Form for Comments

***Chemistry Programme for Water Cooled Nuclear Power Plants* (DS525)**

Comment No	Paragraph /Line	Proposed new text	Reason	Accepted	Accepted but modified	Rejected	Reason for rejection	Country
1	1.2	We propose to add a remark (maybe as a footnote), pointing out that water chemistry is the main (and dominating) subject in this Safety Guide, however additional nonwatery related chemistry issues are also addressed.	Completeness			X	The title states that the topic is chemistry programme which contains all chemistry related issues	Israel
2	General	Guidelines regarding chemistry parameters and chemistry actions to be taken during accident and post-accident are missing and the same may be included based on the lessons learned from the Fukushima-Daiichi NPP accident.	One of the justifications of revising the SSG-13 mentioned in DPP was to update the guidance on accident and post-accident sampling systems and to recommend if possible which chemistry parameters to be followed and chemistry actions to be taken during accident and postaccident conditions.			X	The new version has more guidance than the previous one regarding these conditions. 2 experts from TEPCO and 1 from KEPCO gave their necessary inputs for the document during the revision process.	Pakistan
3	General	Please consider including recommendations to address “chemical effects” upstream of sump strainers/filters. These recommendations may be summarized as follows:	Chemical effects upstream and/or downstream of the sump strainers/filters have been shown to play an important role	X	…plant design and safety analysis to contribute in safe plant operation during all operational states, designed accident			Saudi Arabia

		To decrease the risk of sump clogging, the debris source term in case of LOCA should be reduced and the presence of specific combination of materials should be avoided. These design measures should be complemented by a good housekeeping to minimize latent debris, and monitoring of important parameters such as sump water temperature and pH.	in the issue of sump filter clogging and hence for the reliability of ECCS and containment spray pumps, and possibly for fuel assembly loss of cooling (see for example NEA report NEA/CSNI/R(2013)12).		conditions and during design extension conditions. Chapter 4.4 (b) Note: Original comment is correct and important but too detailed for the main body text			
4	1.3	Implementing a chemistry programme is essential to ensure the safe operation of a nuclear power plant. It contributes to the integrity, reliability and availability of structures, systems and components (SSCs) in accordance with their intended design and functions.	Clarification	X				Germany
5	1.3.	The main goals of the chemistry programme (both chemistry and radiochemistry) are to contribute to the reactivity management, to minimize all forms of corrosion of SSCs influenced by the chemistry regime, to preserve the integrity of the fuel and to reduce the buildup of radioactive material enabling lower radiation doses of occupational ~~radiation~~ exposure.	Rhetorical modifications In the light of radiation protection, it is more important to reduce the dose rather than to reduce the exposure.	X	….material enabling lower occupational radiation doses.			Japan

6	1.3	The chemistry programme is based on a detailed rationale usually provided by the ~~manufacturer~~ designer of the plant, …	Water chemistry is normally be fixed by the designer. Manufacturer manufactures the items in line with requirement fixed by designer.	X				India
7	1.3	It is suggested to add to the second last sentence the following text: "one of the goals of the water chemistry regime is to minimize the processes of radiolytic hydrogen generation".	Radiolytic hydrogen may be generated in significant amounts in the primary circuit of water-water WER-type reactors.	X	The main goals of the chemistry programme (both chemistry and radiochemistry) are to contribute to the reactivity management, to minimize the potentially harmful effects of radiolytic decomposition of water and all forms of corrosion of SSCs influenced…….			Russian Federation
8	1.5.	The chemistry programme comprises ~~of~~ three basic elements, the chemistry regime, chemistry control and chemistry measurements. The chemistry regime is defined by the reactor type, its design, the construction materials used and any requirements placed on the operating chemistry in the plant's safety analysis. The chemistry control assures that the plant is operated in accordance with the chemistry regime and defines the	Graded action levels are substantial part of almost every water chemistry programme and should therefore be mentioned here. Please formulate more precise, what further decisions are meant.	X	The chemistry programme comprises of the following basic elements..			Germany

		parameters to be measured, their measurement frequencies, action levels, limit values and corrective actions to be taken if necessary. The chemistry measurements provide information about the actual chemistry conditions in the systems, which in turn serve as the basis for all further operational and safety-related decisions.		X X	, expected measurement values, graded limit values, …which in turn serve as the basis for all further operational and safety-related decisions.			
9	1.5	The chemistry programme comprises of ~~three~~ two basic elements, the chemistry regime, and chemistry control ~~end~~ by means of chemistry measurements.	Chemistry measurements are a part (tool) of the chemistry control and not a separate element	X	The chemistry programme comprises of the following basic elements…			Russian Federation
10	1.5	The chemistry control ~~assures~~ confirms that the **plant is operated** in accordance with the chemistry regime **requirements** and defines the parameters to be measured, their measurement frequencies, limit values and corrective actions to be t^en if	Control over the plant operations ensures that the chemistry is controlled, not vice versa	X				Russian Federation

		necessary.						
11	1.5	The chemistry programme comprises ~~of~~ three basic elements	Editorial	X	The chemistry programme comprises of the following basic elements…			Saudi Arabia
12	1.7.	The objective of this Safety Guide is to provide recommendations on water chemistry for nu…….and chemicals to the environment to levels that are as low as reasonably achievable <u>and are within national regulations</u> and to reduce the generation of radioactive waste.	Radiation doses and limit discharges should be as well within national regulations, please add.	X				Germany
13	1.7	These recommendations aim at mitigating the degradation of SSCs and ensuring their **reliability** ~~availability~~...	More correct term	X	….degradation of SSCs and ensuring their integrity and availability...			Russian Federation
14	1.10	This Safety Guide can also be useful to plant chemistry personnel to continuously improve existing chemistry programmes, support the development of new chemistry activities ~~within the progromme~~ and to assist the development of corrective actions for eliminating identified weaknesses in the current programme.	To exclude 'within the programme"	X				Russian Federation

15	1.11.	This Safety Guide covers all types of water-cooled nuclear power plants. This Safety Guide provides Member States … guidance on the chemistry programme that the plant should have in place. This programme should ensure that SSCs important to safety, those SSCs whose failure … including the construction, commissioning and operation (all operational states and accident conditions) as well as the decommissioning stage.	Functioning of certain SSCs in accident condition is important as well, please add. Compare with para. 7.31.	X X	That OK ..,, all operational states and accident conditions as well as the decommissioning stage.			Germany
16	1.11	Full stop missing at the end of the first sentence.	Typo	X				Israel
17	1.11	We suggest to consider dividing the long (second) sentence of this paragraph to two sentences. It will probably make clearer that: - Three separate (safety related) categories of SSCs are addressed - The chemistry programme of the water cooled NPPs should ensure that those SSCs will operate reliably throughout their all lifetime.	Clarity			X	The sentence flows clearly and message understandable as it is now	Israel

18	1.11	This Safety Guide covers all types of water-cooled nuclear power plants. It provides…….	Improve quality and clarity of language. The existing text does not have a full stop and repeats "this safety guide" mid-sentence.	X				England
19	1.11	This programme should ensure that SSCs important to safety, including those SSCs whose failure may prevent SSCs important to safety from fulfilling their intended function and those SSCs that are credited in the safety analyses can operate reliably throughout the original design lifetime including the construction, commissioning and operation as well as the decommissioning stage.	The items listed under "those SSCs whose failure may prevent SSCs important to safety from fulfilling their intended function and those SSCs that are credited in the safety analyses can operate reliably…" are also SSCs important to safety.			X	IAEA SSG-48 defines the scope of ageing management (AM) in NPPs (page 32). Water chemistry programme is one of the plant programmes within AM and hence it should cover at least similar scope. Revised SSG13 and SSG-48 need to be aligned.	Saudi Arabia
20	1.11	This Safety Guide covers all types of water-cooled nuclear power plants. This Safety Guide	Editorial (missing full stop after nuclear power plants)					Saudi Arabia
21	1.12	Comment/Observation	This is the first mention of radiochemistry. Does "chemistry programme" implicitly include radiochemistry and does this need to be clarified at the start of the document?			X	See1.3 The main goals of the chemistry programme (both chemistry and radiochemistry) are….	England
22	1.13.	This Safety Guide does not provide detailed technical advice related to particular water	Clearer wording, typo removed.	X				Germany

		chemistry regimes of water-cooled nuclear power plants.						
23	1.14.	~~Recommendations on meeting the safety requirements applicable to decommissioning are outside the scope of this Safety guide and are provided in IAEA Safety Standards Series No. SSG-47, Decommissioning of Nuclear Power Plants, Research Reactors and Other Nuclear Fuel Cycle Facilities [2]~~	According to para. 1.11 chemical programme should ensure that SSCs important to safety can operate reliably in the decommissioning stage as well. Chemical regime during decommissioning is explained in the current document, recommendation on meeting safety requirements are out of its scope in general. On the other side, SSG-47 is not providing any information on chemical regime during decommissioning. We suggest to delete para. 1.14	X				Germany
24	1.14	Comment/Observation	"decommissioning are outside the scope of this safety guide." Noted, although the document does provide guidance on the preservation of SSCs though all lifecycle	X				England

			stages (i.e. including decommissioning).					
25	1.14	SSG-47 addressed as reference [2] in this paragraph is listed in the References of the present Guide as number [4] and not [2].	Editorial	X				Israel
26	1.15	Two points could be possibly considered to be mentioned in this paragraph, describing the Structure of the present Guide: - The original structure of the revised Guide (SSG-13) is maintained. - The Annex addresses preservation of SSCs which seems to be different from New Practices and New Technologies which was proposed as the title for the ANNEX in the November 2020 DPP for DS525.	Completenss			X	The suggested changes will not improve the clarity	Israel
27	1.15	Section 6 provides recommendations on the optimization of the chemistry aspects of radiation exposure ~~optimization~~.	It would be better to fit the title of Section 6.	X				Israel
28	1.13,1.15	To add two more annexes	The Annex describes "Preservation of SSC in a NPPs", which is only one of a number of chemical procedures in use in NPP operation. It			X	Even though these 2 topics would be interesting and useful, at this point of the process it is not possible to add them	Russian Federation

			is advisable to introduce Annex B on "Chemical cleanup of equipment" and Annex C "Passivation of equipment and pipelines in course of NPP operation" as well.					
29	Section 2 Heading	Functions and Responsibilities of the Operating Organization in Management of the Chemistry Programme	For easier understanding, the title of Section 2 should include operating organisation			X	Title should be as short as possible and operating organisation is mentioned in the first sentence of the paragraph	Nigeria
30	Section 2	Nil	Responsibilities of operating organisation to “other organisations, including designers and manufacturers” are missing (see SSG-13)			X	Yes the “old” subchapter does not exist any more in current revision but the intent is taken into account in various requirements in chapter 2.	Nigeria
31	N/A	Suggest that recommendations made that for each position within the chemistry team there should be a defined role profile that outlines the requirements of the role and expectations.	A defined role profile will help outline qualification and training requirements for a role.			X	Intent is already included in 2.2… define clear functions and responsibilities….. Job descriptions….	EdF England
32	2.1	The operating organisation should support independent function of the chemistry management in identification of the abnormalities, deficiencies or negative trends related to chemistry control & to report or to provide	Addition item suggested			X	The suggested changes are already addressed in chapter 2 within different should statements	Pakistan

		recommendation liberally to the station management without any difficulty						
33	2.2.	Requirement 3 of SSR-2/2 (Rev. 1) [1] states that "The structure of the operating organization and the functions, …. radiochemistry control and measurements, <u>reactivity and</u> dose management, chemistry and radiochemistry surveillance, chemistry and … qualification.	Please add "reactivity management".			X	Reactivity management as such is not part of chemistry responsibilities. Their role is to provide operating organisation relevant data for this activity	Germany
34	2.5.	The chemistry programme should contribute to the following: (a) Ensuring reactivity control of the reactor core; (b) Preserving the integrity of the fuel cladding and pressure boundary components; <u>(b1) Minimizing all forms of corrosion of SSCs influenced by the chemistry regime</u> (c) Minimizing the buildup of … discharges to the environment. <u>(d) Contribute to post-accident measurements, if appropriate</u>	Please put in line with issues, listed in para 1.3, they must match. Additionally, paras 7.42 and 7.43 of the current document are dealing with post-accident sampling. This issue should be mentioned here as well.	X	Preserving the integrity of the fuel cladding ~~and pressure boundary components~~ (B1) is ok	X	Too detailed should statement for this chapter.	Germany
35	2.5 / (a)	Ensuring reactivity control of the reactor core <u>if intended in the design (e.g. boric acid addition in PWR primary circuit, but not for BWR);</u>	Reactivity control by dissolved absorbers is not foreseen in all water-cooled reactor designs.			X	Reactivity control here does not only cover the reactivity control during normal operational phases but all possible situations, hence	Germany

							statement is also relevant different type of reactors.	
36	2.6	The operating organization should ensure **development, introduction and implementation of** a chemistry programme **that ensures** the reliable and continued operation	To explain in more detail what specifically an OO should ensure	X	The operating organization should develop and implement ensure that the chemistry programme supports that enables the reliable and continued operation…			Russian Federation
37	2.8	It is suggested to add the following requirements: "and qualification shall be confirmed by education documents (diplomas, training course certificates) relevant to the position. Personnel qualification shall be maintained and confirmed with a certain frequency".	Current version of the formulation of the requirements for the competence and qualifications of personnel is vague.			X	Addressed in detail in section 3	Russian Federation
38	2.8	It is suggested to supplement "sufficient funds and the necessary number of qualified chemistry personnel" and set it forth as follows: "sufficient funds and the necessary number and structure of qualified personnel shall be justified by the reactor designer."	Current version of the formulation of the funds sufficiency and the number of qualified personnel is vague.			X	The justification of necessary resources is the responsibility of the operating organization	Russian Federation
39	2.8/3	…, supervisors and chemistry managers	Chemistry managers instead of chemistry management	X				Nigeria
40	2.9.	The operating organization should provide sufficient resources for the	Is sampling equipment meant here?	X	The operating organization should			Germany

		development of chemistry control methodologies. The operating organization should provide adequate facilities, sampling ~~and~~ equipment (including laboratory and on-line instruments) for chemistry measurements.	"Sampling and equipment" is not quite understandable.		provide adequate facilities and sampling equipment (including laboratory and on-line instruments) for			
41	2.9	We suggest to add: …on-line monitoring instruments	Completeness	X				Israel
42	2.9	Full stop missing at the end of the first sentence.	Typo	X				Israel
43	2.9	The operating organization should provide resources and provisions sufficient for water chemistry control at NPP ~~the development of chemistry control methodologies.~~	A wider expectation from an OO - not only resources and not only methodology development			X	2.8 addresses already the wider expectations. Methodology development is mentioned here because quite often resources are too limited in MS to do it.	Russian Federation
44	2.10.	The operating organization is required to assess performance and enable its … continuous improvement of ~~operational~~ safety performance in the chemistry area.	Please change to "safety performance" to be in line with GSR Part 2 Requirement 13.	X				Germany
45	2.10	Targets and management expectations should be described in the plant or ~~fleet~~ **corporate level** documentation.	Fleet documentation" is an unclear wording	X	…in the plant or corporate documentation.			Russian Federation
46	2.11.	Plant management should ensure that any …… shutdown and startup stages, maintaining suitable wet or dry ~~conservation~~ preservation conditions in equipment during shutdown).	Please check if wording is consistent within the text. To our understanding "preservation" is the correct term to be used here.	X				Germany

47	2.12	Changes in a plant's organizational structure that could affect the existing chemistry….	Editorial (text not right after the para. number)	X				Saudi Arabia
48	2.14.	Information flow within the chemistry department should be well organized. Relevant information should be properly distributed, archived and it should be easily retrievable.	The standard does not need to define how to distribute information.	X				Finland
49	2.17.	The chemistry programme should be included in the plant self-assessment programme. Audits and other self-…..ry and radiochemistry measurements. The corrective actions necessary for eliminating the causes of non-conformances, and for preventing the occurrence of, or mitigating the consequences of, similar safety related events, shall be determined, and corrective actions shall be taken in a timely manner. Identified non-conformances of the chemistry programme should be reported, should be included in the plant's corrective ….evaluated (see para. 6.3 of GSR Part 2 [5]).	We think that the statement of para.6.3. of GSR Part 2 concerning mitigation of consequences and timely manner by corrective actions is an essential one – please check if this issue can be integrated into the current document.	X				Germany
50	2.19	The chemistry management should regularly collect operating experience from **operating organizations and institutions at national and international level** ~~national and international utilities and organizations~~ to ensure information exchange….	To avoid combination "international utilities" and the word "utilities" in general	X				Russian Federation

51	2.20	If design changes relevant to chemistry are planned, members of the chemistry personnel should be included in the plant's license amendment ~~design authority~~ process.	To exclude the unclear wording "the plant's design authority process" which is not described in SSR-2/1, SSR-2/2 or SSG-72. (In Russian Federation, any design modification is subject to license amendment)			X	Design authority function will be described in Requirement 3 in the SSR 2/2 document which is currently under revision.	Russian Federation
52	2.25.	Water chemistry and radiochemistry reports should be shared with other relevant …..ell as the relevant departments with which they are shared, should match the need of the operating organization. ~~and the process should make urgent reporting possible. These reports should also enable to deliver irregularly provided information, if necessary.~~	The intention and the motivation of the last sentence is not clear. Please consider deleting the sentence or find a clearer wording. We made a suggestion.	X	Delete old text as suggested. New suggestion not approved.			Germany
53	2.25 (final sentence)	Comment/observation	"These reports should also enable to deliver irregularly provided information, if necessary." Quality and clarity of language should be improved. I was unclear exactly what was meant by this sentence, so was unable to suggest revised text.	X	Last sentence is deleted.			England

54	2.26.	~~A method~~ Methods for delivering analytical results to other departments (e.g. the operations and maintenance departments) should be …. personnel.	There may be more than one suitable method .	X				Germany
55	2.26 (final sentence)	When follow-up actions ~~are~~ need to be implemented, ~~the~~ responsibilities should be clearly assigned to the relevant department.	Improve quality and clarity of language. Remove “are” and “the”.	X				England
56	2.26/3	When follow-up actions need to be implemented…	“are” should be deleted	X				Nigeria
57	2.26/3	When follow-up actions ~~are~~ need to be implemented, the responsibilities should be clearly	editorial	X				Saudi Arabia
58	2.29	All contractors ~~and suppliers~~ of the chemistry department should be made subject to the same expectations as chemistry personnel, particularly with respect to the chemistry skills….	To exclude "and suppliers", because the expectations cannot be extended on suppliers who are not involved in NPP operation activities.	X				Russian Federation
59	2.30	The term "**training organization**": It would be useful to define whether does it refer to a part of the operating organization or an external body (or both are possible?).	Clarity	X	The chemistry and training department….			Israel
60	3.2	The chemistry management should ensure that sufficient supervision is carried out and that chemistry personnel demonstrate a	Improve quality and clarity of language.	X				England

		commitment to high standards of safety performance.						
61	3.4	…level of education of **staff**…We assume that the text refers to the staff being trained. It could be considered to rephrase that part of the sentence, to make clear that not the education level of the training personnel is referred to.	Completeness	X	…the level of knowledge and experience of the chemistry staff…			Israel
62	3.6	Initial training for chemists should include on the job training in ~~those~~ areas ~~which are~~ related to the chemistry programme, control and measurements (e.g. chemistry in the safety analysis report, laboratories, sampling points, chemical handling, storage areas, and injection points of chemicals in operating systems). ~~Initial~~ Training ~~for chemists~~ should also cover chemistry-specific areas during startup, normal operation, outages, most probable transients and likely emergency scenarios. The chemistry management or a qualified trainer should approve ~~the~~ successful completion of ~~the~~ initial training.	Improve quality and clarity of language.	X	Initial word is kept, other changes approved			England
63	3.7	~~Continues~~ Continuous training for routine tasks should be……	Editorial	X				India
64	3.7	Continuous training for……..	Improve quality and clarity of language.	X				England

			Typographical error – “continues”.					
65	3.7/ 1	Continuous	Editorial	X				England EdF
66	3.7 (2nd sentence)	Periodic refresher <u>training…….</u>	Improve quality and clarity of language. Typographical error – “trainings”.	X				England
67	3.8	We suggest to add a short remark to paragraph 3.8, (maybe as a footnote) that in specific cases, e.g. when introducing new instruments to the plant, training at the premises of the instrument supplier might be insufficient and it has to be supplemented with “on the job” training at the actual working location.	Completeness	X	Delete text after or….			Israel
68	3.11.	Chemists at a nuclear power plant should have sufficient knowledge in their areas of responsibility ….. safety of the nuclear power plant including operational ~~events~~ <u>states</u>, and the appropriate rationale.	We guess “operational states” is correct wording here.	X	….. including operational states, transients and the appropriate rationale.			Germany
69	3.12	Person responsible for the quality of the laboratory analyses should be familiar with equipment used by chemistry personnel and have the knowledge how to operate it, even if they are not the ones responsible for executing the related tasks on a daily basis.	The job title of "chemist" should be defined. = The person responsible for the (radio)chemistry of the nuclear power plant.	X	Laboratory supervisor should…			Finland

70	3.12	~~Chemists should be familiar with equipment used by chemistry personnel and have the knowledge how to operate it, even if they are not the ones responsible for executing the related tasks on a daily basis~~	Each plant staff member shall execute his/her job duties in accordance with his/her job description at his/her workplace. (In case of Russian Federation, para 3.12 contradicts the national Labour code)			X	Laboratory supervisor should…	Russian Federation
71	3.12/ 2	'daily basis.' should be 'regular basis.'	Editorial comment	X				England EdF
72	3.14	Chemistry personnel and other plant personnel who deal with chemicals should be trained in the following specific areas: ~~(a) The storage, handling and proper disposal of hazardous, flammable and poisonous chemicals as well as radioactive substances;~~ ~~(b) The labelling of chemicals stored and used inside and outside the laboratory;~~ ~~(c) The use of material safety data sheets and where they can be found;~~ ~~(d) The use and maintenance of personal protective equipment.~~ (a) The classification, labelling and packaging of hazardous and radioactive substances~~, in accordance with, when applicable, national and international regulations~~;	Please insure consistency with the wording of applicable regulation on chemicals (EC 1272/2008, Reach, etc.) The word "hazard" already includes physical dangers (flammable, explosive) as well as poisonous properties.	X				Germany

		(b) The corresponding storage, handling and proper disposal of chemicals, mixtures and substances; (c) The use and availability, ~~provision and location~~ of material safety data sheets, (d) The use and maintenance of personal protective equipment.						
73	3.14	It is suggested to add the following paragraph: "(e) first aid regulations for chemical burns and poisoning".	Personnel working with chemical agents is put at risk of chemical burns and poisoning in emergency situations			X	Already included in material safety data sheets	Russian Federation
74	3.15	……should be knowledgeable on	Improve quality and clarity of language.	X				England
75	3.15	After the training the chemistry personnel should be knowledgeable of all relevant plant requirements for nuclear, radiation and industrial safety . **prescribed in their job descriptions.**	To be more specific about the requirements to be followed			X	Included in 3.2&4.2	Russian Federation
76	3.17 &3.18	Should these direct quotes be expanded upon like for 3.1 to be relevant for this document?	See previous (3.12/2)			X	Kari will edit this according to 3.1	England Ed F
77	3.19	Chemistry personnel should take part in training programmes or emergency exercises …. ensure correct responses by chemistry personnel. In particular, emergency procedures and equipment must provide sufficient sampling and analytical capacities, in order to	Experience feedback of the Lubrizol fire in France, that resulted in new regulatory requirements, that sampling and analytical equipment must be provisioned at all industrial sites	X	Create a new should statement 7.44			Germany

		provide necessary information on chemicals or radiological releases~~.~~, ~~including those resulting from a fire, that must be taken into account for the safe implementation of emergency actions, and proper information and protection of population~~.	presenting a significant risk of fire, in order to provide sufficient real-time measuring capacity in case of fire.					
78	3.20	…..post-accident sampling arrangement, should usual routes be inaccessible……	Improve quality and clarity of language.	X				England
79	4.1.	The chemistry programme should contribute to ensuring …..and limiting all discharges to the environment to levels as low as reasonably achievable and within national regulations [1].	Limit discharges should also be within national regulations, please add.	X				Germany
80	4.1	Please quote para. 7.13 of SSR-2/2 (Rev.1)	Para. 4.1 paraphrases para 7.13 of SSR-2/2 (Rev.1) and hence downgrades a requirement to a recommendation.			X	The reference to SSR2/2 Rev.1 is given and the text as such does not downgrade the requirement itself.	Saudi Arabia
81	4.2 (2nd sentence)	……and the plant's safety analysis.	Improve quality and clarity of language. Typographical error – missing word.	X				England
82	4.3.	The chemistry programme should include documentation to serve as a basis for the selection, monitoring and analysis of the chemistry parameters and it should be in place ~~prior to normal operation~~ during the commissioning phase. The	Please put in line with para. 7.13 of SSR-2/2 (Rev. 1) which states that "The chemistry programme shall be developed prior to normal operation and shall be in place during	X	See strikethrough words			Germany

		chemistry instructions should be aligned with operational limits and …. should explicitly define graded limit values ~~("action levels")~~ for specific chemistry parameters enabling efficient implementation of the chemistry programme. The plant ….. stages.	the commissioning programme" (same para. 2.4. of current document). The term "action level" is commonly used in this field and could be added here for clarification.			X	Instead of using action level values this document uses graded limit values	
83	4.3	The chemistry programme should include documentation to serve as a basis for the selection, monitoring and analysis of the chemistry parameters and it should be in place prior to ~~normal~~ **commencement of-power operation.**	Normal operation" has a different sense. In this context, it is recommended to use a more appropriate wording	X	….chemistry parameters and it should be in place prior to the commissioning phase.			Russian Federation
84	4.3&4.4	The term " **graded limit values** ": Is it used as an accepted term (suitable to be included in the Safety Glossary…), or does it refer to general limit values to be used in a graded approach manner? Would it be possible to use terms such as "*acceptance criteria specifications"* or "*specified limits"* or "*within specifications",* or other relevant terms which are included in the IAEA Safety Glossary. Alternatively, we suggest to consider adding a (specific) List of Terms to the present Guide.	Clarity			X	Previously the industry used term action level(s). Currently more and more countries have started to use graded limit values to mean the same thing. To avoid unnecessary revision, it is good to use already now this revision.	Israel

85	4.3	The plant ~~documentation~~ **working procedures** should describe potential corrective actions to be applied in various operational stages.	To be more specific about the kind of documentation	X	The plant procedures should…			Russian Federation
86	4.3	The chemistry programme should include documentation to serve as a basis for the selection, monitoring and analysis of the chemistry parameters and it should be in place ~~prior to normal operation~~ during the commissioning programme.	This is not consistent with para. 7.13 of SSR-2/2 (Rev.1), which requires that "The chemistry programme shall be developed prior to normal operation and shall be in place during the commissioning programme". Again the first sentence of para. 4.3 is a bad paraphrasing of para. 7.13 of SSR-2/2 (Rev.1), which was correctly quoted in para. 2.4 of DS525.	X	…..during the commissioning phase.			Saudi Arabia
87	4.4 (b)	A plant specific chemistry regime should be in place and it should be developed in accordance with the original plant design and safety analysis. Potential design changes should take into account the existing chemistry regime. ~~and,~~ Chemistry management should understand the potential design changes and the consequences of these changes for the chemistry	Please put in line with para. 2.20 of the current document: There might be other updates to the existing chemistry programme required, not only structural changes of the SSCs	X	A plant specific chemistry regime should be in place and it should be developed in accordance with the original plant design and safety analysis to contribute in safe plant operation during all operational states, designed accident			Germany

		programme and approve the changes in the design ~~basis documents~~ relevant to the water chemistry programme. ~~For example,~~ If needed, the existing chemistry programme should be updated to reflect any structural changes to the SSCs that are part of the chemistry programme.			conditions and during design extension conditions. Chemistry management should understand the potential design changes and the consequences of these changes for the chemistry programme. If needed the chemistry programme should be updated accordingly. The changes in the design basis documents relevant to the water chemistry programme should be approved by chemistry management.			
88	4.4. (b)	A plant specific chemistry regime should be in place and it should be developed in accordance with the ~~original~~ plant design and safety analysis.	To exclude the word "original" as the chemistry regime shall be in line with the current (updated) design	X				Russian Federation
89	4.4 (c)	The requirement to undertake periodic safety reviews should also include chemistry.	Scope and completeness. Please consider making it clearer that periodic reviews of safety should also include chemistry performance, by adding the suggested text.			X	This should be considered during the revision of SSG-25	England
90	4.4 (d)	…….. (v) crud induced power shifts (where applicable) and……	Improve clarity of language.	X				England

			CIPS is not applicable to BWRs and some other LWR designs which do not use soluble B. Suggest adding “where applicable” in brackets.					
91	4.4 (g)	The chemistry regime for auxiliary <u>and support</u> systems should be in accordance with the used materials to preserve their full integrity and availability.	Is this valid only for auxiliary systems? We suggest “auxiliary and support systems”.	X				Germany
92	4.4. (g)	The chemistry regime for auxiliary systems should be ~~in accordance~~ <u>compatible</u> with the ~~used~~ materials <u>of construction</u>, to preserve their full integrity and availability.	Improve quality and clarity of language.	X				England
93	4.4. (j)	The ~~results of~~ **data from** the chemistry programme should be communicated in a timely manner...	To be more specific about what should be communicated	X	The chemistry programme data should….			Russian Federation
94	4.4 (k)	The chemistry management should ensure that sufficient number of staff is always available at the plant or can quickly come to the plant when needed.	Number of staff available and their ability to come quickly to the plant is not relevant in the “Chemistry Program” paragraph. It would fit better together with §2.7.	X	Moved after 2.8			ENISS
95	4.4 (k)	It seems that using "*<u>can quickly come</u> to the plant when needed*" is somewhat too general in the context used.	Editorial?			X	Current expression is good enough	Israel

96	4.4. (k)	The chemistry management should ensure that sufficient numbers of staff are ~~is~~ always available at the plant, or can quickly come to the plant when needed.	Improve quality and clarity of language.	X	Note s, are instead of is			England
97	4.4 (l)	Any deviations (e.g. deficiencies, adverse trends, fast transients) from normal operational limits should be addressed in a timely manner, and effectiveness of used methodologies for identification of such deviations should be regularly evaluated and improved, if necessary.	The intention and motivation of this sentence is not quite clear. We made a suggestion, please verify.	X				Germany
98	4.4. (l)	……..and the effectiveness of the ~~used~~ methodologies used should be regularly evaluated and improved, if necessary.	Improve quality and clarity of language.	X				England
99	4.4 (m)	Online instruments and equipment in the laboratory …. date. The necessary redundancies ~~and spare parts for~~ this equipment should be ensured.	Availability of spare parts is also important issue.			X	Not always needed if redundant ones exist	Germany
100	4.4. (m)	The necessary redundancies and/or diversities for this equipment should be ensured.	Scope and completeness. Should this also cover any diversity requirements as well as redundancy?	X				England
101	4.4 (o)	The in-service inspection results should be used to confirm whether the chemistry programme is effective or not ~~in all its functions~~	Chemistry programme has a number of functions (see para 2.5), and the fulfilment of	X	See strikethrough			Germany

			them all must be effective. Programme or program? Can you please check that the same word is used within the document					
102	4.4. (o)	the chemistry ~~program~~ programme is effective or not.	Improve quality and clarity of language. Typographical error.	X				England
103	4.4. (o)	…..confirm whether the chemistry programme is effective or not.	Editorial					Saudi Arabia
104	4.4 (s)	The chemistry programme should cover at least the following aspects: … (s) Discharges of radioactive species and chemicals should be kept as low as reasonably achievable and within national regulations. Chemistry departments should carefully evaluate, thoroughly understand and properly document the potential impact of any changes in the chemistry regime on safe operation of the nuclear power plant including aspects of radioactive and chemical discharges. Radioactive discharges to the environment should be measured on-line before their	The last sentence of 4.4 (s) seems to be separate from the first sentences. The online measurements of radioactive discharges are not used for evaluation purposes so the last sentence could be shortened to end after the word "exceeded"	X, evaluation in 2nd sentence.				Finland

		discharge to ensure that national and plant limits are not exceeded.						
105	4.4.(s)	Radioactive discharges to the environment should be measured online/ off-line before their discharge to ensure that national and plant limits are not exceeded and to evaluate potential impacts on the environment.	Sampling is also done before radioactive discharges.			X	Off line measurements do not always ensure that the all possible radioactive discharges are caught.	India
106	4.4 (t)	The chemistry program~~me~~ should provide adequate support to identify, ~~and~~ characterize and ~~reduce~~ radioactive waste generated at the nuclear power plant (including waste from decontamination).	Reducing radioactive waste is one of the functions of the chemistry programme as well (see para 2.5).	X	…adequate support to identify, characterize and minimize radioactive waste…			Germany
107	4.4 (v)	The chemistry programme should include guidance documentation to select suitable decontamination techniques in demand case~~, when necessary~~.	Clarification			X	Exiting text is more appropriate	Germany
108	4.4. (w)	Nil	Word “lear” not clear	X				Nigeria
109	4.4 (w)	Nil	There is probably a typo? lear -> clear	X				Finland
110	4.4 (w)	The ~~lear~~ cleanliness requirements and storage conditions should be defined for SSCs ……. the lifetime of the plant.	This word seems to be a residuum from changes and should be deleted.	X				Germany
111	4.4(w)	The ~~lear~~ cleanliness requirements and storage conditions should be defined for	Editorial	X				India

		SSCs in plant documentation during						
112	4.4(w)	The ~~clear~~ cleanliness requirements, flushing criteria….	Typo and add flushing criteria	X	Check the text			Pakistan
113	4.4(w)	(Typo?) -The second word in the first line of sub-paragraph (w) of paragraph 4.4: ***lear***?	Editorial	X				Israel
114	4.4. (w)	The ~~lear~~ cleanliness requirements…….	Improve quality and clarity of language. Typographical error – suggest "lear" is removed.	X				England
115	4.4.(y)	The chemistry regime should devise suitable criteria to monitor chemistry performance of the lube oils, ion exchange resins and other important plant chemical consumables both: before acceptance of their supply & their effectiveness during plant operational phase.	Additional item suggested			X	Already in Sections7& 9	Pakistan
116	4.4 (y)	It is suggested to add: "Measures for ensuring safety of handling of toxic substances used for the correction of the water chemistry regime shall be stipulated".	Some anti-corrosion and water chemistry corrective additives are toxic.			X	4.4.(u) addresses this topic	Russian Federation
117	5	REACTORS (~~INCLUDIGN~~ INCLUDING ~~WWERs~~ VVERs)	Editorial correction. Standard Acronym used is VVER instead of WWER. WWER may be changed to	X				India

			VVER at all other places in the document accordingly.					
118	5.1	The chemistry regime ~~depends on~~ **is established in the design of the plant taking into account peculiarities** of the design and ~~on~~ the construction materials used	To be more correct about what is taken into account while setting the chemistry regime			X	Suggestion does not increase clarity	Russian Federation
119	5.2.	Paragraph 7.14 of SSR-2/2 (Rev. 1) [1] states that "Chemistry surveillance shall be conducted at the plant to verify the effectiveness of …… of the chemistry ~~control~~ surveillance should be regularly evaluated.	What is the added value of the last sentence of para. compared to the citation from SSR-2/2? Maybe it could be deleted to avoid redundancies. Alternative – replacing "chemistry control" by "chemistry surveillance".			X	SSR2/2 is currently being revised that the terminology in that document will be aligned with this one.	Germany
120	5.5 & 5.7	See comment no. 11 above, regarding the term **graded limit values**.	Clarity			X	See comments above	Israel
121	5.6	We suggest to add: …sensitive, accurate, robust and validated analytical techniques…	Completeness			X	Robust is not clear and validated mentioned in other should statements	Israel
122	5.7.	Plant specific, normal operation control parameter values should be specified in the chemistry documentation to avoid unintentionally exceeding graded limit values.	Clarification. Or is there another explanation to "normal control parameter values" available? Please verify.	X	Plant specific, expected control parameter values…			Germany
123	5.8 & 5.11	In paragraph 5.8, the need to take actions if control parameter values	Completeness	X	5.8:…timely actions are should be taken if			Israel

		are exceeded. We suggest to emphasize that actions need to be taken **before** those parameters are exceeded. Therefore, it could be helpful to add here the content of paragraph 5.11 (or refer to it), addressing the point of continuous analysis of trends and appropriate proactive reaction.			the integrated limit values…..	X	If graded limit values are exceeded, statement in 5.5. applies. The integrated limit values here are different	
124	5.9	Records of the chemistry control parameters should be maintained and assessed, and any values…..	Editorial	X				India
125	5.10	Diagnostic parameters should be defined to provide further information on the ~~chemical~~ chemistry control status of the plant. These parameters	For clarity	X				India
126	5.12	Normal operational values should also be defined for the activity concentrations of the most important radionuclides present in the primary coolant. These values could depend on the fuel design changes or water chemistry regimes and should be updated by taking into account up-to-date knowledge and operating experience. Also the detection limits and threshold values for fuel defects and suspected fuel leakage should be specified.	Future fuel design concepts as ATF could modify the limits or the water regimes. We recommend considering new aspects in the wording			X	This kind of update is generic to all aspects of chemistry programme. No need to change.	Spain

127	5.12	Normal operational values should also be defined for the activity concentrations of the most important **fuel-originated** radionuclides present in Ae primary coolant.	To indicate that this clause covers radionuclides of fuel origin, otherwise it would contradict para 6.4.	X				Russian Federation
128	5.13	Reference [8] quoted in this paragraph deals with NPP's **modifications**, while reference [7] addresses **maintenance, testing and surveillance.** We suggest to consider to change in this paragraph the referring to [7] instead [8].	Clarity	X		X	There is no need to have a reference here	Israel
129	5.14.	Chemistry parameters and their corresponding graded limit values, when applicable, should be clearly defined in chemistry procedures or other relevant plant documentation in the following stages <u>of the lifetime of the nuclear power plant</u>: ….	Clarification of stages of what exactly are meant could be helpful.			X	Does not improve clarity	Germany
130	5.14 (d)	~~Normal~~ **Power** operation	"Normal operation" has a different sense. A better term is proposed	X				Russian Federation
131	5.14 (f) and (g)	(f) Shutdowns~~, both short and extended ones~~; (g) Outages, <u>both short and extended ones;</u>	The duration applies to outages, not to shutdown transients.	X	Delete in f) both short and extended ones, no other change			ENISS
132	5.14 (g)	~~Outages~~	To exclude the item (or to merge with the item			X	Cold shutdown and outage are similar in chemistry perspective,	Russian Federation

			f)), since in the context of the document there are no difference between shutdowns and outages				hot shutdown is different. Hence both kept in the document	
133	5.14 (h)	Chemistry parameters and their corresponding graded limit values, when applicable, should be clearly defined in chemistry procedures or other relevant plant documentation in the following stages: … (h) Accident conditions; …	Why are (h) Accident conditions in this list? The chemistry parameters for the other plant states can be clearly defined, but for various accident conditions not.	X				Finland
134	5.14 (h)	~~Accident~~ conditions;	To exclude the item, because for accident conditions, chemistry parameters shall be defined in SAMGs rather than in "chemistry procedures"	X				Russian Federation
135	5.16.	The water chemistry regime of active and passive safety systems ~~(e.g. boric acid tanks, containment sprinkler systems, bubble stacks, reservoirs containing gadolinium)~~ that contain liquid neutron absorbers (e.g. boric acid tanks, containment sprinkler systems, bubble stacks, reservoirs containing gadolinium) should be maintained in accordance with their technical specifications.	Editorial	X				Germany

136	5.17.	The quality of lubricant oil for safety related systems (e.g. emergency pumps, emergency diesel generators) should be regularly monitored and controlled ~~by the operating organization chemical department~~.	By operating organisation or by chemical department? Please verify.	X	Delete text after controlled			Germany
137	5.17	The quality of lubricant oil for safety ~~related~~ systems (e.g. emergency pumps, emergency diesel generators) should be regularly monitored and controlled by the operating organization.	The terminology "Safety related systems" has a specific meaning in the IAEA safety glossary (see page 152 of the IAEA safety glossary, interim edition 2022). Here, it seems that safety systems are meant, according to the given examples.	X	The quality of lubricant oil for systems important to safety should be…			Saudi Arabia
138	5.18	The quality of diesel fuel should be verified before transferring into the diesel fuel tanks. The quality of diesel fuel in the storage tanks for the ~~emergency~~ diesel generators should	Some NPP designs have emergency diesel generators for accident conditions as well as reliable diesel generators for plant transients.	X				India
139	5.19	We suggest to write: **Including** iodine (instead *and iodine*).	Clarity	X	.. and iodine species			Israel
140	5.20	Please consider adding: **for corrosion of SSC's** after the words *risk assessment.*	Completeness			X	Does not improve clarity	Israel

141	5.20 (2nd sentence)	If a biocide containing chlorine is added to the system, the chemistry department should perform a risk assessment.	Relevance and usefulness/scope and completeness. Why is this singled out as requiring a risk assessment? Would this not apply elsewhere to other chemistry-related activities? Suggest this is either removed or other parts of the document clarify where specific risk assessment is required and under what circumstances.	X	Delete the sentence starting with If….			England
142	5.20	It is suggested to add at the end: "and personnel health".	Some anti-corrosion and water chemistry corrective additives are toxic.			X	Industrial safety is already mentioned	Russian Federation
143	5.21.	During operation, the chemistry control at a boiling water reactor power plant should be focused on decreasing the concentration of harmful impurities in the reactor coolant to the optimum practicable level in order to avoid or minimize intergranular stress corrosion cracking of core components and parts of pressure vessel penetrations, to minimize fuel performance risks and to reduce radiation levels on surfaces of SSCs.	Clarification. Please check the wording in this sentence.	X	See changes			Germany
144	5.22.	To avoid or minimize stress corrosion cracking of specific …..	Suggestion for better understanding.			X	Basis is appropriate	Germany

		measured. The ~~basis~~ reasons for the applied chemistry regime should be clearly documented.						
145	5.22	Please consider moving the words *if applicable* to a different place in the first sentence of the paragraph. For example: …*mitigating chemicals,* ***if applicable****, should be injected….*	Clarity	X				Israel
146	5.27.	The origin of corrosion products entering the reactor coolant should be …. products (e.g., feedwater sources, reactor internal materials sources, ~~reactor water cleanup system surfaces with carbon steel~~ surfaces with carbon steel in reactor water cleanup system).	Wording	X	… carbon steel surfaces in reactor water cleanup system			Germany
147	5.28.	Shutdown and startup procedures should be strictly followed to control ….should be carefully evaluated by operating organizations and the ~~basis~~ results clearly documented for future assessments	Wording			X	Basis is the correct word here	Germany
148	5.28	…corrosion products and to effectively remove them using coolant purification system filters and demineralizers, as well as to minimize corrosion ~~and explosion risks.~~ Any deliberate…..	Correlation of corrosion products in coolant and explosion risks is not clear	X				India

149	5.32	We suggest to replace *recombiner* ***probe*** with recombiner **device**.	Clarity			X	It is a probe.	Israel
150	5.32	Consider changing the phrasing in this paragraph, since once the recombination device was installed, there is no need to ensure its "availability" but to verify its propriety.	Clarity	X	…availability to fulfil its function should be ensured.			Israel
151	5.33	For a nuclear power plant with a **graphite moderator and water cooling by forced circulation** ~~ed and water cooled primary~~ circuit, the ~~**correction free**~~ chemistry regime with **keeping pH close to neutral value (in the range from 6.5 to 8.0) should be adopted** ~~applied without the use of any acids or alkalizing chemicals~~. Graphite moderated reactor plants should have high purity feedwater. **This feedwater quality should be achieved by** an ~~and~~ effective purification process using a full-flow ~~systems for~~ condensate purification system and reactor coolant **purification using a bypass clean-up system**.	The paras 5.33-5.36 are devoted to water chemistry control for RBMKs, which are in operation in Russian Federation only. Therefore, it is advisable to bring the text as close as possible to the chemistry control requirements existing for Russian RBMKs.	X	…circuit, ~~correction free~~ a chemistry regime which keeps the pH close to a neutral value (in the range from 6.5 to 8.0) without chemical additions should be adopted. This feedwater quality should be achieved by an effective process using a full flow condensate and bypass purification systems for reactor coolant.			Russian Federation
152	5.34	Chemistry control at a graphite moderated reactor should ensure the following: (a) The deposition of corrosion products on **fuel**	Current formulation is vague. The paras 5.33-5.36 are devoted to water chemistry control for RBMKs. which are in	X	(a) The deposition of corrosion products on fuel assemblies, heat exchanger surfaces and pipelines should be minimized;			Russian Federation

		assemblies and heat transfer ~~exchanger~~ surfaces **of equipment and pipelines** ~~ing~~ **surfaces should be minimized;** (b) Corrosion **strength** ~~(e.g. intergranular stress corrosion cracking, flow accelerated corrosion)~~ of **construction materials** of **equipment** ~~**and** pipelinesthe main stoom wator circuits~~ should be ensured ~~minimized~~; (c) **Reliable operation of plant equipment with generation of steam (of a high quality as defined by the turbine requirements) ,in** moisture separators should ~~produce high quality steam for turbines~~ **be ensured.**	operation in Russian Federation only. Therefore, it is advisable to bring the text as close as possible to the chemistry control requirements existing for Russian RBMKs.		(b) Corrosion phenomena of construction materials should be minimized; (c) Moisture separators should produce high quality steam for turbines as specified by the turbine manufacturer.			
153	5.36	To minimize the level of "Zr and other activated corrosion products in crud deposits on heat transfer ~~within the oxide films on component~~ surfaces **of equipment and pipelines of the forced circulation circuit**, flushing (**with/without reagents** ~~washing~~)	The paras 5.33-5.36 are devoted to water chemistry control for RBMKs. which are in operation in Russian Federation only. Therefore, it is advisable to bring the text as close	X	To minimize the level of activated corrosion products in deposits on component surfaces in forced circulation circuit, flushing with/without reagents should be performed			Russian Federation

		~~of the primary circuit~~ should be performed) **both** at the beginning of**, and after** shutdown.	as possible to the chemistry control requirements existing for Russian RBMKs.		both at the beginning of, and after the shutdown periods.			
154	5.37	Concentration of 10B should be verified before preparation of borated solution to ensure required percentage of 10B is present in the boric acid.	Monitoring of 10B is more important before its addition in system & not feasible in reactor coolant during plant operation	X	Add this sentence to the text.			Pakistan
155	5.37	In addition, the makeup water should be deaerated/degassed and oxygen concentration should be monitored regularly				X	Addressed in 5.39	Pakistan
156	5.39/2	oxidizing species in the primary coolant. In addition, ,	Double comma	X				Saudi Arabia
157	5.42	Shutdown and startup procedures should be strictly followed to control the release of corrosion products and to effectively remove them using coolant purification system filters and demineralizers, as well as to minimize corrosion. ~~and explosion risks~~.	Release of corrosion products does not lead to explosion during normal operation	X				Russian Federation
158	5.43	No specific layup conditions are needed for drained primary systems during the outages since the materials <u>are selected to minimise susceptibility</u> ~~are not supposed to be susceptible~~ to	Improve quality and clarity of language.	X				England

		corrosion at ambient temperature and atmosphere						
159	5.44	It is suggested to replace "nickel-based alloys" with "high-nickel alloys".	Effectiveness of zinc additives for corrosion prevention in construction materials used at the VVER primary circuit has not been evaluated and justified. Benefits or harms are not proven.			X	Nickel based alloys term is used when materials is mainly composed of nickel also including high nickel alloys. In VVERs primary such materials do not exist. However, the Zn addition should be at least evaluated. The statement does not require its implementation.	Russian Federation
160	5.45	An upper limit tor zinc should be specified (**in coordination with fuel vendor**) at the plants that inject it, ~~to comply with fuel vendor guidance~~.	Any control values are set by the operating organization, not the fuel vendor			X	The original text does not imply that fuel vendor defines the control values. No change needed.	Russian Federation
161	5.50	….and oxygen concentrations in cover gas systems should be adequately established to eliminate the possibility of ~~creating~~ formation of an explosive gas mixture….	“formation of” is a more appropriate than ‘creating’	X				India
162	5.54.	During reactor shutdown, normal chemistry specifications should be maintained for the moderator system, except for the following occasions: (a) When the moderator contains gadolinium as a result of:	Listing of the reasons here might be more reader friendly.			X	Does not improve clarity	Germany

		- poison injection by the shutdown safety system, - ~~as a result of~~ being in a guaranteed shutdown state or - as a result of xenon simulation;						
163	5.55.	Special attention should be paid to the integrity of the various parts of the ~~secondary and~~ auxiliary and support systems that might be significantly affected by various forms of corrosion or deposited corrosion products. ~~The secondary and~~ Aauxiliary and support systems and their water chemistry control should be designed to minimize the ingress of corrosive impurities.	Are auxiliary and support systems meant here of secondary circle and auxiliary system? Please verify.			X	This section addresses secondary side and systems related to it. No need to change wording in the original text	Germany
164	5.56 a	Should minimize the flow accelerated corrosion of construction materials, particularly in components made of carbon steels	Scope and completeness. The guide is written from the perspective of chemistry managing FAC, whereas, where practicable, FAC should first be "eliminated" by appropriate materials selection using materials which are "immune" to FAC, without having to rely on chemistry control as one of the primary measures to protect against FAC.	X	Should further minimize the….	X	Since this is mainly design related comment it is addressed in the SSR2/1.	England

			Suggest a footnote is added to the guide to explain this point and/or this principle is reinforced earlier in the guide.					
165	5.56 (f)	Should be achieved by selecting appropriate chemicals to avoid causing unnecessary health risks to the personnel of operating organization.	Clarification	X				Germany
166	5.56 (f)	Should be achieved by selecting appropriate chemicals to avoid causing unnecessary health risks to the operating organization staff.	Editorial (health risks are for persons and not for organizations	X	…. unnecessary health risks to the personnel of operating organization.			Saudi Arabia
167	5.58.	A reducing agent should be added when necessary to scavenge oxygen in the water in order to minimize susceptibility to stress corrosion cracking in steam generators. The most effective injection strategy (injection points, injection rate, injection frequency, …) of chemicals should be carefully evaluated.	This a complex field with a large degree of optimization issues. This could be reflected by the added text.	X				Germany
168	5.60.	The levels of deleterious impurities (e.g. sodium ions, chloride ions, sulphate ions, lead ions, copper ions) in the steam generator water should be measured and kept as low as possible. The impurities concentrate …. a representative indicator (e.g. cation conductivity).	Clarification. If required, differentiation on cations and anions might be helpful.	X				Germany

169	5.61	Add the following text at the end: "the use of high copper metals as structural materials of elements and equipment of the secondary circuit should also be avoided".	Copper-bearing alloys are identified as undesirable construction material on the basis of operating experience.			X	Agreed, but should statement cannot be used in the context because not applicable to all plants in MSs. Proper phrase would be should consider… but this cannot be used in safety standards.	Russian Federation
170	5.62.	The potential impact of chemistry parameters on the integrity ……following: (a) Evaluation of the results of non-destructive testing (during in-service inspections) of the integrity of the steam generator tubes, at least for degradation relating to the ~~primary and secondary water~~ chemistry control <u>of primary and secondary circuits</u>.	Clarification	X				Germany
171	5.62	Evaluation of the amount of hard deposits in the steam generators ~~able to~~ which can cause clogging.	For clarity	X				India
172	5.62(d)	Evaluation of the amount of hard deposits in the steam generators ~~able to cause~~ <u>that can cause</u> clogging.	Rhetorical modifications	X				Japan
173	5.63.	If necessary, an effective cleaning procedure should be applied to remove deposits from steam generators to mitigate the effects of	Please review the comma placement in this sentence.	X	If necessary based on safety assessment, an effective cleaning procedure should be			Germany

		various forms of corrosion. However, the need to perform cleaning should first and foremost~~,~~ be avoided~~,~~ by implementing effective chemistry control and/or other related measures, i.e., materials selection/compatibility, etc. ~~If cleaning becomes necessary, a~~An adequate safety justification should be performed to verify the necessity of such cleaning procedure.	It is not quite clear in what cases an adequate safety justification should be performed: If cleaning becomes necessary, or if the necessity of such a cleaning procedure must be verified? Please clarify.		applied to remove deposits from steam generators to mitigate the effects of various forms of corrosion. However, the need to perform cleaning should first and foremost, be avoided, by implementing effective chemistry control and/or other related measures, i.e., materials selection/compatibility, etc.			
174	5.64	To further optimize corrosion products control in the steam generators, the use of dispersant compounds and film forming products ~~should~~ in the secondary water should be assessed. The results of ~~these monitoring activities~~ the assessment should be clearly documented for future work.	Editorial changes The assessment of dispersant of filming products addition may involve monitoring activities but it is mainly engineering support.	X				ENISS
175	5.64.	To further optimize corrosion product ….compounds and film forming products ~~should~~ in the secondary water should be assessed. ….. for future work	Wording. The “should” is redundant here.	X				Germany
176	5.64	To further optimize corrosion product control in the steam generators, the use of dispersant	Editorial	X				India

		compounds and film forming products ~~should~~ in the secondary water should be assessed.						
177	5.64	The word ***should*** is used twice in that paragraph. The "first ***should***" has to be deleted.	Clarity	X				Israel
178	5.64	To further optimize corrosion product control in the steam generators, the use of dispersant compounds and film forming products ~~should~~ in the secondary water should be <u>considered and</u> assessed.	Improve quality and clarity of language. Typographical error.	X				England
179	5.64/2	… film forming products in the secondary water should be addressed.	"should" after the film forming products in the original text to be deleted.	X				Nigeria
180	5.66	Auxiliary systems should be operated according to specific chemistry regime ~~to address e.g. microbiologic induced corrosion~~ and specific chemistry control to minimize corrosion risks.	Microbiologic induced corrosion can happen but several other corrosion processes can also happen. There is no need to focus on one specific type of corrosion. The end of the sentence covers all corrosion processes relevant to be considered.	X	Auxiliary systems should be operated according to specific chemistry regime to minimize corrosion risks.			ENISS
181	5.66.	Auxiliary <u>and support</u> systems should be operated according to specific chemistry regime to address e.g. microbiologic induced	Clarification			X	To be consistent with text prior this should statement	Germany

		corrosion and specific chemistry control to minimize corrosion risks.						
182	6.3.	To reduce the radiation dose ~~exposure~~ of personnel ~~to radiation~~, the chemistry programme should include the following:	Rhetorical modifications In the light of radiation protection, it is more important to reduce the dose rather than to reduce the exposure.	X				Japan
183	6.3 (a)	The application of a suitable ~~chemical~~ chemistry regime to minimize dissolution of corrosion products, deposition of corrosion products in-core and their subsequent transport on surfaces of SSCs;	Editorial change	X				ENISS
184	6.4.	The deposition of corrosion products into the core should be minimized by keeping the chemistry parameters of the primary water coolant as constant as possible and at an optimal value during normal ~~power~~ operation.	Please put in line with IAEA Glossary: under "plant states" are mentioned "operational states", "normal operation", "anticipated operational occurrences" etc.	X	…coolant as constant as possible and at an optimal value during steady-state operation.			Germany
185	6.5	'specifying low Co-containing Co containing grades of stainless steel'….	The 'hypen' needs to be removed to give the intended meaning.	X				India
186	6.7.	Programmes for the replacement of Stellite™ (typically 57% Co), silver and materials containing antimony …. being approved for use in plant systems.	Trademark? Can you please explain the meaning?			X	Stellite is trademark	Germany

187	6.10	It is suggested to add the following text at the end: "Justification of a decision on injection or a refusal of injection of zinc-bearing substances to the primary circuit shall be properly documented."	Studies of the effect of zirconium additives In the coolant of the primary circuit of VVER-type reactors have not been conducted, and the benefits of using zinc for VVER-type reactors have not been proven.			X	The intent is the same in the original text, no need to change	Russian Federation
188	6.11./L1	Harmful chemical species (e.g. oxygen, hydrogen, alkalis, corrosion products and additives such as zinc) should be strictly controlled to minimize fuel cladding deterioration and thereby optimize ~~occupational~~ protection and safety for occupational ~~radiation~~ exposure and environmental discharges.	Consistency with GSR Part 3. “Optimization of protection and safety” is used in GSR Part 3.	X				Japan
189	6.13.	The activities of radionuclides in the primary coolant and in other systems should be kept below their specified ~~control~~ values. The activity should be checked by continuous …. fuel cladding defects.	The “control” might be misleading that this is limited to control parameters.	X				Germany
190	6.13	The activities of **fuel-originated** radionuclides in the primary coolant and in other systems should be kept below their specified control values	To specify that this clause covers radionuclides of fuel origin, otherwise it would contradict para 6.4.	X	The activities of fuel-originated radionuclides in the primary coolant and in other systems should be kept below their			Russian Federation

					specified ~~control~~ values			
191	6.14	A remark can be added to paragraph 6.14, pointing out that the regulatory body has to be informed regarding the "process" described here (addressing possible defective fuel elements).	Completeness			X	The processes are different in MS and generic “should statement” cannot be included here.	Israel
192	6.16/3	by reducing the source terms to the extent practicable	Word practical is incorrect in the content	X				Nigeria
193	6.17	Extensive chemical decontamination processes should be avoided in order to <u>prevent</u> ~~avoid~~ high corrosion dissolution rates.	Rhetorical modifications The phrase “avoid” appears twice in one sentence.	X				Japan
194	6.17.	Extensive chemical decontamination processes should be avoided in order to avoid high corrosion …and potential power shifts. Purification of the water should ensure the removal of corrosion products. <u>The need for additional in-service inspections to verify the integrity of SSC important to safety should be assessed.</u>	This might get necessary depending on the specific history of decontamination.			X	Makes sense, but this “should statement” should be in some other safety standard.	Germany
195	6.17	Extensive chemical decontamination processes should be avoided in order to avoid high corrosion <u>/</u> dissolution rates.	Corrosion and dissolution separated by forward slash to give the intended meaning.	X	Delete corrosion, leave dissolution			India

196	6.20(j)	Should use effective filters to separate aerosols and iodines from gaseous discharges;	Impregnated Charcoal filters are also used to capture some form of iodines from gaseous discharges.			X	Intent is already addressed in (i)	India
197	6.20 (k)	We suggest to add the words **of gases** following "*volume reduction*" (in accordance with other adjacent sub-paragraphs referring specifically to liquids and/or to gases).	Clarity	X				Israel
198	6.22.	The principle of optimization of protection and safety should be applied when setting discharge limits, and the regulatory body should evaluate whether the processes established by the operating organization to protect workers and the public are optimized. The operating organization should establish procedures to monitor the source term and the environment in order to control effluents and verify compliance with the discharge limits. Further recommendations on establishing discharge limits and on the process for the optimization of the protection and safety of workers managing radioactive effluents and ~~the~~ members of the public are provided	Consistency with GSR Part 3. "Optimization of protection and safety" and "members of the public" are used in GSR Part 3. The title of GSG-9 should be correctly written.	X				Japan

		in IAEA Safety Standards Series No. GSG-9, Regulatory Control of Radioactive Discharges to the Environment [14].						
199	6.23	"Special consideration shall be given at the design stage of a nuclear power plant to the incorporation of features to facilitate radioactive waste management and the future decommissioning and dismantling of the plant."	Editorial (missing brackets)	X				Saudi Arabia
200	6.23 & 6.24	It seems that paragraph 6.23 ends in line 3 (with last word: *assessed)* and the part starting with "*Requirement 12 of IAEA…* should be a new paragraph (6.24), addressing a separate requirement of SSR-2/1 (Rev.1). Once this is changed, the numbering of existing paragraphs 6.24 and 6.25 will have to be changed to 6.25 and 6.26, accordingly.	Editorial	X	How the SSRs requirements are addressed in this document will be done in systematic manner			Israel
201	6.24.	New nuclear power plants should benefit from prior experience on the selection of materials and should apply a reactor chemistry regime that can keep ~~minimize~~ the source term during plant operations and future decommissioning ~~to~~ as low as practicable to ~~significantly minimize the decommissioning source term~~.	Rhetorical modifications In the light of radiation protection, it is more appropriate to indicate "keep as low as practicable" rather than "minimize as low as practicable".	X	Latter part modified as suggested	X	Minimize is kept	Japan

202	6.24	6.24. New nuclear power plants should benefit from prior experience on the selection of materials and should apply a reactor chemistry regime that can minimize the source term during plant operations to as low as practicable to significantly minimize the decommissioning source term and considering also guidance to minimize cladding corrosion or any other fuel performance risks.	Recommendation from fuel vendor (for example) for future plants			X	Suggested addition is already incorporated	Spain
203	6.25	Appropriate water chemistry control should be applied to minimize the consequences of ~~a loss of coolant~~ accidents resulting in the release of iodine radionuclides in or outside the containment building.	Accidents such as steam generator tube rupture(s) or primary to secondary leak (PRISE) should be also considered because the containment bypass			X	Statement considers only releases into containment.	Saudi Arabia
204	7.3	It is suggested to add "taking into account the operating modes of a reactor installation" after "should be defined".	Depending on the operating mode of the reactor plant. It is advisable to adapt the requirements for the frequency of measurements taking into account the appropriate justification.	X	The frequency of the measurements should be defined taking into consideration the rate of change of parameters compared to the time scales for actions associated with graded limit values, the safety importance of SSCs, aggressiveness of the measured			Russian Federation

					impurities and operational modes.			
205	7.4	See our comment No. 11 above, regarding the use of the term "**graded limit values"** and our suggestions there.	Clarity			X	See previous comments	Israel
206	7.5.	The measurements should be used to detect trends in the chosen parameters, to discover and eliminate undesirable effects and minimize consequences of ~~out-of-range~~ deviations in chemistry parameters. The chemistry …..and when systems are taken out of operation for ~~prolonged~~ long periods.	Clarification. Can it be that different terms, equivalent to "out-of range" have been used before? We suggest to use the same wording all over the document.	X				Germany
207	7.10.	Paragraph 7.16 of SSR-2/2 (Rev. 1) [1] states that: "Laboratory monitoring shall ~~provide~~ involve the sampling and analysis of plant systems for specific chemical parameters, concentrations of dissolved and suspended impurities, and radionuclide concentrations".	Please check the quotation.	X				Germany
207	7.11	This paragraph addresses nine requirements from on-line and laboratory analyses **procedures**. We suggest to add to that list the following requirements: (i) Appropriate documentation (and	Completeness			X	Suggested additional 4 requirements are already discussed in the document	Israel

		history of revisions) of the procedure (ii) Qualification required to perform the procedure (iii) Environmental conditions to perform the procedure, such as temperature and relative humidity. (iv) Daily (or periodic) verification/calibration before performing the procedure.						
208	7.11(c)	We suggest to add the word **applicable** before the words *information on the methods* in sub-paragraph (c). For example, not all analyses procedures need accuracy e.g.when chemical identification is needed without quantification. In addition, please consider adding **limit of detection and limit of quantification** to the factors listed in this sub-paragraph.	completeness	X	Provide a summary of relevant information on… (j) Provide limit of detection and limit of quantification			Israel
209	7.11 (c)	Provide a summary of information on the methods used, indicating the accuracy, linearity and range of the methods, possible matrix interferences ~~between different methods~~ and the precision of the measurements	Interferences are due to matrix effects for a given method.	X	, linearity and range of the methods, possible ~~matrix~~ interferences ~~between different methods~~ and the…			ENISS

210	7.11 (f)	Regarding the quality control requirements mentioned in sub-paragraph (f), we suggest to mention specifically **verification/calibration** of the instruments used in the analyses	Completeness			X	Covered in (h)	Israel
211	7.13.	A calibration and maintenance programme should be established and applied to all on-line and laboratory monitoring instruments. The responsibilities for calibration and maintenance should be clearly defined. ~~Calibration should be performed at regular intervals and the frequency should be decided on the basis of equipment manufacturers' specifications, plant experience or as result of the control charts.~~	Please consider merging / optimisation of paras 7.13- 7.15 because the content is very similar and not rather logical. We made a suggestion.	X				Germany
212	7.14.	Calibration strategies should be chosen in such a way that the range of the calibration points includes the values that are expected to be measured and the calibration points are as close as possible to the expected measurement value. ~~The calibration should be checked regularly with a control solution (control standard).~~		X				Germany
213	7.15.	<u>Calibration should be performed at regular intervals and the frequency should be decided on the basis of equipment manufacturers'</u>		X				Germany

		specifications, plant experience or as result of the control charts. The calibration should be checked regularly with a control solution (control standard). ~~Depending on the analytical method applied, calibration control measurements should be performed before and after each analytical run~~. The concentration of the control solution should be close to the expected value. These results should be graphically displayed in control charts with appropriate control and warning limits. Depending on the analytical method applied, calibration control measurements should be performed before and after each analytical run.						
214	7.19.	The activity of fission products should be measured to: (1) confirm the fuel integrity, (2) identify fuel cladding leaks and (3) get an estimation of severity of the leaks. The following should be taken into consideration for the conduct of these ~~measurements~~ tasks:	Clarification	X	Task is OK	X	Numbering does not improve clarity	Germany
215	7.19 (f)	To be able to detect potential fuel leaks, the radioactivity of the primary circuit ~~of a pressurized water reactor~~ should be monitored using fixed on-line analyzers.	Why is this limited to pressurized water reactors? Please verify.	X				Germany

		Otherwise, an adequate frequency for grab sampling should be defined.						
216	7.19 (f)	Use of fixed on-line analyzers ***or otherwise*** *an adequate frequency for grab sampling in the primary circuit of pressurized water reactors* are addressed for detecting potential fuel leaks. We suggest to consider performing (representative) grab sampling, even if on-line analyzers are used	Completeness			X	If online measurements are working reliably, there is no need to take grab samples for identification fuel integrity.	Israel
217	7.21	Such measurements should ~~can~~ be carried out at different sampling points ~~(e.g. upstream and downstream from the steam generators).~~	Excessive requirement	X				Russian Federation
218	7.22	~~Measurements of other activated species (eg; radioisotopes of argon, tungsten, sodium, potassium^ chlorine) should be performed to verify or cross check the results of chemical analyses and to provide early warning of low concentrations of potential foreign material ingress.~~	It is recommended to delete para 7.22 to avoid conflict between two measurement methods (radiochemistry and chemistry) which are metrologically incomparable.			X	But words verify or deleted from the original text.	Russian Federation
219	7.28	Methods that rely on radiochemical separation and properly calibrated instruments should also be applied to monitor releases of tritium and ^{14}C ~~speciation~~ as these are particularly	14C needs to be overall monitored but speciation is difficult to achieve. Plant can monitor 14C releases but not as precisely as	X	Methods that rely on radiochemical separation should be applied in monitoring releases of tritium and 14C as these are			ENISS

		low energy beta emitters, especially in their gaseous form.	to determine 14C speciation. Specific technical procedures are needed to perform 14C speciation which are difficult to apply in plants.		particularly low energy beta emitters.			
220	7.28	Rephrasing of the text in paragraph 7.28 could clarify whether in the present form it can be understood that tritium and C-14 are particularly low energy beta emitters especially in their gaseous form? (Are they **low energy beta emitters** because they are in **gaseous form**?).	Clarity	X	Methods that rely on radiochemical separation should be applied in monitoring releases of tritium and 14C as these are particularly low energy beta emitters.			Israel
221	7.28	…..be applied to monitor releases of tritium and 14C speciation, as applicable, as these are particularly low energy beta emitters,…..	In BWR, estimated tritium is very low and source of generation is also low and hence not applicable for BWR.	X	Methods that rely on radiochemical separation should be applied in monitoring releases of tritium and 14C as these are particularly low energy beta emitters.			India
222	7.30	We suggest to address **securing** laboratories separately from **supplies and equipment**.	Clarity			X	These are separate things	Israel
223	7.31.	Redundancy of laboratory analysis on site or in other location or organization for most important parameters should be provided to ensure that analytical services can be provided at all times, including	Please put in line with IAEA Glossary	OK				Germany

		design basis accidents and ~~beyond~~ design <u>extension</u> ~~basis accident~~ conditions.						
224	7.31	…..most important parameters should be provided to ensure that analytical services can be provided at all times, including design basis and design extension conditions.	Beyond design basis accident terminology may be changed with updated terminology i.e. design extension conditions.	OK				Pakistan
225	7.31	……location or organization for <u>the</u> most important parameters should be provided…….	Improve quality and clarity of language. Incomplete sentence - “the” missing.	X				England
226	7.31	Redundancy of laboratory analysis on site or in other location or organization for most important parameters should be provided to ensure that analytical services can be provided at all times, including ~~design basis accidents and beyond design basis~~ accident conditions.	“beyond design basis accidents” do not exist anymore in the context of SSR-2/1 (Rev.1) and SSR-2/2 (Rev.1).	X	… including design basis accidents and during design extension conditions.		SSR2/1 Rev. 1 contains these terms and SSR2/2 Rev.1 cover these periods	Saudi Arabia
227	7.37	Instrumentation manuals, well-maintained logbooks and calibration <u>and control</u> records should be made available in the laboratory.	Controls also need to be recorded.	X				ENISS
228	7.39	If the instrument performance shows significant deviation from the expected values, an investigation should be performed to determine the cause of the deviation. Repair <u>and</u>/or recalibration of an analytical instrument should be done, as	If repair is needed, then the instrument will have to be recalibrated.	X	If the instrument performance shows significant irregularities, an investigation should be performed to determine the cause and to identify suitable			ENISS

		appropriate, to restore the necessary accuracy.			actions to restore measurements with appropriate quality.			
229	7.39.	If the instrument performance shows significant irregularities ~~deviation from the expected values~~, an investigation should be performed to determine the cause of them ~~the deviation~~. Repair or recalibration of an analytical instrument should be done, as appropriate, to restore the necessary accuracy	To our understanding the term "deviation from the expected values" is used in this Safety Guide as an indicator for changes in plan itself, as deviation in control parameters (see paras 4.4 g, 5.5 etc). In this para is about the functionality of instrument performance and its accuracy, we would like to suggest another wording, "irregularity" for example. Please verify.	X	If the instrument performance shows significant irregularities, an investigation should be performed to determine the cause and to identify suitable actions to restore measurements with appropriate quality.			Germany
230	7.39	It is suggested to replace *necessary* ***accuracy*** with: necessary **quality control parameter**. Analytical instrument deviation can be caused by additional factors, (for example by its repeatability), and not only by its accuracy. The need for proper documentation of instruments repairs and calibrations has to		X	If the instrument performance shows significant irregularities, an investigation should be performed to determine the cause and to identify suitable actions to restore measurements with appropriate quality.			Israel

		be mentioned in conjunction with this paragraph. This can enable later "reconstruction"/ investigation of irregular results/events.						
231	Section 7	Before para. 7.40, it is suggested to add a paragraph with the following text: "Measures should be provided for the preparation and verification of the means used for sampling, as well as sampling methods containing clear instructions for personnel, in order to avoid distortion of the results of chemical and radiochemical measurements."	One of the most important sampling requirements.			X	7.40 &7.41 cover already the suggested topics, no need for change	Russian Federation
232	7.40	We suggest to add to this paragraph the important subject of **traceability of the samples.**				X	Included already in the statement to have written procedure	Israel
233	8.10	Please consider either combining 8.3 and 8.10 or move one of them closer to the other one.	Para 8.10 has almost the same meaning as para. 8.3 with more detail.	X	Move 8.10 after 8.3			Saudi Arabia
234	8.2.	The data relating to chemistry should be suitably archived, … and the quality assurance programme ~~expectations~~ requirements.	Clarification	X				Germany
235	8.3	To identify actual and potential deviations in chemistry parameters, assessment of **any**	To specify in which cases such assessment should be performed, in order to avoid increased			X	8.3. already states:…assessment of chemistry data should be performed promptly	Russian Federation

		suspicious chemistry data should be performed promptly after the data have been recorded.	workload related to unnecessary assessments				after the data have been recorded. This covers suspicious chemistry data	
236	9.8	The subject presented in this paragraph can be further emphasized by referring to procedures of purchasing chemicals only from certified suppliers.	Completeness			X	To buy a product from the certified/audited supplier does not automatically mean that the product meets the set requirements (it should, but..)	Israel
237	9.11.	The contents of the smaller container … substances should be disposed ~~of~~ in accordance with plant procedures.	Wording			X	The text has been reviewed by IAEA editors. This is correct. No change	Germany
238	9.12	Replacement of harmful chemicals and substances and operational chemicals and substances has to be done with appropriate change control procedure, including full risk assessment.				X	Covert in 9.4	Israel
239	9.12.	The number of new chemicals and substances in the plant should be minimized. However, <u>the</u> replacement of harmful chemicals or other substances (from the point of view of personnel safety, environmental protection and material compatibility) by harmless ones should be encouraged.	Typo.	X				Japan

240	9.12	However, the replacement of harmful chemicals or other substances	Improve quality and clarity of language. "t" missing.	X				England
241	9.12/1	However, the replacement..	The word "he" is a typographical error	X				Nigeria
242	9.12/1	…minimized. However, ~~he~~ the	editorial	X				Saudi Arabia
243	9.16.	Chemicals should be stored in an appropriate cabinet which ~~is, for example,~~ should be fire protected and captures spillages and a safety shower should be in place in accordance with plant documentation.	Clarification			X	Not all chemicals need to be fire protected.	Germany
244	Page 39	~~Annex~~ Appendix	We suggest to transfer "annex" into "appendix" because of the importance of the issues, this part of document is dealing with. According to SPESS A, page 119 "An appendix, if included, is considered to form an integral part of the safety standard. Material in an appendix has the same status as the main text… Annexes and footnotes are not integral parts of the main text."			X	As Annex, more flexibility in organising related activities is enabled in MS.	Germany

245	References	References [7], [9] and [10] are marked as *(in press*). Of course, this status will be followed and updated when changed, during the next steps in preparing this Guide.		X				Israel
246		Comment/observation	Scope and completeness. In the UK, where the legal requirement to reduce risks to ALARP exists, we expect dutyholders to recognise the chemistry regime is often a delicate balancing between parameters which can often conflict. For example – injecting zinc into the primary circuit is good for dose, but potentially bad for fuel and fuel deposits, if not appropriately controlled. We therefore expect a justification to be provided of how these conflicts between parameters have been considered and why, overall, the chemistry selected has been optimised and there has been a "balancing" of parameters.			X	Good idea but too country specific and would not be accepted by all MS.	England

			Should the guide say something about this? Is this an expectation of other Member States?					
247	Annex	Comment/observation	Scope and completeness The annex on preservation of SSCs presents a large volume of very detailed information on a narrow topic. It is not immediately clear why the document has been structured in this way. It would be useful if the document could explain at the beginning why a lot of information has been presented on preservation. For example – is this seen as a particular problem, or is this something Member States requested?	X	X	X	In many MS commission phases have been much longer than originally planned and therefore preservation of SSCs has become an important topic. Similarly in some MS unit have been shutdown for long period of time due to Fukushima accident. IAEA considered that there is need in MS to give some kind of basic guidance how to address this topic. Hence the Annex.	England
248	~~A-4.~~ A-1	The scope of this ~~annex~~ Appendix is to provide information based on best international ……. repairs or replacement programmes.	We suggest to remove this para to the begin of the Annex / Appendix	X				Germany
249	Table A-2	The simplified example of preservation documentation presented in Table A-2 of the Annex, presents **target values** for the various parameters listed in five columns of the table. In one	Completeless			X	It is not possible to define some one target value. In addition, other target values in the table are also just examples. These values can be	Israel

		additional column referring to **Total iron** (mg/kg), no target value is presented.					different in real NPPs. The table is only a simplified example .	
250	A-5 Line 6	…. The measures taken have to take into account the industrial and radiation safety of the ~~operational~~ operating organization and limit both the amount of liquid and solid wastes generated, and the amount of chemicals discharged to the environment	Please put in line with IAEA Glossary	X				Germany
251	A-10/ 1	At room temperature general corrosion usually appears on susceptible metal surfaces and is spread over the entire system which is in contact with water or air with high humidity. However, if conditions are suitable, different types of localized corrosion can also occur.	Minor The text is understandably vague to cover a wide number of scenarios but would propose the addition of the word susceptible as for more corrosion resistant metals you would not usually expect to see general corrosion.	X				England EdF
252	A-12	If the components are made of high alloyed steels, like austenitic stainless steels, typically no specific preservation actions are needed. If the layup period is extensively long, ……. when dry preservation is not feasible, wet alkaline perservation is selected in most cases, particularly if the ~~lauoup~~ layup time is longer.	Typo	X				ENISS
253	A-12/ 1	like austenitic stainless steels with a high Pitting resistance number (PREN)	Minor - Suggest the addition of a reference to PREN numbers as	X	The components are made of high alloyed steels, like most of the			England EdF

			there are some grades of stainless steel (maybe 304L) that although more corrosion resistant than carbon steels you would still want to preserve in an outage to avoid degradation.		austenitic stainless steels,….			
254	A-12/5	…, particularly if the layeup time is longer	"layup" is incorrect	X				Nigeria
255	A-12/7	Venting, fill and drain approaches	"and" should be removed after "venting"	X				Nigeria
256	A-14(b)/9	… need to be implemented	"be" was omitted	X				Nigeria
257	A-14 c	Maintaining systems and equipment in the same conditions after shutdown. To be considered when outage duration is short enough and materials are not susceptible to corrosion in those particular conditions. This is the best layup practice for closed cooling water systems if no maintenance work is planned inside the concerned equipment.	Editorial, proposed text may not be the only way to write it but its currently quite a long sentence. In line 3 change of 'to' to 'is'	X				England EdF
258	A-14(c)/3	This is the best layup practice	"This to be the best layup practise" is incorrect	X	The most practical layup…			Nigeria
259	A-16	When starting up the plant after a long layup, the highest capacity ….the length of the planned ~~layout~~ layup and the kind of preservation method that is to be considered.	Editorial change	X				ENISS
260	A-29	Desiccants (i.e. substances able to adsorb water) have to be carefully used to reduce the risk of	Minor, you may feel the current text goes far enough with	X				England EdF

		introducing impurities or foreign materials into the systems and the equipment. Consideration should also be given to the material compatibility of the desiccant (or desiccant bag) with metal surfaces..	introducing impurities so feel free to discount. However there may also be a risk of desiccant/ desiccant bags containing halogens which could then be leached onto the surface of mental internals causing pitting or accelerated general corrosion.					
261	A-30 (g) (i)	Checking and analyzing the trend in the overpressure (using a manometer) (e.g. once per day and after a steady state is reached, once per week);	Editorial change to be consistent with the other items	X				ENISS
262	A-30 (h)	If vacuum is used to decrease humidity, checking and analyzing the trend in the under-pressure (using a manometer) (e.g. once per day and after a steady state is reached, once per week).	Editorial change to be consistent with the other items Police character seems different in the first part of the sentence compared to the remaining text.	X				ENISS
263	A-31	(a) Wet layup without any changes to the water chemistry ….. storage tanks and the primary side of the steam generators. (b) ~~For example, the~~ The secondary side of the steam generators is in most cases preserved using …..	The second sentence is not an example to the first sentence. The first sentence deals with primary systems and primary side of the steam generators. The second sentence deals with the secondary side of the steam generators,	X	Editorial ones			ENISS

			usually requiring different preservation than the primary side. Editorial changes are proposed for a better understanding.					
264	A-38 f) and g)	f) Checking and analyzing the trend in the concentration of relevant corrosion products (e.g. ion, suspended solids) (e.g. once per day and later on after a steady state is reached once per week) ; g) Checking and analyzing the trend in over-pressure (using a monometer) if the system is under inert gas~~,~~ (e.g. once per day and~~,~~ later on after a steady state is reached once per week).	Editorial change to be consistent with the other items	X				ENISS
265	A-39 d), e), f), G)	d) Checking that the system is filled up to the specified level (e.g. once per day and after a steady state is reached, once per week); e) Checking and analyzing the trend in over-pressure (using a manometer) when the system is under inert gas~~,~~ (e.g. once per day and after a steady state is reached, once per week); f) Checking and analyzing the trend in the quality of the preservation medium, for example, checking the pH and/or the concentration of additives, corrosion inducing ions (e.g.	Editorial change to be consistent with the other items	X				ENISS

		fluoride, chloride, sulphate) and measuring the oxygen concentration (e.g. once per day and after a steady state is reached once per week); g) Checking and analyzing the trend in the concentration of relevant corrosion products (e.g. iron, suspended solids) (e.g. once per day and after a steady state is reached check once per week).						