3.3 (33)	Review of SAM Provisions Following Severe External Events The systematic review of SAM provisions focusing on the availability and appropriate operation of plant equipment in the relevant circumstances, taking account of accident initiating events, in particular extreme external hazards and the potential harsh working environment.	severe accident management	ENSREG Compilation of Recommendations	Action 26: Improvements of SAMGs and EOPs (e.g. focusing on longer term accidents and including better training provisions) Action 27: Assessment of the need to upgrade equipment and/or instrumentation dedicated to SAM purposes.	Proposed rescheduling from 2013 to 2016 Completed
3.4 (34)	Enhancement of Severe Accident Management Guidelines (SAMG) In conjunction with the recommendation 4, the enhancement of SAMGs taking into account additional scenarios, including, a significantly damaged infrastructure, including the disruption of plant level, corporate-level and national-level communication, long-duration accidents (several days) and accidents affecting multiple units	severe accident management	ENSREG Compilation of Recommendations, xCNS	Several measures are being implemented to further enhance the SAMGs, including: training of long term SAMG measures (Action 24), developing specific SAMGs for the SFP (Action 25), assessment of the need to upgrade equipment for SAM (Action 27). Actions on EDMGs (like Action 19).	Ongoing Study finished 2013, training to be finished March 2015. Completed Completed Phase 1 completed, Phase 2 implementation proposed rescheduling from 2013 to mid

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	and nearby industrial facilities at the same time.			For communication issues refer to ENSREG No. 3.5 (35) of this table.	2017
3.5 (35)	Analysis of human resources, communication, personnel training and guidance during severe long term accidents (esp. multi-unit) and validation of effectiveness through exercises.	severe accident management	xCNS	This is addressed in measures mentioned with ENSREG topic 34. In addition there is: Action 5 'Assessing ERO staffing regarding its adequacy 24/7.' Action 11 (M7) attention to communication issues; 'Establishing independent voice and data communication under adverse conditions'.	Completed Completed
3.6 (36)	SAMG Validation The validation of the enhanced SAMGs.	severe accident management	ENSREG Compilation of Recommendations	This is part of the measures mentioned with ENSREG No. 3.4 (34).	Refer to 3.4 (34) in this table.
3.7 (37)	SAM Exercises Exercises aimed at checking the adequacy of SAM procedures and organisational measures, including extended aspects such as the need for corporate and nation level coordinated arrangements and long-	severe accident management	ENSREG Compilation of Recommendations	SAM exercises are a frequent phenomenum at Borssele NPP. Structures & procedures are in place for interfacing with the national and local authorities in crisis situations. Exercises often involve more than 1,000 people. There are additional exercises for specific scenarios (like flooding) in cooperation with the armed forces.	

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	duration events.			Related Actions are: Action 24 (training of long term-term SAM measures should improve the reliability of existing procedures), Action 26 (improvements to SAMGs and EOPs, e.g. focusing on longer term accidents and including better training provisions, Action 27C (well defined and trained procedures to use those equipment/instrumentation).	 Study finished 2013, training to be finished March 2015 Rescheduling proposed from 2013 to 2016 Completed
3.8 (38)	SAM Training a. Regular and realistic SAM training exercises aimed at training staff. Training exercises should include the use of equipment and the consideration of multi-unit accidents and long-duration events.	severe accident management	ENSREG Compilation of Recommendations	a Refer to ENSREG No. 3.4 (34) for enhancing training SAM. Also refer to ENSREG No. 3.7 (37) of this list.	Refer to named references in list.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	b. The use of the existing NPP simulators is considered as being a useful tool but needs to be enhanced to cover all possible accident scenarios.			b. A full scope simulator (in Essen, Germany) is used regularly, but its purpose does not extend to SAM exercises. KCB uses a desktop simulator for support of its exercises/training of severe accidents and the improvement of this facility is under consideration.	Completed A recent OSART mission did not give additional recommendations with respect to this item.
3.9 (39)	Extension of SAMGs to All Plant States The extension of existing SAMGs to all plant states (full and low-power, shutdown), including accidents initiated in SFPs.	severe accident management	ENSREG Compilation of Recommendations	The SAMGs cover all plant states. Dedicated SAMGs are being developed for the SFP (Action 25).	Completed
3.10 (40)	Improved Communications The improvement of communication systems, both internal and external, including transfer of severe accident related plant parameters and radiological data to all emergency and technical support centre and regulatory premises.	severe accident management	ENSREG Compilation of Recommendations	Structures and procedures are in place to communicate and cooperate with local and national authorities in crisis situations. Plant data can be shared with the authorities. All important plant data and radiological data are available in the ECC and the TSC. Some enhancement of communication systems is being pursued (Action 11 / M7 Establishing independent voice and data communication under adverse conditions)	Completed
3.11 (41)	Presence of Hydrogen in Unexpected Places The preparation for the potential for	severe accident management	ENSREG Compilation of Recommendations,	The SFP is in the containment of Borssele NPP. So the facilities to lower H_2 concentration (autocatalytic recombiners,	Completed

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	migration of hydrogen, with adequate countermeasures, into spaces beyond where it is produced in the primary containment, as well as hydrogen production in SFPs.		xCNS	ventilation, dispersion over larger volumes etc) that are present in the containment also apply to the SFP. Action 39 (S7): In previous periodic safety reviews an extensive set of formal analyses has been performed to address the threats of hydrogen to the containment. In 10EVA13 these studies will be reviewed and where necessary renewed and extended, e.g. the management of hydrogen from the SFP, into the filtered containment venting system and into the neighbouring buildings.	
3.12 (42)	Large Volumes of Contaminated Water The conceptual preparations of solutions for post-accident contamination and the treatment of potentially large volumes of contaminated water.	severe accident management	ENSREG Compilation of Recommendations	Enhancement of the means to handle contaminated water is being pursued in Action 45 'procedures for handling of large amounts of radioactively contaminated water'	Completed
3.13 (43)	Radiation Protection The provision for radiation protection of operators and all other staff involved in the SAM and emergency arrangements.	severe accident management	ENSREG Compilation of Recommendations	In Dutch legislation there are dose limits for several categories of staff involved in crisis situations. An analysis is being conducted to analyse the potential dose to workers (Action 4).	Study finished 2013, implementations: rescheduling proposed from 2014 to mid 2017

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
3.14 (44)	On Site Emergency Centre The provision of an on-site emergency centre protected against severe natural hazards and radioactive releases, allowing operators to stay onsite to manage a severe accident.	severe accident management	ENSREG Compilation of Recommendations	Borssele NPP has an on-site Emergency Response Centre (ERC). The protection against extreme severe natural hazards is being re-evaluated (flooding, seismic events). This includes the protection against radiation from radioactive releases. (Actions 3 and 4).	Study finished 2013, implementation rescheduling proposed from 2013 to 2017
3.15 (45)	Support to Local Operators Rescue teams and adequate equipment to be quickly brought on site in order to provide support to local operators in case of a severe situation.	severe accident management	ENSREG Compilation of Recommendations	At Borssele NPP, there are procedures for bringing new or additional staff on site in case of severe situations. A recent exercise (with the armed forces) showed it is possible to bring staff and equipment on site under flooding conditions. It has been arranged to have these exercises with the armed forces each year, the next exercise has been scheduled for 30th January 2013. Action 19 (development of EDMGs and training program) will among others identify necessary staff, equipment and procedures.	Completed Phase 1 completed, Phase 2 implementation rescheduling proposed from 2013 to mid 2017

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
3.16 (46)	Level 2 Probabilistic Safety Assessments (PSAs) A comprehensive Level 2 PSA as a tool for the identification of plant vulnerabilities, quantification of potential releases, determination of candidate high-level actions and their effects and prioritizing the order of proposed safety improvements. Although PSA is an essential tool for screening and prioritising improvements and for assessing the completeness of SAM implementation, low numerical risk estimates should not be used as the basis for excluding scenarios from consideration of SAM especially if the consequences are very high.	severe accident management	ENSREG Compilation of Recommendations	Borssele NPP features a full scope PSA, including PSA-1, PSA-2 and PSA-3. During the PSR, the PSA is used to identify potential weaknesses. The development of the PSA is driven by the instrument of PSR in combination with the IAEA IPSART missions, initiated by the RB. The upcoming IPSART follow-up mission in April 2013 will address a number of post-stress test (post-Fukushima Dai ichi) aspects.	Completed
3.17 (47)	Severe Accident Studies The performance of further studies to improve SAMGs.	severe accident management	ENSREG Compilation of Recommendations	This is covered by Actions 24, 25, 26 and 27 as explained before and Action 3 and 4 (severe) accident management under all extreme circumstances). Furthermore the areas of study related to this item are important and will be covered in international framework.	25, 27 Completed, 24 and 26 rescheduling proposed from 2013 to 2015 and 2016 respectively 3 and 4 Completed

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
3.18 (48)	Containment venting for new NPPs	severe accident management	xCNS	The NPP Borssele has facilities for filtered containment venting, dating from long before 'Fukushima'. For new NPPs in the Netherlands it is expected it will be part of the requirements. There is one action regarding this system: Action 14 (M10) Ensuring the availability of the containment venting system TL003 after seismic events.	Completed

PART II Topics 4, 5 and 6

Part II of this report consists of the Chapters 4, 5 and 6. Activities in the domain of Part II mostly are the responsibility of governmental bodies.

4. National Organisations

The licensee is primarily responsible for nuclear safety. However, the government, the regulator, technical support organizations, vendors, service providers and other stakeholders are also important to improve and to maintain a high standard of safety. Section 4.0 presents a general introduction to the various National Organisations relevant for nuclear safety. The developments and actions regarding National Organisations have been listed in a table, refer to section 4.1.

4.0 Introduction to National Organisations

4.0.a Regulatory Body (RB)

All nuclear facilities in the Netherlands, including the NPP of Borssele, operate under licence, awarded after a safety assessment has been carried out. The licence is granted by the Regulatory Body (RB) under the Nuclear Energy Act.

The RB is the authority designated by the government as having legal authority for conducting the regulatory process, including issuing licences, and thereby regulating nuclear, radiation, radioactive waste and transport safety, nuclear security and safeguards.

4.0.a.1 Organisation of the RB until the beginning of 2015

In January 2014 the Dutch Governement has decided to create one single independent administrative regulatory authority for nuclear safety and radiation protection. Refer to section 4.0.a.2 for a description of the situation at the RB as it will be, starting from January 1st 2015.

This section describes the current situation as it will be until the end of 2014.

In the Netherlands the minister of Economic Affairs (EZ[6]) is the primarily responsible authority for conducting the regulatory process under the Nuclear Energy Act and for the main functions of the RB.

The legal foundation of the RB is found in several ministerial decisions detailing the mandates of the entities that constitute the RB. The separate entities that form the RB operate with working agreements under the responsibility of the minister of Economic Affairs.

The structure of the current RB is presented in the figure below.

[6] Dutch: EZ, 'Economische Zaken' (i.e. Economic Affairs)

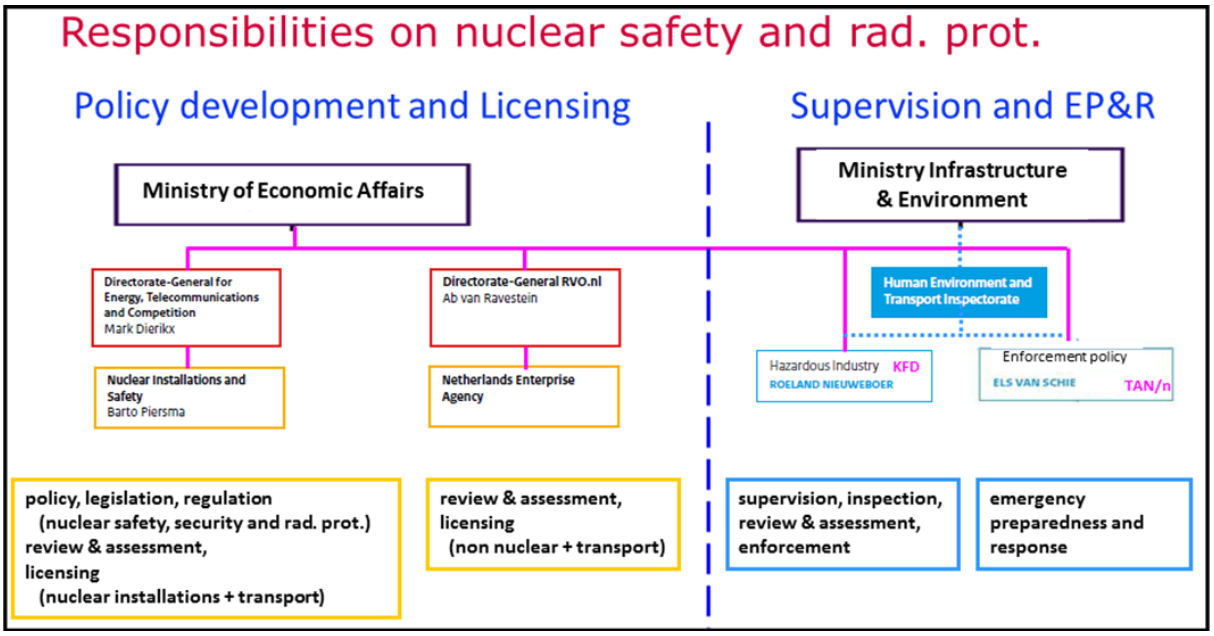

Figure 1 Regulatory structure in the Netherlands, valid until the end of 2014, with the ministry of EZ as the primarily responsible authority for conducting the regulatory process under the Nuclear Energy Act.

Within the ministry of EZ:

- The 'programmadirectie voor Nucleaire Installaties en Veiligheid' (NIV, Directorate Nuclear Installations and Safety), is responsible for the preparation of legislation, formulating policies (excluding energy policy), regulatory requirements and licensing and related review and assessment. .
- RVO (Netherlands Enterprise Agency), team Radiation Protection & Society (TSB), has been mandated to grant licenses under the Nuclear Energy Act, excluding licenses for nuclear installations and licenses for the larger transports of nuclear fuel. Such licences are issued by NIV.

Embedded within the ministry of I&M are:

- The nuclear inspectorate, the 'Kernfysische dienst' (KFD) is within the general responsibility of the Minister of EZ the responsible organisation for the independent oversight (safety assessment, inspection and enforcement) of compliance of the Licence Holder (LH) with the requirements on the nuclear, waste and transport safety, radiation protection, security and non-proliferation of activities and facilities (including nuclear facilities). The KFD is embedded in an organisational division of the Human Environment and Transport Inspectorate (ILT), which is the inspection branch of the ministry of Infrastructure and the Environment (IenM).
- TAN deals with the executive part of the emergency preparedness and response and advices the NIV on policy items.
- 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.

Activities of the RB on regulation

Not related to Fukushima Dai-ichi, an update and extension of Dutch Safety Rules (which are based on IAEA-requirements and guides) has been introduced for the existing NPP. A new regulation framework has been developed based among others on IAEA requirements. Part of this are the 'Dutch Safety Requirements' (DSR). It is planned to formally publish them in 2015. They contain also lessons learned from Fukushima. A first quick check has been done

addressing the compliance with the updated WENRA Reference Levels (RLs) for existing reactors in the new DSR and their implementation in the NPP. First findings of this check are provided in chapter 8.

Implementation of COUNCIL DIRECTIVE 2009/71/EURATOM of 25 June 2009 on nuclear safety also has no direct relation with the Fukushima Dai-ichi accident.

The Netherlands has brought this directive into force on July 22, 2011: Regulation of the Minister of Economic Affairs, Agriculture (EL&I) and Innovation and the Minister of Social Affairs and Labour of 18 July 2011, No WJZ/11014550, concerning the implementation of Directive No 2009/71/Euratom of the Council of the European Union 25 June 2009 establishing a Community framework for nuclear safety of nuclear installations (PB EU L 172/18). The Netherlands forth withed to inform the European Commission thereof. This regulation prescribes the systematic evaluation and investigation of the nuclear safety of nuclear installations during the lifetime of the nuclear installation. Also, the regulation prescribes inter alia that:

- Licensees should give sufficient priority to nuclear safety systems;
- Licensees must provide adequate human and financial resources to meet the obligations on the nuclear safety of a nuclear installation;
- All parties, including the licensee, are required to provide a mechanism for educating and training their staff responsible for the safety of nuclear plants to meet the expertise and competence in the field of nuclear safety to be maintained and developed.

4.0.a.2 Changes to the RB in the Netherlands

The Dutch Council of Ministers decided on January 24, 2014 that the expertise in the area of nuclear safety and most of the expertise on radiation protection will be brought together in a single new administrative Authority. It will be positioned at the ministry of Infrastructure and the Environment. The RB, the Authority for Nuclear Safety and Radiation Protection (Autoriteit Nucleaire Veiligheid en Stralingsbescherming, or ANVS) will be responsible for regulating the nuclear sector and radiation protection as an Independent Administrative Authority (in Dutch a ZBO –Zelfstandig Bestuursorgaan), the ANVS as an organization will fall under the responsibility of the Minister of Infrastructure and the Environment.

The new RB will meet international standards, including those published by the International Atomic Energy Agency. The new authority will prepare and draft legislation, develop safety and security requirements and requirements for radiation protection, issue licenses and permits, carry out inspection, safety assessment and enforcement, regulatory research and development and provide information to the public. The ANVS will also be jointly responsible (with the local and regional authorities and the national crisis organization) for emergency preparedness and response in the event of incidents which could result in the release of radiation.

A specific law is being prepared in order to formally establish the ANVS. It is expected that although the ANVS will not be formally established until the end of 2015, it will pick up its duties from January 1st 2015 under a mandate from the Minister of I&M. Advice on the position of the ANVS has been sought from the IAEA.

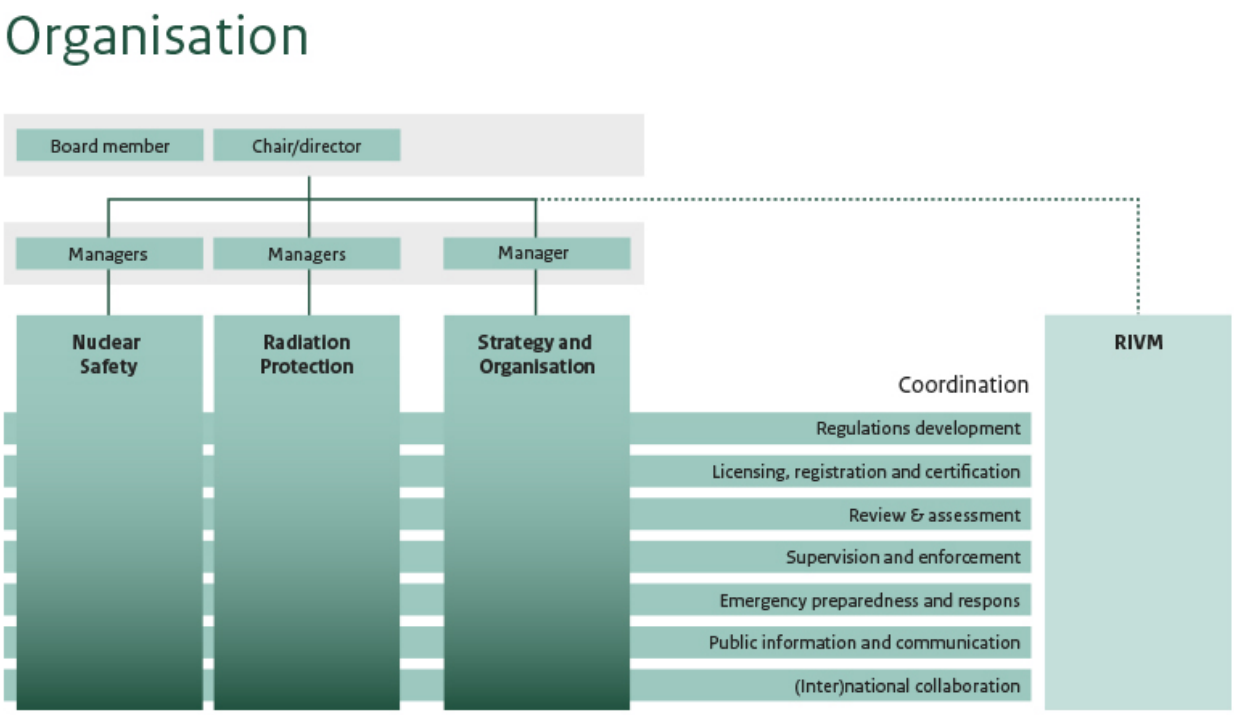

Figure 2 Structure of the new RB, the ANVS

4.0.a.3 Emergency preparedness organizations

This issue is addressed in chapter 5.

4.0.b Governmental supporting organisations: RIVM

An annual contribution is provided to support the work of the National Institute for Public Health and Environment (RIVM). RIVM provides scientific support to several ministries, including the ministry responsible for the function of the RB. The 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 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).This issue is also addressed in chapter 5. The RIVM supports the Ministries with scientific studies. 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. RIVM also operates the national radiological monitoring network.

4.0.c Education and training organisations

4.0.c.1 Education & yraining organisations and arrangements in the Netherlands

The RID/R3 organisation at the Technical University in Delft and the Nuclear Research & consultancy Group (NRG) in Petten and Arnhem provide education and training in nuclear technology and radiation protection to clients from nuclear and non-nuclear businesses and various governmental organisations. NRG also provides training for the NPP staff.

For the education and training in radiation protection a national system exists with four levels of education. The government recognizes training institutes for a specific training of radiation protection. For getting a degree in radiation protection, an exam has to be passed.

In the Dutch system of radiation protection, it is a requirement that a LH has an adequate degree of expertise in the field of radiation protection. The quality of the expertise depends on the application and on the risk and is extensively regulated in the Radiation Protection Decree (Bs), in the Ordinance Radiation Protection EZ and in the licences.

Anticipating on the implementation of Euratom Directive 2013/59, the registration of the Radiation Protection Experts (RPE), (the co-ordinating expert - level 3 and the general co-ordinating expert -level 2) has been started. This registration will be legally required from January 2015. For the evaluation of risk and other regulated tasks, the LH is obliged to involve a (general) co-ordinating expert.

Furthermore, an LH is obliged to designate a radiation protection officer (RPO) for each application. The level of training of the RPO depends on the application as well as the risk. Key terms of the expertise system are continuing training and practice after the initial education. The LH is required by law to ensure that sufficient resources are present to guarantee radiation protection.

4.0.c.2 International training arrangements

The Dutch RB benefits from internationally operating organisations with education and training facilities. Examples are German TSO GRS, ENSTI (training institute of ETSON[7]), IAEA, OECD/NEA and others. The LH EPZ also benefits from internationally operating organisations offering education and training.

4.0.d Technical (Support) Organisations

It is considered one of the basic policies of the RB to have the core disciplines available in-house, while the remaining work is subcontracted to third parties (like RIVM) or Technical Support Organizations (TSOs such as GRS and Lloyd's Register). 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 of TSOs or other consultancy organizations.

To date there is no dedicated national TSO. Organizations are contracted on ad hoc basis to support the RB with various tasks. Support is provided by foreign TSOs and national and international consultancy organizations. Some major supporting organizations 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 organizations. GRS currently has major framework contracts with both the licensing and inspection branch 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 branch of the RB.
- The inspectorate branch of the RB (KFD) is supported by one independent notified body, Lloyd's Register, for inspections on nuclear equipment under pressure. These inspections are done on behalf of KFD and are paid for by the licensees.

[7] ETSON, European Technical Safety Organisation Network

4.0.e Utility N.V. EPZ

N.V. EPZ operates the only NPP in the Netherlands, in Borssele, the KCB. The KCB shares its site with a conventional power plant which is mainly a coal fired plant and seven wind turbines.

4.0.f Vendor

The architect engineer and original vendor of the Borssele NPP is Siemens-KWU. The nuclear part of Siemens-KWU is now named Areva NP GmbH. For the non-nuclear part of the plant, the vendor is Siemens AG.

Both companies are contracted by EPZ for specialised services in their respective areas.

With respect to nuclear incidents, the Areva NP Emergency response support service is particularly noteworthy. Areva NP maintains an emergency support organisation for its customers. KCB is one of the customers that has a contract in place for support during and after incidents, with the emphasis on beyond design-base incidents including core melt scenarios. In both Areva NP crisis centres (Erlangen and Offenbach) real-time KCB process information can be displayed and all necessary documentation is kept current and available on a dedicated computer. Specialised equipment for (post-) accident support can be made available through Areva. The Areva NP crisis centre participates yearly in three to four emergency exercises with the ERO of EPZ. During these exercises the full scope simulator in Essen is used with forwarding of the process data of the simulator to both Areva NP crisis centres.

4.1 Tabled summary of items reported

Table 4-1 **Tabled summary of items reported for Topic 4 –National Organisations**.
In the first column, the original numbering of ENSREG observations (items) is found between parentheses, combined with a code with the format '4.x' which results from a renumbering per theme by the Dutch RB.
The second column presents the ENSREG observations, the third column gives the associated Theme, and the fourth the source of the observation.
The fifth column presents the reflections of the Dutch RB on the ENSREG observations, the Action numbers mentioned in the reflections refer to Part IV of this NAcP, where these National Actions can be found with their planning.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
4.1 (101)	a. Review and revision of nuclear Laws, Regulations and Guides. b. Where the RB is constituted of more than one entity, it is important to ensure efficient coordination. c. Emphasis on the need for comprehensive periodic reviews of safety, using state-of-the-art techniques. d. To remind CP that national safety frameworks include the RB, TSO and Operating Organisations. e. Wide participation in safety networks for operating organizations, RB and TSOs will strengthen them.	National organisations	xCNS	a. The RB is revising and drafting nuclear regulations and guides. b. The RB is constituted of two entities (NIV and KFD) residing in two ministries, NIV is responsible for licensing and regulations, KFD is responsible for supervision. Coordination is provided and will be subject to review in the IRRS self assessment. For details on current organisation of the RB, refer to section 4.0. c. The licensees of power and research reactors are required by law and through the licence to perform PSRs, every two years and 10 years. d. The safety framework in the Netherlands includes the RB and the Operating Organisations. To date there is no national dedicated TSO. Organisations are contracted to support the RB with various tasks. Support is provided by foreign TSOs and national and international consultancy organisations.	a. Ongoing Rest completed. But notice information on new RB, the ANVS, provided in section 4.0.a.2.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				e. The RB and the licensees are participating in international activities and working groups of WANO, OECD/NEA, WENRA, EU (e.g. ENSREG) and IAEA.	
4.2 (102)	Changes to functions and responsibilities of the RB. a. Effective independence of the RB is essential, including the following aspects: b. Transparency in communicating its regulatory decisions to the public. c. Competent and sufficient human resources. d. Adequate legal powers (e.g. suspend operation). e. Financial resources.	National organisations	xCNS	Present situation: a. The nuclear safety policy is independent from energy policy. b. It is transparent in its communication of regulatory decisions to the public; such decisions are published with supporting documentation on governmental websites. Information about supervision issues is also published on the website of the RB. A special act gives citizens the right to request information related to an administrative matter as contained in documents held by public authorities or companies carrying out work for a public authority. c. Recently the RB staffing has been strengthened and the staffs receive dedicated training. d. The RB has adequate legal powers; if needed it can suspend operation of a nuclear facility. e. The financial resources seem adequate. The situation is under evaluation.	The new RB, the ANVS, will pick up its duties January 1st 2015. Refer to text on ANVS in section 4.0.a.2. Ongoing. The new ANVS will have a staff of 120 FTE

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
					with associated budget. Based on assessments performed by external Consultant Berenschot and others, the ANVS in 2015 – 2016 will re-assess its resources.
				Action: New financing mechanisms are being studied for handling of license applications and supervision.	Nuclear facilities in the Netherlands are obliged to pay an annual contribution under the Nuclear Energy Fees Decree. On the basis of this Decree, the costs of implementing the law are to a very limited extent covered by the financial contribution of nuclear installations.
				Action: Evaluation in the framework of the IRRS self-assessment and coming mission.	Self-assessment and Evaluation by IAEA IRRS team completed. In line with the IRRS team's recommendations, the new RB will re-assess the adequacy of its resources.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
4.3 (103)	Importance of inviting IRRS missions, and to: • Effectively implement the findings. • Make the findings and their means of resolution publicly available. • Invite follow -up missions.	National organisations	xCNS	Action: The RB will be subjected to an IRRS mission in 2014. Action: In advance of the IRRS mission, the RB will perform a self-assessment.	Actions completed. Summary Report of IRRS review team will be published, an Action Plan will be drafted and implemented. A follow-up mission will be planned.
4.4 (104)	Review and improvements to aspects of National EP&R • How to routinely exercise: - All involved organizations, up to ministerial level - Scenarios based on events at multi-unit sites • How to train intervention personal for potentially severe Accident conditions • Rapid intervention team to provide support to sites • Determination of the size of the Emergency Planning Zone is variable • Trans- border arrangements need to be further considered and exercised • The use of regional centers to provide support to sites	EP&R	xCNS	The Netherlands has a national EP&R plan, refer to chapter 5.0 for a description. It includes the lines of command, communication and informing the public. The EP&R is regularly trained, often in large scale exercises involving some 1,000 staff and occurring once in aboutevery 5 years. For Training and Exercises the NL has a long range policy plan. Based on this plan and the lessons learned from exercises, every year, a yearly schedule for training and exercise is developed.	EP&R will be restructured in the ANVS, refer to section 5. For ANVS developments – refer to section 4.0.a.2 Practice continued

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	• Education of the public and the media in aspects related to emergencies (e.g. radiation does and their effects)			There are arrangements with bordering countries for crisis situations. There are MoUs with Belgium and Germany. In addition thereare MoUs with Great Britain and Norway, supported by infrequent meetings.	Practice continued
4.5 (105)	Openness, transparency and communication improvements: a. Communication with stakeholders is a continuous activity not just in an emergency	National organisatio ns	xCNS	a. RB and operator communicate with the public. Meetings are organised at special occasions, however these are frequent. Via websites information is provided continuously. Parliament is informed by the RB via the ministry of Economic Affairs.	a: Refer to developments toward the ANVS (section 4.0.a.2). Having this new RB will increase transparency en independence in decision making.
	b. Active stakeholder engagement in the decision making process builds public confidence			b. Stakeholder involvement is embedded in the process of the EIA (under the Environmental Protection Act) and licensing. The Licensee makes considerable efforts to communicate with stakeholders.	b: Continued practice. Recently also stakeholder involvement in the preparation phase (e.g. related to countermeasures foodstuff/agricultural national/branch stakeholders) was set up.
	c. International bilateral cooperation can be			c. Based on bilateral agreements and MoUs, cooperation with bordering countries (Belgium,	c: Continued practice. In 2014 the RB met

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	beneficial (eg joint regulatory inspections)			Germany) is operational. Arrangements for bilateral information exchange (preparation and response) are in place.	with the French and Belgian RBs to decide about the creation of a cross border inspections programme. First inspection in this programme has taken place.
	d. The proper balance of understandable information provided to informed groups and the general public needs to be addressed			d. 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 and summary versions.	Continued practice.
	e. The transparency of the operators activities needs to be enhanced.			e. The operator presents its activities via presentations, dedicated websites and publicly available reports. The RB publishes its findings related to the performance of the licensee on governmental websites.	Continued practice.
4.6 (106)	Post- Fukushima safety reassessments and action plans. a. All CP should perform a safety reassessment and the resolution of their findings should be progressed through a national action plan or other transparent means and should not be limited to NPPs in operation. b. Established safety networks should be	National organisations	xCNS	a. The Netherlands' RB produced the present NAcP and participates in all CNS and ENSREG-led efforts to enhance nuclear safety. In the Netherlands for all nuclear installations stress tests have been performed: research reactors, enrichment facilities and waste management facilities. The NPP Dodewaard which is in safe enclosure (fuel removed) was not considered relevant.	Practices continued

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	efficiently used by CP to disseminate and share relevant information.			b. The RB participates in most relevant networks to share information.	
4.7 (107)	Human and organizational factors (HOF) a. There is a need to further develop human resource capacity and competence across all organizations in the field of nuclear safety.	National organisations	xCNS	a.1. Recently the RB staffing (both NIV and KFD) has been strengthened and the staff receives dedicated training. The common project 'lessons learned Fukushima' and the self-assessment for the IRRS will promote the knowledge throughout the whole organisation of the RB.	The new RB, the ANVS (refer to section 4.0.a.2) will re-assess HOF (including resources, competence management, training & qualifications). This is also an IRRS recommendation.
				a.2. Licensee EPZ is in the process of further enlarging HR capacity and competence since the signing of the Covenant that allows Borssele to operate till 2034. As of November 2012, the NPP organisation has about 75 fte more than the organizational chart lists. This surplus is in initial training and/or in knowledge transfer phase.	Ongoing. As of October 2014 the surplus is about 52 FTE. This capacity is dedicated to projects, knowledge transfer and education.
	b. Governmental level commitment is needed to ensure a long-term approach is developed for capacity building.			b. The long-term approach (capacity plan) will be evaluated in the IRRS self-assessment and mission.	Completed. Recommendation IRRS is to re-evaluate resources, refer to a.1.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	c. Collaborative work is needed in the area of improving and assessing HOF, including safety culture			c.1. The KFD is involved in OECD working group 'OECD/NEA WG HOF' .	Practice continued
				c.2. Licensee EPZ: HOF has been a focus point at Borssele NPP already for several years. INPO guides and practices (e.g. AP928, AP913) are introduced to improve on work management and preparation. Also a loop flow simulator is in development to practice worker and supervisor skills and behaviours. HOF are an explicit part of WANO Peer Reviews. The Borssele NPP had a WANO Peer Review last September-October (2012).	Continued practice. In September 2014 there was an OSART mission with modules on Corporate and Safety Culture. Findings of the mission will be input for improvements. OSART reports will be published. Also refer to item d.2. below.
	d. The role of sub-contractors may be important; can they be harnessed quickly?			d.1. The RB makes use of foreign TSOs.	Practice continued
				One of the future actions of KFD (RB inspectorate) is to have TSO-support during the accident itself.	In progress

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				d.2. Licensee EPZ addresses the contractor involvement in the HOF improvement program.	Continued practice. Current practice at EPZ is that contractors receive a e-learning course when reporting for the first time at the site. In preparation of activities at the site, a meeting is arranged to discuss risks and other relevant issues. Contractors participate is such meetings. Management expectations are communicated to contractors in various ways (e.g. with booklets). The LH (EPZ) specifies requirements contractors need to meet.
4.8 (133)	Public discussion of safety issues should be encouraged (Transparency)	National Organisations	xCNS	The RB endorses and practices this objective.	Practice continued

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
4.9 (134)	An open and trustful relationship between regulators, operators and the public with keeping in mind their respective roles and functions are essential.	National Organisations	xCNS	The RB endorses and practices this objective.	Practice continued
4.10 (135)	Recognizing differences in national cultures, each CPs should define appropriate actions to ensure that the desired safety culture characteristics are achieved in the regulatory and operational organizations.	National Organisations	xCNS	The RB endorses this objective. The supervision on safety culture at the operating organisation already is an important part of the yearly inspection programme. In the light of the self-assessment within the framework of the IRRS-mission special attention will be paid to explain the management of Safety Culture within the Regulatory Body.	Practice continued Safety culture within the RB (KFD, NIV and TSB transforming into ANVS) has been further developed with support from the IAEA in a Safety Culture Continuous Improvement Process (SCCIP) starting with a workshop at the end of 2014. This will be continued in 2015.

5. Emergency Preparedness and Response and Post Accident Management (off site)

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 technical information on plant conditions and the potential risk for emissions.

Section 5.0 presents a general introduction to the EP&R and PAM in the Netherlands. The developments and actions regarding EP&R and PAM have been listed in a table, refer to section 5.1.

5.0 Introduction to organisation of EPR and PAM in the Netherlands

5.0.a Regulatory frame work - National Nuclear and Radiological Response Plan NCS

Chapter VI of the Dutch Nuclear Energy Act describes the responsibilities and tasks of the authorities that are responsible inter alia for for the preparation and the organisation of measures in response to emergencies. Under Article 40 of the Act, the national government is responsible for the preparatory work and for actually dealing with any emergency that may occur in case of nuclear accidents.

National Nuclear and Radiological Response Plan (NCS)

The Nuclear Energy Act, the Radiation Protection Decree, and the National Nuclear and Radiological Response Plan (NCS) constitute the policy framework for the responsibilities and tasks regarding nuclear and radiological emergencies (preparation and response). The NSC is an update (September 2014) of the former National Plan For Nuclear Emergency Management and Response, the NPK. Therefore in plans subordinate to the NCS, "NPK" is still named in titles et cetera. The implementation of the NCS in all related documents will be established from 2015 on, which is a process involving several stakeholders.

The 'Responsplan NPK 3.0' (i.e. Response Plan) describes the potential threats in the Netherlands classified as Category A and B objects and the response structure for nuclear emergency management. The response structure of nuclear emergency management is harmonized with the response structure for conventional emergencies. The structure for conventional emergencies is described in the 'Nationaal Handboek Crisisbesluitvorming' (National Handbook for Decision making in Crises).

Threat categories

Since the threat categorization used in the Netherlands was established before the introduction of IAEA Safety Standard Serie No. GS-R-2, this categorisation is not identical to the threat categories specified by the IAEA in Table 1 of GS-R-2. The categorization is in categories A and B. Incidents in category A are those that could have regional or national impact, and include category I and II of GS-R-2. NPPs are category A objects. Incidents in category B can only have local impact with regard to the radiation aspects, and include categories III and IV of GS-R-2. Transport incidents are included in category B.

Roles and responsibilities

The 'Response Plan' defines the roles and responsibilities of local/national government and the Safety Region. For A-incidents the national authorities are responsible for decision making, the regional authorities are responsible for the implementation of the countermeasures (such as

evacuation, sheltering etc.). The local fire brigade has to be involved in preparing the emergency planning (this is a licence requirement).

For B-incidents the mayor of the municipality where the incident occurs is responsible for the emergency response. Incidents with category B can be up scaled to A. The licence sets the requirement to inform the local fire brigade about the presence of radioactive material.

5.0.b Organisation - National Nuclear Assessment Team, EPAn

On the national level, the key organization in the nuclear and radiological response structure is the National Nuclear Assessment Team, ('EPAn')[8]. This team advises the policy teams on local and national level when there is a real threat of an off-site emergency in a nuclear installation or a radioactive release (in the Netherlands or in a neighbouring country). This team consists of a Front-Office, where the emergency situation is analysed and advice on measures is drafted, and Back-Offices for radiological, and medical information. The Back-Office for radiological information provides projected dose data on the basis of dispersion calculations and monitoring data concerning the environment, drinking water and foodstuff. It is located within the National Institute for Public Health and the Environment (RIVM[9]). RIVM operates the national radiological monitoring network (NMR[10]) and in addition monitoring vans. It also collects data from other institutes. Alongside the radiological experts, the inspectorate of the nuclear regulatory body (KFD) has an important role in assessing the status of the relevant nuclear installation, the accident prognoses and the potential source term. In addition, KFD inspectors go to the nuclear installation to closely monitor the events and support the oversight process.

Other groups in the 'Response Plan' organisation are:

- A National Contact Point (NCP) at the ministry of Infrastructure and Environment (inspectorate ILT) to which all nuclear incidents and accidents (and other environmental incidents) are reported. This centre is operated and accessible 24 hours a day. The NCP is related to the Departmental Crisis Coordination Centre of the environmental department of the ministry of Infrastructure and Environment.
- The National Competent Authority. Based on the conventions of the IAEA and the EU treaty, a National Competent Authority is appointed and a National Contact Point is established in order to fulfil the corresponding obligations. This includes the international exchange of information and the handling of requests for assistance. The National Competent Authority and the National Contact Point are embedded in the Human Environment and Transport Inspectorate (ILT). The Duty Officer of the NCA is on duty 24/7.
- On a national level, the Interdepartmental Commission Crisis Management and the Ministerial Commission Crisis Management (ICCb) and the Ministerial Commission Crisis Management (MCC) are responsible for the coordination of intersectoral crisis management and deciding on a cohesive approach. In the case of a radiological incident with a category A-object, national supervision ("GRIP Rijk") applies. The Commission at the National Crisis Centre (NCC) of the ministry of the Security and Justice decides on the countermeasures to be taken to mitigate the consequences of the accident. It is composed of ministers and senior civil servants, and chaired by the minister of Economic Affairs or the minister of Security and Justice.
- The National Information Centre is located within the ministry of Security and Justice. This centre is responsible for the coordination of crisis communication to be supplied to the public, the press, other national and international authorities and specific target groups and stakeholders, such as farmers.

[8] Dutch: 'Eenheid Planning en Advies nucleair', EPAn
[9] Dutch: 'Rijksinstituut voor volksgezondheid en milieu', RIVM
[10] Dutch: 'Nationaal Meetnet Radioactiviteit', NMR

The local authorities also are responsible to establish contingency plans for nuclear emergencies. The mayors of municipalities likely to be affected by accidents involving nuclear installations located either within their boundaries or in their vicinity (including those across national borders) have established emergency contingency plans in consultation with representatives of central government. These plans are obligatory under Article 7 of the Disasters and Major Accidents Act, and encompass all measures that need to be taken at both local and regional levels. Exercises are also conducted at regular intervals.

5.0.c Training and exercises and their organisation

Based on the NPK, the Dutch training and exercise programme for nuclear emergency management and response is based on a four-years training- and exercise-cycle that is implemented in the annual programmes. Training is organized for different topics e.g. the use of Emergency Information and Decision Support Systems, and some exercises. A full scale exercise is planned approximately every five years. In these national exercises the interaction between generic national emergency management structures and nuclear emergency management and response are integrated.

Officials of different departments and organisations of the National Nuclear Assessment Team (EPAn) participate in exercises and trainings. They all have their own expertises and roles during such an exercise and during an actual accident-response. Examples of such roles are performing radiological/technical analyses, advising on health aspect, etc.

Nuclear and radiological training and exercises are organised by the Ministry of Infrastructure and the Environment (IenM/ILT), under the responsibility of the Ministry of Economic Affairs (EZ). The Ministry of Safety and Justice is responsible for the generic national crisis response-structure and for exercises to train the national crisis organisations. Ministries work together in the organisation and conducting of integrated and large scale exercises.

Some recent examples are:

- 'Indian Summer', October 2011, evaluation in 2012. This was a large scale national exercise in emergency Preparedness and Reponse and Post Accident Management off-site, with about 1,000 people involved. This is a reoccurring event. Lessons learnt have led to reviewing the relation and structure of the of EPAn with the structure of the National Crisis Management System.
- 'WakeUp', March 2012, a two-week-long large scale exercise near various power stations of a mechanised army brigade in cooperation with civil units. This is a recurring event. Near the NPP, a flooding was simulated. The army arranged and transported fuel, food and staff to predetermined buildings on the NPP site, in accordance with the NPP's Emergency Response Organisation's requirements. The exercise proved that the army was capable to provide the required support to the NPP under flooding conditions.

5.1 Tabled summary of items reported

Table 5-1 **Tabled summary of items reported for 'Emergency Preparedness and Response and Post Accident Management off-site'**
In the first column, the original numbering of ENSREG observations (items) is found between parentheses, combined with a code with the format '5.x' which results from a renumbering per theme by the Dutch RB.
The second column presents the ENSREG observations, the third column gives the associated Theme, and the fourth the source of the observation. The fifth column presents the reflections of the Dutch RB on the ENSREG observations, the Action numbers mentioned in the reflections refer to Part IV of this NAcP, where these national Actions can be found with their planning. The sixth column presents the status of the actions as of November 2014.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
5.1 (108)	Expansion of the set of scenarios on which the plan was based – NPP PLUS Infrastructure / NPP PLUS chemical plant	EP&R	xCNS	External threats other than nuclear facilities (e.g. transport, chemical plants) have been considered in safety assessments, up to certain levels of severity in the process of licensing the NPP. In the EP&R multiple scenarios, multiple units (there is only one NPP) and damage of infrastructure are not fully taken into account yet. Action: Damage to infrastructure (hampering EP&R activities) is subject to renewed evaluation in the light of post-Fukushima learning.	Completed Completed. This has been accounted for in various Actions of the LH that reduce the dependence of the NPP on external support. Examples are: purchase of fuel transport trailers, mobile fuel transfer pumps (completed), internal means to transport mobile emergency power supply (completed), purchase satellite telephones for external communication.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
					A new Action for the RB is to consider the purchase of alternative communication means for RB staff to support their activities in a crisis area. Refer to RB-5-003 in part IV.
5.2 (109)	Increasing the scope of off-site exercise programs to reflect NPP plus external infrastructure simultaneous problems	EP&R	xCNS	Under consideration.	Completed. First small size technical scenario (cut of external power) exercised by RB and LH in March 2014
5.3 (110)	Blending mobile resources into planning and drill programs	EP&R	xCNS	Mobile NPP equipment is included in exercising; other mobile equipment eg. diesel engines or fuel tanks can be supported in the framework of the national mechanism assistance program from the ministry of Defence ("ICMS"). Licensee EPZ conducts exercises together with the armed forces, simulating harsh conditions.	Continued practice Continued practice. Annual event. The army can support EPZ with for example transport of staff, supply of diesel or mobile EDG, setting up of communication networks et cetera. These aspects are trained in the exercises.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
5.4 (111)	Increasing emphasis on drilling with neighbouring countries	EP&R	xCNS	On a regular base, several national exercises in NL or the bordering countries are joint exercises. Bilateral exercise planning and organization is ongoing.	Continued practice Observers from both national and regional organizations participate in relevant exercises
5.5 (112)	Exercising all interface points (national, regional, municipal,…)	EP&R	xCNS	During exercise and training all interface points are involved.	Continued practice Depending on the scope and scenarios, interface points are selected & involved
5.6 (113)	Performing of longer term exercises to reflect the challenges of extreme events	EP&R	xCNS	In NL every year a national exercise is performed. Extreme events like high tides/flooding, extreme weather, forest fire, loss of electricity, cyber crime etc. are scenarios for these exercises.	Continued practice. In practice most scenarios address the early and mid-term phase of a scenario. A national policy for remediation/recovery has to be established. The current strategy is not particularly tailored to Nuclear or radiological scenario's..

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
5.7 (114)	Enhancing radiation monitoring and communication systems by additional diversification / redundancy		xCNS	The Netherlands has an extensive national radiation monitoring network. There are several communication systems available in crisis situations, providing redundancy and diversity. The communication via the National Radiation Monitoring Network proved to be robust in the assessment in 2009. Redundant power supply, telephone lines, dedicated internet etc. communication is available. Expansion of mobile monitoring equipment is ongoing. Assessment for further improvement of monitoring and communication systems is ongoing (post-Fukushima).	Continued practice
5.8 (115)	Development of a common source term estimation approach	EP&R	xCNS	This is being developed by a Working Group with participation by licensee EPZ, inspectorate KFD and governmental institute RIVM (National Institute for Public Health and the Environment).	Ongoing. The WG has been working on this issue; an improved source term has been defined. The source term has been used in an exercise. As a follow-up, the WG will continue its work on the source term improvement .
5.9 (116)	Provide access to a "big picture" (international picture) of radiological conditions	EP&R	xCNS	RIVM can provide analyses and prognoses. Information is based on: USIE (Unified System for Information Exchange in Incidents and Emergencies), ECURIE (European Community Urgent Radiological Information Exchange)	Continued practice

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				information exchange,other formal and informal sources and sharing of information with other RBs.	
5.10 (117)	Development of reference level for trans-border processing of goods and services such as container transport	EP&R	xCNS	Some international reference levels are available. Further policy development is ongoing.	Ongoing The RB participates in HERCA activities and research is being conducted by research institute RIVM.. Experiences and policy developments are shared with neighbours (e.g. Belgium/Germany).
5.11 (118)	Re-examination of approach and associated limits to govern the "remediation" phase	EP&R	xCNS	Framework and mechanism for remediation and recovery is developed. Further implementation and policy development is ongoing.	Ongoing Policy for remediation and recovery has to be developed. NL is actively interested in ongoing activities e.g. CODIRPA (France)
5.12 (119)	Develop criteria for the return to evacuated area and criteria for return to normal from emergency state	EP&R	xCNS	Refer to ENSREG No. 5.11 (118) of this table.	Ongoing RIVM in 2015 will develop a plan. Also refer to 5.11 above.
5.13 (120)	Improvement of the approach to establish contamination monitoring protocols and locations during the	EP&R	xCNS	Refer to ENSREG No. 5.11 (118) of this table.	Ongoing A Working Group on monitoring strategy and

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	recovery phase				cooperation between several monitoring organizations, is active.
5.14 (121)	Hardening of support infrastructure (Emergency Response Centers, Sheltering facilities, essential support facilities (like Corporate Offices) with back-up power, environmental radiological filtering, etc.	EP&R	xCNS	Current facilities meet the criteria.	Continued practice. Facilities related to the National nuclear Assessement Team (Back-Office and Front-Office) are equipped with redundant communication lines and power supplies. Back up facilities are available
5.15 (122)	Analyzing medical and human aspects of response to support Emergency workers	EP&R	xCNS	Back-Office Health Information and relevant Health organisations are involved.	Continued practice
5.16 (123)	Implementation of processes to enable access to inter-country support including customs processes for access for diplomats and emergency response personal	EP&R	xCNS	Improvement is under consideration.	Ongoing
5.17 (124)	Systematic assessment of all aspects of organizations that contribute to emergency response using tools like job and task analysis	EP&R	xCNS	Improvement is under consideration.	Continued practice. As a follow-up of a major emergency response exercise in 1991an assessment was made of said aspects using such tools. Since then the EP&R organisations in the

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
					Netherlands have seen steady development and assessment of their functioning.
5.18 (125)	Develop radiological reference levels for rescue and emergency response personnel in extreme events	EP&R	xCNS	Such reference levels are documented in Dutch regulations, like 'Besluit Stralenbescherming' and 'Responsplan NPK' and the implementation of the new BSS (Action Plan 2015-2018).	Continued practice
5.19 (126)	Develop reference levels for the application of immediate countermeasures such as sheltering, iodine distribution and evacuation	EP&R	xCNS	These reference levels have been documented, e.g. in the ' Responsplan NPK'.	Continued practice

6. International Cooperation

Section 6.0 presents a general introduction to contributions of the Netherlands to international cooperation. The developments and actions regarding this topic have been listed in a table, refer to section 6.1.

6.0 Introduction to contributions of the Netherlands to international cooperation

The regulatory body in the Netherlands has always participated in the most important international organisations like OECD/NEA, IAEA and Euratom. Also the Netherlands is a 'Contracting Party' to various (nuclear safety-related) conventions.

International cooperation

Regular exchange meetings are taking place with Germany and Belgium, also in relation with post-Fukushima Dai-ichi lessons learned. Other ways of communications are established through the incident reporting and communication channels that are well established (e.g. IAEA/NEA IRS[11], IRSRR[12], INES, NEA/CNRA/WGPC[13]).

International organisations, apart from the above mentioned, with which there is cooperation are for instance WENRA, ENSREG, EUROSAFE Forum, HERCA[14] and NERIS[15].

The regulatory body in the Netherlands participates in working groups of IAEA (Safety Standard Committees), WENRA (reactor harmonisation working group), and ENSREG (nuclear safety, decommissioning/waste). There is also cooperation in various OECD/NEA committees like the NEA/CSNI[16] and NEA/CNRA[17] and their working groups. Examples of CNSI-groups are WGFS, WGAMA, WGRISK, WGHOF, and WGIAGE. CNRA-groups are WGIP and WGOE.

Peer reviews

International peer reviews have always been part of the strategy for improvement. Regularly IAEA mission are invited. Examples of missions to the Borssele NPP are AMAT/SALTO (2009, 2012 and 2014), IPSART (2010, 2013) and OSART (once in 10 years: 2005 and 2014). The OSART mission of 2014 had two additional modules: 'Corporate' and 'Integrated Safety Culture' Assessment. Examples of missions to the Research Reactor HFR are INSARR (2002, 2005, 2011), IPPAS (2008 and 2012), and IPSART (2000, 2002). The Waste Safety Appraisal visited the Netherlands in 2009. In November 2014 there was an IRRS mission to the RB. In addition, members of the RB have participated in IRRS missions to Belgium, Bulgaria, France, Germany, Sweden, and the United Kingdom.

[11] IRS: IAEA and OECD/NEA Incident Reporting System, using operational experience to improve safety
[12] IRSRR: Incident Reporting System for Research Reactors at the IAEA
[13] NEA/CNRA/WGPC: Working Group on Public Communication of Nuclear Regulatory Organisations
[14] HERCA: Heads of the European Radiological protection Competent Authorities
[15] NERIS: European platform on preparedness for nuclear and radiological emergency response and recovery
[16] CSNI: Committee on the Safety of Nuclear Installations
[17] CNRA: Committee on Nuclear Regulatory Activities

6.1 Tabled summary of items reported

Table 6-1 **Tabled summary of items reported for Topic 6 – International Cooperation**[18].
In the first column, the original numbering of ENSREG observations (items) is found between parentheses, combined with a code with the format '6.x' which results from a renumbering per theme by the Dutch RB.
The second column presents the ENSREG observations, the third column gives the associated Theme, and the fourth the source of the observation. The fifth column presents the reflections of the Dutch RB on the ENSREG observations, the Action numbers mentioned in the reflections refer to Part IV of this NAcP, where these national Actions can be found with their planning. The sixth column presents the status of the actions as of November 2014.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
6.1 (127)	Strengthening the peer reviews process of CNS and of missions (IAEA, WANO and Industry) a Effectiveness of IAEA peer review processes should be reviewed in response to concerns raised by the public and Non Governmental Organizations. b. The CNS national reports should include how peer review and mission findings have been addressed. c. Processes and initiatives should be strengthened to ensure implementation of findings of the peer review and missions. d. CNS review meetings should ensure robust peer reviews and reporting of peer review results and findings.	International cooperation	xCNS	The RB endorses this objective. RB and licensee are in their respective roles involved in the Peer Review process of CNS, IAEA activities, WANO evaluations and missions etc. a. The RB endorses efforts to improve the process. b. The Dutch CNS reports have addressed the topic of Peer Review in much detail to disseminate this concept and its benefits. In future CNS reports the findings and their resolution will be presented. c. The RB already incorporates the findings of international peer review efforts in its own national	Continued practice

[18] Several of the actions mentioned in this and other tables of the report are related to the IAEA action plan.

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				evaluations and actions. Almost all IAEA missions are organised by the RB as part of the supervision strategy. The RB will study possibilities to strengthen further the implementation of measures. d. The Dutch RB endorses this intention.	
6.2 (128)	Strengthening the peer reviews process of CNS and of missions (IAEA, WANO and Industry) - continue e. Plant design safety features and related modifications should be considered in WANO and OSART missions. f. Better coordination of WANO and IAEA peer review activities should be established. g. International experience gained from the review of Russian designs after Chernobyl could be considered as an example of good international practice.	International cooperation	xCNS	e. The Dutch RB and NPP-licensee endorse this intention. f. Coordination of missions is essential for keeping them effective & efficient and prevent unnecessary burden on human resources of licensees and RB. WANO and IAEA have concluded an agreement. The Dutch RB will take into account coordination in the planning of future missions. g. The Dutch RB agrees with this statement.	Continued practice

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
6.3 (129)	Optimisation of the Global Safety Regime a. Primary responsibility for safety remains with operators. b. The collective responsibility of the various institutions and organizations should be optimized. c. The growing number of international meetings, assessments, peer reviews and expanding mandates is placing high demands on existing human resources, which may become counter productive. d. Efforts should be continued to reduce duplication of initiatives and actions by various organizations such as IAEA, NEA, EU, WANO, etc. e. The respective roles and objectives of the various organizations, institutions and missions should be recognized in the optimization process.	International cooperation	xCNS	a. This is the basis of most regulatory frameworks and thus also applies to the Dutch situation. It should be ensured this principle applies globally. b. The Dutch RB endorses this statement. c. The Dutch RB agrees with this statement. d. The Dutch RB endorses this statement. e. The Dutch RB endorses this statement.	Continued practice

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
6.4 (130)	Strengthening communication mechanisms through regional and bilateral cooperation a. Initiatives relating to the Regional Crisis center for operators of NPPs with VVER type reactors as being implemented by Moscow WANO Center and also considered by some other vendor countries. b. Bilateral agreements between vendor countries and new embarking countries, complemented by IAEA Standards and review processes, have been reported to be effective and should be encouraged. c. Strong support of political leaders is important to establish the necessary nuclear safety infrastructure. d. Countries with established nuclear programmes should assist with the establishment of nuclear and regulatory infrastructure. e. Countries should cooperate with neighbouring and regional countries and exchange information on their civil nuclear power programmes.	International cooperation	xCNS	The Dutch RB endorses this objective. a. The Dutch RB agrees with statement b. The Dutch RB agrees with statement c. The Dutch RB agrees with statement d. The Dutch RB agrees with this statement. Countries with established nuclear programmes already contribute to the establishment of infrastructure elsewhere by disseminating their experience, publishing their regulation and actions on the internet and participating in various international processes. The Netherlands has a small nuclear programme and a dedicated but lean RB. Its contribution to international assistance programs is expected to be constrained by the allocation of resources to national day-to-day duties and international processes under the CNS, ENSREG activities, IRRS and the like. Action: The RB in the Netherlands	Continued practice

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				will undergo an IRRS mission for the first time in 2014 (follow-up in 2017). This will claim a considerable part of available resources at the RB. e. The RB agrees with this statement. Examples of the Dutch activities are participation in activities in WENRA, ENSREG and other EU activities like the EU HERCA WG Emergencies. Also bilateral contacts with neighbouring countries Belgium and Germany on EP&R are frequent.	
6.5 (131)	Effectiveness of experience feedback mechanisms a. Information exchange and feedback should be enhanced by using the established mechanisms (eg. IRS, INES) and organisations (eg. WANO). b. The sharing and utilisation of information is limited and not always necessarily well coordinated or disseminated. This has been identified as an area for improvement.	International cooperation	xCNS	a. The Dutch RB and licensees already use these mechanisms. b. The RB agrees that sharing and utilization of information can be improved. The Dutch RB will seek gradual increase dissemination of information.	Continued practice Continued practice

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
	c. All nuclear power plants should share Operating Experience. d. The current focus is on reporting events and not necessarily on learning from the events. Effectiveness of Operating Experience Feedback should be assessed and its implementation should be included in peer reviews.			c.1. The single operating NPP in the Netherlands is part of the WANO and the German VGB network. The operator actively collects relevant information from workshops, conferences and regular participation in experience feedback working groups like WANO and VGB. German full phase out by 2022 will hamper the option VGB. Therefore the NPP is considering becoming a member of the WH-owners group. c.2. The Dutch RB will evaluate the possibility to increase exchange of information with other regulators of German design plants like Spain and Switzerland.	Ongoing Completed. In 2013 the First annual meeting of the so-called KWU Regulators Club took place in the Netherlands, followed by the second meeting in Spain in 2014. Members are now Brazil, Germany, Netherlands, Spain and Switzerland

ENSREG No.	Measure / Requirement identified by ENSREG / xCNS	Theme	Source	NL Implementation (NAcP 2012)	Current status
				d. In the Netherlands the focus is on learning from events. The RB will evaluate the possibility to increase the feedback on improvements in the Netherlands.	Ongoing. The RB will improve the operating & regulatory experience feedback, taking into account the IRRS recommendations. The implementation should be before the IRRS follow-up mission, the date of which has to be decided on. (Action RB-6.008)
6.6 (132)	Strengthening and expanded use of IAEA Safety Standards a. The Safety Fundamentals remain appropriate as a sound basis for nuclear safety when properly implemented. b. Implementation should strike the right balance between prevention and mitigation. c. The IAEA Safety Standards should be taken into account in developing national nuclear safety regulations. d. These Safety Standards have a role to play in seeking continuous improvements to safety at existing nuclear power plants.	International cooperation	xCNS	The RB endorses the statement. a/b. The nuclear safety framework in the Netherlands is under review. The question to incorporate the Safety Fundamentals is being discussed. c. IAEA Safety Standards, they are the basis for parts of the Netherlands' nuclear regulation. d. Continuous improvement already is incorporated in the national framework through the implementation of the EU-Nuclear Safety Directive.	Continued practice

PART III Additional Topics

7. Specification of Additional Topics

7.0 Introduction

This chapter addresses topics, not identified in the ENSREG-led Peer Review or the Extraordinary Meeting of the CNS, but that have been identified in the national review.

7.1 Tabled summary of items reported on ‘Additional Topics’

All Actions on the part of the Regulatory Body (RB) can be found in a table in Part IV of the present report. The next table presents Actions on the part of licensees in the Netherlands. However, all Actions on the part of the licensee of the NPP already have been addressed in Part I and II, and their planning can be found in Part IV of the present report. The Actions listed below extend to all licensees, so also to those not operating the NPP.

Table 7-1 Additional Topics regarding licensees, specific for the Netherlands and not inventoried or listed by ENSREG and/or CNS

No.	Measure / Requirement
1	All licensees with nuclear installations have undertaken a Complementary Safety Assessment (a.k.a. stresstest) to assess the robustness of their facilities. This applies to waste management facilities, research reactors, nuclear research laboratories, and the enrichment plant

PART IV Implementation of Activities

8. Specification of the Implementation of Activities

8.0 Introduction

This chapter presents the measures agreed with or imposed on the licensee (EPZ). It also details their planning and status. In addition it presents a numbered list with Actions on the part of the Regulatory Body (RB). It should be noted, that as of December 2014, in Table 8-2 new Actions for the RB have been added.

This chapter also presents our quick check of the compliance of the Dutch regulation and the design and operation of the NPP with recently updated WENRA Reference Levels (RLs). This is provided just for information purposes and is not a thorough assessment of the compliance. Refer to section 8.2.

8.1 Tabled summary of national implementation of post-stress test actions

This section features two tables, one table with the Actions initiated by or imposed on LH EPZ, and another table with Actions mainly related to the functioning of the Regulatory Body (RB).

8.1.a Actions on the part of the LH

Most of the Actions to be executed by the LH have been completed or are on schedule. Some of the Actions of the LH have been proposed for rescheduling for various reasons, some of which are:

- For some of the Actions the initial planning turned out not to be feasible due to the complexity of the measures involved, insights gained since the publication of the first proposed list of Actions (in the first NAcP) prompted for a rescheduling of some Actions;
- For implementation of some of the Actions, some activities are needed that can only be performed during a (long) outage of the NPP or in combination with measures that are associated with the 10-yearly PSR.
- For the implementation of some Actions, support by third parties is needed, that will be provided, albeit with delays.

The RB is in the process of determining its position regarding the rescheduling of the various Actions. Changed finalization dates mentioned below thus constitute *proposed* rescheduling dates.

Table 8-1 **National post-stress test Actions – initiated by or imposed on Licensee EPZ (operator of one NPP unit)**.
This is the official national list of Actions. Mx-, Px- and Sx- numbers between parentheses refer to original list of proposed measures of licensee EPZ. Other numbers in between parentheses: NR refers to section in National Report (2011), PR refers to section in Peer Review Report (2012).

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
1 (M1)	design issues	Emergency Response Centre (ERC) - study and consider options to better protect ERC like alternative location ERC, new building, strenghtening	1, 8, 22, 27, 32, 44	In 2013 alternative flood resistant ERC locations were arranged.	2013

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
		current building etc.		The possibilities to protect the existing ERC were studied leading to the proposal to build a new ERC at a greater distance from the plant. On-going discussions about the earthquake risk, the exact location of the new building and the building type caused project delays.	mid 2017 (was 2014)
2 (M2)	design issues	Storage facilities for portable equipment (needed for accident management), study and consideration of options to improve resistance against external hazards	1, 8, 27, 32, 44	In 2013 a flood and earthquake resistant storage facility for light portable equipment was arranged and equipped. The decision was made to build a storage facility for additional heavier mobile equipment adjacent to the ERC (refer to 1, measure M1).	2013 end 2017 (was 2014)
3 (NR 7.3.1)	design issues	Improvement of accessibility under extreme conditions	32, 44	Implemented. The accessibility of rooms after external events including a loss of all ac power was performed and showed no safety issues.	2014
4 (PR 4.2.4.2)	SAM	Analysis of potential doses to workers	22, 32, 43, 44	Implemented. A re-evaluation of the post core melt dose rates at several locations in the plant was performed. A calculation was made for the dose rate at the refuelling floor in relation to the SFP level.	2013

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
5 (NR 6.1.5)	SAM	Reassessment of ERO Staffing regarding its adequacy 24/7	35	Implemented. The ERO is adequate and can be deployed 24/7.	2013
6 (M3)	SAM	A possibility for refilling the spent fuel pool without entering the containment - this will increase the margin to fuel damage in certain adverse containment conditions.	23	Implemented. The plant already had several possibilities to refill the SFP from outside the containment using existing systems. These possibilities have been assessed and documented. An additional SAMG guideline was developed containing all possibilities to inject into the SFP.	2012
7 (M4)	SAM	Additional possibilities for refilling the spent fuel pool - this will increase the number of success paths and therefore increase the margin to fuel damage in case of prolonged loss of spent fuel pool cooling.	23	Implemented. A possibility to fill the SFP from the fixed fire fighting system via a hose connection to the SFP cooling system outside the containment has been added. Future installation of an injection line form the bunkered area to the SFP cooling system (refer to 29, measure S1) brings an additional possibility.	2012
8 (NR 7.3.1)	SAM	Improvement of possibilities to sustain cooling SFP *- this is covered under action 7 (M4).*		Refer to 7 and 29.	

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
9 (M5)	SAM	Reduction of the time necessary to connect the mobile diesel generator to Emergency Grid 2 to 2 hours - this will increase the margin in case of loss of all AC power supplies including the SBO generators.	15, 26	Installed A tractor and trained personnel is constantly available on site to transport the diesel generator from its parking position to the connection point. Two quick connection points and cable plugs were purchased to connect the diesel generator to the emergency bus. Commissioning tests can be performed only during a stop with empty reactor core (first one in 2016).	2014 2016
10 (M6)	SAM	Establishing ability to transfer diesel fuel from storage tanks of inactive diesels to active diesel generators. Phase 1: emergency grid 1 EDGs, Phase 2: remaining diesels.	15, 17	Implemented. A mobile fuel transfer pump and hoses have been purchased to transfer diesel between the fuel tanks of emergency grid 1 diesels. Two fuel transport trailers have been purchased to transport diesel fuel from any fuel tank to active diesels including fire trucks and other mobile equipment.	2014

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
11 (M7)	SAM	Establishing independent voice and data communication under adverse conditions, both on-site and off-site, would strengthen the emergency response organisation. Includes evaluation current means, procurement satellite communication apparatus, and arrangements with Ministry of Defence.	35	Implemented. Satellite telephones are available for external communication including data transfer. Independent internal communication is possible by use of the existing fixed and portable radio sets.	2013
12 (M8)	design issues	Ensuring the availability of fire annunciation and fixed fire suppression systems in vital areas after seismic events - this will improve fire fighting capabilities and accident management measures that require transport of water for cooling/suppression.	7, 32	Study completed. A Seismic Margin Assessment (SMA) including the fire suppression systems has been performed. The fire annunciation systems in the vital areas have been renewed with attention to seismic resistance. A modification to enhance the fire suppression systems in the vital areas is being developed.	2013 Impl's mid-2017

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
13 (NR 7.3.1)	design issues	Quality fire fighting systems buildings 01/02 and 35 for a DBE. *This is covered under action 12 (M8).* [The fire fighting systems in buildings 01/02 (dome) and 35 (backup control room) are not designed for operability after occurrence of the design base earthquake (DBE). To enhance their reliability after a DBE they should be qualified. However, any enhancement should be based on the results of the proposed advanced seismic analysis. This position is linked to licensee's proposal S3 (Action 33) but also (for implementation) to its measure M8 (Action 12).]		Refer to 12	
14 (M10)	design issues	Ensuring the availability of the containment venting system TL003 after seismic events - this will increase the margin in case of seismic events.	3, 31, 32, 48	Study finished The containment venting system has been assessed during the SMA. The system is expected to be able to withstand the Review Level Earthquake (RLE) that was defined for the SMA. No modifications necessary.	2013

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
15 (NR 7.3.1)	design issues	Technical and organisational improvement of availability under earthquake conditions of systems for containment filtered venting and fire fighting - should be based on results of advanced seismic analysis. *This is covered in actions 12 (M8) and 14 (M10).*		Refer to 14 & 12	
16 (M9)	design issues	Increasing the autarky-time beyond 10 h - this will increase the robustness of the plant in a general sense.	16	The possibilities and necessity to increase the autarky-time of the plant was studied. The licensee decided to increase the plant's robustness for autarkical operation without formally increasing the 10 hour design autarky time. Resulting plant modifications have been proposed and will be implemented.	2012 2017
17 (NR 7.3.1)	design issues	Increasing the autarky time beyond 10 hours (M9). Further study to define its proper implementation. *This is covered in action 16 (M9).*		Refer to 16.	

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
18 (M11)	design issues	Wave protection beneath the entrances to the bunkered back-up injection- and feedwater systems and to the bunkered emergency control room - this will mitigate the sensitivity to large waves combined with extreme high water and will make the plant fully independent from the dike.	8	Completed. A new study of the flood risk (refer to 30, measure S2) showed a large margin to the design flood level of the plant. There is no added value in a further increase of this margin with additional protection.	2013
19A (P1)	SAM	Develop set of EDMGs and implement training program (phase 1)	17, 27, 29, 30, 32, 45	Implemented. Phase 1: light mobile equipment is available including written instructions for the use of it.	2013
19B (P1)	SAM	Develop set of EDMGs and implement training program (phase 2)		Study finished by the original plant vendor to determine what Phase 2 mobile equipment could be beneficial and where it can be connected to the plant's systems This equipment will be purchased in 2015 and made available at different positions in 2015-2016. Additional connections needing hardware modifications will be realized in combination with the ongoing PSR in the mid 2017 (long stop)	2013 2015 2017

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
20 (NR 7.3.2)	SAM	Developing set of EDMGs - This is covered in action 19A and 19B		Refer to 19.	
21 (P2)	SAM	Training of the procedure to ensure water supply during mid-loop operation and loss of AC power	19	Implemented. The existing procedure was optimized, validated on the plant's simulator and trained by control room personnel and field operators.	2013
22 (PR 3.3)	SAM	Prepare and validate capabilities to cope with SBO during mid-loop operation.	19	Refer to 21.	
23 (P3)	SAM	Develop check-lists for plant walk-downs and the necessary actions after various levels of the foreseeable hazards		Implemented. A new Abnormal Operating Procedure in progress was developed with walk-downs and actions before, during and after external hazards like flooding, extreme weather and earth quake.	Extr weather & flooding: 2013. Earthquakes: 2014
24 (NR 6.1.5)	SAM	Training of long term SAMG measures	34, 47	Study finished. The existing SAMGs already address long term aspects of events but these will be enhanced with insights from the Fukushima accident. The SAMGs are trained regularly.	2013 Training to be finished March-2015

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
25 (PR 4.2.2.2)	SAM	Develop specific SAMG for SFP	34, 47	Implemented. An additional SAMG SAG-7 to inject into the SFP has been developed, implemented and trained.	2013
26 (PR 4.2.4.2)	SAM	Improvement of SAMGs and EOPs focusing on long term accidents. Operator EPZ will also become member of the Westinghouse Owner Group	33, 34, 47	In progress. The existing EOPs and SAMGs already address long term aspects of events but these will be enhanced with insights from the Fukushima accident. An alternative to a PWROG membership is to cooperate with Westinghouse and use their knowledge and experience to improve in the EOPs and SAMGs. A project will be started to implement these improvements.	End-2016
27A (NR 7.3.2)	SAM	Assessment of the need to upgrade equipment and/or instrumentation dedicated to SAM purposes (hardened core approach). Part A includes: study increasing robustness existing equipment & study protection of equipment against BDB extreme hazards	1, 17, 18, 32, 33, 47	Implemented. The existing equipment is robust only the robustness of the SFP level measurement must be enhanced.	2013

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
27B (NR 7.3.2)	SAM	Assessment of the need to upgrade equipment and/or instrumentation dedicated to SAM purposes . Part B includes study of accessibility of locations for manual operation, including relocation options.	1, 17, 18, 29, 32, 33	Implemented, refer to 3.	2013
27C (NR 7.3.2)	SAM	Assessment of the need to upgrade equipment and/or instrumentation dedicated to SAM purposes. Part C includes study of periodic test/inspection programs for equipment & of well defined and trained procedures to use the equipment.		Implemented. All fixed components are subjected to the plant's test and maintenance program.	2013
28 (NR 7.3.2)	SAM	Develop set of clear criteria to provide a basis for deciding when to switch the turbine oil pump off to increase the battery time. Disabling this pump will damage the turbine		Implemented. This criterion has been defined and added to the SBO procedure.	2012
29 (S1)	SAM	Study of a reserve SFP cooling system independent of power supply. This is also addressed in action 7 (M4).	19, 23	A study was finished by the original plant vendor to determine the possibilities of an AC power independent SFP cooling system. Proposed solution consists of external makeup water injection and filtered steam relief from the containment.	2013

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
				Resulting plant modifications will be combined with the on-going PSR project and implemented in 2017.	Mid 2017
30 (S2)	design issues	Investigate measures to further increase the safety margins in case of flooding (survey & analysis). When needed, proposal for modifications and implementation.	13	Study finished A new study of the flood risk showed a large margin in respect to the design flood level of the plant. There is no need to increase this margin with additional protection and therefore no modifications were proposed	2012
31 (NR 7.3.3)	design issues	Study flooding - this is covered by action 30 (S2).		Refer to 30	
32 (PR 2.3.3)	design issues	Study super storms - this is covered by action 30 (S2).		Refer to 30. Super storms were included in the mentioned flood study.	
33 (S3)	design issues	Study Seismic Margin Assessment, this includes various studies: Study SMA and SPSA methods Evaluation KNMI: Recommendation study 'Seismic Hazard in context IAEA' Drafting of proposal SMA Determining RLE	7, 13, 23	An SMA has been performed against a defined Reference Level Earthquake of 0.15g. The update of the seismic risk assessment showing that the pre-defined RLE is the correct value has not been finalized. DBE and liquefaction are also part of the scope.	Completed. Proposed finalization in 2015

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
		Undertake SMA		Modifications to enhance the seismic margins of specific SSCs will be implemented as part the on-going PSR project.	Mid 2017
34 (NR 7.3.3)	design issues	Study SMA - this is covered by action 33 (S3)		Refer to 33	
35 (PR 2.1.3)	design issues	Consider update hazard assessment, including DBE and liquefaction. *This is covered by action 33 (S3)*		Refer to 33	
36 (S4)	design issues	Study on strengthening off-site power supply, includes studies and when needed implementation.	15	Possibilities to strengthen the off-site power supply have been studied and discussed with the regulator and the external grid owner. A new house load transformer connected to a separate 380 kV grid was proposed and decided on. Implementation of this modification will be combined with the on-going PSR project and implemented in 2017.	2013 Mid 2017
37 (S5)	design issues	Study more extensive use of steam for powering an emergency feed water pump; includes studies and when needed implementation.	15	A study was finished by the original plant vendor to determine the possibilities and benefits of the additional use of steam. The plant has one existing steam driven auxiliary feed water pump. This study showed a preference for mobile diesel driven pumps instead of the additional use	2013

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
				of steam. Decision was made not to enhance the use of steam.	
38 (S6)	design issues	Study impact aircraft impact on safety functions		Implemented. The impact of relevant aircraft on the containment were studied and documented.	2013
39 (S7)	design issues	Study hydrogen threat to containment. The NPP has ample provisions to deal with this threat. Nevertheless additional studies will be undertaken.	31	Implemented. The existing hydrogen producing scenarios were updated and analysed using MELCOR. No new hydrogen threats were determined. Additional studies are ongoing to look for further improvement and possible optimisation of the position of the existing Passive Auto- catalytic Recombines (PARs) .	2014
40 (NR 7.3.3)	SAM	Water accumulation if drain pipes are blocked during fire-fighting; studies and when needed implementation of measures. The studies will also cover prevention of freezing of underground piping, other weather related hazards.		Implemented. Accumulation of water cannot cause damage to safety relevant buildings. Weather hazards were studied and preventive actions were included in the Abnormal Operating Procedure for extreme weather and earthquake (refer to 23, measure P3).	mid-2014

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
41 (PR 2.3.3)	design issues	Study freezing of underground piping, operation of diesels in cold conditions, effects of snow. *This is covered in action 40.*		Refer to 40.	
42 (NR 5.1.5)	SAM	Study amount of lubrication oil (for diesels) in crisis situations	17	Implemented. The standard stock of lube oil at the site is enough for a at least one week of continuous emergency diesel operation. When lube oil is used from stock during normal operation an automatic purchase order is sent to the oil supplier to assure the availability of the normal stock.	2014
43 (NR 5.1.5)	design issues	Re-assessment of alternative power sources (alternative to emergency grids). This includes planning and implementing extra external connection points for mobile diesel generator and the fire-fighting system (water supply)	15, 16, 22, 26	Implemented. The re-assessment has been performed. Additional connection points to connect a small diesel generator to the emergency buses will be implemented in combination with the on-going PSR project and implemented in 2017 (refer to 44).	Study 2013 Impl's end 2017
44 (PR 4.2.4.2)	SAM	Better arrangements for mobile diesel generators and batteries. This includes study of small	16, 22, 26	In progress.	Study finished 2013

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European Level	Status end 2014	Finalization
		emergency power generators or fuel cells as a means for recharging or backup power. Possibly also instructions for recharging or switching to such power sources.		Refer to 43. An Uninterrupted Power Supply (UPS) will be installed in the bunkered area as a back-up for the existing uninterrupted power supply that is not earthquake resistant. Implementation will be done in 2017 combined with the on-going PSR project.	Impl 2017
45 (NR 6.4.3)	SAM	Study of procedures for handling of large amounts of radioactively contaminated water. Includes study & when needed implementation.		Study finished, implemented. An existing 17.000 m^3 water tank connected to underground piping can be used to store a large amount of radioactively contaminated water.	2013
46 (PR 4.3)	SAM	Unambiguous tagging of keys of rooms in bunkered building (ECR). Keys will be numbered and the necessity of having SAMG documentation in the ECR will be evaluated.		Implemented. The keys were correctly tagged but misinterpretation led to the assumption that they weren't. SAMG documents are available in the ECR.	2012

8.1.b Actions on the part of the RB

Table 8-2 National post-stress test actions – acting on and initiated by the national RB

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European level	Status end 2014	Planned finalization
RB-4.001	National organisation	The RB is drafting requirements for the design and construction of new nuclear reactors - they will be implemented in the regulatory framework.	101	In progress. The requirements will be documented in the DSR.	draft 2013 final 2015
RB-4.002	National organisation	The RB is in the process of drafting requirements related to internal & external hazards - they will be implemented in the regulatory framework.		In progress The requirements will be documented in the DSR	draft 2013 final 2015
RB-4.003	National organisation	The RB is studying new financing mechanisms for handling of license applications and supervision.	102	Completed. There is legislation regulating fees. A small (but higher than before) part of the costs of oversight and licensing now are covered by annual fees and fees for individual licensing activities, to be paid by the LHs.	2014
RB-4.004	National organisation	RB evaluation in the framework of the IRRS self-assessment and coming IRRS mission. In the self-assessment the RB will take notice of the xCNS summary 'Action oriented objectives	102	Completed. The IRRS mission visited the Netherlands in 2014.	2014

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European level	Status end 2014	Planned finalization
		for strengthening Nuclear Safety'.			
RB-4.005	National organisation	Consequences of German phase out. a. The Dutch RB will study the possible long term impact of the German phase out on the operation of the German-design Dutch NPP. b. The Dutch RB will evaluate the possibility to increase exchange information with other regulators of German design plants like Spain and Switzerland.	131	a. In progress. b. In 2013 the First annual meeting of the so-called 'KWU Regulators Club' took place in the Netherlands, followed by the second meeting in Spain in 2014. Members are now Brazil, Germany, Netherlands, Spain and Switzerland.	2015/2016 2013
RB-4.006	National organisation	In the light of the self-assessment within the framework of the IRRS-mission special attention will be paid to explain the management of Safety Culture within the Regulatory Body.	135	Completed as part of the IRRS self-assessment.	End 2014
RB-4.007	National organisation	The Netherlands is implementing the IAEA action plan. A number of actions are already practice, like the adoption of the IAEA-regulations, the IAEA missions, and evaluation and		In progress	Refer to the Appendix for the IAEA Action Plan

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European level	Status end 2014	Planned finalization
		strengthening of EP&R.			
RB-4.008	National organisation	Taking into account the European developments on this matter, research is in progress into clearance levels and protocols for measurement, decontamination and clearance, applicable to clearance of containers and other materials		Completed. Research was contracted with consultancy organisations. Based on this work, a new action (RB-4.012) has been defined to establish guidance for LHs on clearance of materials, buildings and sites in decommissioning projects.	2013
RB-4.009	National organisation	Implementation in the Dutch regulations of the update of the WENRA RL for existing reactors as published in September 2014 and based on the Fukushima Lessons Learned		In progress	2017 (new Action)
RB-4.010	National organisation	Implementation in the NPP of the update of the WENRA RL for existing reactors as published in September 2014 and based on the Fukushima Lessons Learned		In progress	2020 (new Action)
RB-4.011	National organisation	Implementation in the regulatory framework of the EU Nuclear Safety Directive published in 2014.		In progress	2017 (new Action)

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European level	Status end 2014	Planned finalization
RB-4.012	National organisation	To establish guidance for LHs on clearance of materials, buildings and sites in decommissioning projects.		In progress	2015 (new Action)
RB-5.001	EP&R	Planning and organisation of bilateral exercises with Belgium and Germany is ongoing.	111	In progress	no end date
RB-5.002	EP&R	Damage to infrastructure (hampering EP&R activities) is subject to renewed evaluation in the light of post-Fukushima learning	108	Completed	Completed. Refer to chapter 5, action 5.1(108) for details of actions.
RB-5.003	EP&R	Study alternative means of communication for RB staff visiting a potential crisis area with disturbed communication infrastructure.	108		2016 (new Action)
RB-6.001	international cooperation	Drafting and publishing national report for CNS 2014		Completed	August 2013
RB-6.002	international cooperation	EU/ENSREG, participation in Peer Review Workshop regarding National Action Plans (post Fukushima measures)		Completed	April 2013

NL Action No.	Topic	Action / Activity	Related Recommendation No. on European level	Status end 2014	Planned finalization
RB-6.003	international cooperation	EU/ENSREG, participation in workshops 'Natural Hazards' and 'Emergency response', publication guidance documents planned for review.		Completed	Nat Haz, June 2013 Em zones, March 2013
RB-6.004	international cooperation	Harmonisation effort with neighbouring countries regarding emergency countermeasure zones (and associated intervention levels) and responses		Completed	2014
RB-6.005	international cooperation	Two workshops of Dutch RB with peers in Belgium (FANC)		Completed. In addition, first steps have been taken to start cross-inspections with Belgium and France: a tripartite meeting will take place to discuss a structural cross-inspection program starting from 2015.	2013
RB-6.006	international cooperation	Collaboration in international forums is continued	101	Continued practice	No end date
RB-6.007	international cooperation	cooperation with foreign TSOs		Continued practice.	No end date
RB-6.008	International cooperation	Regarding improvement of regulatory experience feedback, implement IRRS recommendations before IRRS follow-up mission	131	Ongoing	2018

8.2 Quick scan of compliance with recently updated WENRA RLs

WENRA in 2006 published a set of safety reference levels (RLs) for operation of NPPs. The RLs represent expected practices to be implemented in WENRA countries. In September 2014 an update[19] of the RLs was published by WENRA.

The Dutch RB has undertaken a quick scan of compliance of its regulatory framework with the very recently updated RLs. Because of the tight schedule, this action should not be regarded as a thorough exercise, therefore the results of it are presented 'as is' for information purposes only.

The implementation of the RLs is found in various pieces of regulations like:

- DSR, Dutch Safety Requirements (refer to chapter 4 for an explanation of the DSR);
- M&O, Management & Organisation regulations, that detail M&O requirements for licence holders;
- Bkse, Nuclear installations, fissionable materials, ores, and radioactive substances Decree;
- Bs, Radiation Protection Decree;
- Implementation Euratom Directives, the requirements of these have been implemented in Decrees like Bkse and Bs, but also in dedicated other regulations.
- NVRs (Dutch adaptations of IAEA guides), referenced in the licences.

The preliminary conclusion is that Dutch regulation largely complies with the new RLs.

[19] Report WENRA Safety Reference Levels for Existing Reactors – Update in Relation to Lessons Learned from TEPCO Fukushima Dai-ichi Accident, WENRA RHWG, 24th September 2014

Appendix A Implementation of IAEA Action Plan as of October 2014

Table A-1 Implementation of IAEA Action Plan as of October 2014

Nr.	Activity	Implementation	Status
1.1	Member States to promptly undertake a national assessment of the design of nuclear power plants against site specific extreme natural hazards and to implement the necessary corrective actions in a timely manner	(European) Stress test on all nuclear installations	Completed
2.1	Member States to provide experts for peer review missions.	List of possible reviewers for European IRRS missions provided. IRRS Training sessions being followed. Participation in IRRS-missions 2012 (Sweden), 2013 (Bulgaria, Belgium) and followup mission in 2013 (UK)	Completed
2.3	Member States to be strongly encouraged to voluntarily host IAEA peer reviews, including follow-up reviews, on a regular basis; the IAEA Secretariat to respond in a timely manner to requests for such reviews	Long tradition (see list in CNS6 report) E.g. OSART mission at plants every 5 years, SALTO mission+fu, IPSART+fu, etc…	Completed
3.1	Member States to conduct a prompt national review and thereafter regular reviews of their emergency preparedness and response arrangements and capabilities, with the IAEA Secretariat providing support and assistance through Emergency Preparedness Review (EPREV) missions, as requested	Decision about EPREV mission will be taken after the completion of the 2014 IRRS mission.	Open
3.2	The IAEA Secretariat, Member States and relevant international organizations to review and strengthen the international emergency preparedness and response framework, taking into account recommendations given in the final report of the International Action Plan for Strengthening the	The RB has participated in the European EPR review and further is participating in European/regional harmonization efforts. Participation in HERCA/WENRA and several of their working groups (e.g. mutual assistance and exchange	Ongoing

Nr.	Activity	Implementation	Status
	International Preparedness and Response System for Nuclear and Radiological Emergencies, and encouraging greater involvement of the relevant international organizations in the Joint Radiation Emergency Management Plan of the International Organizations	of information and the development of the DEEPER database for European NPP's). See also 11.1	
3.3	The IAEA Secretariat, Member States and relevant international organizations to strengthen the assistance mechanisms to ensure that necessary assistance is made available promptly. Consideration to be given to enhancing and fully utilizing the IAEA Response and Assistance Network (RANET), including expanding its rapid response capabilities.	The Netherlands is considering to register in RANET. Capacities have to be analysed.	On going
3.4	Member States to consider, on a voluntary basis, establishing national rapid response teams that could also be made available internationally through RANET	In the Netherlands there is only 1 NPP. Therefore no national response team will be established.	Completed
4.1	Member States to conduct a prompt national review and thereafter regular reviews of their regulatory bodies, including an assessment of their effective independence, adequacy of human and financial resources and the need for appropriate technical and scientific support, to fulfil their responsibilities	Self-assessment (within the IRRS 2014 frame) performed in the period 2012-2013 with the following result: Government decision to reorganize RB and set up a new authority to increase and better organize efficiency, resources, independence, communication etc. IAEA was consulted. To be implemented in 2014 – 2016. Regular self-assessments (are now part of the strategy of the RB.	Completed
4.3	Each Member State with nuclear power plants to voluntarily host, on a regular basis, an IAEA IRRS mission to assess its national regulatory framework. In addition, a follow-up mission to be conducted within three years of the main IRRS mission	IRRS mission including follow up mission requested in 2012. The mission is scheduled in Nov 2014. It is also an obligation according to the EU Nuclear Safety Directive.	Completed
5.1	Member States to ensure improvement, as necessary, of management systems, safety culture,	Human and organisational Factors are a specific topic in a yearly meeting between the	Completed

Nr.	Activity	Implementation	Status
	human resources management, and scientific and technical capacity in operating organizations the IAEA Secretariat to provide assistance to Member States upon request	operator and the RB. Additional efforts have been carried out to review the HOF area in the framework of the license application for LTO during full scope SALTO-mission in 2012 as an added issue. Further reviews are going on during the current PSR and inspection work. In addition the OSART mission of September 2014 contains two added modules dealing with the subject: the corporate OSART and integrated safety culture assessment modules. On a more regular basis the operator will host a WANO Peer Review every 4 years, with a follow up after two years. OSART missions will take place every ten years.	
5.2	Each Member State with nuclear power plants to voluntarily host at least one IAEA Operational Safety Review Team (OSART) mission during the coming three years, with the initial focus on older nuclear power plants. Thereafter, OSART missions to be voluntarily hosted on a regular basis	OSART mission scheduled in September 2014, advanced one year compared to the original schedule (2015) to comply with the IAEA action plan for older reactors. OSART mission every ten years was already the practice in the Netherlands.	Completed
6.2	Member States to utilize as broadly and effectively as possible the IAEA Safety Standards in an open, timely and transparent manner. The IAEA Secretariat to continue providing support and assistance in the implementation of IAEA Safety Standards	It is a long standing policy and practice in the Netherlands to use the IAEA safety standards. This policy and practice is now being formalized and extended (e.g. in the area of the RB). NVR's (Dutch adaptation of IAEA Safety Standards) are part of the license requirements for KCB. New Dutch Safety Requirements are being developed, based on new safety insights published by WENRA and IAEA , including the already known Fukushima lessons. These requirements are applied to new reactors, but will also be used as a reference for	Completed

Nr.	Activity	Implementation	Status
		existing installations.	
7.1	States parties to explore mechanisms to enhance the effective implementation of the Convention on Nuclear Safety, the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management, the Convention on the Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, and to consider proposals made to amend the Convention on Nuclear Safety and the Convention on the Early Notification of a Nuclear Accident	NL participate actively in CNS, JC, Early Notification and Assistance and supports all efforts to increase the effectiveness to enhance nuclear safety and transparency worldwide.	Completed
7.2	Member States to be encouraged to join and effectively implement these Conventions	See 7.1	Completed
7.3	Member States to work towards establishing a global nuclear liability framework that addresses the concerns of all States that might be affected by a nuclear accident with a view to providing appropriate compensation for nuclear damage. The IAEA International Expert Group on Nuclear Liability (INLEX) to recommend actions to facilitate achievement of such a global framework. Member States to give due consideration to the possibility of joining the international nuclear liability instruments as a step toward achieving such a global framework	NL is Contracting Party for the Paris+Brussel convention on liability. Further developments in this area are being followed.	Ongoing/ completed
9.1	Member States with nuclear power programmes and those planning to embark on such a programme to strengthen, develop, maintain and implement their capacity building programs, including education, training and exercises at the national, regional and international levels to continuously ensure sufficient and competent human resources necessary to assume their responsibility for safe, responsible and sustainable use of nuclear technologies the IAEA Secretariat to	In general in the Netherlands it is not difficult to attract people with a good technical or scientific background, but it is difficult to attract people experienced in the usual nuclear safety technical competences. The Dutch education infrastructure (universities and technical schools) has only a limited capacity in this field. Therefore a long training period is needed before new personnel	Open/ongoing

Nr.	Activity	Implementation	Status
	assist as requested. Such programmes to cover all the nuclear safety related areas, including safe operation, emergency preparedness and response and regulatory effectiveness and to build upon existing capacity building infrastructures	become effective. At this moment there is no National Programme to strengthen, develop etc... On the other hand there are some initiatives by the industry (e.g. support of regional higher education facilities). The reorganization of the RB in the next years will merge the available capacity (and knowledge) of the RB into one organization. This will contribute to increase its robustness. Please refer to the latest update . Since the Netherlands has a small but diverse nuclear programme strong international participation is necessary. The formation of the informal KWU Regulators Club (Initiative of the Netherlands, with participation of Germany, Spain, Switzerland and Brazil) is part of the efforts to sustain knowledge. The plan of KFD is to introduce a formal inspector qualification programme in the future (as one of the actions from the IRRS-action plan).	
9.2	Member States with nuclear power programmes and those planning to embark on such a programme, to incorporate lessons learned from the accident into their nuclear power programme infrastructure the IAEA Secretariat to assist as requested	See 4.1 and 6.2	completed
10.1	Member States, the IAEA Secretariat and other relevant stakeholders to facilitate the use of available information, expertise and techniques for monitoring, decontamination and remediation both on and off nuclear sites and the IAEA Secretariat to consider strategies and programmes to	Bilateral agreements with neighbouring countries and actions/recommendations HERCA/WENRA. IAEA and EC are working on protocols to exchange information from the EC member states with IAEA. See also 3.2	Ongoing

Nr.	Activity	Implementation	Status
	improve knowledge and strengthen capabilities in these areas		
10.2	Member States, the IAEA Secretariat and other relevant stakeholders to facilitate the use of available information, expertise and techniques regarding the removal of damaged nuclear fuel and the management and disposal of radioactive waste resulting from a nuclear emergency	One of the action following the stress test analysis at the Borssele power plant involves a "study of procedures for handling of large amounts of radioactively contaminated water. Includes study & when needed implementation". The development of strategy and guidance documents for EP&R organizations for handling large volumes of radioactive waste after a nuclear accident and of human and animal remains after a nuclear or radiological emergency is foreseen for 2016. (RB action anticipating IAEA guidance on Preparedness and Response for a nuclear or radiological emergency, DS457)	Open/ongoing
10.3	Member States, the IAEA Secretariat and other relevant stakeholders to share information regarding the assessment of radiation doses and any associated impacts on people and the environment	Bilateral protocols and arrangements are in place and contact with the relevant institutes and organizations are established and under construction. NL is party to the EU Ecurie etc.	Ongoing
11.1	Member States, with the assistance of the IAEA Secretariat, to strengthen the emergency notification system, and reporting and information sharing arrangements and capabilities	Competent Authority domestic and abroad is merged into one Competent Authority; USIE is implemented at the National Nuclear Emergency Management and Response Plan ("NCP"). (New NPK). The USIE system is operational. NL is involved in the development of the IRIX format to improve standards for information exchange. NL participates actively in the development of the DEEPER database (technical specialized information database of the Western Europe NPP's: WENRA initiative). See also 3.2..	Ongoing

Nr.	Activity	Implementation	Status
11.2	Member States, with the assistance of the IAEA Secretariat, to enhance the transparency and effectiveness of communication among operators, regulators and various international organizations, and strengthen the IAEA's coordinating role in this regard, underlining that the freest possible flow and wide dissemination of safety related technical and technological information enhances nuclear safety.	The RB has a long tradition is informing the public (and the Parliament). The KFD has completed a new external communication strategy based on the ENSREG guidelines from 2011. This will be further implemented in the framework of the development of the new RB. Regularly bilateral meetings with regulators of neighboring countries (B, D) are held in order to exchange information and share experiences. Similar exchange of information will also happen within the KWU regulators club including Brazil, Switzerland, Spain and The Netherlands). See also 3.2 en 11.1	Ongoing
11.6	The IAEA Secretariat and Member States, in consultation with the OECD NEA and the IAEA International Nuclear and Radiological Event Scale (INES) Advisory Committee to review the application of the INES scale as a communication tool	In 2011 NL has taken part in the stock-taking of the INES-actions in The Netherlands during the Fukushima accident. In 2012 we participated in the review of the guidance on communication.	Completed
12.1	Relevant stakeholders, with assistance provided by the IAEA Secretariat as appropriate, to conduct necessary research and development in nuclear safety, technology and engineering, including that related to existing and new design-specific aspects	The government finances (partially) research and development activities (on nuclear technology and nuclear safety) by the NRG consultancy group and TU Delft. Some regulatory research and development (mainly in the area of radiation protection) is commissioned by NIV (on project basis). The nuclear safety regulatory research by KFD (participating in OECD/NEA/CNSI projects) has been reduced almost	Open/Ongoing

Nr.	Activity	Implementation	Status
		completely over the last couple of years.	
12.2	Relevant stakeholders and the IAEA Secretariat to utilize the results of research and development and to share them, as appropriate, to the benefit of all Member States	see 11.2	

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