COMMENTS BY REVIEWER Reviewer: Marcus Grzechnik Country/Organization: ARPANSA, Australia Date: 9/10/18				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	General	The first three guides appropriately reference GSR Part 7, however consideration should be given to referencing GSR Part 7 in the remaining guides. This is particularly relevant where emergency plans are required (such as in NS-G-2.5 revision).		Ok Text modified			

COMMENTS BY REVIEWER Reviewer: Mikko Lemmetty, Stéphanie NGUYEN, Laurence Oury Country/Organization: ENISS Date: 2018-09-26				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	NS-G-2.14, para 3.1	To direct or assume the duties of a control room operator to ensure the safe operation of the plant if such action is considered necessary and is allowed by the national regulations and licensee's procedures	In some countries, the shift supervisor manages, supervises operators but never assumes the duties of a control room operator (they do not have the same training and rights).	Ok But text modified as:	Words “or assume” left, because they do not contradict to the added text in the end of the sentence.		

2.	NS-G-2.14, para 3.11	The shift crew should may include	The inclusion of technical support personnel in the shift is not a necessity and not observed universally in the IAEA member states. This practice should not be elevated to the level of recommendation.	Fully agree with comment Text modified			
3.	NS-G-2.14, para 4.6.A	Administrative procedures should be put in place on the transfer of operator at multiunit power plants between units. In an emergency the operators from one unit or from the Emergency response organization can be transferred to another the degraded unit if…	In some countries, there exists a national pool of specifically trained emergency response operators that may be transferred between sites.	Ok Text modified			
4.	NS-G-2.14, para 4.13	The procedure should provide for a written handover document a clear declaration of acceptance of duty from the incoming operator before the outgoing operator is released.	Turnover is formalized in practice by written handover document. Calling this a "declaration" is a bit pompous.			X	The main idea here is a clear confirmation of acceptance of duty. In some plants shift log is used to formally register such acceptance with signatures of both operators, but no any specific “written handover document” is used. That original text reflects this idea well.

5.	NS-G-2.14 para 4.22	The configuration management of the plant should ensure that the operating procedures and other documentation used in the main control room by the operators are up-to-date should be reviewed before the start-up of the plant after maintenance outages. If necessary, this should include the review of operating procedures and other documentation.	A good configuration management system makes a formal review of all operating procedures unnecessary. In addition, on many plants, such exercise is simply impractical. For example, assume a two-week outage, 6000 pages of procedures. A review during the outage cannot be made but the approach needs to be based on systematic document and configuration management.	Agree Text modified			
6.	NS-G-2.14, para 4.26	Administrative controls should be put in place to ensure that the operator prepares carefully for an activity by reviewing the procedure, in order to understand fully the procedural steps to be taken for correct performance of the activity or plant evolution. When an operator is preparing for an activity, emergency or off-normal procedures should be considered by the operator during the preparation included in the planning in case conditions outside the normal operating conditions are encountered.	Wording "planning" is unclear in the text which otherwise discusses the preparation of the operator. We propose a wording which we consider clearer: Emergency and off-normal procedures should be included in the preparation work of the operator. Wording "planning" means that this consideration could be done by someone other, e.g. operations support that may have planned the task.	Agree Text modified			

7.	NS-G-2.14, para 5.31.D	To ensure operating personnel and emergency response organisation are able to use	The emergency response organisation of the plant may include staff members who are not usually working with the operations. For them, the specific training mentioned in this paragraph is particularly necessary.	Agree Text modified			
8.	NS-G-2.14, para 5.43	All operators should be trained to look for unapproved temporary modifications in the course of their rounds and tours of the plant. The training should include how to identify unauthorized temporary modifications as well as the action to be taken if such a modification is found.	During training, operator should be trained to review ALL of them and identify the unauthorized ones.	Agree Text modified			

9.	NS-G-2.14, para 6.17 6.16	An administrative control system can help should be established at the plant to provide instructions on how to administer and control an effective programme for operator aids such as drawings, instructions, tags, curves and graphs. The administrative control system for operator aids should cover, as a minimum, the following: — The types of operator aid that may be in use at the plant; — The competent authority for reviewing and approving operator aids prior to their use; — Verification that operator aids include the latest valid information.	Administrative control for all kind of aids without any kind of graded approach causes an unacceptably high workload and may lead to focusing on administratively easy but non-safety-related issues. Having an administrative control of drawings, instructions, tags curves graphs is naturally normal. But the same work for sketches, handwritten notes, copies of instructions that are done by the individual operator to help them in their work means in practice that the operator can only write down things if that is required by some procedure, which is a very severe limitation on the operator's freedom of action.			X	Clarification of the "operator aid" term is given in the footnote 14. Not controlled copies of instructions, handwritten notes made long ago and not reflecting actual status of the plant, wrong sketches can compromise safety. Established administrative control system can clarify the scope of controlled operator aids and some of them, i.e. hand-written notes made during the shift, may be allowed without having formal authorization.
10.	NS-G-2.14, para 7.8	Provisions Work management practices or other administrative or technical measures should be established at plants that have multiple units to ensure that major changes to work in progress in one unit do not affect the safe operation of other units.	Clarification of requirement	Ok Text modified			

COMMENTS BY REVIEWER Reviewer: M-L Järvinen Country/Organization: STUK Date: 9th October 2018				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	2.8	Operations personnel should maintain the reactor and its supporting systems within the bounds of proper equipment alignments and approved operational limits and conditions. All operations affecting safety should be undertaken only in accordance with written procedures. The nuclear power plant should be maintained in a safe condition by deliberate control and monitoring to ensure that basic fundamental safety functions (such as controlling the power criticality, cooling the nuclear fuel residual heat removal and confining radioactive material) are fulfilled.	Fundamental safety functions should be used as in requirements documents and in line with the definition. SSR-2/1, Req. 4. Please	Ok Text modified as:	The nuclear power plant should be maintained in a safe condition by deliberate control and monitoring to ensure that fundamental safety functions (such as control of reactivity, removal of heat from the reactor and from the fuel store, and confinement of radioactive material) are fulfilled.		Consistency checked with SSR-2/1 req.4. During operation on power it is better to use “reactivity” instead of criticality. This is also in line with SSR-2/1.
2.	2.9	The operating approaches and practices should ensure that doses due to exposure to ionizing radiation in the plant or due to any planned	Radioactive substance is used for releases.	Ok Text modified			

		release of radioactive material substance from the plant are kept below prescribed dose limits in all operational states, and that they remain ‘as low as reasonably achievable, economic and social factors being taken into account’ (ALARA). Requirements for protection against exposure to ionizing radiation are established in the Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, General Safety Requirements IAEA Safety Standards Series No. GSR Part 3 [4].					
3.	2.17	Performance objectives and associated criteria should be established and used to monitor routinely the performance of the plant and operations staff, and in particular their attitudes to safety and their responses to safety infringements and violations of operational limits and conditions or procedures (recommendations on operational limits and conditions are provided in Ref. Operational Limits and Conditions and Operating Procedures for Nuclear Power Plants, IAEA Safety Standards Series No. NS-G-2.2 [7]). The performance of operations staff should be appraised regularly and the results should be used for enhancing individual performance and, preventing	Please observe Systematic Approach To Training (SAT) and collection of information. Please add: and systematic collection of date for training of operations staff.	Ok Text modified as:	The performance of operations staff should be appraised regularly and the results should be used for enhancing individual performance, preventing complacency and systematic collection of data for training of operations staff.		“data” instead of “date”

		complacency and systematic collection of date for training of operations staff.					
4.	3.12. 3.10.	The main functions of the shift safety engineer or technical adviser on duty should be to evaluate the plant conditions and to provide technical expertise and analytical assistance to the shift supervisor for normal operation, anticipated operational occurrences and accidents conditions. In transient operational states and emergency conditions, the safety engineer or technical adviser should analyse the adherence of critical plant parameters to those predicted in the safety analysis to verify that the plant is responding adequately.	Accident conditions should be accidents due to change in definition in SSR-2/1. All types of accidents should be considered.			X	According to definition in SSR-2/1 “plant states” comprise operational states (normal operation and Anticipated operational occurrences) and accident conditions (DBAs and DECs including severe accidents). There are no contradictions in current text
5.	4.15	Non-routine operating activities should be prohibited in the main control room during shift turnover. Access of non-shift personnel to the main control room during the shift turnover should be prohibited or minimized. Telephone calls to MCR main control room during the shift turnover should be minimized.	Acronyms should not be used. MCR -> main control room	Ok Text modified			
6.	4.22	Procedures, drawings and any other documentation used by the operations staff in the main control room or anywhere else in the plant should be approved and authorized in accordance with the specified procedures. Such documentation	To keep in good condition = its’ integrity should be ensured.			X	Good condition except integrity includes satisfactory conditions of the paper and folder, folder labelling,

		should be controlled, regularly reviewed and updated promptly if updating is necessary, and it should be kept in good condition its' integrity should be ensured. The operating procedures and other documentation used in the main control room by the operators should be reviewed before the start-up of the plant after maintenance outages. Emergency operating procedures should be clearly distinguished from other operating procedures.					readability of the text, absence of unauthorized handwritten additions, etc.
7.	5.9	The shift supervisor should conduct a thorough review before equipment is removed from service. This review should cover, as a minimum, items such as reasons for release from service and the related OLCs Operating Limits and Conditions. The review should also include the effects of temporary modifications on the availability of the system and the capability of the modified system to fulfil its intended safety functions. The shift supervisor should consider the combined impact of all modifications on the systems and components. In conducting this review, the shift supervisor should be supported by appropriate competent staff.	Acronyms should not be used. OLC -> Operating Limits and Conditions	Ok Text modified			
8.	5.20.	A Surveillance activities should also cover the equipment related to safety, non-permanent, used to provide	typo	Ok Text			

		ressources of electricity and cooling residual heat removal.		modified			

COMMENTS BY REVIEWER Reviewer: ? Country/Organization: Japan/NRA Date: 09/10/2018				RESOLUTION			
No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	Para. 5.31E	Add the underlined description; Operations personnel should be trained for coping with such accidents including those affecting all or more than one unit of multi-unit nuclear power plants. At the same time, the operations personnel should use any available and inter-connectable means between units to mitigate the accidents, without giving any effect on intact unit(s). More information can be found in Ref. Severe Accident Management Programmes for Nuclear Power Plants, Safety Guide IAEA Safety Standards Series No. NS-G-2.15 [12B].	Prevention of any events in intact unit by interconnecting it to damaged unit.	Ok Text modified as: Consistency checked in NS-G-2.15, para 2.1(5)	At the same time, the operations personnel should use any available and inter-connectable means between units to mitigate the accidents, without compromising the safe operation of intact unit(s).		If you use means form other unit you give an effect on it in any way (parameters can change / personnel can be distracted and so on). The main objective – not to compromise safety of the intact unit
2.	Para. 4.34A	4.34.A Arrangements should be prepared to visit or monitor the areas, with limited access, and be prepared to monitor the areas or which cannot be entered during the power operation.	Clarification Arrangements could not be prepared to visit the area which cannot be entered during the power operation.			X	Duplication with existing text.

COMMENTS BY REVIEWER Reviewer: Richard Screeton Country/Organization: UK Office For Nuclear Regulation Date: /				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	New section 1.3	The safety case for the facility should be written in a cogent and coherent format and structure; such that it is meaningful to the operating personnel. Operating documentation should be derived from the requirements and assumptions set out within the safety case, and the operational personnel, should be familiar with its contents relevant to their role.	I could find no reference to 'safety case' 'safety analysis report' in the report. Given the scope of the guidance doc I would expect some guidance around the need for a cogent and coherent safety case that is usable by the operating staff. It is the safety case where COO is initially defined / substantiated			X	The term "safety analysis" is used in this matter. SSR-2/2rev.1: 4.7. The operational limits and conditions shall reflect the provisions made in the final design as described in the safety analysis report. … All operational limits and conditions shall be substantiated by a written statement of the reason for their adoption. 4.11. Operating personnel who are directly responsible for the conduct of operations shall be trained in and

							shall be thoroughly familiar with the operational limits and conditions in order to comply with the provisions contained therein. The draft NS-G-2.14 has several references to the safety analysis. No need to duplicate SSR-2/2 and use one more term.
2.	2.10	The operations manager should ensure that an adequate number of competent staff are available at all times to operate the plant safely and **securely**, in both normal and abnormal conditions. There should be sufficient numbers of operations staff to allow staff members to be periodically released to meet requirements for training and development. A long-term succession plan for staff should be put in place, supported by reviews of career development, associated action plans and recruitment plans. **In addition, this plan should consider changes potential technical**	Consider a line concerning the need to monitor technical capability and plan for changes in need. For example, digital I&C upgrades require new skill-sets on plant. Also need to include decommissioning. Or change Section 1.5-1.6 to exclude NPPs in decommissioning. Also…should there be something on security?	Ok Text modified as:	In addition, this plan should consider changes potential technical capability through life cycle.	X X	Security topic is treated in the NSG-2.4 to avoid overlapping (DS497). Decommissioning topic is one phase in the life cycle of a Nuclear Power Plant. To be comprehensive all phases would be needed to referenced.

		capability through life. These reviews should aim to foster continuous improvement and learning. **As the facility reaches end-of-life, specific consideration of technical capability reduction and re-training necessary to support decommissioning activities should be given.**					
3.	New Section 2.13	Derivation of staffing levels should specifically consider the effects of design basis accident and design extension conditions and their potential to impede personnel response. The use of the internal and external hazard analysis can inform this process.	Section 2.10 states…"adequate number of competent staff are available at all times to operate the plant safely in both normal and abnormal conditions." I think there needs to be some recognition of the challenges associated with DEC-A/B. For example, DBA earthquake could flatten a significant portion of the site buildings (e.g. canteen) resulting in significantly reduced staffing levels. It would be helpful to draw the links between the internal and external hazard analysis here.			X	Para.2.11 duplicates the most part of the suggested text. It is not necessary to introduce DEC here. Para not more understandable with suggested text ➔ No change added.
4.	2.13	Special training should be provided on internal and external events relevant for the safety of	It is important to recognize that severe accident simulation and training have			X	Already included in NSG-2.8

		the plant. Where reasonably achievable, severe accident simulation capability should be provided and used to optimize and train severe accident response.	now been established as best practice – there are several SA simulators world-wide.				
5.	2.16	Remove 'challenging' Challenging performance objective + nuclear safety is not necessarily compatible. Why not just use the commonly used SMARTT (Specific Measurable Achievable Relevant Traceable Time-bound) instead?				X	Challenging indicators help to improve not only performance but also safety, e.g. indicators related to human errors or equipment reliability. According to GS-G-3.1 para.5.32: "Performance indicators should have particular emphasis on safety". This is common fundamental principle – "safety first", no need to doubt here. SMARTT does not always help to strive for excellence if the goal is easy achievable
6.	2.20	"Periodic self-assessment" By whom?				X	Self-assessment can be performed at different levels of the plant (shift, operations department,

							production department, whole plant) and operating organization. It depends on various factors. No need to clarify it here or to add “by the operating organization”.
7.	New paras in section: “Interfaces with other plant groups”	There should be effective interfaces between the plant shift crew and the security team to ensure that operational and security conflicts can be quickly resolved. Arrangements should be in place to ensure that adequate design information is available to the plant shift crew to enable effective decision making during all plant conditions. Specific consideration should be given to the interface arrangements where the design authority / vendor is outside of the host country.	Also needs to include plant security and emergency services in the list of interfaces. I would also add the design authority too, given that some DAs are extra-national to the plant location. What if you need plant information only available in the DA in an emergency and the DA staff are all asleep? Also multi-unit / adjacent site consideration?			X	This suggestion duplicates para.2.29 but with other words. During normal operations shift crew has a technical support. Interface with design authorities described in TS-related guidelines (NS-G-2.5 para 8.2, NS-G-2.6 para 3.10 – 3.12 etc.). During accident conditions shift crew does not have to analyze the design information (they do not have time for it and they can be not trained / obliged to make decisions during severe accidents).

							During DBAs the crew uses EOPs, developed using design information. During DEC technical support center/group (or its analogue) may need this information. But performance of the technical support group during DECs is out of scope of this guideline. What is adequate design information? Not enough clear.
8.	3	Add into all role profile sections the following sentence: Familiarity with the safety case relating to those activities that they are directly and indirectly responsible for.	General comment – I think there should be something added regarding familiarity with the safety case for all roles. Procedures do not always explain the risk significance of actions. For safety, it is importance to understand this significance to reduce the risk of violation behavior.	Ok Text modified as:	"Safety analysis" used instead of "safety case" New para added: 2.13A. All the operational and shift technical support personnel should be familiar with the safety analysis relating to those activities that they are directly and indirectly		Paragraphs 4.30 and 2.19 with footnote 3 require to apply conservative decision making approach, which is based on awareness of the safety consequences of any decisions or evolutions. This awareness comes from knowledge of the safety analysis (see footnote 3). But to make it clearly defined, agree with suggestion. As long as

					responsible for.		knowledge is gained during the training process, decision to include new text to "Human resources and qualification of personnel" chapter
9.	3.3	Suggest revision to: "in accordance with the relevant operating instructions, procedures, and ***behaviors***.	Behaviors are also important to human reliability. Behavioral expectations are set by the management team.	Ok Text modified			
10.	3.4	Suggest re-wording to: The number of operators on each shift and their responsibilities should be determined on the basis of: • The complexity of the plant • The level of automation • The organizational structure • Sickness resilience • Aging resilience • Capability resilience • Hazard analysis – are personnel essential personnel protected when a hazard occurs?	Misses key factors – too simplistic as written.	Ok Text modified			
11.	3.7	Irrespective of the reactor type and organizational structure, at least one authorized reactor operator should be present at the controls in the main control room	'Operation' is ambiguous.	Agree Text modified			Agree that "operation" is ambiguous. Even if reactor is in shutdown mode the operator

		at all times to deliver any important to safety operator actions.					must be present at the controls, i.e. something may happen with reactor / SFP cooling or reactor control systems.
12.			Somewhere in this report, there needs to be some guidance on conservative decision making and conflict management. For example, there have been multiple historic events where junior personnel have felt unable to challenge senior decision making with adverse consequences.			X	Paragraphs 4.30 and 2.19 with footnote 3 require to apply conservative decision making approach.
13.	4.2	Scheduled activities and other potential distractions should be optimized to balance cognitive workload and stress limitations with boredom, which can impact upon situational awareness, vigilance and safety culture. The number of concurrent plant evolutions affecting the control board indications should be limited so that the ability of operators to detect and respond to abnormal conditions is not impaired.	Not just overload. Modern plants CAN be extremely boring to operate where high levels of automation are present. Suggest adding some words like "workload should optimized to maximize situational awareness and vigilance"	Ok Text modified as:	Scheduled activities and other potential distractions should be managed to reduce simultaneous activities and to avoid overloading the control room operators so as to keep them focused on their responsibilities		Potential distractions and simultaneous activities should be reduced and overload should be avoided. But agree that workload should be optimized to avoid "sleepy" condition.

					for ensuring safety. The workload should be optimized to balance stress limitations with boredom, which can impact upon situational awareness, vigilance and safety culture. The number of concurrent plant evolutions affecting the control board indications should be limited so that the ability of operators to detect and respond to abnormal conditions is not impaired.		
14.	4.1	New sentence at end of para: Stress management and monitoring programmes should be in place to ensure that periods of unacceptable stress and workload are identified and resolved.	I would like to see something on management actively measuring stress and workloads on the plant and acting where it is identified as too high.			X	It is not easy to measure stress. And who will do it? Operations managers are not able to spend 24/7 in MCR. And what about field

							operators? How to measure their stress? Too many factors: age and experience of certain people, unit on power or outage, presence of equipment defects affecting evolutions and so on. We can manage only stress related to scheduled activities and this is described in para 4.2
15.	4.8	The Instrumentation and Control within the control room…	Remove panels – change to I&C as panels are a not likely to be deployed in GenIII+ and gen IV designs			X	GenIII+ still have panels, some of them have only monitors, some others have also I&C. But anyway, we can call them panels.
16.	4.8.	Remove e.g. hourly and replace with (e.g.) "as derived by the safety case"	Surveillance periodicity should be driven by the safety case, e.g. PSA success criteria, i.e. how often do you need to x-check to remain confident that a fault can be detected and recovered from.	Ok Text modified as:	…Operators should be required to check important parameters periodically (e.g. hourly or derived by the safety analysis), irrespective of…		Not sure that safety cases at all units derive surveillance periodicity.
17.	4.10	No suggested text	This text needs further explanation to describe what is meant by independently verified. s			X	The process of independent verification can be organized differently

			this a local to plant recommendation or includes MCR. Does it refer to using diverse indication to confirm plant status?				depending on organizational structure of the plant, staffing levels and equipment specifics. The main idea is understandable from existing text. Difficult to suggest universal method of such verification in the guideline.
18.	4.11	For plants with multi-unit control rooms, the design of the control room and crewing structure should specifically consider and mitigate the risk of distraction during faults or transients on individual units.	Distraction is not always a conscious decision. he recommendation should refer to the design of the control room and the crew structure to reduce the risk of distraction.	Ok Text modified as:	Crewing structure of multiunit control rooms should specifically consider and mitigate the risk of distraction during faults or transients on individual units.		In this guideline we do not consider the design of the MCR. Staffing levels requirements are discussed in other paragraphs and safety analysis is considered. Design of multiunit plants is considered in SSR-2/1 Rev.1
19.	4.11a	No suggested text	What about delegation of responsibility? This is a large responsibility for potentially a single person during a busy outage.			X	According to para.3.1: "The shift supervisor should manage plant operations on each shift and should be responsible for overall safety at the plant, protection and safety of personnel, coordination of plant activities and performance of the

							assigned shift". To ensure safety – his direct responsibility, he can delegate other responsibilities except controlling safety related activities. Control doesn't mean full involvement in these activities.
20.	4.13	No suggested text	"Turnover" is not an expression we are familiar within this context. Suggest changing to "shift hand-over"			X	This term is used for a long time in different documents, e.g. SSR-2/2 para.8.9 which are out of the DS scope. To keep consistency, I believe we should keep "turnover" (In UK usually is used "station" but not "plant". We cannot adjust terms for only one country).
21.	4.13	New sentence at the end of the paragraph: "Sufficient (paid) overlap between shift turnovers should be provided to ensure there is time to perform an effective hand-over."	Suggest explicitly recommending that sufficient paid over-lap be provided in the shift rota to ensure sufficient time to perform an effective hand-over.	Ok Partly Text modified as:	Sufficient overlap between shift turnovers should be provided to ensure there is time to perform an effective transfer of the information.		I suggest not to use words "turnover" and "hand-over" in one sentence – to ambiguous. We cannot recommend member states the way how to calculate salaries, so I suggest not to use "paid overlap".

22.	4.19	Arrangements should be put in place for dealing with: • Difficulties for the outgoing shift staff in leaving the site • Difficulties for the incoming shift in arriving at the site. • Extended habitation of the facility due to extreme operational demands, e.g. beyond design basis / severe accident.	What about recommendations relating to extended habitation of the plant during abnormal / emergency situations – food, potable water, beds, etc.?			X	I believe that phrase "a situation in which there are difficulties for the outgoing shift staff in leaving the site or for the incoming shift in arriving at the site" covers all abnormal situations. Recommendations on habitability of supplementary control rooms and shelters are given in para 6.6, NS-G-2.15 and other documents. Not all the plants have canteen next to MCR. Some plants have MCR inside the radiation controlled area (RCA) and it is prohibited to feed personnel inside RCA.
23.	4.21	**Operating procedures are a key mechanism for ensuring compliance with the limits, conditions, and assumptions set out within the safety case.** The policy at the plant for the use of operating procedures by the operators should be clearly established and communicated. **Operating procedures should**	Operating procedures are a key method of ensuring compliance with the expectations / assumptions of the safety case. This para should really include something along those lines	Ok Text modified as:	Operating procedures are a key mechanism for ensuring compliance with the Operational Limits and Conditions.		According to NS-G-2.2: "8.2. The OPs for normal operation should be developed to ensure that the plant is operated within the OLCs and should provide …"

		be categorized according to safety and the manner in which they are applied. Operating procedures that are applied continuously in a step by step manner, procedures that are used as references to confirm the correctness of actions and procedures for informational use should be clearly indicated through the method of categorization of procedures. The use of step-by-step procedures should require signing of the steps after they have been carried out. Procedures should contain hold points at which certain critical tasks are to be performed and require independent checks of these tasks, as appropriate. Recommendations for the development of plant operating procedures are provided in Ref.[7].					No links to the safety case. Suggest to have no links to the safety case here as well.
24.	4.21		Add in: categorized by safety as well.	Ok Text modified as:	Words “by safety” added to the 3rd sentence		
25.	Procedures	No suggested text	This section is quite limited without explanation why. Should it also cover the COO elements concerning?:			X	Almost all of the items in the list are well taken care of in NS-G-2.2 and NS-G-2.15. The reference to NS-G-2.2 is given in para

			• Computerized procedures • EOPs • SAMGs • AOPs • Symptom based • Fault based • State oriented approach • The need for procedures and training to work together in concert. • The need for operability when transitioning between normal, EOP, SAMG procedures.				4.21 It doesn't make sense to duplicate requirements from these documents here.
26.	4.27	Pre-job briefings should be used as a means of avoiding personnel errors, difficulties in communication and misunderstandings. **They should, where reasonably practicable to do so, include a summary of the relevant part of the safety case to ensure that personnel are aware of the safety context in which the job is being performed.** The operations shift crew should use pre-job briefings for all operations other than daily, routine shift activities. A	Pre-job briefings should link to the safety case where practical to do so – what does it say about the task about to be performed?	Ok Partly Text modified			Significance for safety also should be emphasized in the used procedure (NS-G-2.2 para.9.6)

		procedure for pre-job briefings should be put in place that includes the following aspects:					
27.	4.30	Operations managers should demonstrate and reinforce a conservative attitude to decision making for activities that directly or indirectly affect **the critical, and supporting, safety functions.**	"Indirectly affect…" Suggest the phrase 'critical safety functions' to align with IAEA terminology	Ok Partly Text modified as:	Operations managers should demonstrate and reinforce a conservative attitude to decision making for activities that directly or indirectly affect the safety functions		The term "critical safety functions" is not used neither in SSR-2/1 nor in SSG-30 and Safety Glossary (2016). The term "supporting safety function" is not defined clearly (just as supporting functions for primary function – see SSG-30 para 3.3)
28.	4.32	No suggested text	Be careful recommending this. There is a significant side effect to this. If operators very rarely get to manually operate an automatic system that they may be called upon to operate manually in the event of an automation failure, the consequences are typically very poor human reliability.			X	In normal operation without defects there is no need to manually operate an automatic system, otherwise probability of the human error increase. The training process using the full-scope simulator should be used to improve manual response skills of operators.
29.	Conduct in the control room		I would suggest this section needs to summarize CRM (crew resource management) practices with respect to conduct as it has proven benefits. As it			X	The most important requirements are given in the guideline. Summarizing of international practices can be done in tecdoc

			stands it doesn't really offer much useful guidance.				series document but not in this document.
30.	4.37	Replace "proven" with "there is evidence to question the reliability of the information".	This then covers the stuck meter indicating all is fine when things are not.	Ok Text modified			
31.	4.38	Suggest addition: "Prompt action should be taken **by the organization** to investigate the causes…"	For clarity			X	No need to clarify it here or to add "by the operating organization". Same answer done for the comment number 6.
32.	Comms	This section could do with being retitled as there is a later section on communications equipment.				X	This title is used now and there are no other comments that this title is ambiguous. The word "communication" is commonly used when discussing verbal and non-verbal personnel interactions.
33.	Comms	Suggest additional Para. Reliable inter and intra-plant communications should be provided for operators. The communications equipment should remain viable during all design basis events, and ideally remain functional during beyond design basis events."	To reflect OPEX			X	According to the newly introduced para 6.14A: "Communication and coordination between control rooms and technical support centers, control rooms and the field operators and between onsite and offsite support facilities should be

							ensured by means of available, reliable, redundant and diverse communication tools and real-time information systems." No need to duplicate.
34.	Labelling	Suggest remove	Labelling is a plant condition or design issue – not COO. There are other IAEA guides that cover this, e.g. the upcoming HFE guide.			X	What is "HFE guide". Difficult to understand which guidelines cover this theme better than NS-G-2.14. Labelling is very important for safe conduct of operation. I believe that this chapter should stay. That helps to unexperienced user of the IAEA safety standards find necessary guide in one place.
35.	Control of Reactivity	*Recommend a further review is done by IAEA*	This section seems very focused on control of reactivity when core is in the vessel. Fuel loading has a higher risk associated with it and there are lots of COO issues associated with it: • Split responsibilities • Locations of controls and			X	Reference to NS-G-2.5 is given in para 5.21

			instrumentation and the ability to rapidly take action if needed. • Comms difficulties between refueling and MCR. • There is OPEX in this area regarding core mis-loads.				
36.	Accident conditions	*General Observation*	This section seems short and is too control room focused. it does not cover: • Tactical vs Strategic decision making. If you feed tactical information to strategic decision makers, they will think tactically. Thus, the COO relating to the transmission of plant information to the strategic decision maker is critical for effective outcomes. • FLEX / SA response across the site and how this is managed • The role of the ECC and how this			X	Detailed requirements and guidelines for accident conditions are given in NS-G-2.15 and GSR Part 7. The reference to these standards is given in para 5.31E

			fits with the MCR. • There is Fukushima learning on the COO of severe accident management which could be drawn upon by the authors. • The interfacing protocol for external agency hand-overs, i.e. the COO relating to on-site and government fire agencies. The title of this guidance either needs re-wording to COO of MCR or a lot of the sections need revisiting to consider the wider COO across the plant.				
37.	Abnormal Situations	No suggested text.	Either here or somewhere else, there really needs to be a discussion on recovery from misdiagnosis summarizing the learning on what to do if you find yourself in a worsening plant state having reached the 'end' of your recovery procedures. The use of critical safety function monitoring (by STA or similar independent) in conjunction with normal			X	According to the para 5.33: "If the plant does not respond as expected in an abnormal situation or an accident, all efforts should be directed by the shift personnel to putting the plant into a safe and stable status." If you use wrong procedure because of

			EOPs can help in this situation				wrong diagnosis, you would face additional criteria (parameters, equipment failures etc.) to review this diagnosis or to start using symptom based emergency procedures. No need to describe this situation in more details.
38.	5.52b	Remove Situational Awareness CRM should be listed and isn't. The section could also discuss the use of visualization and working through 'what-if' scenarios during periods of low workload. This is proven to work in Aero sector.	Situational Awareness is not a human error prevention tool. Situational awareness is a cognitive state, i.e. you're either aware or not, or somewhere in between.	Agree Text modified	And mentioning of visualization (one of best practices in OSMIR database) and using "what-if" can be useful.		
39.	6	Remove all design / equipment related guidance unless directly pertinent to COO and not just general human performance.	Much of this section really doesn't relate to COO. There is also a lot of duplication with earlier sections. Some guidance is also misplaced – there is some good guidance on minimizing unnecessary comms in the main control	 Ok Para 6.4 moved to the chapter		X	Subjective comment. All the requirements are related to COO No clear and direct duplication found.

			room, but it sits in CONDITION OF CONTROL ROOMS AND PANELS which is nothing to do with conduct of MCR staff.	4 (new para 4.31A)			
40.	6.6	Include references to other important rooms – Reactor engineering, ECC for example.	Too control room focused. Other rooms equally risk important	Ok Text modified as:	Other operational panels outside the control room, including supplementary control room, local instrumentation and control panels, should be similarly maintained and it should be checked that they remain free of obstructions.		"The alternative control room used for reactor control" is mentioned. What is the Reactor engineering room? The term "supplementary control room" is used in other paragraphs instead of "ECC".
41.	6	Add in paragraphs on: • Control Room Evacuation • Good practice regarding instrumentation failures	Where does control room evacuation get discussed? What about instrumentation / display failures? What is the good practice here with respect to managing MCR C&I failures.			X	The chapter "Accident conditions" (paras 5.31A – 5.31E) presents general guidance, including use of SAMGs, and gives reference to NS-G-2.15 and GSR part 7. According to the para 2.17 of NS-G-2.15:

							"In the severe accident management guidance, consideration should be given to specific challenges posed by external events, such as loss of the power supply, loss of the control room or switchgear room and reduced access to systems and components." Additional information can be found in para 3.53. The role of I&C is also discussed in paras 3.71 – 3.77 of NS-G-2.15. General guidance for instrumentation control is given in paras 4.32, 4.37, 4.38
42.	7.2	Add in full list e.g. include: • Working at height • Confined space • Lifting • Workplace exclusions • Interfacing works (conflicts)	Not a definitive list yet written as such, e.g. no: • Working at height • Confined space • Lifting • Workplace exclusions	Ok Text modified as:	Precautions for industrial safety, including working at height, working in confined space, lifting and rigging, workplace		

		Or specify that list is e.g. and not comprehensive	• Interfacing works (conflicts)		exclusions, interfacing works;		
43.	Non-radiation related safety	Add in paras at the start: All operational personnel should be aware of the appropriate non-radiation safety protocols / requirements for the facility. Personnel should be familiar with the limits of their responsibility and who to contact in the event of specialist emergency personnel being required; for example, in relation to casualty evacuation from height or confined spaces. Specialist on site emergency personnel should have well developed rescue plans and suitable equipment for all reasonably foreseeable rescue scenarios and be sufficiently trained to reliably enact these plans. Joint exercises between operational personnel and emergency services should be periodically performed to ensure that interfaces and communications are demonstrably effective. The operations or emergency services manager should ensure that these rescue plans are	Confined space rescue and rescue at height are two areas which currently missing from this section.	Ok Text modified as:	7.38. All operational personnel should be familiar with the limits of their responsibility and who to contact in the event of specialist emergency personnel being required; for example, in relation to casualty evacuation from height or confined spaces. 7.39. Specialist on site emergency personnel should have well developed rescue plans and suitable equipment for all reasonably foreseeable rescue scenarios and be		The sentence, highlighted with green, is generally duplicating para 7.35

		maintained up to date to reflect plant configuration changes or operational learning.			sufficiently trained to reliably enact these plans. Joint exercises between operational personnel and emergency services should be periodically performed to ensure that interfaces and communications are demonstrably effective. 7.40. The operations or emergency services manager should ensure that these rescue plans are maintained up to date to reflect plant configuration changes or operational learning.		

COMMENTS BY REVIEWER Reviewer: ? Country/Organization: United States of America/NRC Date: 10-11-2018				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text/comments	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	NS-G-2.14 Para 5.31.B Page 43	Reword paragraph 5.31.B: "In the preventive domain, EOPs should be used. EOPs cover both design basis accidents. EOPs or other appropriate emergency procedures should cover design extension conditions without significant fuel degradation.	Procedures should be in place to address DECs. However, they may be emergency procedures separate from the EOPs, which historically have been used for DBAs.	Ok According to NS-G-2.2 para.8.8 AMGs are not covered with the term "EOP" Text modified.			
2.	NS-G-2.14 Para 5.31.C Page 43	Incomplete sentence: "Accident management activities in the mitigatory domain should be used the SAMGs."	Clarification is required.	Ok Text modified as:	The SAMGs should be used for accident management activities in the mitigatory domain.		
3.	NS-G-2.14 Para 7.3 Page 55	Modify Para. 7.3 to read: "7.3. Recommendations on the authorizations, permits and certificates referred to in paragraph 7.2 are provided in Ref.[9]. Ref. Radiation Protection and Radioactive Waste Management in the Operation of Nuclear Power Plants,	Completeness. Added text is in blue.	Ok Text modified as:	The second sentence of the para.7.3 changed: Ref. Radiation Protection and		Normally direct references to paragraphs are not used in guidelines. Waste minimization and

		IAEA Safety Standards Series No. NS-G-2.7 [12], in particular paragraphs 3.39–3.47 for recommendations on permits for radiation work. Recommendations for waste minimization and radiological releases are also discussed in NS-G-2.7"			Radioactive Waste Management in the Operation of Nuclear Power Plants, IAEA Safety Standards Series No. NS-G-2.7 [12], provides recommendations on permits for radiation work, waste minimization and radiological releases.		potential releases should be considered in work control system.
4.	NS-G-2.14 After Para 7.14	Add a new Para: Work plan control addressing decommissioning funds and aspects of transitioning into decommissioning [Ref. GSR 6]	Completeness to address planning for decommissioning, including assessment of available funds.			X	This chapter of the guideline considers readiness of operations for maintenance and outage activities. Decommissioning activities will be assessed by operations as a part of the work plan (described in paras 7.10 – 7.13). There is no need to mention

							assessment of available funds and decommissioning planning in this guideline.
5.	Reference section in NS-G-2.4, NS-G-2.5, NS-G-2.14	EUROPEAN COMMISSION, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS ENVIRONMENT PROGRAMME, WORLD HEALTH ORGANIZATION, Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, IAEA Safety Standards Series No. GSR Part 3, IAEA, Vienna (2014).	Completion: Recognize all of the sponsors, and provide consistency with other safety guides.	Yes 04/11/18 Checked in SSR-2/1rev.1 and GSR part 6 – used the same full list of the sponsors. Reference [4] for GSR Part 3 changed			