

TITLE: DS525 “Chemistry Program for Water Cooled Nuclear Power Plants”
Revision of IAEA Safety Standards Series No. SSG-13, Chemistry Program for Water Cooled Nuclear Power Plants.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: U.S. Nuclear Regulatory Commission							
Country/Organization: U.S. Nuclear Regulatory Commission				Date 06/02/2020			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	Section 3 and Link to Section 7	<p>DS525 indicated that “significant amount of additional operating experience in Member States has been gained, and the nuclear industry has identified new challenges in the plant chemistry area. Particularly, the IAEA review missions OSART (Operational Safety Review Team) continue to identify areas where operational safety performance at a nuclear power plants needs to be improved in accordance with IAEA safety standards. Therefore, it is necessary to revise the Safety Guide so that it reflects the current understanding of the expectations set for chemistry and radiochemistry programs. However, the structure of the revised guide as listed in Section 7; did not list section(s) to address these gaps, and lessons learned. Therefore, We suggest the structure of the proposed DS525 includes a Section on</p>	<p>Completeness to include important a Section on “Gaps and Lessons Learned.”</p>			Rejected	<p>The Lessons learned and Gaps identified in Chemistry programs will be used to modify the existing should statements to be more precise or to add new should statements to help Member States (MS) in improving their chemistry programmes.</p>

1.	General	<p>There should be a discussion on whether the document should apply to research reactors and should consider applicability to emerging technologies.</p> <p>The same principles apply to non-water cooled reactors.</p>		Accepted			Rejected	<p>This is a revision of SSG-13 and it addresses only water chemistry in water cooled NPPs. To include research reactors and e.g. sodium cooled reactors as well as technologies to be used in SMRs would totally change the scope of the SSG-13. However, in certain MS there is a need huge need for Safety Guide on a non-water cooled reactors.</p>
2.	Section 3, bullet 1	<p>“Address new practices and technologies in the preservation of plant systems during extended outages, delayed construction programmes or modernisation projects for long term operation”</p> <p>Comment: Suggest including the term "refurbishment" since the Canadian CANDUs are undergoing refurbishment (for long term operation/life extension) or mid-life retubing of Calandria and Pressure tubes.</p>		Accepted	Accepted			

3.	Section 3, bullet 2	<p><i>“Revise the guidance related to the quality control of chemistry parameter measurements and data”</i></p> <p>Comment: Does this mean revisions to guidance in section 7, MANAGEMENT OF CHEMISTRY DATA of the current revision or section 9, QUALITY CONTROL OF CHEMICALS AND OTHER SUBSTANCES ?</p>		Accepted	Accepted			Section 7 will provide more details on quality control of chemistry parameter measurements and data.
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4.	Section 3, bullet 3	<p><i>“Include guidance to validate software tools used in chemistry and radiochemistry laboratories...”</i></p> <p>Comment: According to IAEA Technical Report 384 definition of Validation is "the testing and evaluation of the integrated computer system (hardware and software) to ensure compliance with the functional, performance and interface requirements". Definition of Verification is "The process of determining whether or not the product of each phase of the digital computer system development process fulfils all the requirements imposed by the previous phase". In the current revision clause 6.4. Software for calculations of chemistry processes important to safety should be verified and validated by a third party or another appropriate independent organization or experts before use. [NS-G-1.1]. The example given are pH[T] at operating temperature calculation software and tube to tube sheet crevice chemistry calculation software. Is the intent of proposed revision to the guidance to include non-safety related software used in the laboratory or simulations.</p>		Accepted	Accepted	Bullet point deleted.		As correctly stated in Safety Guide level documents only guidance should be given to safety related software.
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5.	Section 3, bullet 5	<p><i>“Balance the current details of chemistry programmes given for various types of water cooled NPPs”</i></p> <p>Comment: It is not clear what does "balance the current details" means. The current SSG-13 provides separate guidance in Section 4 Chemistry Control for BWR, PWR, RBMK and heavy water reactors. Would the new revision have separate sections for other areas such as radiation exposure optimization, surveillance, management of data, etc.?</p>		Accepted	<ul style="list-style-type: none"> •To update the water chemistry requirements in all relevant technologies within the scope of the document. Some significant improvements have been introduced and applied in the area of NPP chemistry since the publication of the current version of the SSG-13. 	Balance is actually not a correct word. The intent was not originally correctly expressed
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COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Page 1 of 1 Country/Organization: Republic of Korea / Korea Institute of Nuclear Safety (KINS) Date: 07/05/2020							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	3. JUSTIFICATION FOR THE REVISION OF THE DOCUMENT / Lines 8~10	... to update the existing Specific Safety Guide on the chemistry programme for water cooled NPPs. Therefore, it is necessary to revise the Specific Safety Guide so that ...	Clarification	Accepted			
2	3. JUSTIFICATION FOR THE REVISION OF THE DOCUMENT / Lines 16, 22~23	· Revise the guidance related to the quality control of chemistry parameter measurements for measurement of chemistry parameters and data; ... Update the current guidance for post-accident sampling systems and necessary chemistry measurements measurement of chemistry parameters;	Consistency with the word organization 'measurement of chemistry parameters', as used in SSG-14	Accepted			
3	7. OVERVIEW / Line 1	The structure of the revised Specific Safety Guide will remain essentially unchanged.	Clarification	Accepted			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: ENISS		Page 1 of 3					
Country/Organization: ENISS		Date: 25.05.2020					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	5. Scope	This revised Specific Safety Guide will give Member States updated recommendations and guidance for water chemistry programmes needed to ensure that SSCs important to safety, as well as those SSCs that may have an impact on safety related SSCs, will fulfil their intended functions throughout the original design life time and a potential life extension period. <u>ensuring safe operation and their long-term integrity.</u>	To be in accordance with SSR-2/1, Req. 29; Para 7.13. A potential life extension period is welcomed, but not finally known in the time of the original design. Therefore, the concerned time should independent.			Rejected	SSR2/1 nor SSR-2/1 (Rev.1) have this paragraph in Req.29. As stated, IAEA Safety Guide for Design does not address long term operation (LTO). However, water chemistry of NPPs need to take this into consideration and therefore before entering the LTO the NPP needs to evaluate the applicability of the existing water chemistry programme and make necessary modifications if needed. This is a specific requirement in SSG-48

2.	5. Scope	The revised guide will cover all areas important to the chemistry programme of water cooled NPPs during <u>construction</u> , commissioning, operation and preparation for decommissioning.	The construction period should be covered because of their significance for the later operation period.	Accepted			
3.	6. Place in the overall structure	<ul style="list-style-type: none"> • Conduct of Operation (DS497, Revision of NS-G-2.4 • Recruitment, Qualification and Training (DS497, Revision of NS-G-2.8) • The Operating Organisation (DS497 NS-G-2.14) 	The following IAEA documents should be referenced, due to the related content in: NS-G-2.4: Req. 29 NS-G-2.8: see para 3.28, 4.26, 5.27. NS-G-2.14 (section Control of Plant Chemistry)	Accepted			
4.	3. JUSTIFICATION FOR THE REVISION OF THE DOCUMENT	<ul style="list-style-type: none"> • Update the current guidance for post-accident sampling systems and necessary chemistry measurements; 	SSG-13 includes in the paras 6.43 and 6.44 information about a POST-ACCIDENT SAMPLING SYSTEM (PASS). Although this is an information related to chemistry the PASS is also strongly focused on radiological sampling and data.		<ul style="list-style-type: none"> •Update the current guidance on accident and post-accident sampling systems and to recommend if possible which chemistry parameters to be followed and 		NPT-T-3.16 gives rather limited information of water chemistry measurements. SSG-13 needs to give guidance what chemistry measurements are needed during the accidents and post-

			<p>There is an IAEA SERIES PUBLICATIONS No. NP-T-3.16 document ACCIDENT MONITORING SYSTEMS FOR NUCLEAR POWER PLANTS which gives some more information, but this is no Safety guide.</p> <p>ENISS propose to delete the information to the PASS in DS525 and to address it in other guides e.g. GS-G-2.1 <i>Arrangements for Preparedness for a Nuclear or Radiological Emergency</i>, to dissociate the chemistry operating program under normal conditions from those under incidental/accidental ones).</p>		<p>chemistry actions to be taken during accident and post-accident conditions.</p>		<p>accident situations, if any. The experts have to evaluate carefully what measurements are really needed and which ones not at all during those conditions. During the document revision decision will be made in which chapters this topic is going to be addressed.</p>
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COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: WNA/CORDEL Page.11.of. x							
Country/Organization: WNA/CORDEL				Date: 30/04/2020			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	Section 5	<p>Add a sentence :</p> <p>During construction and commissioning, components and systems are installed in a progressive manner, before ownership and responsibility are transferred to the operating organization. Recommendations will be provided to ensure that necessary provisions for the chemistry programme are implemented during such phases to maintain SSCs in proper conditions until the plant is fully operational.</p> <p>...</p>	<p>Requirement 29 of SSR-2/2 rev.1 only addresses the operating organization. However, the chemistry programme needs to be progressively implemented during construction and commissioning, even before the operating organization takes ownership and responsibility. This aspect is neither covered in current SSG-13 not in SSG-28. Either recommendations are provided in the revision of SSG-13 or in an upcoming revision of SSG-28 or in both, avoiding, while duplication but making sure that the necessary interfaces and transitions are identified and treated. A specific section should be added in the table of</p>		<p>Accepted:</p> <p>During construction and commissioning periods, structures systems and components (SSC) are installed in a progressive manner. The updated Specific Safety Guide will give guidance to ensure that applied water chemistry programme maintain SSCs in proper conditions until the plant is fully operational.</p>		<p>Suggested sentence was too long to be added to the list of proposed changes. During the revision, IAEA will decide where to place this guidance.</p>

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: WNA/CORDEL Page.11.of. x							
Country/Organization: WNA/CORDEL				Date: 30/04/2020			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			content (section 7 of DPP DS525)				

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Page.1.. of..5..							
Country/Organization: UK/Office for Nuclear Regulation				Date: May 2020			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	Section 2, Page 1	Change to: “In addition, a properly implemented programme results in reduced radiation doses to plant personnel, reduces the generation of solid radioactive waste and helps keep radioactive discharges to the environment within the authorized limits established by the regulatory body.	Management of plant chemistry is also important in minimising solid wastes as well as discharges to the environment.	Accepted			
2	Section 3 Page 2	Add a bullet point as follows: <ul style="list-style-type: none"> Add guidance on chemistry considerations in design of water cooled NPPs. 	The existing standard says little on chemistry considerations for design and there is little in this DPP to suggest that this will be addressed in the revised version. However, the DPP			Rejected	The links to the other IAEA Safety Guides is given for a reason. To avoid duplication within different standards. The vendor defines the design and

			<p>includes NS-G-1.9 (Design of the Reactor Coolant System and Associated Systems for Nuclear Power Plants) as well as other design standards as interface documents. To quote from Section 3.3. of NS-G-1.9; “Other objectives of the RCSASs include reactivity control, chemical control of the reactor coolant and the removal of heat from other safety systems.” Clearly, the intent for reactor chemistry during operation must be considered at the design stage, including the capacity of the plant systems to respond to excursions etc. This should therefore be reflected in the DPP and hence the revised document.</p>				<p>applicable water chemistry boundary conditions. The licensee needs to have vendors approval if the original water chemistry conditions are to be modified significantly. The purpose of SSG13 is to give in fairly general level recommendations for water chemistry without going into the details connected to design as such. Even the current version mentions the importance of design phase in terms of water chemistry.</p>
3	Section 3 Page 2	Amend the 2nd bullet point to read: Revise the guidance related to the quality control of chemistry parameter measurements and data, to include the desirability of obtaining analytical accreditation and/or quality control	The existing guidance (SSG-13) describes the need for quality control, especially in the measurement of various chemical parameters, but there is no guidance on	Accepted			

		programmes at the point of operational delivery.	the desirability or option of having accreditation from an appropriate body for quality control programmes. This would enhance the quality control provision at NPPs.				
4	Section 3 Page 2	Add a bullet point as follows: Update the structure of SSG-13 to focus on the key principles for chemistry	The current structure of SSG-13 is a mixture of high level principles, for example Section 3, and sections that contain a significant amount of technical detail. The structure of the document would be improved by separating the key chemistry principles from the technical detail, which could be successfully captured in a series of appendices.			Rejected	Personally, I support the idea. However, this was already tried during the previous update and too many MS did not want to have that detailed requirements. The situation has not changed significantly since then.

5	Section 3 Page 2	Add a bullet point as follows: Update SSG-13 to clearly identify and delineate between factors that are important for safety, and those that are important for other reasons	The extant SSG-13 guidance does not provide any commentary on whether the factors identified are important for safety, or for another reason, such as plant lifetime. As a Safety System Guide, SSG-13 should be clear in the identification of factors that are requirements for the safe operation of the plant.	Accepted	•To identify more clearly what chemistry parameters are important to safety and which parameters for other reasons such as long term operation.		This is important point and clear identification of chemistry factors affecting safety would be useful also during the IAEA review missions and would reflect the international approach of having control and diagnostic parameters
6	Section 3 Page 2	Add a bullet point as follows: Update the guidance to provide an explanation of the concept of balancing detriments and benefits.	The adoption of an appropriate chemistry programme at NPPs requires the balancing of detriments and benefits, in order to provide the optimal solution. This concept is not currently explored within the guidance, but its inclusion would help to explain how such an important process should be conducted.			Rejected	This would be do detailed guidance for the Safety Guide. Such guidance could be given in TecDoc level or Safety Series level documents.

7	Section 4, Page 2	Change to: The updated document will provide recommendations which mitigate degradation of SSCs, improve quality control of chemistry laboratory activities, reduce the generation of radioactive waste and contribute to maintaining radiation doses as low as reasonably achievable.	As above	Accepted			
8	Section 5 Page 2, 3 rd paragraph	This paragraph should be amended to state that up-to-date and detailed technical advice is included in the scope or give a reference to where this information can be found.	<p>The existing document (SSG-13) states that it does not provide detailed technical advice as this can be found in references such as Safety Aspects of Water Chemistry in Light Water Reactors, IAEA-TECDOC-489, IAEA, Vienna (1989). However TECDOC-489 document is extremely dated and not available electronically. Are there up to date references with a sufficient level of technical information that can be supplied or does TECDOC-489 also need revision?</p> <p>Note as an example of how DS514 uses an Annex to reference out to international standards.</p>			Rejected	I am not aware of such up-to-date TecDoc in the area of NPP water chemistry. In addition to this, similar needs are for e.g. sodium cooled reactors and other reactors which are not water cooled.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Page 1 of 1 Country/Organization: Republic of South Africa / National Nuclear Regulator Date: 26/05/2020							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	2. BACKGROUND / Line 6with water cooled reactors, and it gives guidance how the water chemistry programme should be planned and implemented to ensure the safe operation of a nuclear power plant.....	It is not just water parameters that are being monitored, Auxiliary systems that contain oils, diesels etc...	Accepted			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Japan NUSSC Member Pages:3 Country/Organization: Nuclear Regulation Authority (NRA) Date: 27 May, 2020							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	3. Justification for the Revision of the Document General	Clarify the justification of revision of SSG-13 with some examples. If there are significant events/experiences except for the Fukushima-Daiichi NPP accident, should be specify as the justification here.	There are no clear description for the revision of SSG-13 in this DPP. SSG-13 was published in 2011 taking into account SSR-2/2 (2011) in advance, and there are no major changes in SSR-2/2 (Rev. 2) (2016) from the	Accepted	Text added to Justification: In addition, role of chemistry during the accident and post-accident situations should be updated based on the lessons		The changes in SSR2/2 are minor and do not support the revision. However, purpose of the SSG-13 is to give more detailed guidance how MS should implement proper water chemistry

COMMENTS BY REVIEWER Reviewer: Japan NUSSC Member Pages:3 Country/Organization: Nuclear Regulation Authority (NRA) Date: 27 May, 2020			RESOLUTION				
			viewpoint of water chemistry.		learned from the Fukushima-Daiichi NPP accident.		programs. Since 2011 new practices and technologies have been adapted with sufficient operating experience.
2.	5. Scope	This revised Specific Safety Guide will give Member States updated recommendations and guidance for water chemistry programmes needed to ensure that SSCs important to safety, as well as those SSCs that may have an impact on safety related SSCs, <u>in particular fuel cladding</u> , will fulfil their intended functions throughout the original design life time and a potential life extension period.	Water chemistry condition for fuel cladding is essential for the integrity as stated in SSG-52 and DS497d. Should be specified in the scope.			Rejected	It is not necessary to mention here the fuel cladding, because integrity of the fuel cladding has been always the basis of designing the existing water chemistry programs and continues to be so. The chemistry cannot be changed without “approval” of the fuel vendor.

COMMENTS BY REVIEWER Reviewer: Japan NUSSC Member Pages:3 Country/Organization: Nuclear Regulation Authority (NRA) Date: 27 May, 2020			RESOLUTION			
3.	5. Scope /5-6	The revised guide will cover all areas important to the chemistry programme of water cooled NPPs during commissioning, operation (<u>including start-up and shutdown, and regular and extended outages</u>), <u>accident (including severe accident)</u> and preparation for decommissioning. <u>It should address quality guidance of water being injected into the reactor and containment vessel for damaged fuels and debris cooling in case of a severe accident.</u>	<ol style="list-style-type: none"> 1) Recommend to clarify the scope of "operation" in this guide. Start-up and the shutdown modes would be essential for transient of water chemistry. 2) Accident conditions should be addressed in this guide clearly. There are some descriptions in chapter 3 and 4 as only post-accident sampling system, but chemistry programmes during accident especially in severe accident is crucial point for reducing disposal of radioactive material and it should be addressed in line with SSG-53. 3) There are lessons learnt from during the accident response at Fukushima Daiichi 	Accepted	In chapter 3: •Update the current 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 post-accident conditions.	There is no need to change the scope to have more details than already given, because all of those topics will be addressed in the coming SSG-13. The accident and post-accident chemistry actions will be the part of current SSG-13 which is going to change most significantly.

COMMENTS BY REVIEWER Reviewer: Japan NUSSC Member Pages:3 Country/Organization: Nuclear Regulation Authority (NRA) Date: 27 May, 2020			RESOLUTION				
			nuclear power station.				
4.	6.Place in the Overall Structure of the Relevant Series and Interfaces with Existing and/or Planned Publications	<p>Modify and Add the following references;</p> <ul style="list-style-type: none"> ▪ <u>Design of the Reactor Coolant System and Associated Systems for Nuclear Power Plants, No. SSG-56, IAEA Vienna (2020) (DS481, revision of NS-G-1.9);</u> ▪ <u>Design of Reactor Core for Nuclear Power Plants, No. SSG-52, IAEA Vienna (2019)</u> ▪ <u>Design of the Reactor Containment and Associated Systems for Nuclear Power Plants No. SSG-53, IAEA Vienna (2019)</u> ▪ <u>Core management and fuel handling for NPPs, revision of NS-G-2.5 (DS497d)</u> 	These IAEA guides are important for water chemistry.			Rejected	Significant amount of IAEA Safety Guides has some kind of link/interface with the water chemistry. In the DPP it does not give added value to mention all of them. I looked SSG-53 and it does not have anything related to sampling or water chemistry.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Japan NUSSC Member Pages:3 Country/Organization: Nuclear Regulation Authority (NRA) Date: 27 May, 2020							
5.	7. Overview	Add this before the last sentence; <u>The common issues should be stated in the main body and specific issues dependent on reactor type should be states in the footnotes or annex.</u>	Water chemistry area strongly depends on reactor types and there are some specific description for each reactor type in SSG-13.			Rejected	This was tried in the previous exercise. All MS do not accept having too detailed specific guidance even though it would be useful. In current structure it is sufficiently efficient to address the most important water chemistry topics in various reactor types.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer:				Page.... of....			
Country/Organization: France				Date:			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection

1	INTERFACES WITH EXISTING AND/OR PLANNED PUBLICATIONS	Add the following publication (the draft document is currently under revision) : IAEA- NUCLEAR ENERGY SERIES No. NP-T-X.XX Decontamination approaches during outage in nuclear power plants – Experiences and lessons learned	The decontamination program is complementary to the chemical program, in order to reduce the “source term” of the plant and reduce the occupational radiation exposures of workers Paragraph 5.22 of SSG-13 mentions chemical decontaminations and should refer to this draft document			Rejected	Interface list in DPP is for IAEA Safety Standards. The suggested document will be in the list of supporting documents in the next SSG-13. And its content will be used in the revision of SSG-13 when applicable.
2	2.20 Interface control	Add a paragraph : Proper interface arrangements should be established between the chemistry group and the group in charge of the radiological risk prevention to ensure that the activities, in particular the effluent sampling activities are carried out under adequate safety conditions as well as to check the absence of impact on the radiological conditions of the room where the sampling is carried out	Taking samples can lead to the release of aerosols and rare gases in the premises			Rejected	This is too detailed in the DPP. However, the organization interfaces are and will be revised in the next version of SSG-13.
3		5. 16 : add a sentence relating to the increase of cobalt 58 following a steam generator replacement and the need to put in place adequate measures for minimizing	An increase of cobalt has been observed during several fuel cycles following a steam generator replacement on PWR			Rejected	This is too detailed in the DPP. Might also be too detailed in the SSG-13. This could be addressed if Zn injections are

		occupational exposure due to cobalt 58					addressed after system level decontaminations or large component replacements.
4		Add a paragraph relating to the impact of the duration of the purification on the reduction of the deposited activity	Take advantage of the feedback related to the impact of last RCP shutdown on primary circuit contamination in PWR			Rejected	Too detailed in the DPP. Might also be difficult to address in SSG-13 since the operability of the purification system depends on the availability of MCPs or additionally installed pumps.
5		Develop the methods and benefits of zinc injection /noble metal chemical addition on corrosion and dose rates	Take advantage of international feedback on zinc injection and noble metal chemical addition			Rejected	Too detailed in the DPP. But will be addressed in SSG-13 somehow.
6		Mention the use of gamma Camera/CZT as a tool for source-term characterisation	Take into account the development of this technology			Rejected	Too detailed in the for DDP and SSG-13.
7		Encourage licensees to present case studies				Rejected	Not within the scope.

COMMENTS BY REVIEWER Reviewer: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (with comments of GRS) Page 1 of 1 Country/Organization: Germany Date: 29.05.2020					RESOLUTION			
Rele- van- z	Comment No.	Para/Lin- e No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Reject- ed	Reason for modification/re- jection
1	1	Page 2 Ch. 3, 1 st bullet point	The proposed revision of the Specific Safety Guide will: • Address new practices and technologies in the preservation of plant systems during extended outages (<u>including long-term shutdown with intended restart</u>), delayed construction programmes or modernisation projects for long term operation <u>as well as in the post-operational phase prior to decommissioning</u> ; [...]	The aspects of post-operational phase prior to decommissioning and long-term shutdown with intended restart are of certain importance in some countries, but not explicitly addressed in current document. Our suggestion is to add both topics here.	Accepted			
1	2	Page 2 Ch. 3, 6 th bullet point	The proposed revision of the Specific Safety Guide will: [...] • Increase the level of detailed guidance for chemistry control of auxiliary systems <u>and associated systems of the reactor coolant system</u> ; [...]	Our suggestion is that enhancing the scope to all safety-related cooling circuits will give a complete image of water chemistry programmes in water-cooled NPP, such as safety relevant intermediate and service water circuits.	Accepted			

COMMENTS BY REVIEWER				RESOLUTION			
Country/ Reviewer: India		Pages: 1					
Country/Organisation : India		Date: 28.05.2020					
Comment No.	Page/Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / Rejection
1.	1/Background	A comprehensive programme minimizes the amount of aggressive ionic impurities in the water and hence mitigates degradation of plant systems, structures and components (SSCs) and reduction of solid waste generation.	Chemistry control helps in reduction of solid waste generation as well.	Accepted	The change done in the Background chapter, but in different part.		The same comment from another MS.
2.	Pg. No. 2 Addition in the bulleted list of section 3	Suggestion: Addition of following bullet in section 3 on areas to be covered in proposed revision: <ul style="list-style-type: none"> Provide guidance on chemistry programme of systems other than water chemistry like PHWR Pressure Tube Annulus Gas 	Along with water chemistry experiences shows that chemistry of these systems is also very important in safety of SSCs. Present guide SSG-13 is mainly focused about water chemistry.			Rejected	Too detailed information for DPP. However, this will be taken into consideration when the PHWR chapter of the SSG-13 is revised.

		System, Cover Gas system, transformer oil, DG oil etc.					
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COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Eneida Regina G. D. Ribeiro Page of Country/Organization: Brazil/CNEN-DRS Date: 15/MAY/2020							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	Item 3: bullets	Add a new bullet: “Incorporate guidances for chemistry monitoring related to ageing effects.”	The revised SSG-13 should also address issues related to how the chemistry programme can improve the safety of the life extension option, such as specific monitoring aspects, chemical species indicators and performance.	Accepted	•To identify more clearly what chemistry parameters are important to safety and which parameters for other reasons such as long-term operation.		SSG-48 clearly requires that before entering the LTO the NPP needs to evaluate the applicability of the existing water chemistry programme and make necessary modifications if needed. This needs to be clearly stipulated. SSG-13 needs to be aligned with this.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Helio Akira Furusawa Page of Country/Organization: Brazilian National Nuclear Energy Commission, CNEN, Nuclear and Energy Research Institute, IPEN Date: 2020/05/15							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection

1	Page 2, 1 st paragraph, bullet 2.	To include a new bullet with this text: “Stablish, as much as possible, all chemical requirements for each process step/phase that requires chemical/radiochemical control”.				Rejected	This is too detailed guidance for Safety Guide. What is written needs to be approved by all MS and if the text is too detailed it will not be approved.
2	Page 2, 1 st paragraph, bullet 2.	To include a new bullet with this text: “Stablish, as much as possible, all quality systems and associated norms related to the chemical/radiochemical analyses required for the assurance of the generated chemical/radiochemical results.”				Rejected	This is too detailed guidance for Safety Guide. What is written needs to be approved by all MS and if the text is too detailed it will not be approved.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Cecilia Eriksson, Marcus Gustavsson Page...1. of...3. Country/Organization: Swedish Radiation Safety Authority (SSM) Date: 29 May 2020							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	5 Scope. 1:st sentence,	needed to ensure that SSCs important to safety, as well as those SSCs that may have an impact on safety related SSCs	According to IAEA Safety Glossary 2018 a SSC important to safety is <i>part of a safety group</i>		...ensure that SSCs important to safety and, other SSCs		The original was not detailed enough. Just by stating SSC

	beginning phrase.		<p><i>and/or whose malfunction or failure could lead to radiation exposure of the site personnel or members of the public.</i> This indicate that “SSCs that may have an impact on safety related” are already included. If not, it should be clearly explained what “have an impact on safety related” means and what “items not important to safety” this would include.</p>	<p>whose failure may prevent SSC important to safety from fulfilling their intended functions should operate reliably throughout the original design life time and a potential life extension period. In addition, other SSCs that are credited in the safety analyses should be covered by NPPs water chemistry program.</p>	<p>important to safety the message may not be understood consistently within the all MS. Therefore, more detailed explanation is needed here. The revised text is aligned with SSG-48 which gives specific requirements for the NPPs water chemistry programme</p>
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2.	5. Scope. 1:st sentence, last phrase.	This revised Specific Safety Guide will give Member States updated recommendations and guidance for water chemistry programmes needed to ensure that SSCs important to safety, as well as those SSCs that may have an impact on safety related SSCs, will fulfil their intended functions throughout its the original design entire/operating life time. and a potential life extension period.	The importance is that the functions are fulfilled throughout the entire life time. No need to distinguish between original design and extended periods.			Rejected	It is important to distinguish the difference between original design lifetime and long-term operation. Before entering the LTO the NPP needs to evaluate the applicability of the existing water chemistry programme and make necessary modifications if needed. This needs to be clearly stipulated.
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3.	9. Overview	<p>We would like to add a chapter committed to the topic preparation for decommissioning. Such a chapter could include information regarding the effect of chemistry on:</p> <ul style="list-style-type: none"> • contamination of the facility caused by accumulation of uranium and other fission products, • amount and properties of nuclear waste in order to handle, dispose and reposit spent fuel and radioactive waste, and • connection to Foreign Material Management during all stages of the plants lifetime. 	<p>To emphasize the importance of proactive preparation for decommissioning, also based on ongoing and upcoming decommissionings and experiences so far. We would like to further stress the importance of also discussing high radiation (mainly alfa) contamination of the facility caused by accumulation of uranium that has been set free in the systems due to fuel damage. This also has a close connection to Foreign Material Management during all stages of the plants lifetime, (design, building, commissioning, operation and decommissioning).</p>		<p>Chapter 3 1st bullet point modified: modernisation and refurbishment projects for long term operation as well as in the post-operational phase prior to decommissioning;</p>		<p>The aspects of post-operational phase prior to decommissioning are of importance in some MS countries, but not explicitly addressed in current document. The extent will be decided once the work has started with the document. The level of details to be addressed will be aligned with that in other IAEA Safety Standards. More detailed approaches can be given in TecDoc level documents.</p>
4.	4. Objectives . 1:st sentence, last phrase	<p>.....more detailed guidance for the safe operation of water-cooled nuclear power plants based on current international best practices in the chemistry area.</p>	<p>We would just like to comment that best practice is a high level approach which is not mandatory in all countries so it should be stated clearly that the recommendations based</p>	Accepted	<p>.. more detailed water chemistry guidance for the safe operation of water-cooled nuclear power plants.</p>		<p>More precise description.</p>

			on best practices are such, i.e best practices.				
5.	SSG 13	SSG 13 handling of deposits in the steam generator.	We would like to note the fact that deposits in other SSCs as well (both on primary and secondary sides) may have a negative effect on availability or performance of required safety functions and important process parameters and would recommend this to be included in the enhancement of the guide.	Accepted	Too detailed comment to be addressed in the DPP. Note that SSG-13 does not only talk about deposits in SGs.		This topic will be discussed during the revision of the current version of SSG-13