# DS462

Addenda to the IAEA Safety Requirements:

- GSR Part-1 on Governmental, Legal and Regulatory Framework for Safety
- NS-R-3 on Site Evaluation for Nuclear Installations
- SSR-2/1 on Safety of Nuclear Power plants: Design
- SSR-2/2 on Safety of Nuclear Power plants: Commissioning and Operation
- GSR Part 4 on Safety Assessment for Facilities and Activities

**Status**
STEP 7: first review by the Review Committees (NUSSC, RASSC, TRANSSC, WASSC)
Information of NSGC
Deadline for comments: 24May 2013

**Addendum to GSR Part 1**

| Lesson learned | Current text | Proposal following NUSSG WG meeting held from 5 to 8 March 2013 |
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| 2.1<br><br>Japanese Investigation Committee Interim Report<br><br>*Report by Fukushima Nuclear Accident Independent Investigation Committee<br><br>*Extraordinary CNS Meeting August 2012 | Req. 4 - Independence of RB<br>2.8. To be effectively independent, the regulatory body shall have sufficient authority and sufficient staffing and shall have access to sufficient financial resources for the proper discharge of its assigned responsibilities. The regulatory body shall be able to make independent regulatory judgements and decisions, free from any undue influences that might compromise safety, such as pressures associated with changing political circumstances or economic conditions, or pressures from government departments or from other organizations. Furthermore, the regulatory body shall be able to give independent advice to government departments and governmental bodies on matters relating to the safety of facilities and activities. | Req. 4 - Independence of RB<br>2.8 To be effectively independent from undue influence in its decision making, the regulatory body shall:<br><br>(a) have sufficient authority and sufficient staffing;<br><br>(b) have access to sufficient financial resources for the proper and timely discharge of its assigned responsibilities;<br><br>(c) be able to make independent regulatory judgements and regulatory decisions, under operational and accident conditions;<br><br>(d) be free from any undue influences that might compromise safety, such as pressures associated with changing political circumstances or economic conditions, or pressures from government departments, authorised parties or from other organizations.<br><br>(f) be able to give independent advice to government departments and governmental bodies on matters relating to the safety of facilities and activities. |
| Letter from Chairman of INSAG (24 August 2012)<br><br>Underlying theme of several reports, though not explicit<br><br>It is strongly recommended to | Req. 5: Prime responsibility for safety<br>**The government shall expressly assign the prime responsibility for safety to the person or organization responsible for a facility or an activity, and shall confer on the regulatory body the authority to require such persons or organizations to comply with stipulated regulatory requirements, as well as to demonstrate such compliance**. | Req. 5: Prime responsibility for safety<br>New para. After 2.15<br><br>"2.15a Having prime responsibility for safety, the person or organization responsible for a facility or an activity must proactively search for, propose and implement reasonably practicable safety improvements taking into account progress in science and technology as well as relevant experience feedback" |

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| emphasise the meaning of the Requirement | | |
| 2.2 | Req. 8: Emergency preparedness and response<br>2.23. The government shall specify and shall assign clear responsibilities for decision making in an emergency, and shall make provision for effective liaison between authorized parties and competent authorities and for an effective means of communication. | Req. 8: Emergency preparedness and response<br>2.23 The government shall specify and shall assign clear responsibilities for timely decision making in an emergency, and shall make provision for effective coordination and communication between authorized parties and response organizations* ~~competent authorities and for an effective means of communication.~~<br><br>*Include Ref. to the revision of GS-R-2 (GSR Part 7) |
| *Report by Fukushima Nuclear Accident Independent Investigation Committee<br><br>*ONR Final Report<br><br>*Ext. CNS Meeting August 2012 | Req. 8: Emergency preparedness and response | Req. 8: Emergency preparedness and response<br>New paragraph after 2.24<br><br>2.24a The government shall ensure that adequate training, drills and exercises are carried out, involving authorised parties and response organizations, including decision makers, to demonstrate an effective response to emergencies*. The training, drills and exercises should consider a full range of potential emergencies (e.g. events affecting several facilities on a single site, practical exercise with long duration and, if appropriate, transboundary emergencies).<br><br>*Include Ref. to the revision of GS-R-2 (GSR Part 7) |
| *Report by Fukushima Nuclear Accident Independent Investigation Committee<br><br>*ONR Final Report | Req. 8: Emergency preparedness and response | Req. 8: Emergency preparedness and response<br>New paragraph after 2.24<br><br>2.24b The government shall ensure that arrangements are in place to keep the public informed in regard to potential emergencies. The arrangements shall include information provided before start of operations, during normal operation and throughout any emergency*.<br><br>*Include Ref. to the revision of GS-R-2 (GSR Part 7) |

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| *Ext. CNS Meeting August 2012 | | |
| *Japanese Investigation Committee Interim Report<br><br>*ONR Final Report<br><br>*Ext. CNS Meeting August 2012 | Req. 14: Int. obligations and arrangements for int. cooperation<br>3.2. The features of the global safety regime include:<br>(a) International conventions that establish common obligations and mechanisms for ensuring protection and safety;<br>(b) Codes of conduct that promote the adoption of good practices in the relevant facilities and activities;<br>(c) Internationally agreed IAEA safety standards that promote the development and application of internationally harmonized safety requirements, guides and practices;<br>(d) International peer reviews of the regulatory control and safety of facilities and activities, and mutual learning by participating States;<br>(e) Multilateral and bilateral cooperation that enhances safety by means of harmonized approaches as well as increased quality and effectiveness of safety reviews and inspections. | Req. 14: Int. obligations and arrangements for int. cooperation<br>New bullet in 3.2<br>3.2. The features of the global safety regime include:<br>[…]<br><br>(f) Development of regular cooperation between Regulatory Bodies and other relevant organizations in order to share knowledge and experience (e.g. through the development of networks). |
| A 5.1 | Req. 14: Int. obligations and arrangements for int. cooperation | Req. 14: Int. obligations and arrangements for int. cooperation<br>New paragraph after 3.2<br><br>3.2a The government shall ensure that adequate arrangements are in place to benefit from international cooperation and assistance during a nuclear or radiological emergency*.<br><br>*Include Ref. to the revision of GS-R-2 (GSR Part 7) |
| 4.1 | Req. 21: Liaison between the RB and authorized parties<br>4.24. The regulatory body shall foster mutual understanding and respect on the part of authorized parties through frank, | Req. 21: Liaison between the RB and authorized parties<br>4.24. The regulatory body shall foster mutual understanding and respect on the part of authorized parties through frank, open and yet |

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| | open and yet formal relationships, providing constructive liaison on safety related issues. | formal relationships, providing constructive liaison on safety related issues and in-depth technical dialogue between experts of each party. |
| * Iter consult: Preliminary Report<br>*ENSREG<br>* NRC Task Force Report (implicit)<br>*Ext. CNS Meeting August 2012 (implicit) | Req. 25: Review and assessment of information relevant to safety<br>Req. 26: Graded approach to review and ass. of a facility or an activity | Req. 25 : Review and assessment of information relevant to safety<br>New paragraph below the overarching requirement 26<br>Req. 26: Graded approach to review and ass. of a facility or an activity<br>4.39a The Regulatory Body shall ensure that the authorised parties periodically perform comprehensive safety reviews and submit them to its assessment (e.g. for nuclear power plants, Periodic Safety Reviews shall be performed, at least every ten years). The Regulatory Body shall ensure that any reasonably practicable safety improvements identified in the findings are implemented. |
| 5.1<br>*ENSREG Report<br>*Japanese Investigation Committee Interim Report<br>*NRC Task Force Report<br>*ONR Final Report<br>Also see Req. 1 / 2.5 (3) | Req. 25: Review and assessment of information relevant to safety<br>Req. 26: Graded approach to review and ass. of a facility or an activity<br>4.43. The regulatory body shall assess all radiation risks associated with normal operation, anticipated operational occurrences and accident conditions, prior to operation of the facility or conduct of the activity, and periodically throughout the lifetime of the facility or the duration of the activity, to determine whether radiation risks are as low as reasonably achievable. | Req. 25: Review and assessment of information relevant to safety<br>Req. 26 : Graded approach to review and assessment of a facility or an activity<br>4.43. The regulatory body shall assess all radiation risks associated with normal operation, anticipated operational occurrences and accident conditions, including low frequency severe accidents, prior to operation of the facility or conduct of the activity, and periodically throughout the lifetime of the facility or the duration of the activity, to determine whether radiation risks are as low as reasonably achievable. |
| 4.1 | Req. 25: Review and assessment of information relevant to safety | Req. 25: Review and assessment of information relevant to safety<br>Req. 26: Graded approach to review and ass. of a facility or an activity |

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| | Req. 26: Graded approach to review and ass. of a facility or an activity | New paragraph after 4.48<br>4.48aThe regulatory body shall encourage the authorized party to continuously search for safety improvements and implement them in line with the regulatory process without needing to be prompted to do so by the regulatory body. |
| *IAEA Mission on Remediation<br><br>*ONR Final Report (implicit)<br><br>*Ext. CNS Meeting August 2012 (implicit) | Req. 36: Communication and consultation with interested parties<br>4.66. The regulatory body shall establish, either directly or through authorized parties, provision for effective mechanisms of communication, and it shall hold meetings to inform interested parties and the public and for informing the decision making process. This communication shall include constructive liaison such as:<br>[…]<br>(d) Communication on the requirements, judgements and decisions of the regulatory body, and on the bases for them, to the public;<br>(e) Making information on incidents in facilities and activities, including accidents and abnormal occurrences, and other information, as appropriate, available to authorized parties, governmental bodies, national and international organizations, and the public.<br>[…] | Req. 36: Communication and consultation with interested parties<br>New bullet in 4.66<br>(e) The public shall be given the appropriate opportunities to be involved effectively in regulatory decision making, in accordance with national legislation and international obligations;<br>(f) Making information on incidents in facilities and activities, including accidents and abnormal occurrences, and other information, as appropriate, available to authorized parties, governmental bodies, national and international organizations, and the public. |
| A 6.2<br><br>* IAEA Mission on Remediation<br><br>*Japanese Investigation Committee Interim Report<br><br>* NRC Task Force Report | Req. 36: Communication and consultation with interested parties<br>4.68. The authorized party has an obligation to inform the public about the possible radiation risks associated with the operation of a facility or the conduct of an activity, and this obligation shall be specified in the regulations promulgated by the regulatory body, in the authorization or by other legal means. | Req. 36: Communication and consultation with interested parties<br>4.68. The authorized party has an obligation to inform the public about the possible radiation risks (under both operational and accident conditions) associated with the operation of a facility or the conduct of an activity and this obligation shall be specified in the regulations promulgated by the regulatory body, in the authorization or by other legal means. |

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| *ONR Final Report<br><br>*Ext. CNS Meeting August 2012 (implicit) | | |

## Addendum to NS-R-3

| Lesson learned | Current text | Proposal following NUSSC WG meeting held from 5 to 8 March 2013 |
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| *Lessons learned*<br><br>*8.1* | 2.5 Proposed sites for nuclear installations shall be examined with regard to the frequency and severity of external natural and human induced events and phenomena that could affect the safety of the installation. | 2.5 Proposed sites for nuclear installations shall be ~~examined~~evaluated with regard to the frequency and severity of external natural and human induced events and their co-occurences~~phenomena~~ that could affect the safety of the installation.<br><br>**New paragraph after 2.5:**<br><br>2.5b Site specific design and safety assessment parameters shall be periodically evaluated based on the updated information, knowledge and methodologies and their safety implications shall be evaluated. |
| *Lessons learned*<br><br>*8.1* | 3.55. If the hazards for the nuclear installation are unacceptable and no practicable solution is available, the site shall be deemed unsuitable | **Modify paragraph 3.55:**<br><br>If the hazards for the nuclear installation are unacceptable and no practicable solution is available for protection of the nuclear installation with sufficient safety margins, the site shall be deemed unsuitable or no longer suitable. |
| *Lessons learned*<br><br>*10.1* | | **New paragraph after 2.13**<br><br>2.13a For assessing the feasibility of the implementation of the emergency plans, all nuclear installations to be installed on the site shall be considered. |
| *Lessons learned*<br><br>*10.1* | 3.51. The region shall be investigated for installations (including installations within the site boundary) in which flammable, explosive, asphyxiant, toxic, corrosive or radioactive materials are stored, processed, transported and otherwise dealt with that, if released under normal or accident conditions, could jeopardize the safety of the installation. This | ***Modify existing para 3.51***<br><br>3.51. The region shall be investigated for installations (including installations within the site boundary, including collocated NPP units) in which flammable, explosive, asphyxiant, toxic, corrosive or radioactive materials are stored, processed, transported and otherwise dealt with that, if |

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| | investigation shall also include installations that may give rise to missiles of any type that could affect the safety of the nuclear installation. The potential effects of electromagnetic interference, eddy currents in the ground and the clogging of air or water inlets by debris shall also be evaluated. If the effects of such phenomena and occurrences would produce an unacceptable hazard and if no practicable solution is available, the site shall be deemed unsuitable. | released under normal or accident conditions, could jeopardize the safety of the installation. This investigation shall also include installations that may give rise to missiles of any type that could affect the safety of the nuclear installation. The potential effects of electromagnetic interference, eddy currents in the ground and the clogging of air or water inlets by debris shall also be evaluated. If the effects of such phenomena and occurrences would produce an unacceptable hazard and if no practicable solution is available, the site shall be deemed unsuitable. |
| *Lessons learned*<br><br>*10.1 & 11.1* | 2.7. The hazards associated with external events that are to be considered in the design of the nuclear installation shall be determined. For an external event (or a combination of events) the parameters and the values of those parameters that are used to characterize the hazards should be chosen so that they can be used easily in the design of the installation.<br><br>3.21. The hazards for the site due to flooding shall be derived from the model. | ***Modify existing paragraph 2.7:***<br><br>2.7. The hazards associated with external events that are to be considered in the design of the nuclear installation and for its safety assessment shall be determined. For an external event (or a combination of events) the parameters and the values of those parameters that are used to characterize the hazards should be chosen so that they can be used easily in the design of the installation and for its safety assessment.<br><br>***Modify existing paragraph 3.21:***<br><br>3.21. The hazards for the site due to flooding shall be derived based on suitable ~~from the~~ models. |
| *Lessons learned*<br><br>*12.1* | | **New paragraph after 2.5.**<br><br>2.5a From the characterization of the hazards resulting from the external events:<br>– The frequency and severity information shall be used in establishing the design basis hazard level for the nuclear installation;<br>– Account shall be taken of uncertainties in the design basis hazard level; and<br>– The assessment level hazard to meet safety margins objectives shall be established for the installation. |

# Addendum to SSR-2/1

## Update of Plant State Definition

<table>
<tr><th>LL</th><th>Current text</th><th>Proposal following NUSSC WG meeting held from 5 to 8 March 2013</th></tr>
<tr><td>N.A.</td><td>DEFINITIONS pg. 59<br><br>[beyond design basis accident]<br><br>This term is superseded by design extension conditions.</td><td><s>[beyond design basis accident]</s><br><br><s>This term is superseded by design extension conditions</s><br><br>Plant states (considered in design)<br><br>
<table>
<tr><td colspan="2">Operational states</td><td colspan="3">Accident conditions</td><td>(a)</td></tr>
<tr><td>Normal operation</td><td>Anticipated operational occurrences</td><td>Design basis accidents</td><td colspan="2">Design extension conditions</td><td></td></tr>
<tr><td colspan="3"></td><td>No core melt</td><td>Severe Accidents (Core melt)</td><td></td></tr>
</table>
<br>(a) Conditions practically eliminated that are therefore not included in the design basis of items important to safety</td></tr>
<tr><td>N.A.</td><td colspan="2">Modification for clarity<br><br>5.31. The design shall be such that design extension conditions that</td><td>5.31 The design shall be such that <s>design extension</s> conditions that could lead to significant radioactive releases are practically eliminated (see</td></tr>
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| | could lead to significant radioactive releases are practically eliminated (see footnote 1). If not,for design extension conditions that cannot be practically eliminated, only protective measures that are of limited scope in terms of area and time shall be necessary for protection of the public, and sufficient time shall be made available to implement these measures. | footnote 1).<br><br>5.31.a ~~If not,~~ For design extension conditions ~~that cannot be practically eliminated,~~ only protective measures that are of limited scope in terms of area and time shall be necessary for protection of the public, and sufficient time shall be made available to implement these measures. |

## 1) Prevention of unacceptable radiological consequences for the public and environment

| LL | Current text | Proposal following NUSSC WG meeting held from 5 to 8 March 2013 |
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| 21.1 | 2.13.<br><br>…<br><br>(4) The purpose of the fourth level of defence is to mitigate the consequences of accidents that result from failure of the third level of defence in depth.<br><br>The most important objective for this level is to ensure the confinement function, thus ensuring that radioactive releases are kept as low as reasonably achievable. | 2.13.<br><br>…<br><br>(4) The purpose of the fourth level of defence is to mitigate the consequences of accidents that result from failure of the third level of defence in depth. This level is aimed at preventing the progression of fuel damage and mitigating consequences of severe accidents.<br>In case of a severe accident, the most important objective for this level is to ensure the confinement function, thus ensuring that significant radioactive releases (footnote) would be practically eliminated ~~are kept as low as reasonably achievable.~~<br><br>Footnote:<br><br>"significant radioactive releases": Those releases for which only limited protective measures in area and time are insufficient to protect the public and the environment. |

| LL | Current text | Proposal following NUSSC WG meeting held from 5 to 8 March 2013 |
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| 25.1 | **Requirement 33: Sharing of safety systems between multiple units of a nuclear power plant**<br><br>**Safety systems shall not be shared between multiple units unless this contributes to enhanced safety.** | **Requirement 33: Sharing of safety systems between multiple units of a nuclear power plant**<br><br>**Safety systems shall not be shared between multiple units unless, in accident conditions, this contributes to enhanced safety for the units.** |
| 35.1, 46.16 and 46.17 | **Requirement 68: Emergency power supply**<br><br>**The emergency power supply at the nuclear power plant shall be capable of supplying the necessary power in anticipated operational occurrences and accident conditions, in the event of the loss of off-site power.** | New paragraph under Requirement 68, after 6.45<br><br>6.45.a<br><br>The design shall include features for connection of alternative power sources (available at the site or mobile) to cope with prolonged total loss of AC power or DC sources. |

| LL | Current text | Proposal following NUSSC WG meeting held from 5 to 8 March 2013 |
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| 21.2 | **Requirement 58: Control of containment conditions**<br><br>**Provision shall be made to control the pressure and temperature in the containment at a nuclear power plant and to control any buildup of fission products or other gaseous, liquid or solid substances that might be released inside the containment and that could affect the operation of systems important to safety.** | New paragraph under Requirement 58 after 6.28<br><br>6.28 a<br><br>The design shall include features to facilitate the use of alternative/mobile equipment for removing heat from the containment for preserving its integrity in case of loss of all containment cooling systems. |
| 30.2 | 6.29.<br><br>Design features to control fission products, hydrogen, oxygen and other substances that might be released into the containment shall be provided as necessary:<br><br>(a) To reduce the amounts of fission products that could be released to the environment in accident conditions;<br><br>(b) To control the concentrations of hydrogen, oxygen and other substances in the containment atmosphere in accident conditions so as to prevent deflagration or detonation loads that could challenge the integrity of the containment. | New paragraph under Requirement 58 before 6.29<br><br>6.28.b<br><br>The loss of containment integrity shall be practically eliminated. This shall be achieved without the use of means that could lead to significant radioactive releases. |

| LL | Current text | Proposal following NUSSC WG meeting held from 5 to 8 March 2013 |
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| 46.3 | **Requirement 67: Emergency control centre**<br><br>**An on-site emergency control centre, separate from both the plant control room and the supplementary control room, shall be provided from which an emergency response can be directed at the nuclear power plant.**<br><br>6.42.<br>Information about important plant parameters and radiological conditions at the nuclear power plant and in its immediate surroundings shall be provided in the on-site emergency control centre. The on-site emergency control centre shall provide means of communication with the control room, the supplementary control room and other important locations at the plant, and with on-site and off-site emergency response organizations. Appropriate measures shall be taken to protect the occupants of the emergency control centre for a protracted time against hazards resulting from accident conditions. The emergency control centre shall include the necessary systems and services to permit extended periods of occupation and operation by emergency response personnel. | **Requirement 67: ~~Emergency control~~ Technical support centre** (Foot note)<br><br>**~~The design of the plant shall include~~ an on-site technical support centre, separate from both the plant control room and the supplementary control room, ~~shall be provided~~ from which ~~an emergency response~~ technical support can be ~~directed at the nuclear power plant~~ provided to the operation staff during emergency conditions.**<br><br>6.42.<br>Information about important plant parameters and radiological conditions at the nuclear power plant and in its immediate surroundings shall be provided in the on-site technical support centre. The on-site technical support centre shall provide means of communication with the control room, the supplementary control room and other important locations at the plant, and with on-site and offsite emergency response organizations. ~~Appropriate measures shall be taken to protect the occupants of the emergency control centre for a protracted time against hazards resulting from accident conditions. The emergency control centre shall include the necessary systems and services to permit extended periods of occupation and operation by emergency response personnel.~~<br><br>6.42 a<br><br>The design basis of the technical support centre shall be such that it remains operable and habitable for a protracted period of time in situations generated by all accident conditions and hazards with significant margins.<br><br>Paragraph 6.40 on Control room should also be modified to be consistent with 6.42a: |

| LL | Current text | Proposal following NUSSC WG meeting held from 5 to 8 March 2013 |
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| | | 6.40a<br><br>The design basis of the control room shall be such that it remains operable and habitable for a protracted period of time in situations generated by all accidents conditions and hazards with significant margins.<br><br>Footnote: Other facilities for the management of emergencies such as the Emergency Centre are addressed in GSR Part 7: Emergency Preparedness and Response |

## 2) Avoid long term off site contamination (Severe accident mitigation)

| LL | Current text | Proposal following NUSSC WG meeting held from 5 to 8 March 2013 |
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| 19.1 | 5.21. The seismic design of the plant shall provide for a sufficient safety margin to protect against seismic events and to avoid cliff edge effects (see footnote 5). | 5.21 ~~The seismic design of the plant shall provide for a sufficient safety margin to protect against seismic events and to avoid cliff edge effects (see footnote 5).~~The design of items important to safety shall include sufficient provisions or margins to avoid cliff edge effects for external hazards of a severity or duration moderately exceeding those considered in their design basis. |
| 22.1 | 5.29. The analysis undertaken shall include identification of the features that are designed for use in, or that are capable of preventing or mitigating, events considered in the design extension conditions. These features:<br><br>(a) Shall be independent, to the extent practicable, of those used in more frequent accidents;<br><br>(b) Shall be capable of performing in the environmental conditions pertaining to these design extension conditions, including design extension conditions in severe accidents, where appropriate;<br><br>(c) Shall have a reliability commensurate with the function that they are required to fulfil. | 5.29<br><br>…<br><br>(d) Shall include sufficient design margins to remain operational in conditions moderately more severe than those considered in their design basis to avoid cliff edge effects to occur. |

| LL | Current text | Proposal following NUSSC WG meeting held from 5 to 8 March 2013 |
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| 35.1, 46.16 and 46.17 | **Requirement 68: Emergency power supply**<br><br>**The emergency power supply at the nuclear power plant shall be capable of supplying the necessary power in anticipated operational occurrences and accident conditions, in the event of the loss of off-site power.** | **Requirement 68: Emergency power supply**<br><br>**The emergency power supply at the nuclear power plant shall be capable of supplying the necessary power in anticipated operational occurrences and accident conditions, including ~~in~~ the event of prolonged~~the~~ loss of off-site power.** |

## 3) Prevention of severe accident/ Strengthen the plant design basis

| LL | Current text | Proposal following NUSSC WG meeting held from 5 to 8 March 2013 |
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| 21.1 | 2.13. Application of the concept of defence in depth in the design of a nuclear power plant provides several levels of defence (inherent features, equipment and procedures) aimed at preventing harmful effects of radiation on people and the environment, and ensuring adequate protection from harmful effects and mitigation of the consequences in the event that prevention fails. The independent effectiveness of each of the different levels of defence is an essential element of defence in depth at the plant and this is achieved by incorporating measures to avoid the failure of one level of defence causing the failure of other levels. There are five levels of defence: | New paragraph 2.13a segregated from 2.13<br><br>2.13. Application of the concept of defence in depth in the design of a nuclear power plant provides several levels of defence (inherent features, equipment and procedures) aimed at preventing harmful effects of radiation on people and the environment, and ensuring adequate protection from harmful effects and mitigation of the consequences in the event that prevention fails. ~~The independent effectiveness of each of the different levels of defence is an essential element of defence in depth at the plant and this is achieved by incorporating measures to avoid the failure of one level of defence causing the failure of other levels. There are five levels of defence:~~ |

| LL | Current text | Proposal following NUSSC WG meeting held from 5 to 8 March 2013 |
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| | | ….<br><br>2.13 a The independent effectiveness of each of the different levels of defence is an essential element of defence in depth at the plant and this is achieved by incorporating measures to avoid the failure of one level of defence causing the failure of other levels. The independence of levels three and four is of particular relevance because of the severity of potential consequences should simultaneous failures of these two levels occur. |
| 25.2 | **Requirement 17: Internal and external hazards**<br><br>**All foreseeable internal hazards and external hazards, including the potential for human induced events directly or indirectly to affect the safety of the nuclear power plant, shall be identified and their effects shall be evaluated. Hazards shall be considered for determination of the postulated initiating events and generated loadings for use in the design of relevant items important to safety for the plant.**<br><br>5.18 Items important to safety shall be designed and located to minimize, consistent with other safety requirements, the likelihood of external events and their possible harmful consequences. | **Requirement 17: Internal and external hazards**<br><br>**All foreseeable internal hazards and external hazards, including the potential for human induced events directly or indirectly to affect the safety of the nuclear power plant, shall be identified and their effects shall be evaluated. Hazards shall be considered when establishing plant layout, ~~for~~ determining~~ation~~ the postulated initiating events and generating loadings for use in the design of relevant items important to safety for the plant.**<br><br>5.15 a (after Requirement 17)<br><br>Items important to safety shall be designed and located, considering other safety implications, to limit their exposure to hazards and possible harmful consequences of their failures.<br><br>~~5.18 Items important to safety shall be designed and located to minimize, consistent with other safety requirements, the likelihood of external events and their possible~~ |

| LL | Current text | Proposal following NUSSC WG meeting held from 5 to 8 March 2013 |
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| | | ~~harmful consequences.~~ |
| 19.1 | 5.20.<br><br>The design shall be such as to ensure that items important to safety are capable of withstanding the effects of external events considered in the design, and if not, other features such as passive barriers shall be provided to protect the plant and to ensure that the required safety function will be performed. | 5.20<br><br>The design shall be such as to ensure that those items that are necessary to fulfil the fundamental safety functions ~~important to safety~~are capable of withstanding the effects of external hazards considered in the design basis, and if not, other features such as passive barriers shall be provided to protect those items ~~the plant~~and to ensure that the required safety function will be performed. |

| LL | Current text | Proposal following NUSSC WG meeting held from 5 to 8 March 2013 |
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| 19.1 | **External hazards**<br><br>5.17. The design shall include due consideration of those natural and human induced external events (i.e. events of origin external to the plant) that have been identified in the site evaluation process. Natural external events shall be addressed, including meteorological, hydrological, geological and seismic events. Human induced external events arising from nearby industries and transport routes shall be addressed. In the short term, the safety of the plant shall not be permitted to be dependent on the availability of off-site services such as electricity supply and fire fighting services. The design shall take due account of site specific conditions to determine the maximum delay time by which off-site services need to be available. | 5.17. The design shall include due consideration of those natural and human induced external events (i.e. events of origin external to the plant) that have been identified in the site evaluation process. Natural external events shall be addressed. ~~including meteorological, hydrological, geological and seismic events.~~ Human induced external events arising from nearby industries and transport routes shall be addressed. Causality and likelihood shall be considered in postulating potential concurrent hazards. In the short term, the safety of the plant shall not be permitted to be dependent on the availability of off-site services such as electricity supply and fire fighting services. The design shall take due account of site specific conditions to determine the maximum delay time by which off-site services need to be available. |
| 29.1 | **Requirement 53: Heat transfer to an ultimate heat sink**<br><br>**Systems shall be provided to transfer residual heat from items important to safety at the nuclear power plant to an ultimate heat sink. This function shall be carried out with very high levels of reliability for all plant states.** | 6.19a (after Requirement 53)<br><br>If the availability of the ultimate heat sink cannot be demonstrated for all potential conditions generated by external hazards, an alternative ultimate heat sink that it is not impaired by the same hazards shall be provided. |

| LL | Current text | Proposal following NUSSC WG meeting held from 5 to 8 March 2013 |
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| 35.1, 46.16 and 46.17 | **Requirement 68: Emergency power supply** | 6.44a (new)<br><br>The design of the emergency power supply shall be such that relevant safety features for design extension conditions can be supplied by dedicated back-up power system independent (including DC power) and physically separated from the one used in case of loss of off-site power to avoid significant core or spent fuel degradation. The same system shall be able to supply the power necessary to mitigate the consequences of a severe accident should it occurred. The dedicated back-up power system connection time shall be consistent with battery autonomy.<br><br>6.44 b (new)<br><br>The design of the emergency power supply shall be such that relevant safety features for design extension conditions could be powered by any of the available power sources. |
| **42.1** | 6.68. For reactors using a water pool system for fuel storage, the design of the plant shall include the following:<br><br>a) Means for controlling the temperature, water chemistry and activity of any water in which irradiated fuel is handled or stored;<br><br>b) Means for monitoring and controlling the water level in the fuel storage pool and means for detecting leakage;<br><br>c) Means for preventing the uncovering of fuel assemblies in | 6.68. For reactors using a water pool system for fuel storage, the design of the plant shall prevent the fuel uncover in operational and accident conditions and include the following:<br><br>a) Means for monitoring and controlling the water level and the temperature in all operational and accident conditions;<br>b) Means for monitoring the activity in all operational and accident conditions;<br>c) Means for monitoring chemistry in operational conditions;<br>d) Means for preventing the uncovering of fuel assemblies in the pool in the event of a pipe break (i.e. anti-siphon measures). |

| LL | Current text | Proposal following NUSSC WG meeting held from 5 to 8 March 2013 |
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| | the pool in the event of a pipe break (i.e. anti-siphon measures). | e) Means to facilitate the use of alternative/mobile equipment to ensure the long term cooling of the fuel in case of events not considered in the design. |
| 25.2 | 5.55<br>The design shall support operating personnel in the fulfilment of their responsibilities and in the performance of their tasks, and shall limit the effects of operating errors on safety. The design process shall pay attention to plant layout and equipment layout, and to procedures, including procedures for maintenance and inspection, to facilitate interaction between the operating personnel and the plant. | 5.55<br>The design shall support …<br>… The design process shall pay attention to plant layout and equipment layout, and to procedures, including procedures for maintenance and inspection, and to facilitate interaction between the operating personnel and the plant in operational states and accident conditions. |

**Addendum to SSR-2/2**

| Lessons Learned | Current Text | Proposal to NUSSC |
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| 43.1/<br><br>43.2 | Requirement 4.44:<br>Safety reviews shall be carried out at regular intervals. Safety reviews shall address, in an appropriate manner, the consequences of the cumulative effects of plant ageing and plant modification, equipment requalification, operating experience, current standards, technical developments, and organizational and management issues, as well as siting aspects. Safety reviews shall be aimed at ensuring a high level of safety throughout the operating lifetime of the plant. | Requirement 4.44:<br>Safety reviews shall be carried out at regular intervals. Safety reviews shall address, in an appropriate manner, the consequences of the cumulative effects of plant ageing and plant modification, equipment requalification, operating experience, current standards, technical developments, and organizational and management issues, as well as ~~siting~~ site related aspects. Safety reviews shall be aimed at ensuring a high level of safety throughout the operating lifetime of the plant. |
| 46.15 | Requirement 4.47<br>On the basis of the results of the systematic safety assessment, the operating organization shall implement any necessary corrective actions and reasonably practicable modifications for compliance with applicable standards aiming at enhancing the safety of the plant. | Requirement 4.47:<br>On the basis of the results of the systematic safety assessment, the operating organization shall implement any necessary corrective actions and reasonably practicable modifications for compliance with applicable standards aiming at enhancing the safety of the plant. This shall include the goal of further reducing the likelihood and consequences of severe accidents. |
| 44.1 | Requirement 5.7:<br>Facilities, instruments, tools, equipment, documentation and communication systems to be used in an emergency shall be kept available and shall be maintained in good operational condition in such a manner that they are unlikely to be affected by, or made unavailable by, accident conditions. | Requirement 5.7:<br>Facilities, instruments, tools, equipment, documentation and communication systems to be used in an emergency, including for the accident management programme, shall be kept available and shall be maintained in good operational condition in such a manner that they are unlikely to be affected by, or made unavailable by, accident conditions. The operating organization shall ensure relevant safety parameter information is available in the emergency centre and technical support centre and communication is effective between the control rooms and these centres in accident conditions. These capabilities shall be tested periodically. |

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| 46.1/<br>21.2/<br>46.17/<br>46.2 | Requirement 5.8:<br>An accident management programme shall be established that covers the preparatory measures and guidelines that are necessary for dealing with beyond design basis accidents. The accident management programme shall be documented and periodically reviewed and revised as necessary. It shall include instructions for utilization of the available equipment — safety related equipment as far as possible, but also conventional equipment — and the technical and administrative measures to mitigate the consequences of an accident. The accident management programme shall also include organizational arrangements for accident management, communication networks and training necessary for the implementation of the programme. | Requirement 5.8<br>5.8 An accident management programme shall be established that covers the preparatory measures and guidelines that are necessary for dealing with beyond design basis accidents, including for spent fuel storage. The accident management programme shall be documented and periodically reviewed and revised as necessary.<br>5.8a For a site where several units are co-located, the accident management program shall consider concurrent severe accidents on multiple units due to, for example, external hazards. Resource in terms of trained and experienced personnel, equipment, supplies and external support shall be available to cope with the above.<br>5.8b It shall include instructions for utilization of the available equipment — safety related equipment as far as possible, but also conventional equipment.<br>5.8c It shall include alternative contingency measures such as supply of water, compressed air and mobile power to mitigate severe accidents, including any necessary equipment. This equipment shall be located and maintained so that it can withstand an accident.<br>5.8d It shall include the technical and administrative measures to mitigate the consequences of an accident, organizational arrangements for accident management, communication networks.<br>5.8e It shall include training necessary for the implementation of the programme.<br>5.8f When developing the accident management programme and associated procedures, adverse working conditions (e.g. elevated radiation levels, lack of lighting) for operating staff, as well as degraded operating conditions for equipment shall be taken into account to ensure expected accident management actions will be feasible. |
| 21.2 | Requirement 5.9<br>Arrangements for accident management shall provide the operating staff with appropriate systems and technical support in relation to beyond design basis accidents. These arrangements and | Requirement 5.9<br>Arrangements for accident management shall provide the operating staff with appropriate systems and technical support in relation to beyond design basis accidents. These arrangements and guidance |

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| | guidance shall be available before the commencement of fuel loading and they shall address the actions necessary following beyond design basis accidents, including severe accidents. In addition, arrangements shall be made, as part of the emergency plan, to expand the emergency response arrangements, where necessary, to include the responsibility for long term actions. | shall be available before the commencement of fuel loading, be tested in exercises, and they shall address the actions necessary following beyond design basis accidents, including severe accidents. In addition, arrangements shall be made, as part of the emergency plan, to expand the emergency response arrangements, where necessary, to include the responsibility for long term actions. |
| (Proposal from Finland) | Requirement 5.24:<br>The operating organization shall be responsible for ensuring that appropriate procedures are in place for effectively coordinating and cooperating with all firefighting services involved. Periodic joint fire drills and exercises shall be conducted to assess the effectiveness of the fire response capability. | Requirement 5.24:<br>The operating organization shall be responsible for ensuring that appropriate procedures and staffing are in place for effectively coordinating and cooperating with all firefighting services involved. Periodic joint fire drills and exercises shall be conducted to assess the effectiveness of the fire response capability. |
| 45.1 | Requirement 5.27:<br>The operating organization shall establish and implement a programme to report, collect, screen, analyse, trend, document and communicate operating experience at the plant in a systematic way. It shall obtain and evaluate information on relevant operating experience at other nuclear installations to draw lessons for its own operations. It shall also encourage the exchange of experience within national and international systems for the feedback of operating experience. Relevant lessons from other industries shall also be taken into consideration, as necessary. | Requirement 5.27:<br>The operating organization shall establish and implement a programme to report, collect, screen, analyse, trend, document and communicate operating experience at the plant in a systematic way. It shall seek to obtain and evaluate information on relevant operating experience at other nuclear installations to ~~draw~~ incorporate lessons for its own operations including emergency related arrangements. It shall also encourage the exchange of experience within national and international systems for the feedback of operating experience. Relevant lessons from other industries shall also be taken into consideration, as necessary. |

## Addendum to GSR Part 4

| LL | Current text | Proposal for NUSSC Meeting |
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| 50.1<br>50.2 | **Requirement 2: Scope of the safety assessment**<br><br>**A safety assessment shall be carried out for all applications of technology that give rise to radiation risks; that is, for all types of facilities and activities.**<br><br>**Requirement 14: Scope of the safety analysis**<br>**The performance of a facility or activity in all operational states and, as necessary, in the post-operational phase shall be assessed in the safety analysis.** | 4.36a<br>The safety assessment has to consider the site as a whole to establish that hazards from interactions between different facilities or activities have been taken into account.<br><br>4.36.b<br>For sites with multiple facilities or activities, account has to be taken in the safety assessment of the effect of external hazards on all facilities and activities, including the possibility of concurrent events in different facilities and activities, and of the potential hazards presented by each facility or activity to the others.<br><br>4.36.c<br>A systematic process shall be used to review multiple facility sites for the potential for common cause failures due to the possibility of using the same safety systems for more than one unit in accident conditions.<br><br>4.36.d<br>If facilities share resources in accident conditions the safety assessment shall demonstrate that the required safety functions for each facility can be fulfilled. |

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| 50.1 | 4.31.<br>The external events that could arise for a facility or activity have to be addressed in the safety assessment, and it has to be determined whether an adequate level of protection against their consequences is provided. This could include natural external events, such as extreme weather conditions, and human induced events, such as aircraft crashes, depending on the possible radiation risks associated with the facility or activity. Where applicable, the magnitude of the external events that the facility is required to be able to withstand (sometimes referred to as design basis external events) has to be established for each type of external event on the basis of historical data for the site for natural external events and a survey of the site and the surrounding area for human induced events.<br><br>Where there is more than one facility or activity at the same location, account has to be taken in the safety assessment of the effect of a single external event, such as an earthquake or a flood, on all of the facilities and activities, and of the potential hazards presented by each facility or activity to the others. | 4.31<br>The external events that could arise ….<br><br>~~Where there is more than one facility or activity at the same location, account has to be taken in the safety assessment of the effect of external on all of the facilities and activities, and of the potential hazards presented by each facility or activity to the others.~~<br><br>In case of extreme external hazards, the safety assessment shall demonstrate that only off-site protective measures limited in time and areas might be sufficient to protect the public and the environment. |

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| 35.1, 46.16, 46.17 | 4.47.To determine whether defence in depth has been adequately implemented, it has to be determined in the safety assessment whether:<br>(a)Priority has been given to: reducing the number of challenges to the integrity of layers of protection and physical barriers; preventing the failure or bypass of a barrier when challenged; preventing the failure of one barrier leading to the failure of another barrier; and preventing significant releases of radioactive material if failure of a barrier does occur;<br>(b)The layers of protection and physical barriers are independent of each other as far as practicable;<br>(c)Special attention has been paid to internal and external events that have the potential to adversely affect more than one barrier at once or to cause simultaneous failures of safety systems;<br>(d)Specific measures have been implemented to ensure reliability and effectiveness of the required levels of defence. | 4.47.To determine whether defence in depth has been adequately implemented, it has to be determined in the safety assessment whether:<br>(a)Priority has been given to: reducing the number of challenges to the integrity of layers of protection and physical barriers; preventing the failure or bypass of a barrier when challenged; preventing the failure of one barrier leading to the failure of another barrier; and preventing significant releases of radioactive material if failure of a barrier does occur;<br>(b)The layers of protection and physical barriers are independent of each other as far as practicable;<br>(c)Special attention has been paid to internal and external events that have the potential to adversely affect more than one barrier at once or to cause simultaneous failures of safety systems and in particular the response of the facility in case of total loss of power supply;<br>(d)Specific measures have been implemented to ensure reliability and effectiveness of the required levels of defence. |
| 5.1 | 4.48<br><br>It has to be determined in the safety assessment whether there are adequate safety margins in the design and operation of the facility, or in the conduct of the activity in normal operation and in anticipated operational occurrences or accident conditions, such that there is a wide margin to failure of any structures, systems and components for any of the anticipated operational occurrences or any possible accident conditions. Safety margins are typically specified in codes and standards as well as by the regulatory body. It has to be determined in the safety assessment whether | 4.48 a<br><br>The safety assessment shall include investigations to identify potential cliff-edge effects in the facility response to postulated initiating events. For each cliff-edge effect identified, the safety assessment shall confirm that adequate margins or grace period are available. |

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| | acceptance criteria for each aspect of the safety analysis are such that an adequate safety margin is ensured. | |
| 22.1 | 4.54. The aim of the deterministic approach is to specify and apply a set of conservative deterministic rules and requirements for the design and operation of facilities or for the planning and conduct of activities. When these rules and requirements are met, they are expected to provide a high degree of confidence that the level of radiation risks to workers and members of the public arising from the facility or activity will be acceptably low. This conservative approach provides a way of compensating for uncertainties in the performance of equipment and the performance of personnel, by providing a large safety margin. | 4.54. The aim of the deterministic approach is to specify and apply a set of conservative deterministic rules and requirements for the design and operation of facilities or for the planning and conduct of activities. When these rules and requirements are met, they are expected to provide a high degree of confidence that the level of radiation risks to workers and members of the public arising from the facility or activity will be acceptably low. This conservative approach provides a way of compensating for uncertainties in the performance of equipment and the performance of personnel, by providing a large safety margin. It shall be demonstrated that this margin is sufficient to avoid cliff edge effects. |
| 19.1 | 5.6.The results of the safety assessment have to be used to specify the procedures to be put in place for all operational activities significant to safety and for responding to anticipated operational occurrences and to accidents. The safety assessment is also to be used as an input into planning for on-site and off-site emergency response and accident management. | 5.6.The results of the safety assessment have to be used to specify the procedures to be put in place for all operational activities significant to safety and for responding to anticipated operational occurrences and to accidents. The safety assessment is also to be used as an input into planning for on-site and off-site emergency response and accident management~~.~~ in particular, in case of extreme events that are not considered in the design. |

**Update of cross-references**

**GSR Part 1**

Update reference [4] with SSR-6 and check the text of 2.17

Update reference [5] with GSR Part 7 (DS457) and check the text of 2.20, 2.24

Update reference [6] with GSR Part 3 and check the text of 2.25, 4.42 (a). Check also the footnote 6

Update reference [7] with GSR Part 6 (DS450) and check the text of 2.28

Update reference [8] with GSR Part 4 Rev.1 (DS462) and check the text of 4.3 (b) and (e)

Update reference [9] with GSR Part 2 (DS456) and check 4.3 (e), 4.14

**NS-R-3**

Update reference [1] with SF-1 and amend the text of 1.1

Update reference [2]. Remove “in preparation”

Update reference [3] with SSG-9

Update reference [4] and [5] with SSG-18

Update reference [9] with GSR part 2 (DS456), GS-G-3.1 and GS-G-3.5 and see what can be done with section 6 on quality assurance. Shall we just change the reference ?

**SSR-2/1**

Update reference [2] with GSR Part 4 rev.1 (DS462)

Update reference [4] with SSR-2/2 rev.1 (DS462). Should ref [4] be used in para 2.7 or rather [9]

Update reference [8] with GSR Part 2 (DS456)

Update reference [9], taking out the “interim edition” and check Requirement 5 and below

Update reference [10] with NS-R-3 Rev.1 (DS462)

Include the reference to GSR Part 7

**SSR-2/2**

Update reference [2] with GSR Part 2 (DS456) and update para 1.3. Check also Requirements 2 and associated requirements 3.4 to 3.7

Update reference [4] with SSR-2/1 Rev.1 (DS462)

Update reference [5] with GSR Part 7 (DS457) and check the text of 5.2, of 5.10, of 5.14

Update reference [6] with GSR Part 3

Update reference [8] with SSR-6 and check the text of 7.27

Update reference [9] with GSR Part 6 (DD450) and check section 9

**GSR Part 4**

Update reference [2] with GSR Part 1 Rev.1 (DS462) and update footnote 3 (title)

Update reference [3] with SSR-6

Update reference [4] with GSR Part 3

Update reference [5] with SSR-5 and update the first sentence of 4.44