Authority for Nuclear Safety and Radiation Protection

# 2nd Netherlands' *National Action Plan (NAcP)*

# The new Dutch Regulatory Body

# Regulatory Body in the Netherlands

Before 2015:

- Fragmented
- Several entities at different Ministries
- Regulatory Body and Government interlaced.

# New Regulatory Body

New organisation started 1/1/2015

Authority for Nuclear Safety & Radiation Protection (ANVS)

- Positioned under the Minister of Infrastructure and Environment
- Staff: 120 - 150 fte

## Why

- More explicitly meet international standards, e.g. independency (IAEA review)
- Unite and utilize available expertise & experience
- Increase robustness, efficiency and effectiveness

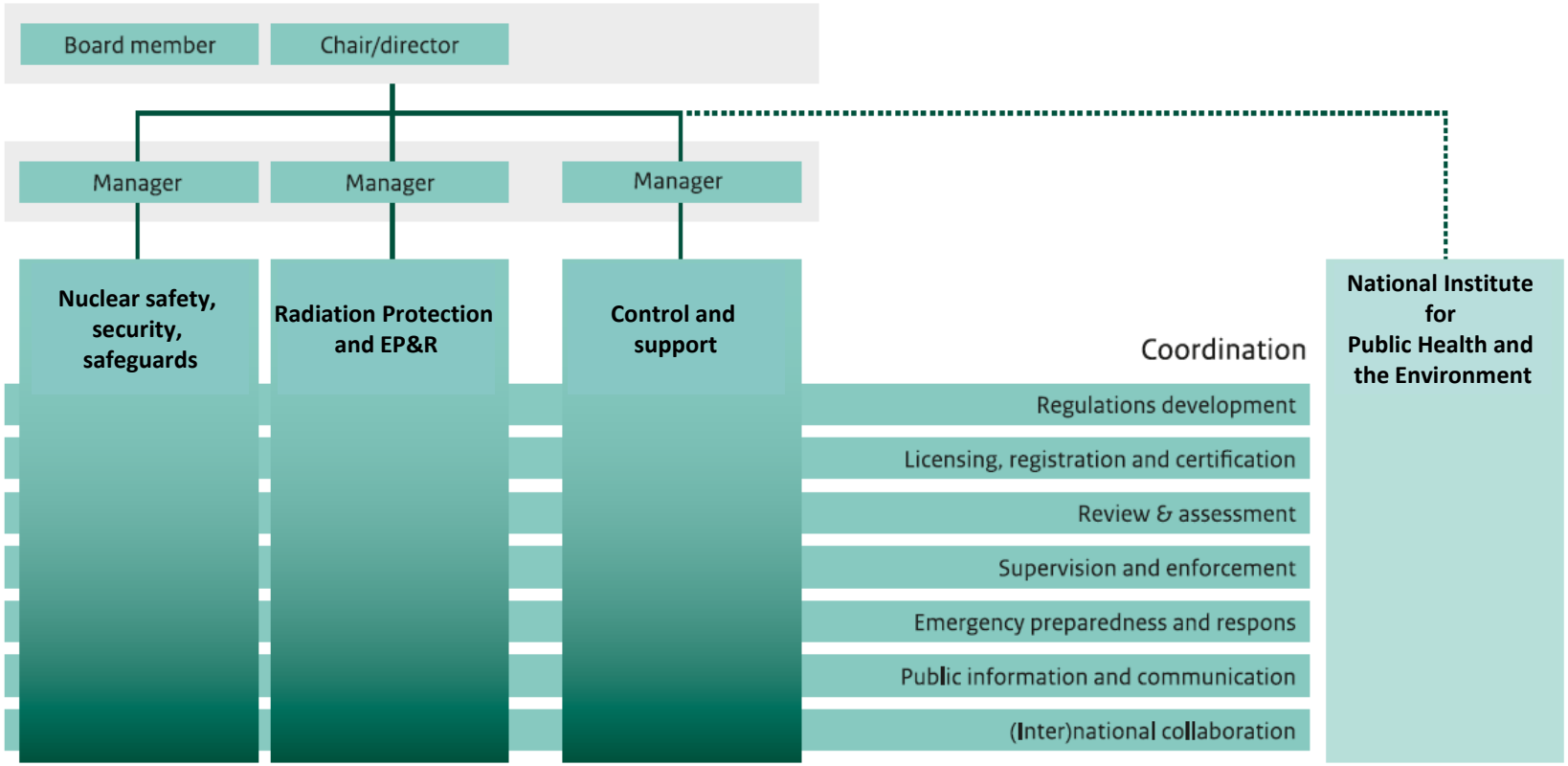
# New Regulatory Body

## Responsibilities and tasks

- Responsible for nuclear safety, security, safeguards, radiation protection and emergency preparedness

- Evaluate and prepare policy and legislation, develop safety requirements, licensing, registration, certification, supervision, enforcement, EP&R, international collaboration, public communication, research and development

# Organisation



# The National Action Plan

# A. Clarification on issues identified in rapporteur's report in 2013.

## A.1 German phase out – implications for NL

- LH member of VGB
- Many contacts/collaboration between RB and German regulator

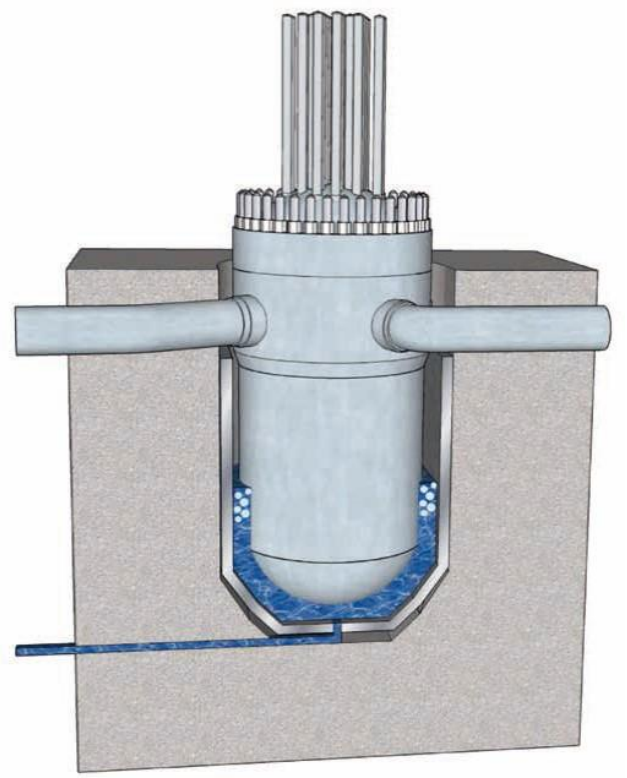
- RB → initiated 'KWU regulators club', with Bra, CH, D, E, NL
- EPZ → already contact with German designed plants outside of Germany → 'KWU users club'
- EPZ → Full scope simulator will possibly be relocated, probably to an on-site location

# A. Clarification on issues identified in rapporteur's report in 2013.

## A.2 Possibilities for in-vessel retention of molten core in KCB

- Finding a solution is a challenge giving the design of KCB. NL should note progress in this area in other countries.

- In-vessel retention is being analyzed in the ongoing PSR (see also Q&As).



# A. Clarification on issues identified in rapporteur's report in 2013.

## A.3 Timeframe to implement all measures is ambitious & commendable

- 2015: Most measures on schedule
- Some measures rescheduled for various objective reasons

# B. Progress on implementation & update NAcP

- Some rescheduling occurred:
  - New insights
  - Alignment with other activities like the ongoing 10-yearly PSR
  - Involvement third parties for delivering information (delayed)

- In addition: some measures extended beyond original plan

# C. Main changes in the NAcP since 2013 workshop

- ERC (temporary solution, existing buildings not suitable)
- New ERC building, protected against all extreme events – however no final RLE available yet → delay
- Multiple modifications aligned with PSR related measures:
  - *Increasing autarky time beyond 10h*
  - *Remote control of SBO measures during midloop*
  - *Additional alternative cooling of SFP (one is already in place)*
  - *Small diesel generators for recharging batteries and backup power*
  - *Hardware modifications  for additional connections for mobile equipment as part of EDMGs (action 19B)*

# D. Technical basis leading to main changes identified in the NAcP

- Determination of RLE specification → delays for other measures.
- Proper alignment with implementation of PSR related measures that only fit in long outage (2017) → delays.
- Waiting for WH Generic Improvements → delays in improving Westinghouse based EOP/SAMG
- In addition to the original NAcP measures, the following relevant measures have been defined:
  - Additional cooling option for SFP cooling and suppletion;
  - Additional hookup points for mobile systems;

# E. Some relevant outcomes of studies & analyses completed since 2013

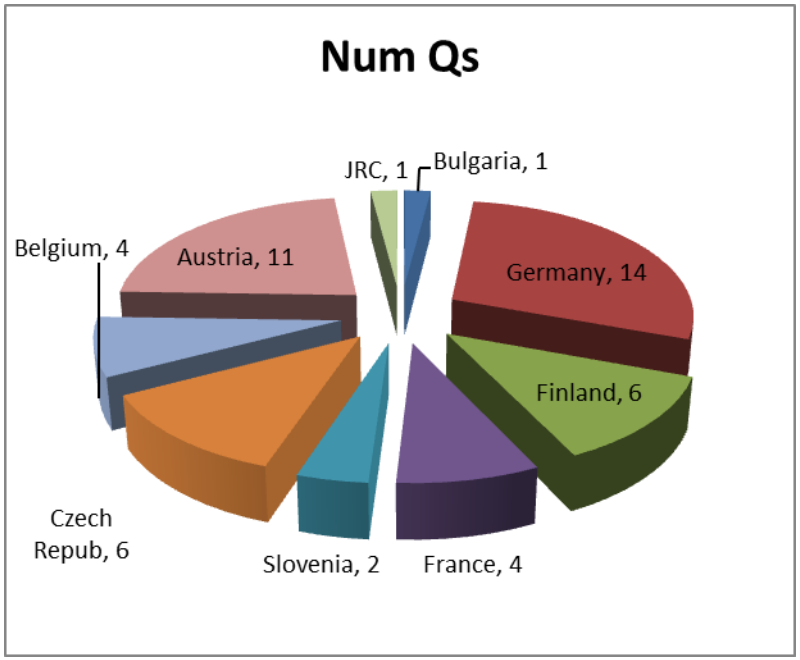
- Action 12: SMA → improvement fire suppression systems
- Action 14: SMA → containment venting system available at 0.15 g
- Action 18: Study of flood risk → no extra measures needed
- Action 27: Study on upgrading SAM equipment → only SFP level measurement needs enhancement
- Action 36: Study on strengthening off-site power supply → new house load transformer to connect to 380kV grid
- Action 45: Study on handling large amounts of radioactive contaminated water → use 17,000 $m^3$ tank

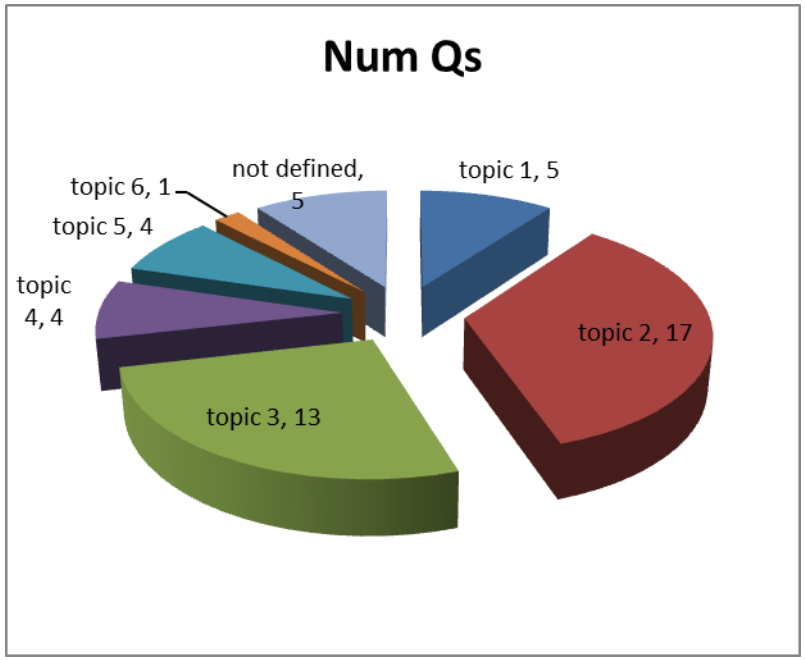
# F. Good practices and challenges identified during implementation so far

- Challenge: discussion about RLE and related design specifications for ERC building
- Good practice: alignment of post-Fukushima measures with PSR

# G. Response/clarification on the Qs/Cs raised on the 2014 version of the NAcP (1/4)

## Some statistics



# G. Response/clarification on the Qs/Cs raised on the 2014 version of the NAcP (2/4)

## Questions about schedules

- Explained in section B
- Proposed rescheduling accepted by Regulatory Body

## Questions about External events (topic 1)

- More details about the SMA against RLE = 0.15 g

# G. Response/clarification on the Qs/Cs raised on the 2014 version of the NAcP (3/4)

## Questions about Design issues (topic 2)

- about strengthening availability of SFP (4x)
- about strengthening (off-site) power (7x)
- aircraft impact study (2x)

# G. Response/clarification on the Qs/Cs raised on the 2014 version of the NAcP (4/4)

## Questions about SAM (topic 3)

- study of H2 management (2x)
- new ERC building and RLE – already discussed
- enhancement SFP-level measurements (3x)
- upgrade EOPs and SAMGs

# H. Other issues

- WENRA RL
  - *NPP: first analysis shows that majority of relevant gaps will be closed by the actions of the CSA and/or the ongoing periodic safety review*
  - *Regulations: new guidance closes relevant gaps*

- Publication of Dutch Safety Requirements

  *(www.internetconsultatie.nl/handreikingvobk/document/1566)*

Thank You for Your Attention!

# Q&A list (Q1 – Q4)

| | Country asking the question | Country to which the question is addressed | Reference to the topics 1-3 | Page number (of NAcP) | Text of question / comment | Text of Answer |
|---|---|---|---|---|---|---|
| 1 | Bulgaria | Netherlands | Topic 3 | Page 60 | Reference:<br>4.0 f Vendor<br>……."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."<br>Questions:<br>1) Have Areva NP crisis centres direct connection with KCB that delivers the critical parameters of the NPP in real time?<br>2) Have you used the services of that Areva centres so far, including for training? | 1) Yes, process data from the plant's procescomputer is transferred in real time via an ISDN line to AREVA NP's crisis centres in Erlangen and Offenbach.<br>2) Yes, training was given by AREVA on several topics except emergency management because the plant uses Westinghouse procedures that were not provided by AREVA. The AREVA emergency centres are frequently involved in the plant's emergency exercises playing their support role. |
| 2 | Germany | Netherlands | 1 | 24 (sec. 1.1) | ENSREG 1.4 (8): What is the temporary solution implemented in 2013 in response to Action 2 (M2)? | In an existing onsite building the licensee arranged a storage location for tools and portable equipment. This storage is above maximum flood level in a robust concrete building. The storage consists of: hand tools, lighting, lifting equipment, several combustion engine driven water pumps, small AC-generators, a welder and a torch, gasoline and diesel fuel etc. |
| 3 | Germany | Netherlands | 1 | 105 (sec. 8.1) | Action 33 (S3): Please elaborate in more details the main findings of the SMA performed against a defined Reference Level Earthquake of 0.15 g? | The SMA started with the selection and screening of Structures Systems and Components that are needed to bring and keep the plant in a safe shutdown state after earthquake. The seismic robustness of the selected SSCs was analyzed via plant walk downs and document searches. Three unique, plant specific SSCs couldn't be assessed this way namely the containment vent filter, the outside containment part of the main steam lines and the supporting column of the polar crane. Additional detailed analyses were needed to verify the seismic robustness of these three SSCs. The containment filter assessment is ready. The robustness of this filter was proved to be sufficient. The other two analyses have not been finalized yet. The walk downs showed some minor shortcomings in other SSCs for example insufficient anchorage of a cabinet or a pump. These shortcomings have been reported and will be fixed. |
| 4 | Germany | Netherlands | 2 | 30 (sec. 2.1) | 'Ample means of alternate cooling and heat sink are available…<br>However, additional measures to strengthen the availability of the SFP have been studied and are being implemented (Acts 7 and 29).' Please provide a short description of the additional measures? | A possibility to fill the SFP from outside the containment with water via a new hose connection between the SFP pool cooling system and the fire fighting system has been implemented. An additional injection line to supply water with a mobile pump from the bunkered building to the SFP cooling system is planned. Water from the storage tanks, the fire fighting system or any other outside source can be used. During SBO water will be supplied to the SFP using a mobile diesel driven pump and the produced steam will be vented out through the filtered containment vent. Vent capacity is sufficient to remove all decay heat from a recently unloaded core. |

# Q&A list (Q5 – Q8)

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| 5 | Germany | Netherlands | 2 | 30-31 (sec. 2.2) | It is stated, that the implementation of a measure to strengthen off-site power is ongoing. Please describe shortly this measure.<br>As mobile pumps are preferred rather than steam driven pumps, it would be appreciated if the Netherlands could provide information if these mobile pumps are already available at the NPP and where those equipment will be stored.<br>Are there any agreements about rapid restoration of off-site power between the NPP and grid operators in case of a SBO? | In the plant region there are only two interconnected power grids: 150kV and 380kV. The plants main transformer and start-up transformers are both connected to the 150kV grid. The plant has no generator breaker. The house load of the plant during outage can also be provided by the neighbouring coal fired plant. The measure planned to strengthen the off-site power supply consists of an additional transformer connected to the 380kV grid feeding both house load buses of the plant .<br>The plant has fire fighting trucks that can be used as mobile pumps to supply water to the plant systems. Additional mobile pumps are planned but not available yet. Mobile equipment will be stored in a safe place (measure M2).<br>No special agreement with the grid operators has been made. |
| 6 | Germany | Netherlands | 2 | 31-32 (sec. 2.3) | What kinds of implementations are made to enhance the DC power supply?<br><br>What autarky time will be achieved after implementation will be completed? | Load shedding by manually switching off less important DC users. About 5 hours for the emergency grid 1 batteries and 7,5 hours for the emergency grid 2 batteries.<br>The autarky time is the period of time in which no human interventions (manual actions) are needed to stabilize the plant and to maintain a stable position (KCB definition). This autarky time of 10 hours is a design feature of the plant and therefore based on the design concepts of the plant (single failure criterion etc.). For beyond design basis accidents this autarky time cannot guaranteed but robustness will be added if reasonably achievable (see CSA measure M9).<br>A complete station blackout caused by a Loss Of Offsite Power and failure of all emergency diesel generators is a beyond DBA. In this situation load shedding will be helpful to extend the use of the batteries. Design autarky time of 10 hours is not available in this example, manual actions are needed before depletion of the batteries. CSA measure M9 is intended to enhance the autarky feature for beyond DBA but is bound by certain design concepts. |
| 7 | Germany | Netherlands | 2 | 32 (sec. 2.4) | What is the capacity of the tanks for the storage of diesel fuel? How long lasts the stored amount of diesel fuel if the diesel generators are used in case of a SBO?<br>What are the main topics of the Extensive Damage Mitigation Guidelines (EDMG) to restore power supply in case of a SBO? | The minimum amount of diesel fuel available at any time is 245m3. Depending on their availability and the fuel consumption related to produced power, the running time of one single diesel generator can be extended to a total of 280 hours (4,3 MW diesels) or even 1,300 hours (0,85 MW diesels) before exhausting of the stocks.<br>In case of SBO the main topics of the EDMGs are the transfer and connection of the 1 MW mobile diesel generator to restore power on the bunkered emergency grid 2. |
| 8 | Germany | Netherlands | 2 | 35 (sec. 2.10) | Please provide a short description to refill the SFP without entering the containment? | A new SAMG guideline was written to refill the SFP in several ways from outside the containment by use of existing plant systems adding borated water, plain water or even salt water. Additional hardware provisions were made or planned to fill the SFP from outside the containment with water via a hose connection to the fire fighting system, or via a separate injection line from the bunkered area by use of a mobile pump.<br>Still under review by RB. |

# Q&A list (Q9 – Q13)

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| 9 | Germany | Netherlands | 3 | 47 (sec. 3.5) | In the report it is stated that “Establishing independent voice and data communication under adverse conditions.” Is the purchased satellite telephone (ENSREG No. 5.1, Current status) capable of sending data or has an additional system been purchased (compare situation in Switzerland)? | Two so called data terminals (Inmarsat BGAN Explorer 700) and one handheld satellite telephone (Iridium 9555) were purchased. The data terminals can be used for voice and data communication because a telephone, a fax machine and a (laptop) computer can be connected to it. Therefore fax, e-mail and internet can be used via a satellite connection using the fax machine and laptop computer that are stored with the data terminal. Two small AC generators with extension cords that are stored in the same place can be used to power the communication devices. |
| 10 | Germany | Netherlands | 3 | 104 | In the report the following action item is mentioned: “Develop set of clear criteria to provide a basis for deciding when to switch the turbine oil pump off to increase the battery time”. What are the criteria mentioned? | The applied criterion is standstill of the turbine shaft. Normal rundown time of the turbine is 1 hour. Switching off the oil supply will damage the bearings if the turbine is still turning. Manually switching of the oil supply in the first hour of an accident and as a consequence of this directly damaging the turbine could give discussion and distraction of operating staff from other important tasks.<br>If the DC oil pump would be switched off after 30 minutes (assumed time, more actions have to be taken) this would give only a limited extension (1 hour) of the operation time of the batteries. |
| 11 | Germany | Netherlands | Emergency Preparedness and Response and Post-Accident Management | 77 (sec. 5.1) | Under item 5.8 (115) an improvement of the source term is mentioned. How has this source term been improved and which improvements shall be done in future by the working group? | The Netherlands was already participating in the STERPS project (A rapid response source term indicator based on plant status for use in emergency response). KCB implemented this methodology as software tool SPRINT to do source terms prediction. Furthermore, the source term prediction was adapted into a methodology in which scenarios (actual, prognose, realistic and worse case) are formulated. What was changed were not the basic source terms themselves but the methodology to use them. The WG will analyse the experiences from recent excersises and improve the methodology based on these analyses. |
| 12 | Germany | Netherlands | International Cooperation | 114 | The Netherlands reported that a cross-inspections program with Belgium and France will start in 2015. It would be appreciated if the Netherlands could elaborate in more detail on this program. How are arrangements set up between the different regulatory bodies and license holders (granting access to staff of foreign authorities)? How will insights from such inspections be analyzed and transferred to the Dutch situation? | In september 2014 a first tripartite meeting between the Regulatory Authorities of Belgium (FANC), France (ASN) and the Netherlands (now ANVS) took place. It was agreed to exchange eachothers inspection programmes for 2015 and that all organisations would express their wishes to participate to eachothers inspections. Inspections will be done together to learn form each others approaches and from the results. In 2015 again there will be an annual tripartite meeting. In the meaqntime it has been decided to increase cooperation between ANVS and FANC under an existing MoU from 1990. |
| 13 | Germany | Netherlands | National Organization | 57 (sec. 4.0.a) | In the Dutch report it is stated, that the new regulatory body, the ANVS, will operate under a mandate of the Minister of infrastructure and environment starting January 1st 2015. However, the new authority will not be formally established within 2015, because a new law has to be prepared. It would be appreciated if the Netherlands could explain in more detail the arrangements between and roles of the minister of economic affairs (who has the right to issue licenses by the Dutch nuclear energy act), the minister of infrastructure and environment, and the new authority ANVS under the mandate of the minister of infrastructure and environment in 2015. | On 1 January 2015 a new organization of the Dutch regulatory body, the Nuclear Safety and Radiation Protection Authority (ANVS), started operations. Please refer to annex A for more information about the ANVS. |

# Q&A list (Q14 – Q19)

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| 14 | Germany | Netherlands | National Organization | 59 (sec.4.0.d) | It is stated that NRG is a license holder and also supports the licensing branch of the Dutch regulator. How does the Dutch Regulator ensure its independence in regulatory decision making with respect to licensing of nuclear activities/facilities in those cases, where its TSO is a license holder at the same time? | NRG is never involved as TSO in the licensing of its own nuclear installation/activities. The framework contract between the Dutch regulator and NRG (for support activities) stipulates that no consultancy contracts are concluded related to documents and activities involving a license of the contractor himself. More in general, according to the framework contract NRG is responsible for guaranteeing that no conflict of interest exists. |
| 15 | Germany | Netherlands | National Organization | 59 (sec. 4.0.f) | EPZ has contracted AREVA NP Emergency Response Support Service in case of beyond design basis accidents. Are there possibilities to get information from AREVA's Emergency Centre (directly or via EPZ) to the emergency organization of the regulatory body? | The regulatory body has direct contact with the emergency organization of EPZ during an accident. EPZ has contact with AREVA's Emergency Centre for support. This support is not directly available for the RB. |
| 16 | Finland | Netherlands | 1-3 | the whole report | Quite many actions have been rescheduled. What is the reason for that? | Please refer to 8.1.a., p. 94 of the NAcP for description of the reasons for delay:<br>- 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;<br>- 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;<br>- For the implementation of some Actions, support by thrid parties is needed, that will be provided albeit with delays. |
| 17 | Finland | Netherlands | 1 | 23 | It is said that implementation measures are rescheduled from 2016 to mid 2017. Does this mean that the study of fire fighting systems is rescheduled? When would the implementation of possibly needed actions take place? | The study of the fire fighting systems is ready. Measures to enhance the robustness of the fire fighting system are being engineered and planned. Individual measures are being implemented earlier than mid 2017 if possible. Implementation of measures can be bound to plant outage or to the delivery of purchased equipment. For the fire fighting system a modification plan is being made. |
| 18 | Finland | Netherlands | 2 | 33 | It is said that the assessment of the need to upgrade equipment and/or instrumentation to SAM purposes has been completed. Did this result any actual modifications at the plant? | The only modification in this respect is the replacement of the SFP level measurement by an instrument that is capable to withstand harsh environmental conditions for a longer period of time.<br>Under review of the RB. |
| 19 | Finland | Netherlands | 3 | 44 | It is said that the molten corium stabilization has been analysed in PSRs. What was the result, were there any needs for changes identified or additional study needs? | The result of this PSR study was the proposal to introduce an in vessel retention possibility. In vessel retention in this relatively small reactor can be obtained by ex vessel cooling. The planned modification consists of a provision to supply water to the dry cavity around the vessel.<br>Under review of the RB. |

# Q&A list (Q20 – Q25)

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| 20 | Finland | Netherlands | 3 | 44 | It is said that the reviews of hydrogen management studies has been completed. What was the result of the extended studies (e.g. the management of hydrogen from the SFP, in the filtered venting system, and in the neighbouring buildings)? Were there any additional needs for plant changes identified? | The outcome of the study of the core melt scenario in the SFP is that there is no eminent hydrogen threat to the containment because the containment environment will be steam inert. Therefore no additional PARs are needed in this scenario. Containment leakage will not lead to an accumulation of hydrogen in the surrounding reactor building as long as this building is sufficiently ventilated. Procedural guidance and mobile emergency power will be provided to manage the accumulation of hydrogen.<br>Under review of the RB. |
| 21 | Finland | Netherlands | 3 | 50 | It is said that the study was finished in 2013 concerning the potential dose to workers. Implementations is said to be rescheduled from 2014 to mid 2017. Table does not specify what are the rescdeduled actions. Are there some plant modifications planned related to this subject? | The study consisted of a review and update of the calculated dose rates at various locations after core melt. There are no other direct actions as to this subject.<br>Under review of the RB. |
| 22 | France | Netherlands | 2.3 | p94 | Emergency Response Centre (ERC) - study and consider options to better protect ERC like alternative location ERC, new building, strengthening current building etc.<br>It is explained that on-going discussions about the earthquake risk, the exact location of the new building and the building type caused project delays from mid-2014 to 2017. In so far as this delay concerns only studies, could Netherlands clarify the new delay for the implementation and realization of the associated works? | The study was finished in 2014. A modification plan was written which is currently being assessed in an internal review process. The mentioned discussions caused delays in the definition part of the project. As the definition phase is the first part of the sequential project steps these delays have also consequences for the end date. The planned end date of the measures being the start of the operational phase of the ERC is end 2017. |
| 23 | France | Netherlands | 2.2 | p97<br>Action 9 | Reduction of the time necessary to connect the mobile diesel generator to Emergency Grid to 2 hours. A tractor and trained personnel is constantly available on site to transport the diesel generator from its parking position to the connection point. However, as explained in the National Report, if a truck is considered to be light equipment, in the postulated scenario of ENSREG it will be available 24 hours after LOOP started; if this truck is considered to be heavy equipment, during the first 24 hours no credits can be given to the mobile EDG. How this issue has been dealt with to ensure this mean can be quickly implemented in case of SBO? Does it mean that the truck considered in the National Report was not parked on the site while the new tractor is constantly available on the site? | This last conclusion is correct. Before a trucking company had to come with a tractor from outside to pull the mobile diesel generator that is parked onsite to its connecting position. Now no external trucking company is needed anymore. Tractor and mobile diesel generator are both parked onsite, ready to be deployed at any time. Furthermore, connectors have been implemented to quickly connect the dieselgenerator to NS2. |
| 24 | France | Netherlands | 2.2 & 2.5 | p31 | Concerning the reassessment of alternative power sources (alternative to emergency grids) including reassessment of the possibility of having extra fixed external connections for mobile diesel generator. The study is completed, additional connection points to mobile power will be implemented. Could Netherlands specify whether implementation of alternative power sources has been decided? | If alternative to diesel generators is meant by this question the answer is no, only diesel generators will be used.<br>Under review by the RB. |
| 25 | France | Netherlands | 2.2 | p35 | The actions 6, 7 and 29 relative to the SFP cooling are considered there as design issues while they are considered as part of SAMG in Table 8.1. Could Netherlands clarify this point? | The three actions mentioned and the new SAMG guideline for the SFP are related to each other. This new SAMG guideline contains all possible ways to add water to the SFP, including the new provisions that are being installed as a result of these actions.<br>Under review by the RB. |

# Q&A list (Q26 – Q30)

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| 26 | Slovenia | Netherlands | 1 | 95 | Regarding action No. 2: Which values of seismic load parameters were taken into account as design basis? | The design-basis earthquake (DBE) corresponds with a peak ground acceleration of 0.075 g. Its spectrum is based on the Hosser spectra adapted to the local sub soil conditions and intensity. The lowest seismic capacity of all considered systems, structures and components has been assessed to be 0.15 g, based on an engineering judgement (SMA).<br>Under review by the RB. |
| 27 | Slovenia | Netherlands | 3 | 98 | Regarding action No. 12: Is the new seismically resistant fire annunciation system operable in case of design basis event? Does this system exchange data via an ordinary data cable or wirelessly? What kind of seismic technical solutions were applied for the system? | Yes, with the limitation that the part of the annunciation system that is located in the containment cannot withstand the harsh environmental conditions that result from a medium or large break LOCA. The detectors inside the containment will fail above a certain temperature.<br>Data transmission is done via cable.<br>Use of seismically qualified detectors and seismically qualified mounting.<br>Under review by the RB. |
| 28 | Czech republic | Netherlands | All | n/a | Revised NAcP informs that the majority of measures to improve nuclear safety planned by the end of 2014 have been done, remaining measures are in progress. There is certain delay for some measures due to objective reasons (e.g. a decison to build a new ECR). The RB is in the process of determining its position regarding the rescheduling delayed Actions. Thus the new dates only constitute proposed rescheduling dates.<br>What is the schedule for final determining the new completion dates by the RB? | The rescheduling has been approved by the Regulator on February 11th, 2015 |
| 29 | Czech republic | Netherlands | 5 | 5 (NR 6.1.5) | **Reassessment of ERO Staffing**<br>- regarding its adequacy 24/7. The measure has been implemented. The ERO is adequate and can be deployed 24/7.<br><br>What is the organization of shifts concerning the number and profile of people? | There is always one complete ERO shift on call ready to be deployed 24/7.The number of ERO members is flexible. Abnormal conditions are first classified and then the extent of the emergency response organisation to be activated is decided upon. The typical initial number of ERO-staff will be 25-30 but this is dependent on the situation at hand.<br>An ERO team includes among others site emergency director, manager operations, manager radiation protection, on-duty shift personnel, engineering support people (knowledgable on SAMGs), fire fighters, et cetera.<br>In case of a long-lasting emergency situation the current ERO will make a succession planning and call ERO trained colleagues to take their place.<br>OSARTs and WANO peer reviews review the plant's ERO regularly. OSART team members take the Fukushima insights into account in their assessment of a plant. The ERO organization, roles and responsibilities and the number of ERO trained employees that can be deployed was assessed recently (2014) by OSART and was found to be adequate. |
| 30 | Czech republic | Netherlands | 5 | 27A (NR 7.3.2) | Assessment of the need to ***upgrade equipment and/or instrumentation dedicated to SAM purposes*** (hardened core approach). Part A includes: study<br>increasing robustness existing equipment & study protection of equipment against BDB extreme hazards.<br><br>According the revised NAcP the measure have been implemented since 2013 The existing equipment is robust only the robustness of the SFP level measurement must be enhanced.<br><br>What is the current status of the SFP level measurement enhancement (or date of enhancement)? | The enhancement of the SFP level is in the basic engineering phase. Enhancement is found to be complicated as the SFP of the plant is situated inside the containment and therefore can be subjected to the harsh environmental conditions after a LOCA. A solution is underway and planned to be implemented in 2017.<br>See also answer to question 18.<br>Under review by the RB. |

# Q&A list (Q31 – Q37)

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| 31 | Czech republic | Netherlands | 5 | 29 (SI) | ***Study of a reserve SFP cooling system independent of power supply***<br>A study was finished by determining 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.<br><br>What type of the external makeup water system it will be (separate building, vessel, mobil....?.)? | The external makeup water will be delivered by a diesel driven mobile pump via a new injection line connected to the SFP cooling system.<br>Also refer to the answer to question 4. |
| 32 | Czech republic | Netherlands | 2 | 38 (S6) | ***Study impact aircraft impact on safety functions***<br>The project has been implemented im 2013. The impact of relevant aircraft on the containment were studied and documented.<br><br>What type of aircraft was defined for the study and what conclusions were made from the study? | Large commercial aircraft. The conclusions of the study are classified.<br>Under review by the RB. |
| 33 | Czech republic | Netherlands | RB | RB-4.002 | The RB is drafting requirements for the design and construction of new nuclear reactors including internal & external hazards - they will be implemented in the regulatory framework. Draft exists since 2013.<br><br>What is the current status of the DSR and when it will be issued? | It has been decided to publish the DSR as guide. In April 2015 an internet consultation will be organised and the final publication is planned in the summer 2015. |
| 34 | Belgium | Netherlands | 3 | 17, 103 (126) | The robustness increase of existing equipment and the protection of equipment against extreme hazards were the subject of a study that concluded that the robustness of the spent-fuel-pool level measurement had to be upgraded. What main design aspects have to be upgraded (like qualification to earthquake and to accident conditions, location of the measurement reading (control room, local, other), backup power?)? Is it the study alone, or the robustness upgrade that was (were) finalized in 2013? If no, what is the planning of robustness upgrade? | The enhancement is focussed on increased containment conditions: high temperature for a prolonged time and higher dose rates. These new criteria exceed the LOCA conditions where the existing SFP level measurement complies with. The planning of the enhancement is 2017.<br>Also refer to the answers to questions 18 and 30. |
| 35 | Belgium | Netherlands | 3 | 25, 34, 38, 51, 94, 95 (126) | Emergency Response Center (ERC): an alternative location was implemented in 2013; this location is claimed to be flood resistant; what is the level of resistance against other extreme natural events like earthquakes, bad weather conditions? A new ERC is proposed for 2017, to shelter the emergency response organization after all foreseeable hazards: what does "all foreseeable hazards" mean? What are the other main design principles (in terms of location, habitability, capacity, communication means, plant parameter control, power supplies, fire protection, radio-protection, ...)? Only a few of them are addressed in the report. | The alternative location is a meeting room close to the main control room and a meeting room close to the laboratory. The buildings these rooms are in are not seismically qualified but strong enough to survive bad weather conditions like storm, heavy rain and flooding.<br>All foreseeable hazards are the threats that were assessed during the ENSREG stress test, including airplane crash and radioactive releases from the plant.<br>The ERC must be available for accident management when the plant has been struck by an external event. This means that the ERC must be at least as strong and flood resistant as the plant itself and that all necessary functions like communication means, SPDS, emergency power, radiation protection must be available when the ERC is needed. |
| 36 | Belgium | Netherlands | 1 | 26 (126) | Flooding margin assessment is claimed to be a continued practice; in which framework (other than stress tests) and with which recurrence is this practice continued? Is margin assessment for other natural hazards or external events also a continued practice? If so, in which framework and with which recurrence? And if no, why? | The ten yearly PSR is the program in which design principles and design assumptions like the flood risk are being assessed periodically. If found necessary, measures will be taken. In a PSR all relevant external risks are being evaluated and updated if necessary. |
| 37 | Belgium | Netherlands | 2 | 31, 108, 109 (126) | Reassessment of alternative power sources (action 43) and better arrangements of mobile diesel generators and batteries (action 44) are linked together and aim at installing an earthquake-resistant backup UPS in the bunker. They are rescheduled from 2013 to 2017. What compensatory measures are taken in the meantime? | The original measure was implemented fully. Additional measures have been identified for further improvement.<br>There is redundancy in the already implemented and planned measures. The existing 1 MW mobile diesel generator can be connected to emergency grid 2. This diesel generator is able to energize one train of emergency grid 2 and one train of emergency grid 1 at the same time when the grids are interconnected via the AM connection. The mobile diesel generator has enough access capacity to feed part of the users of emergency grid 1 in parallel. The mentioned UPS and additional external connection points on emergency bus 1 add diverse possibilities to power the components the 1 MW mobile diesel generator can supply on its own. In conclusion no compensatory measures are needed. |

# Q&A list (Q38 –Q44)

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|---|---|---|---|---|---|---|
| 38 | Austria (RAP) | Netherlands | All | n/a | It is commendable that most activities of the NAcP have been completed according to the planned schedule, or are proceeding according to plan.<br>For some actions for which new deadlines are given, it is not clear whether there is a genuine delay, or whether the new deadline refers to additional measures which were not planned originally. Additional measures are not always clearly denoted as such, see below. | Thank you. |
| 39 | Austria (RAP) | Netherlands | All | n/a | It is commendable that the Netherlands' NAcP is compiled as a stand-alone report, and is referring only to published material. | Thank you. |
| 40 | Austria (RAP) | Netherlands | 2 | 94/95 | For the NL Action No. 1, a delay is noted in table 8.1 (from 2014 to 2017), which also has effects on NL Action 2.<br>However, the original NLA 1 refers to *study and consider options to better protect ERC*; whereas the "status end 2014" appears to refer to a proposal for the building of a new ERC, which would be an additional step not part of the original action.<br>Is it the actual building of the ERC which is to be finalized by mid-2017, or is the planning for the ERC to be finalized by then, after resolving issues concerning earthquake risks etc. which are mentioned?<br>Likewise, the original NLA 2 refers to *study and consideration of options* for storage facilities for mobile equipment, and the building of a facility for heavier equipment is noted as delayed (from 2014 to 2017). Is it the actual building which is to be finalized by end-2017 (which would be an additional measure), or just the planning? | Different options for a protected ERC and storage facility for mobile equipment have been studied. The finalization of the actual (new) building that houses both could not be ready before 2017.<br>Under review by RB. |
| 41 | Austria (RAP) | Netherlands | 3 | 101 | For NLA 19B, it is not clear whether the two actions listed in "status end 2014" in table 8.1 which are to be finalized 2015 and 2017 are part of the original activity, or whether they are additional measures which have been derived as a consequence of the original activity. | The original measures will be completed in 2015. Additional measures will be completed in 2017.<br>For additional information also refer to the answer to question 37 of our list. |
| 42 | Austria (RAP) | Netherlands | 3 | 103 | NLA No. 26 was to be finalized in 2013, according to the NAcP from 2012. It is now delayed until end-2016.<br>Under "status end 2014", cooperation with Westinghous is noted as an alternative to PWROG membership as originally envisaged.<br>It is not clear whether this alternative has already been definitely chosen, or whether it is presently under consideration. Also, it is not clear why the original plan has not been followed and what is the reason for the delay. | The plant has a complete suite of Westinghouse based EOPs and SAMGs. Long term accident management is already in it and an additional SAMG guideline for the SFP was added to the plant's procedures in 2013. Westinghouse implements new insights fro the Fukushima accident in the generic procedures but they have become available only recently. The licensee has started a project with Westinghouse to incorporate these new insights in the plant specific procedures. This project is planned to be finalized end 2016. |
| 43 | Austria (RAP) | Netherlands | 2 | 105 | It appears that an important part of NLA No. 33, determining RLE, is delayed (from 2013 to 2015). The reason for the delay is not provided.<br>Furthermore, an additional measure (modifications to enhance seismic margins) is mentioned which presumably was not part of the original planning? | The reason is that there is little statistical data for the plant region as this area has very low seismicity. Seismic experts involved in the assessment of the seismic risk and RLE therefore take various assumptions, leading to numerous discussions and time delay.<br>An SMA has been performed against a chosen RL as part of the recent PSR project. Some modifications to enhance the seismic margins of specific SSCs were delayed and some will be proposed and implemented as part the on-going PSR project. |
| 44 | Austria (RAP) | Netherlands | 2 | 107 | NLA No. 39 deals with the hydrogen threat. It appears that the originally planned activities are completed, and *[a]dditional studies are ongoing to look for further improvement.*<br>What is the schedule for these additional studies? | Yes the originally planned studies are ready. These hydrogen studies and potential enhancements derived from them are part of the recent PSR project. An additional study was aimed at a possible optimisation of the PAR positions.<br>Also refer to the answer to question 20 for more information. |

# Q&A list (Q45 – Q49)

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| 45 | Austria (RAP) | Netherlands | 2 | 108 | The original activity NLA No. 43 includes *implementing extra external connection points for mobile diesel generators*.<br>Under "status end 2014", it is noted that *[a]dditional connection points to connect a small diesel generator will be implemented*, by 2017<br>Are the "additional connections" an additional measure on top of the "extra external connections"? If so, what is the reason for this additional measure?<br>If the "additional connections" were part of the measure from the beginning, what is the reason for the delay? | The original measure #43 was: "*Re-assessment of alternative power sources (alternatives to emergency grids)*". This study has been finalized according to the original planning by the end of 2013. The study proposes to add two external connection points to the emergency buses where a mobile diesel generator can be connected. In the latest action table this study and the proposed measure are combined as if they had been combined from the beginning. The implementation of two external connection points is scheduled to be ready by the end of 2017. The implementation is a logical consequence of the study but it has not been planned nor agreed upon up front.<br>For additional information refer to the answer to question 37. |
| 46 | Austria (RAP) | Netherlands | 3 | 95 | For NLA No. 4, it is noted that post core melt dose rates were evaluated and dose rates at the refuelling floor in relation to the SFP level were calculated.<br>However, the outcomes of these evaluations and calculations are not reported. | The outcome is as expected that during a core melt and under a certain level in the SFP dose rates become too high in certain areas of the plant. |
| 47 | Austria (RAP) | Netherlands | 2 | 107 | For NLA No. 38, it is noted that the impact of aircraft was studied and documented.<br>However, the outcomes of these studies are not reported. | The outcomes of the aircraft study is classified and therefore not reported. |
| 48 | Austria (RAP) | Netherlands | 3 | 44/107 | The rapporteur's report 2013 noted the *[w]ithin the frame of the ongoing PSR and NAcP also the possibilities for in-vessel retention of molten core are investigated.*<br>In Table 3.1, ENSREG item 3.1, it is noted that the analysis of in-vessel retention in the PSR 2013 is completed. Under the same ENSREG item, NLA 39 concerning hydrogen threats is also addressed.<br>However, in table 8.1, the results of the analysis of in-vessel retention are not reported; this work is not mentioned at all in table 8.1. (Whereas information is provided for NLA 39.) | These studies have been performed. For more information, refer to question 19 about in-vessel retention. |
| 49 | JRC | Netherlands | | 109 | Concerning procedures for handling large amounts of radioactive water, it is stated that *"An existing 17.000 m3 water tank connected to underground piping can be used to store a large amount of radioactively contaminated water"*. It is not clear if a 17.000 m3 water tank is enough to handle large amounts of radioactively contaminated water resulting from a severe accident. Additionally the robustness of the tank and the underground piping in case of a severe seismic event is not elaborated in the report. | What is large enough and how much radioactively contaminated water will be produced? No satisfying answer can be given in this respect. The tank and underground piping are not designed to withstand earthquakes.<br>Under review by RB. |

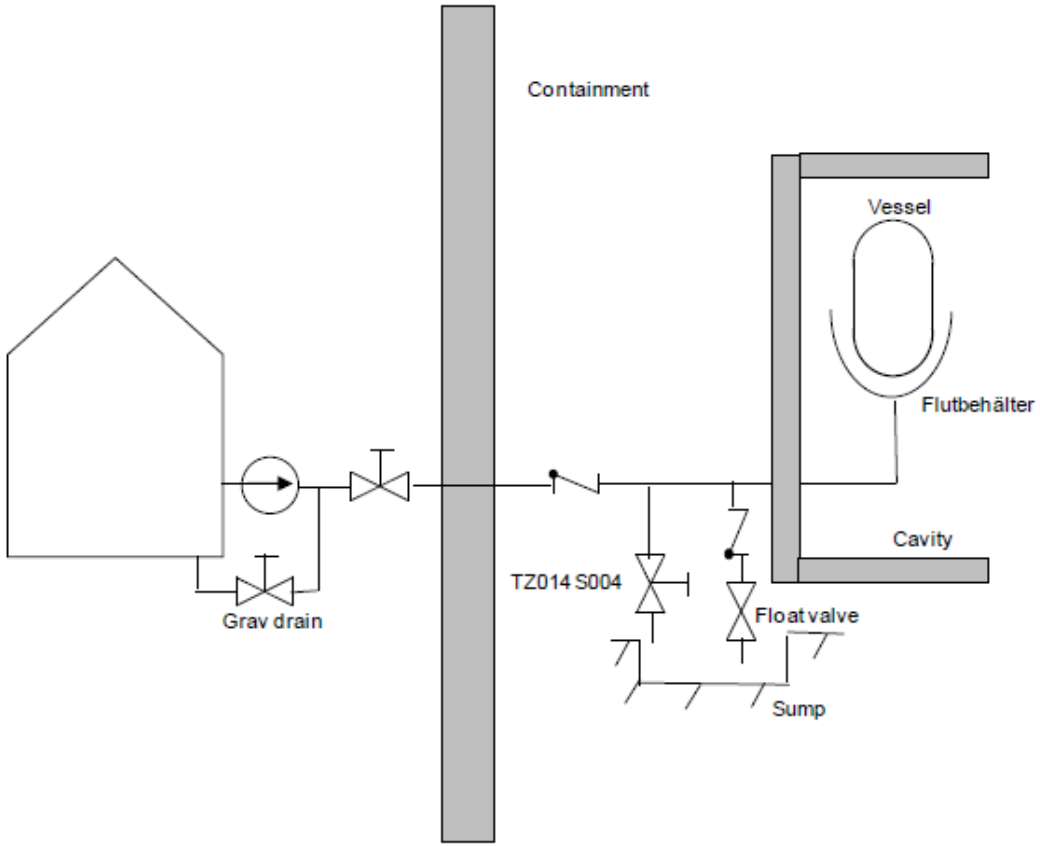


***Figure 13 – Combination of the direct injection to the vessel wall and the passive draining of the sump water to the vessel wall***

# Introduction - *Long history of PSRs at Borssele*

1986:

- Introduction of the '**bunker concept**'.

1997:

- Introduction of a **Reserve UHS**, by eight 17% deep wells
- Expansion of the (primary) emergency power system to 3x 100% EDG's
- Introduction of 30 minutes grace time for all DB events, 10 hours autarky time and 24 hours autonomy time for DB external events;
- **Filtered containment venting**;
- **PARs** for hydrogen control;
- Adoption of the **WOG Generic SAMG's** (in operation since 2000).

2006:

- Possibility to supply the bunkered systems by the primary (large capacity) EDG's;
- Extension of the **autonomy time to 72 hours** for design base external events.
- Protection against hazardous gasses from Westerschelde shipping accidents
- Increasing the **flooding margin** of the bunkered systems by raising the SBO EDG's air intakes;
- Expansion of the **SAMGs to shut-down** conditions.

# RESERVE SHEETS - Introduction - *Structure of the Netherlands' NAcP*

- 'Stand alone' document.
- Refers to publicly available material.
- Tables with measures and their status.
- ENSREG-guidance → 4 parts.

# Introduction – *Structure NL NAcP, PART I*

- **ENSREG** 'Compilation of recommendations and suggestions' +
- **xCNS**
- NL actions described to limited detail

- Chapter 0 'General'
  general conclusions from ENSREG compilations
- Chapter 1 'External Events'
- Chapter 2 'Design Issues' (→ loss of safety functions)
  focus on LOOP-SBO and LUHS events.
- Chapter 3 'Severe Accident Management' (SAM)

# Introduction – *Structure NL NAcP, PART II*

- **xCNS**
- NL actions described to limited detail

- Chapter 4 'National Organisations', with attention to newly established (since Jan 5th 2015) ANVS
- Chapter 5 'Emergency Preparedness and Response and Post Accident Management off site'
- Chapter 6 'International Cooperation'

# Introduction – *Structure NL NAcP, PART III and IV*

PART III

- Chapter 7 'Additional Topics'
  activities and conclusions from the National Review and related discussions not addressed in Parts I and II.

PART IV

- Chapter 8 'Implementation of Activities'
  timelines and key milestones of improvement activities in NL, progress since first NAcP and relative to initial schedule. (incl. input from ENSREG, xCNS, country peer review)

# Introduction – *Management of the implementation of NL NAcP*

- RB issued legally binding orders to LH (EPZ) with requirements for improvement measures
- LH started implementation (shortly after Fukushima, SOER etc.)
- Implementation stress test actions parallel to ongoing PSR
- Every 3 months progress report LH → RB