Form for Comments

***The Management System for the Predisposal Management and Disposal of Radioactive Waste* (DS477)**

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: FANC: Iwein De Baetselier, Manon Pettens, Geert Volckaert, Bel V: Frank Lemy							
Country/Organization: Belgium FANC and Bel V			Date: 4/7/2019				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
	1.9	*"…..The operator's management system should include plans and arrangements for the management system itself to continue for as long as is required to maintain continuous control over the facilities and activities, and to cover all stages of waste management from the generation of waste to its disposal including active institutional control over the waste disposal facility…"* *Last part proposed to be replaced by:* *"…., and to take due account of all the stages of waste management from the generation of waste to all known or decided further stages of its management. The operator's management system should include provisions to handle the uncertainty caused by yet unknown stages or the final disposal of the waste"*	As at the time of waste generation or its first pre-disposal treatment (e.g. to perform physico-chemical stabilisation) all stages of its further management might not yet be known, decided or existing, one cannot expect that the management system of the operator covers these unknown, undecided or non-existing stages. One can only expect that he is aware of these uncertainties and takes this into account in his management system.			R	Whilst it is recognised there will always be unknowns, waste should not be produced without there being an overall plan for how it will be managed. If further issues then arise, the plan can be modified.
	4.35	Emergency drills and exercises, and documentation and reviews of emergency	Final closure of a disposal facility will only			R	The fact that some form of institutional

		arrangements should be continued throughout periods of storage and until *final closure of disposal facilities.*	be authorized when there is sufficient confidence that after final closure the disposal facility will guarantee passive safety. In other words, there is no need to anticipate emergency situations after final closure. Withdrawal of institutional control might occur hundreds of years later.				control may still be required, implies that there is still a risk and consequently plans should be in place to deal with such risks with a proportionate and graded approach.
1	4.52	It is proposed to add the following type of records to the current list: "k) the safety functions fulfilled by the waste form or waste package during storage or disposal"	Waste forms and/or waste packages often contribute to the safety of storage and disposal facilities by limiting the release or dispersion of radionuclides, providing shielding,… Information relevant to these safety functions (quantity of cementitious material, organic matter,… in the waste form, presence of voids,…) should also be recorded.		A/M		Accepted, but the term "predisposal management" used rather than "storage".
2	4.54	It is proposed to add the following type of records to the current list: "r) Monitoring data"	Monitoring data are an essential part of the description of the	A			

			history of waste facilities				
3	4.81	It is proposed to add the following type of records to the current list: « h) The stability of the physical and chemical properties of the waste form »	There exist several examples of safety issues arising during storage or disposal caused by unexpected processes within the waste form (e.g. chemical reaction between cement and aggregates)			R	This para' is not about records and the concern is already addressed by [h] and [i].
	4.87/line 12	e) To ensure the retention of knowledge of the waste and waste management activities	Lack of documentation of waste and waste management activities is proving to be an impediment to verify conformance of nuclear waste with waste acceptance criteria for disposal, sometimes required tens of years after production. Retention of knowledge of the processes is proving crucial to discern the physico-chemical contents of waste. Therefore, bullet **e)** is proposed to be added to the list in 4.87	A			

4	4.121	It is proposed to modify point c) in the following way: "c) The natural geological setting *and the engineered components* of a waste disposal facility *are* normally subject to slow and possibly variable processes. "	Significant uncertainty may also exist regarding safety-significant properties and processes associated with engineered barriers and of their evolution (e.g. sorption of radionuclides in cementitious barriers,…). R&D might also be necessary to reduce this uncertainty.	A			
5	4.144-4.148 4.164-4.167	It is suggested to address the construction or emplacement of engineered barriers in the section « Construction of facilities » instead of addressing it in the section "operation of facilities"	Addressing the construction or emplacement of engineered barriers in the section "operation of facilities" can be confusing as in many cases (e.g. predisposal and near-surface disposal facilities) construction of these barriers start before operation.			R	Although the point is valid, some engineered barriers are put in place during construction and others during waste emplacement even in predisposal facilities.
6	4.144-4.148	It is proposed to add to the section « Construction of facilities » a paragraph on the management of non-conformance: "The management system should include a process and procedures to manage non-conformances with the design	The management of no-conformances is key to ensuring that the facility was constructed in accordance with the conditions of the		A/M		The point is now covered in new Para' 4.149. "Design modification procedure" has been

		requirements. This process should address their identification, their documentation and a decision-making process based on clearly defined conformity criteria."	license, the assumptions and the designs included in the safety case.				used instead of "non-conformance".
7	4.164-4.168	It is proposed to add to the section « Waste emplacement » a paragraph on the establishment of waste emplacement plans: "The management system should include a process and procedures to ensure that the waste emplacement plans are developed in accordance with the waste acceptance criteria and the assumptions included in the safety case"	Waste acceptance criteria and the assumptions included in the safety case may have implications on waste emplacement plans (e.g. to ensure that the distribution of the activity in a disposal facility is sufficiently homogeneous)	A			
	4.151	"Subsequent to the closure of a container and final non-destructive testing or radio-assay, *measures should be taken* to ensure that its content remains as recorded."	Often other means/measures are applied that ensure that the content of a container cannot be modified. Containers of vitrified waste for example have a welded lid. LLW disposal containers are often completely grouted with cement paste. Tamper indicating devices might not be the most adequate. It's not just the radionuclide content		A/M		The point is accepted but slightly different wording has been adopted.

			that has to remain as recorded but all the content since addition of other materials (e.g. water) may compromise the radiological safety.				
8	II.4	It is proposed to add the following item to the current list: « g) identifying the location of the waste packages in the facility »	Waste acceptance criteria and the assumptions included in the safety case may have implications on the waste emplacement plans which conformity needs to be controlled (e.g. to ensure that the distribution of the activity in a disposal facility is sufficiently homogeneous)			R	The substantial point of the comment is accepted, but the comment is rejected because the point is already covered at para. B.3[dd].

DS477: ***The Management System for Predisposal Management and Disposal of Radioactive Waste***

COMMENTS BY REVIEWER Reviewer: CANADA – Public Comments by Industry Page 1 of 3 Country/Organization: **CANADA/Canadian Nuclear Safety Commission (CNSC)** Date: June 27, 2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	1.21	Amend the 1st sentence to read: "It also covers radioactive waste above unconditional clearance levels from activities outside the nuclear fuel cycle, including:"	As currently written, the passage does not exclude quantities of naturally-occurring radionuclides below unconditional clearance levels, which would not normally require a management system.		A/M		"Radioactive" has been adopted but not the further suggestion as the IAEA definition of radioactive waste is that it is above clearance letters and therefore it is implicit.
2.	1.21	Amend it to read: "a) Mining and processing of non-uranium minerals and resources (i.e. waste containing naturally occurring radionuclides, such as in fertilizers, oil and gas)~~;~~ except in jurisdictions where these activities have been exempted;"	In some nations, such as Canada, these activities are specifically excluded from federal regulatory control.			R	The IAEA definition of radioactive waste excludes exempt waste.

COMMENTS BY REVIEWER Reviewer: CANADA – Public Comments by Industry Page 2 of 3 Country/Organization: **CANADA/Canadian Nuclear Safety Commission (CNSC)** Date: June 27, 2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
3.	1.9	Amend the 1st sentence to read, "The prime responsibility for properly executing a particular task (e.g. processing (pretreatment, treatment, and conditioning), storage and disposal, and related activities such as characterization of waste, clearance, and the design, construction, commissioning, operation and decommissioning or closure, as applicable, of predisposal management and disposal facilities) rests with the operators[3]."	There may be more than one entity involved with the tasks described in the 1st sentence. This is supported by the footnote, which reads "The Safety Glossary [4] defines the operator as: "Any person or organization applying for authorization or authorized and/or responsible for safety when undertaking activities or in relation to any nuclear facilities or sources of ionizing radiation. Operator includes, inter alia, private individuals, governmental bodies, consignors or carriers, licensees, hospitals, self-employed persons, etc. Operator is synonymous with operating organization."			R	Although there may be more than one operator involved, there should be a single responsible operator at any one time for a task otherwise there is scope for avoiding or confusing responsibility. The comment is not supported by the footnote cited which refers to "Any person [singular] or organization [singular]…"

COMMENTS BY REVIEWER Reviewer: CANADA – Public Comments by Industry Page 3 of 3 Country/Organization: **CANADA/Canadian Nuclear Safety Commission (CNSC)** Date: June 27, 2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
4.	4.2, 4.64, 4.79, 6.4	Insert relevant references in all of the identified clauses, which currently read, "Error! Reference source not found."	Safety Guide is not complete without all relevant references.	A			
5.	4.126	Amend to read, "When ~~C~~computer software and models are ~~will be~~ used during all stages of waste management and disposal activities, including during the design stage. Appropriate means should be provided for verifying and, to the extent possible, validating such software and models.	The term "when" allows for the use of alternatives to computer software and models, for activities such as those listed in clause 1.21.	A			
6.	4.152	Amend the 1st sentence to read, "It should ~~at any time~~ be readily possible to establish the history of a waste item from its documentation."	Avoid redundancy: "at any time" and "readily".	A			"Readily" and "at any time" are not quite the same. Nevertheless the wording has been modified to make the meaning clearer.

Form for Comments

The Management System for the Predisposal Management and Disposal of Radioactive Waste (DS477)

COMMENTS BY REVIEWER Reviewer: Jaakko Leino, Jouko Mononen and Milka Andersén Country/Organization: Finland/Radiation and Nuclear Safety Authority/STUK Date: 26.6.2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	1.24	Content of paragraph is not consistent with the contents (for example contractors and supply chain)		A			Whilst the structure of GSR Part 2 has been followed, there are certain aspects that are generic and are therefore not mentioned in the text of this Guide., e.g. management of contractors. The wording has been changed to reflect what is actually in the Guide.
2	general	Introduction is very long (9 pages).		A			The introduction has been significantly reduced.
3	general	According to the introduction the SG covers waste management from the generation of waste to its disposal, but in 1.21 SG covers waste from fuel cycle and waste from activities such as 1.21 a.-f. For the future the clarity of the guide could be enhanced by giving more management system guidance on activities before waste disposal. These activities are not clearly covered in chapter 4: Management of Processes and Activities. The				R	This Guide deals with the management system for all stages of radioactive waste management (predisposal management and disposal), not those facilities and activities that give rise to the waste. Although it is accepted that these facilities and activities should minimize the production of radioactive waste and

		recent version focuses mainly on facilities (design, construction etc.).					that that may need to manage radioactive waste, it would be inappropriate in this guide to provide prescriptive guidance on their processes. Specific guidance can be found in a range of IAEA Guides, e.g. SSG45.

TITLE: *DS 477 The Management System for the Predisposal Management and Disposal of Radioactive Waste*

COMMENTS BY REVIEWER Country/Organization: FRANCE Date: 12 July 2019 1 page				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	4.81	The design of processes for predisposal management should take account of the detailed sequence of steps that will be involved, and issues relating to the specific work processes and products (e.g. waste packages); for example: a) Use of protective clothing and/or shielded equipment and facilities for radiation protection; b) The use of special handling equipment, tools and techniques for the emplacement and retrieval of waste packages in storage facilities; c) Testing and assay requirements (e.g. equipment, methods and materials); d) The design of non-intrusive systems and methods for chemical analysis that are used to characterize waste so as to allow the methods to be used to examine waste packages that may have degraded while in storage. e) The design of waste packages and containers with detailed specifications for the package structure and the packaging (container) material; f) The design of transport packages and containers, and of storage facilities in advance of development of a disposal facility taking account of uncertainty in its possible design; **g) The waste storage duration established in particular according to the characteristics of waste packages and storage facilities;** h) The possible failure of waste packages and containers due to long term interactions between waste, packaging materials and the storage environment;	Waste storage duration should depend on the type of waste packages and on the design of the storage facility. It has an impact on safety assessment (aging, properties alteration …) and therefore on the steps following in the waste packages management sequence (transport, conditioning, disposal).		A/M		Accepted but wording slightly changed

TITLE: ***DS 477 The Management System for the Predisposal Management and Disposal of Radioactive Waste***

2.	Appendix I I.1	g) establish links with upstream and downstream facilities; h) establish the waste storage duration; i) take waste retrieval into account; j) take decommissioning into account;	Those activities should be considered when a decision is made to carry out operations involving the management of radioactive materials and waste.		A/M		Extra bullets have been added but wording has been slightly changed.

Form for Comments

***The Management System for the Predisposal Management and Disposal of Radioactive Waste* (DS477)**

COMMENTS BY REVIEWER Reviewer: Zsuzsanna Hauszmann Page.... of.... Country/Organization:Hungary/Hungarian Atomic Energy Authority Date: 10/07/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1 (GENERAL)			In many cases, the document does not distinguish between 'manager' and 'leadership'. The two concepts are not the same, even though they are often used as synonyms. The use of the word "manager" is recommended in the document, as it is not (in all organizations) taken into account when selecting managers whether or not it has leadership marks. What are the criteria for determining leadership?	A			„Leadership” and „management” are not the same. „Leadership” is a quality that managers should have. „Manager” is a role or position within an organisation..

2	1.7. sub-chapter d)		Why do we check whether the waste package is in compliance with the WAC after the waste package is made? I suggest clarifying this issue.			R	As the waste moves from one facility to another it is essential that the receiving organisation check it meets its WAC to ensure compliance with its safety case as it then has responsibility. There are numerous incidents of sites finding that waste packages dispatched to them do not meet the WAC.
3	1.9. sub-chapter		What is meant by "the extended period of waste disposal operations"?		A/M		„Extended" has been changed to „lengthy" to illustrate the longer periods of operation (and closure) compared to typical nuclear facilities.

4	1.10. sub-chapter d)	The waste generator and any organization authorized to undertake waste management activities need to ensure that waste production is minimized and that conditioned waste is compatible with the waste acceptance criteria of the receiving organization.	In this sentence, we recommend deleting the first half of the sentence. In my opinion, every effort should be made to minimize the generation of waste.			R	The comment is not understood as the sentence means that potential waste producers should minimise the waste that is produced.

5	1.10. sub-chapter d)		„Managers at all levels in the organization should possess leadership capabilities. Managers should also have administrative and 'people management' competences, and communication and interpersonal skills. Managers should develop their skills and support their subordinates to systematically develop their skills and solve problems and conflicts." Will the need for leadership characteristics be required? How will they decide, judge?			R	This was incorrectly referenced but the document is structured to deal with specific aspects of management. „Leadership" has its own Section as there is a specific IAEA Requirement relating to it. Managers should have additional qualities as described in the Guide.

6	4.8. sub-chapter		„This is especially pertinent for geological disposal facilities where there could be responsibilities that extend for long periods of time." Why is it important to highlight geological storage facilities? Is there a difference in management system requirements for different types of storage facilities?			R	The Guide does not highlight geological storage facilities. It highlights geological disposal facilities because of the very long periods of operation that could result in changes in responsible bodies as well as changes in those responsibilities, e.g. record keeping.

7	4.64. sub-chapter		„Waste management activities will require resources in the areas of finance, human resources, and infrastructure and the working environment „ I would advise to display knowledge as a resource under / next to human resources. Knowledge is also a resource that is not necessarily available with human resources (even though they own it, for example, after a training course).			R	Knowledge can be individual but in that case would be no different to skills , qualification and experience. Knowledge in terms of records and data would be covered under infrastructure.

Form for Comments

DS477 The Management System for the Predisposal and Disposal of Radioactive Waste

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer : **Dr. Syahrir** Page 1 of 22 Country/Organization : Indonesia / - Date: 8/07/2019							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	Additional paragraph 3.8	The senior management should make sure the interdependencies among the various steps in radioactive waste management are adequately understood and implemented by personnel.	Leadership as specific characteristic on radioactive waste management need to be mentioned		A/M		The overall point is accepted, but the comment has been dealt with by a revising para 3.7. See also paras. 4.28 and 4.29.
2	paragraph 4.9	4.9 …… c) Ensuring that process documentation is both internally consistent, and consistent with the facilities and activities;	What the meaning of this sentence?		A/M		Believe that the meaning is clear, i.e. documentation is not contradictory and that it relates to the actual facilities and

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer : **Dr. Syahrir** Page 1 of 22 Country/Organization : Indonesia / - Date: 8/07/2019							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
							activities. However, text has been modified to make it more clear.

Form for Comments

DS477 The Management System for the Predisposal and Disposal of Radioactive Waste

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer : **Dr. Sihana** Page …. of 22 Country/Organization : Indonesia / Universitas Gadjah Mada (UGM) Date: 8/07/2019							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
1	Page 2 No 1.5a)	ISO 45001 for occupational health and safety management	New ISO has already launched.	A			
2	Page 14 No 3.3	Senior management should communicate to staff specific expectation for performance that affect the safety system.	Staff should be informed about the performance that have effect to the safety.	A			
3	Page 14 No 3.5	Managers should lead by example.	Manager have the main role for safety.		A/M		We agree with the comment, but the point is already covered by first sentences of paras. 3.4 and 3.5.
4	Page 27 No 4.44a)	the quantities and potential hazards of the waste, the necessary degree of	Any mitigation action should be provided for each identified hazard.		A/M		Agreed, but the comment applies to more than

COMMENTS BY REVIEWER Reviewer : **Dr. Sihana** Page …. of 22 Country/Organization : Indonesia / Universitas Gadjah Mada (UGM) Date: 8/07/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
		isolation, time-scale of the hazard, and any necessary mitigation actions;					just bullet (a). Therefore, a new separate bullet point (m) has been added.
5	Page 29 No 4.50	Documentation should be organized according to a pre-define structure, i.e. level 1 for management system manual, level 2 for organizational process and level 3 for detail working document.	Requirement: "documentation shall be controlled"		A/M		Addressed in 4.50.
6	Page 65 No 6.2	Individuals at all levels should review their work critically, on a routine basis, to identify areas needing improvement and the means of achieving it.	All individuals are responsible to evaluate all processes.		A/M		Addressed in para 6.9
7	Appendix	It could be useful if any template for management system document is provided as appendix.				R	This would be very detailed guidance and would be difficult to do as the nature of facilities

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer : **Dr. Sihana** Page …. of 22 Country/Organization : Indonesia / Universitas Gadjah Mada (UGM) Date: 8/07/2019							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
							and activities varies considerably.

Form for Comments

DS477 The Management System for the Predisposal and Disposal of Radioactive Waste

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer : **Prof. Abdul Waris** Page … of 22 Country/Organization : Indonesia / **Institut Teknologi Bandung** Date: 05/05/2019							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification /rejection
1			**General comments**: This document is very important to provide detailed guidance to States' Competent Authorities / Regulators on *The Management System for the Predisposal and Disposal of Radioactive Waste*. **The reason** is because this document will improve and supersede the previous Safety Guides; (GS-G-3.3 and GS-G-3.4) This safety guide has complied with the objective, scopes/coverage clarity, quality and completeness as IAEA technical guidance. This document provides the guidance on developing and implementing systems for management for safety and protection of human health and	A			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer : **Prof. Abdul Waris** Page … of 22 Country/Organization : Indonesia / **Institut Teknologi Bandung** Date: 05/05/2019							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification /rejection
			the environment during all steps of radioactive waste management (excluding transport), as well as the guidance on effective leadership and culture for safety				

Form for Comments

DS477 The Management System for the Predisposal and Disposal of Radioactive Waste

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
1	Title	~~The~~ **Management System For The Predisposal Management And Disposal of Radioactive Waste**	It is recommended to delete the "the" article so that the Draft Safety Guide title is more general	A			The title has been revised in response to comments from several reviewers
2	General	Is there a difference between “waste” and “radioactive waste” in this draft document? So it is often said to be “waste” only and “radioactive waste”	Is there a difference between waste and radioactive waste in this draft document? So it is often said to be waste only and radioactive waste. If there is no difference, be consistent with always writing "radioactive waste"	A			Text is now consistent.
3	General	Aspects related to the safety of radioactive sources (in the form of waste) are less discussed	The security aspect of radioactive sources in	A			This Safety Guide identifies the

COMMENTS BY REVIEWER Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
			radioactive waste may be an important issue				need to consider security as well as safety; requirements and guidance on security are provided in the IAEA Nuclear Security Series publications. Reference is also made to the Code of Conduct on the Safety and Security of

COMMENTS BY REVIEWER Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
							Radioactive Sources.
4	General	After writing numbers from paragraphs for example 1.2. it should be consistent using point (.) or not	Editorial	A			
	1.3	Management for safety includes establishing and applying an effective integrated management system ~~that integrates all elements of management~~ so that requirements for safety are established and applied coherently with other requirements, including those for human performance, quality and security; and so that safety is not compromised by the need to meet other requirements or demands.	The use of the phrase "an effective integrated management system" is quite clear that there is no need to add the phrase "that integrates all elements of management"	A			
	1.7	Application of the requirements and recommendations referred to in the preceding paragraphs relating to the management system for radioactive	Addition of conjunction "that"			R	The proposed change would not make a

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
		waste management **that** will contribute to a high level of confidence that:					proper sentence.
	1.7	d) appropriate records of waste conditioning will be kept that enable waste ~~package~~ **container** identification and decisions on whether the conditioned waste and waste ~~packages~~ **container** meet the waste acceptance criteria for predisposal management and disposal facilities.	It is recommended that the word "package" be replaced by "container" because it might not necessarily be a "package" at this point. The word "package" is associated with radioactive transport *In this case, proper determination and documentation of the characteristics of waste form, waste package and/or waste container should be ensured.*		A/M		Usage of the terms 'waste package' and 'waste container' has been reviewed for consistency with the safety glossary.
	1.8	Adherence to the guidance contained in this Safety Guide will also give confidence that a **radioactive** waste disposal facility and its contents will be managed to comply with limits, controls and conditions important to	It is recommended to add the word "radioactive" before the word "waste"	A			

COMMENTS BY REVIEWER Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
		the fundamental safety objective of protecting human health and the environment					
	1.10	Processing (~~**pre-treatment**~~, **pretreatment**, treatment, and conditioning), storage and disposal of radioactive waste involve a variety of technical and managerial activities and may extend over a very long time (e.g. disposal facility operation may potentially last more than a hundred years). d) Because the responsibility for waste can change during its management, the waste generator and any organization authorized to undertake waste management activities ~~**need to**~~ **should** ensure that waste production is minimized and that conditioned waste is compatible with the waste	Editorial. In an IAEA Safety Guide, usually recommendations (or “should” statements) are provided.	A A			

COMMENTS BY REVIEWER Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
		acceptance criteria of the receiving organization.					
	1.11	… This reliance on a geological system affects the development and implementation of the management system, in which the benefits of a stable geological system and the limited ability of humans to modify such a system ~~must~~ should be recognized.	In an IAEA Safety Guide, usually recommendations (or “should” statements) are provided.	A			
	1.12	In comparison with nuclear power plants, the state of development and the amount of experience with **radioactive** waste disposal facilities is more varied. Although many and various types of near surface **radioactive** waste disposal facility are in operation, there is much less experience with geological disposal,	It is recommended to add the word "radioactive" before the word “waste”	A			

COMMENTS BY REVIEWER Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
		and disposal facilities for spent fuel or high level radioactive waste are not yet operating. Thus, management systems for the research and development, siting, design, construction, commissioning, operation, closure and post-closure stages of **radioactive** waste disposal facilities will have to be developed and improved as knowledge of the development of these facilities is accumulated.					
	1.19	…detailed guidance on the management system for decommissioning activities other than the management of waste is provided in SSG-47 [18] and SSG-49 [19].	Give spacing (editorial)	A			
	2.1	Safety **statement or policy** should be considered first in any business decisions, in any activities and in the	In this case the phrase "safety" cannot stand alone. It's good to add the			R	"Safety" can stand alone. "Safety statement" has not been

COMMENTS BY REVIEWER Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
		associated management system documentation.	word "statement" or “policy”				used anywhere in the document and decisions should consider more than just adherence to policy.
	2.3	The senior management of an organization responsible for a waste management facility or activity should be accountable and responsible for managing the facility or activity and demonstrating its safety activity and demonstrating its safety **policies**	In this case the phrase "safety" cannot stand alone. It's good to add the word "statement" or “policy”			R	As above. We need to demonstrate safety; not safety policies.
	2.5	The clear allocation of accountabilities and responsibilities is essential to	In this paragraph all phrase of "safety" cannot stand			R	As above.

COMMENTS BY REVIEWER Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
		ensure safety **policies** in the management of radioactive waste including both predisposal management and disposal activities	alone. It's good to add the word "statement" or “policy				
	2.10	The research and development activities involved in developing and assessing **the safety aspects** of a proposed waste disposal facility can be conducted both in the laboratory and in the field.	analog like the previous point comment			R	As above. “Safety” is a noun as well as an adjective. The text has been moved to para 4.120 and revised in response to comments from other reviewers.
	2.11	Under senior management direction and oversight, emergency plans, procedures, and other arrangements, including for training, drills and exercises, should be developed,	Changed to add some time aspect. This language is consistent with GSG-3, 4.15			R	The requirements say nothing about approval or

COMMENTS BY REVIEWER Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
		implemented, reviewed, **updated periodically** and maintained **and sub-sequently reviewed/approved by the regulatory body** in line with Requirements 25 and 26 of GSR Part 7 [14]					review by regulators. The word "periodically" adds nothing in this context. Exercises are dealt with in Section 4.
	3.4	Senior management should set an example for **safety aspects**	Analog like the previous point comment			R	As above. "Safety" can stand alone.
	4.2	The processes for fulfilling the responsibilities of senior management in relation to the management and control of radioactive waste are subject to the requirements established in GSR Part 2 [5], and the guidance presented in this Safety Guide; the guidance in **Ref. Error!**	Hyperlink missing	A			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
		Reference source not found. should also be considered					
	4.3	The management system should achieve and enhance safety **aspects** by:	Analog like the previous point comment number 14			R	As above. "Safety" can stand alone.
	4.4	Safety aspects should be paramount within the management system	Analog like the previous point comment			R	As above. "Safety" can stand alone.
	4.21	The requirements of some interested parties (e.g. the regulatory body) ~~must~~ **should** be complied with, while the expectations and preferences of some other interested parties may never be complied with entirely	In an IAEA Safety Guide, usually recommendations (or "should" statements) are provided.	A			
	4.30	… This means that the management system ~~must~~ **should** be integrated to include all of these aspects…	In an IAEA Safety Guide, usually recommendations (or "should" statements) are provided.	A			

COMMENTS BY REVIEWER Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
	4.64	4.64 Resource management necessary for managing and controlling radioactive waste is subject to the requirements established in GSR Part 2 [5], and the guidance presented in this Safety Guide and in **Ref. Error! Reference source not found.** should be considered.	Hyperlink missing	A			
	4.80	or the recycling of a ~~disused~~ spent sealed radioactive source	better to use the word "spent" if possible there is recycling			R	Radioactive sources may become disused for many reasons, not only when they have become spent. The recycling of a disused source is much more

COMMENTS BY REVIEWER Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
							feasible than a spent source.
	4.81	i) The possible ~~need to~~ **should** modify or re-engineer the design of waste packages and containers to incorporate new technology or to be compatible with new storage or disposal arrangements.	In an IAEA Safety Guide, usually recommendations (or "should" statements) are provided.			R	"Need" is correct in this instance and is a noun.
	4.91	a) The output from the process depends strongly on the control of the process or the skill of operators, or both (e.g. inspection results from ~~radio-assay~~ radioassay);	Editorial	A			
	4.93	a) Non-destructive examination and testing of waste packages (e.g. radiography in real time or otherwise, gamma and neutron ~~radio-assay~~ radioassay techniques);	Editorial	A			

COMMENTS BY REVIEWER Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
	4.94	Processes may need to be derived for waste packages that ~~have to~~ **should** be retrieved and relocated if problems arise after they have been emplaced	In an IAEA Safety Guide, usually recommendations (or "should" statements) are provided.			R	In this case "have to" is correct as this is not an instruction, but the text has, in any case, been changed in response to comments from other reviewers.
	4.96	…neutron ~~radio-assay~~ radioassay techniques:	Editorial	A			
	4.151	Subsequent to the closure of a container and final non-destructive testing or ~~radio-assay~~ radioassay, tamper-indicating devices should be attached to the container to ensure that it can be verified that its	Editorial	A			

COMMENTS BY REVIEWER Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
		radionuclide content remains as recorded.					
	4.161	~~**Procedures for waste acceptance**~~ Waste acceptance procedures (WAP) should be used by the operator of the facility to ensure that the facility only accepts suitable waste and can, therefore, be operated safely, in accordance with the safety case. The ~~**procedures for waste acceptance**~~ Waste acceptance procedures (WAP) should include provisions for safely managing waste that fails to meet the waste acceptance criteria; for example, by taking remedial actions or by returning the waste [2].	"Waste acceptance procedures (WAP)" Phrase is more commonly used in the field of waste management			R	This (WAP) is not accepted IAEA terminology.
	4.172	The period after closure of a disposal facility will be very long. Therefore, appropriate management processes ~~**need to**~~ **should be** in place to ensure that the disposal system remains safe	In an IAEA Safety Guide, usually recommendations (or “should” statements) are provided.	A			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
		and that records are adequately maintained. Plans should be prepared for the period after closure to address institutional control and the arrangements for maintaining the availability of information on the disposal facility [3]. These plans shall be consistent with passive safety features and should form part of the safety case on which authorization to close the facility is granted [3].					
	4.180	The supply chain typically includes: designers, vendors, manufacturers and constructors, employers, contractors, subcontractors and consigners and carriers who are supplying safety related items and services. The supply chain can also include other parts of the organization and/or parent companies. Because of the very long time periods involved in radioactive	In an IAEA Safety Guide, usually recommendations (or “should” statements) are provided.	A			

COMMENTS BY REVIEWER Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
		waste management, the responsible organization ~~must~~ should plan how it will manage the availability and quality of equipment, and the procurement of any structures, systems or components that need to be replaced. This may be achieved by ensuring that procurement organizations do not cease operation without prior warning, by ensuring that there is a diversity of supply or by ensuring that the organization has sufficient spare parts. In some instances, research and development may be required to provide forewarning of potential failure of equipment or structures, systems or components, or to identify potential replacements. In addition, procurement plans also ~~have to~~ **should** consider the fiscal policies and financial arrangements that ~~need to~~ **should** be					

COMMENTS BY REVIEWER Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
		in place to accommodate these long term requirements					
	Section 5 5.6 to 5.8	It is recommended to switch people 5.8 to para 5.6 to assert that all individuals in the organization will contribute to sustaining and sustaining a strong safety culture by mentioning senior management responsibilities, senior managers and then workers	Clarification	A			
	6.4	The processes for measurement, assessment6 and improvement applicable to the management system for control of waste management, including disposal, are subject to the requirements established in GSR Part 2 [2], and the guidance presented in this Safety Guide and in **Ref. Error! Reference source not found**. should be considered.	Hyperlink missing	A			

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
	6.5	Self-assessment of management processes in a waste management programme or organization should include consideration of: a) any changes in organizational structure or in the assignment of responsibilities and financial liabilities that could have an effect on the management and control of waste management activities. Such changes will have to be considered at the national level and even possibly at the international level; b) the continuation of assessments over long periods of waste storage, disposal facility operation and institutional control of a disposal facility.	It is recommended to add point C in order to obtain comprehensive self-assessment results		A/M		The point is agreed, but it is already covered in para 6.4, '… and to identify opportunities for improvement'.

COMMENTS BY REVIEWER Reviewer : **Maria Christina Prihatiningsih, M.Eng** Page…. of 22 Country/Organization: Indonesia/ Polytechnic Institute of Nuclear Technology – National Nuclear Energy Agency of Indonesia Date: 05/05/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
		c) self-improvement after self-assessment of management was carried out					
	References	It is recommended to address some IAEA documents in REFERENCES relating to the tracking system for waste packages such as TECDOC-1222 (2001) or the form of the revision document; "Waste inventory record keeping systems (WIRKS) for the management and disposal of radioactive waste."	To provide readers with relevant information available in the IAEA's previous technical documents			R	The references have been revised, but this does not appear to be an appropriate one to include.

TITLE: DS 477

COMMENTS BY REVIEWER Reviewer: Meir Markovits Page1of 1 Country/Organization: ISRAEL, IAEC Date: 12/7/2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	Par. 2.5	We believe that in this paragraph which deals with allocation of accountabilities and responsivities and the management system, it is necessary to mention (and emphasize?) the specific role of the waste generator, within the management system.	Completeness		A/M		Waste generation is now explicitly mentioned
2	Par. 4.30 Waste specification	This paragraph mentions, inter alia, the potential for responsibilities to change and interdependencies between different stages. We would like to suggest to consider adding a few words addressing the necessity to examine the capability/flexibility of the managing system in adapting itself to changes and variations occurring at various stages of the management process.	Completeness		A/M		Point accepted, and wording added at 6.2 and 6.3.
3	Par. 4.155	We suggest to consider to add to this paragraph, (which addresses waste specification), a sentence emphasizing the need to examine the capability/flexibility of the managing system in adapting itself to different kinds of waste and according different handling procedures.	Completeness	A			The point is accepted. We also believe this point is implied by the text on waste acceptance (see para. 4.160 and others).

AForm for Comments

<DS477 The Management System for the Predisposal Management and Disposal of Radioactive Waste>

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 1 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
1	General	Reference number should be checked.	Editorial. See comment No. 17, 19, 22, 54, 56, 58, 62 and 69.	A			
2	1.1/L3 (p.1)	Radioactive waste must be managed in such a way as to avoid imposing an undue burden on future generations; that is, the generations that produce the waste have to seek and apply safe, practicable and environmentally acceptable solutions for its long term management. The generation of radioactive waste must be kept to the minimum practicable level by means of appropriate design measures and procedures, such as the recycling and reuse of material.	Since SF-1, Para 3.29 also notes 3R (reduce, reuse, recycle), we consider it better to note the whole Para 3.29 here including “recycle and reuse” (clearance and discharge).	A			
3	Footnote (p.2)	[1] INTERNATIONAL ATOMIC ENERGY AGENCY, The Management System for the Processing, Handling and Storage of Radioactive Waste, IAEA Safety Standards Series No. GS-G-3.3, IAEA, Vienna (2008). [2] INTERNATIONAL ATOMIC ENERGY AGENCY, The Management System for the Disposal of Radioactive Waste, IAEA Safety Standards Series No. GS-G-3.4, IAEA, Vienna (2008).	Editorial.	A			

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 2 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
4	1.7/3 (p.3)	d) appropriate records of waste conditioning will be kept that enable conditioned waste and waste package identification and decisions on whether the conditioned waste and waste packages meet the waste acceptance criteria for predisposal management and disposal ~~facilities~~ of radioactive waste.	Identification should be required for un-packaged waste. Clarity.		A/M		There are two points here. The first is that not all waste will be packaged and this point is accepted although the suggested wording does not really cover the point. The second point is rejected as there is sufficient clarity.
5	1.11/L3, L4 (p.5)	The ~~geosphere~~ host geological environment has several key roles in providing passive safety in radioactive waste disposal systems. A ~~geosphere~~ host geological environment should be selected that will provide a stable environment for the waste disposal facility,	Since only a small part of the geosphere (the solid part of the earth consisting of the crust and outer mantle) is to be selected, we recommend "host geological environment".		A/M		Although the essence of the comment is agreed, the term "host geological formation" has been adopted for consistency with SSR-5.
6	1.19/L1 (p.7)	Move the sentence "This Safety Guide does not address management system elements required for transport [17]." to the end part of 1.18.	Editorial.		A/M		The sentence has been deleted because the point is made clear in the Objective.
7	1.19/L2 (p.7)	This Safety Guide provides guidance also on the management system for the management of waste arising from decommissioning;	Not to misunderstand that this guide provides guidance **only** for the waste arising from decommissioning.	A			

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 3 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
8	1.20 f)/1 (p.8)	waste fuel → spent fuel designated as radioactive waste	Clarity.	A			
9	1.20 h)/1 (p.8)	h) Decommissioning and site ~~environmental~~ remediation.	Clarity.		A/M		Decommissioning and environmental remediation have now been separated into different bullets. Waste may arise during remediation of the environment outside nuclear sites.
10	1.23/4 (p.9)	…in Refs. [1], [2], ~~[2],~~ [3], [13] and [14].	Editorial.	A			
11	4.2/L6 (p.15)	and the guidance presented in this Safety Guide~~; the guidance in Ref. Error! Reference source not found.~~ should also be considered.	Editorial: Delete this part of the text because the reference (GS-G-3.1) has been deleted.	A			
12	4.12, 4.13 (p.18)	Align the indents for paras. 4.12 and 4.13.	Editorial.	A			
13	4.12 (p.18)	Senior management should derive goals, strategies, plans and objectives that are consistent with government policies and strategies on radioactive waste management and that recognize the operational safety and the long term safety aspects that are involved in radioactive waste management.	Not only long term safety but also operational safety is important.		A/M		Point accepted with slightly revised wording as short term safety issues may arise that are not just operational.

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 4 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
14	4.13/L3 (p.18)	recognize that waste disposal concerns the entire lifetime of a facility built in the ~~natural~~ geological environment,	To distinguish the host geological environment for near surface/ geological disposal from surface accessible biological environment.			R	Not all disposal is geological disposal.
15	4.23/6 (p.22), 4.32/4 (p.24)	human and environmental protection → protection of people and the environment	Wording. This is also relevant to the phrase "IAEA SAFETY STANDARDS for protecting people and the environment" on the cover page.		A/M		Text revised as all covered by the term "safety" according to the IAEA Safety Glossary.
16	4.33/4 (p.24)	Requirements on predisposal ~~waste~~ management and disposal are provided in GSR Part 5 [2] and SSR-5 [3].	Clarity. Waste management includes disposal.	A			A review has been made to ensure appropriate use of the terms 'predisposal', 'disposal' and 'radioactive waste management'
17	Req. 7 /L1 (p.26)	Graded approach Requirement 7 of GSR Part 2 [~~2~~5]: Application of the graded approach to the management system	Editorial	A			

18	4.45 j)/1 (p.27)	j) traceability of items, including conditioned waste and waste packages;	Traceability should be require for conditioned waste as well.		A/M		Revised according to the IAEA Safety Glossary. Conditioning is 'Those operations that produce a waste package suitable for handling, transport, storage and/or disposal'.
19	4.48/L1 (p.29)	In particular, GSR Part 2 [~~2~~5] requires in paras. 4.16-4.20 that:	Editorial	A			

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 5 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
20	4.50/1 (p.29)	Documents may include: policies; safety cases; ~~safety assessments and other reports;~~ processes and procedures; instructions; specifications and drawings (or representations in other media); training materials; and any other texts that describe processes and activities, specify requirements or establish product specifications.	Safety assessments and other reports are parts of safety case.			R	We agree with the comment, but not all Member States share the same use of the term 'safety case' in practice. The point is valid, but this is an illustrative list of documents.
21	4.54/1 (p.30)	Records should also be created and retained to describe the history of waste ~~facilities~~ management, such as…	To address the history of the relevant activities.		A/M		Para. 4.52 covers the history of the waste and it has been made clear there that records of waste management processes are also needed. This Para. relates to the history of facilities.
22	Req.9/1 (p.32)	Requirement 9 of GSR Part 2 [~~2~~5]: Provision of resources	Editorial	A			
23	4.2/6 (p.15) 4.64/3 (p.33) 4.79/3 (p.37) 6.4/3 (p.66)	Reference is missing. Is it GS-G-3.1?	Editorial and clarification.	A			
24	4.64/3 (p.33)	and the guidance presented in this Safety Guide ~~and in Ref. Error! Reference source not found.~~ should be consider	Editorial: Delete this part of the text because the reference (GS-G-3.1) has been deleted.	A			

25	4.67/6 (p.33)	…the generation of waste from operating error ~~of operator error~~.	Editorial and clarification.	A			

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 6 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
26	4.69/4 (p.33)	For a waste disposal facility this includes the period after waste emplacement but prior to closure, and the period of active institutional control (i.e. monitoring) during the post-closure period.	Clarity. See para. II 14.	A			
27	4.77/6 (p.36)	…in the process documentation. 4.29. The sequencing of a process and…	Editorial.	A			
28	4.79/L2 (p.37)	and the guidance presented in this Safety Guide ~~and in Ref. Error! Reference source not found.~~, SSG-40 [20], SSG-41	Editorial: Delete this part of the text because the reference (GS-G-3.1) has been deleted.	A			
29	4.82 (p.38)	e) should move to after g).	The content of e) shows regarding radiation protection and that of d) and f) are regarding engineering, hence it is appropriate to align the sequence by contents.	A			The text has been revised to make the sequence more logical and to cover both near surface and geological disposal. The list is, however, only an example sequence of possible activities.
30	4.87/7 (p.39)	…for predisposal ~~waste~~ management and disposal activities	Clarity. Waste management includes disposal.	A			See response to comment 16

31	4.93 a) (p.41)	a) Non-destructive examination and testing of conditioned waste and waste packages (e.g. radiography in real time or otherwise, gamma and neutron radio-assay techniques);	Non-destructive examination and testing is also necessary for conditioned waste in order to confirm whether physical, chemical and radiological property meet in WAC.		A/M		A review has been made to check that terminology is consistent with the IAEA Safety Glossary. 'Conditioned waste' is not a defined term. Conditioning results in waste packages (waste containers filled with 'conditioned waste' *sensu lato*). Unconditioned waste is just waste.

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 7 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
32	4.100/2 (p.42)	…predisposal ~~waste~~ management and disposal processes	Clarity. Waste management includes disposal.	A			See response to comment 16
33	4.100/2 (p.43)	…in the activities associated with predisposal ~~waste~~ management and disposal.	Clarity. Waste management includes disposal.	A			See response to comment 16
34	4.101/1 (p.43)	Inspections carried out as part of predisposal ~~waste~~ management activities should include:	Clarity. Waste management includes disposal.	A			See response to comment 16
35	4.101 j) (p.43)	j) Inspection of characteristics of conditioned waste and waste packages that are critical to complying with the transport regulations;	Inspection is needed for conditioned waste as well.		A/M		See response to comment 31
36	4.102 f) (p.44)	f) Inspection of installed items that are important to operational safety, environmental protection or the safety case, including witnessing of equipment and/or system operational tests;	Clarity.			R	The change is not needed and would not improve the text. Post-operational safety is also important.
37	4.102 i) (p.44)	i) Inspection (e.g. by non-destructive assay or real time radiography) of conditioned waste and waste packages destined for disposal.	Inspection is needed for conditioned waste as well.		A/M		See response to comment 31

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 8 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
38	4.105 (p.44)	Personnel other than those who prepared conditioned waste and the waste packages should independently verify the conformance of conditioned waste and the waste packages to the waste specifications or acceptance criteria for the facility. The manner in which such verifications are carried out will vary according to the type of conditioned waste and waste package. For low level radioactive conditioned waste and waste packages that can be handled manually, verification may consist of directly examining and measuring the characteristics of the individual waste packages.	Conditioned waste should be inspected in order to verify the conformance with the WAC.		A/M		See response to comment 31
39	4.105 d) (p.45)	d) sample examination of the data recorded for conditioned waste and each waste package;	Conditioned waste should be inspected in order to verify the conformance with the WAC.			R	See response to comment 31

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 9 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
40	4.106/1 (p.45)	If the reports and records from the production of conditioned waste and waste packages do not make it clear that conditioned waste and the waste packages meet the acceptance criteria for disposal (e.g. because the waste packages were produced prior to the setting of acceptance criteria for a disposal facility), it should be verified that conditioned waste and the waste packages are adequately characterized and that they meet the disposal requirements. If the conditioned waste and waste packages do not meet the requirements, the need to rework the packages and the need to evaluate the organization (and the intended processing methods) that will perform the reworking to bring the waste to a qualified condition should be considered.	Since there is a possibility disposing conditioned waste, these guidance should be applied for those waste as well.		A/M		See response to comment 31
41	4.107 a) (p.45)	…of predisposal ~~waste~~ management and disposal activities	Clarity. Waste management includes disposal.	A			See response to comment 16
42	4.110 a)/ L2 (p.46)	The management system is an important element of the safety case [10] ~~and~~ , [26].	Editorial	A			

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 10 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
43	4.111/3 (p.47)	The safety case, together with the management system, should enable the parties involved to judge the level of safety, and human health and environmental protection provided by the waste management programme throughout its development and as new information is obtained regarding predisposal ~~waste~~ management and disposal.	Clarity. Waste management includes disposal.	A			See response to comment 16
44	4.121/L4 (p.49)	the expected behaviour of ~~the geology of~~ the waste disposal facility and the geological environment.	Clarification		A/M		Text revised to recognise the geological environment but also the biosphere.
45	4.136/1 (p.52)	The design process for a predisposal ~~waste~~ management facility or waste disposal facility…	Clarity. Waste management includes disposal.	A			See response to comment 16
46	4.140 (p.53)	In designing both predisposal management facilities and activities, and disposal facilities, consideration should be given to incorporating measures for ease of operation, optimization of activities and protection for workers' exposures, inspection of waste prior to closure, maintenance of structures, systems and components, monitoring, and closure or decommissioning of the facilities.			A/M		The text has been revised for greater clarity.

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 11 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
47	4.162/1 (p.56)	Prior to placing, conditioned waste and waste packages in a storage facility, measures should be taken as appropriate to ensure that: a) The conditioned waste and waste packages meet the waste acceptance criteria for the facility; b) Conditioned waste and ~~W~~waste packages are properly identified; c) The required documentation and records are available and acceptable; d) All necessary processes for waste treatment and conditioning have been undertaken and completed satisfactorily; e) Levels of surface contamination and surface dose rates meet requirements; f) Conditioned waste and ~~W~~waste do not show signs of unacceptable deterioration; g) Measures for criticality control are in place, are effective and are maintained; h) The intended movements of conditioned waste and waste packages within the storage facility can be performed safely, preclude inadvertent criticality and optimize protection for occupational exposures; (continued on next page)	These are also important for conditioned waste (un-packed waste)		A/M		See response to comment 31

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 12 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
47 (continued)	4.162/1 (p.56)	i) Procedures are in place for: a. Monitoring the integrity of conditioned waste and waste packages; b. Controlling environmental conditions in the store (e.g. temperature, humidity, ventilation) and performing associated monitoring; c. Maintaining surveillance of the store and of the status of equipment to allow for its maintenance and replacement as needed and for accident detection and mitigation of consequences; d. Ensuring that conditioned waste and waste packages can be readily identified, located and accessed for inspection and retrieval. j) Suitable locations and space exit within the facility for the conditioned waste and waste packages.	These are also important for conditioned waste (un-packed waste)		A/M		See response to comment 31

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 13 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
48	4.163/1 (p.57)	Prior to emplacing conditioned waste and waste packages in a disposal facility, measures should be taken as appropriate to ensure that: a) The conditioned waste and waste packages meet the waste acceptance criteria for the facility; b) The conditioned waste and waste packages are properly identified; c) The required documentation and records are available and acceptable; d) All necessary processes for waste treatment and conditioning have been undertaken and completed satisfactorily; e) Levels of surface contamination and surface dose rates meet requirements; f) The conditioned waste and waste packages do not show signs of unacceptable deterioration; g) Measures for criticality control are in place, are effective and are maintained; h) Intended movements of conditioned waste and waste packages within the disposal facility can be performed safely, preclude inadvertent criticality and optimize protection for occupational exposures. (continued on next page)	Same as above.		A/M		See response to comment 31

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 14 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
48 (continued)	4.163/1 (p.57)	i) Procedures are in place for: a. Monitoring the integrity of waste packages; b. Controlling environmental conditions in the disposal facility (e.g. temperature, humidity, ventilation) and performing associated monitoring; c. Maintaining surveillance of the store and of the status of equipment to allow for its maintenance and replacement as needed and for accident detection and mitigation of consequences; d. Ensuring that waste packages can be readily identified, located and accessed for inspection. j) Suitable locations and space exit within the facility for the conditioned waste and waste packages. The management system for geological disposal facilities may need to include a process and procedures to ensure the suitability of the host rock surrounding the disposal locations, e.g. [34]. Such a process might, for example, seek to avoid locations in highly fractured or hydraulically conductive rock.	Same as above.		A/M		See response to comment 31

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 15 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
49	4.163 j)/1 (p.57)	Clarify the meaning of "space exit within the facility".	Clarity.	A			'space exit' has been corrected to 'storage capacity exists'.
50	4.164/1 (p.58)	Waste disposal facilities include a system of engineered and/or natural barriers.	Trench disposal facility could be constructed without engineered barriers.	A			
51	4.170/2 (p.58)	In particular, Requirement 7 of GSR ~~(~~Part 6~~)~~ [36] requires that the licensee's ~~operator's~~ management system covers all aspects of decommissioning.	Editorial Clarification. Requirement 7 of GSR Part 6 mentions "The licensee shall ensure that its integrated management system covers all aspects of decommissioning."	A			A review was undertaken to ensure consistency and correct use in the document of Licensee and operator.
52	4.172/6 (p.59)	These plans are required to ~~shall~~ be consistent with passive safety features and should form part of the safety case on which authorization to close the facility is granted [3].	The statement of "shall" is used in Safety Requirements, unless otherwise citation from Safety Requirements.			R	This text is a direct quote from SSR-5. This has been made clearer.
53	4.175/1 (p.59)	Prior to construction and operation of a predisposal management facility and disposal facility, monitoring should be carried out to gather information and, thereby, provide a 'baseline' on the environmental and radiological conditions at the site.	Baseline measurement is also important for predisposal management facility in order to identify 'initial' condition.		A/M		Text changed to reflect the point.

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 16 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
54	4.176/1 (p.59)	The management system should as necessary include procedures to deal with monitoring of active control systems (e.g. temperature, humidity controls, alarm systems), of waste package integrity, and of any other equipment e.g. for the detection and mitigation of accidents, and the maintenance of conditioned waste and waste package identification measures.	Identification should be required for conditioned waste as well.		A/M		See response to comment 31
55	4.179/L0 (p.60)	Requirement 11 of GSR Part 2 [~~2~~5]: Management of the supply chain	Editorial	A			
56	4.181 f)/1 (p.61)	What do "exclusion and expectation" mean? The intention of these terms should be mentioned.	Clarity.			R	"exclusions" means what is not included in the contract, and "expectations" are what is anticipated to be delivered through the contract. These are normal contractual terms and do not require clarification.
57	5.1/L0 (p.62)	Requirement 12 of GSR Part 2 [~~2~~5]: Fostering a culture for safety	Editorial	A			

58	5.6 c)/2 (p.63)	…a ~~n orphan~~ waste with no readily identified treatment and disposal route.	Although the intent is understandable, the term "orphan waste" remind "orphan source" that is outside regulatory control.	A			
59	6.1/L1 (p.65)	In particular, GSR Part 2 [~~2~~5] requires in paras. 6.1 – 6.8 that:	Editorial	A			

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 17 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
60	6.1/(6.5/L4) (p.65)	… direct access to senior management~~,~~.In addition, individuals…	Editorial (comma => period)	A			
61	6.1/(6.7/L2) (p.66)	Lessons from experience gained and from events that have occurred,	Editorial	A			
62	6.4/2 (p.66)	…the management system for control of waste management~~, including disposal,~~ are subject to the requirements established in GSR Part 2 [2],	Clarity. Waste management includes disposal.	A			
63	6.4/L4 (p.66)	GSR Part 2 [~~2~~5],	Editorial	A			
64	6.4/L4 (p.66)	Safety Guide ~~and in Ref. Error! Reference source not found.~~ should be considered.	Editorial: Delete this part of the text because the reference (GS-G-3.1) has been deleted.	A			
65	6.6 g) (p.67)	g) Waste management activities are conducted in conformity with their safety, and human health and environmental impact assessments.	Consistency in the terminology throughout the document.		A/M		Wording has been changed to reflect IAEA definition of "safety".
66	6.10 b)/1 (p.68)	b) The quality of conditioned waste and waste packages produced by the organization.	There is a possibility to manage un-packaged (conditioned) waste in the facility.		A/M		See response to comment 31

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 18 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
67	6.11 a)/3 (p.68)	(e.g. site characterization, disposal concept and facility design, safety case development, research and development, excavation, waste emplacement, engineered barrier construction, disposal facility operation, closure and institutional control)	Clarity.	A			
68	6.15/7 (p.69)	…in waste management~~, including disposal,~~ should…	Waste management includes disposal.	A			
69	6.18 c)/2 (p.70)	for environmental impact assessment: monitoring of the environment, minimal disturbance of the environment, and biota ~~protection of non-human species~~;	Regarding protection of non-human species, is it an appropriate example? Such aspect is specifically addressed in annex of GSG-10. An alternative term "biota" is appropriate.	A			
70	6.22/L0 (p.71)	Requirement 14 of GSR Part 2 [~~2~~ 5]: Measurement, assessment and improvement of leadership for safety and of safety culture	Editorial	A			
71	II.3/1 (p.75)	Items for which there should be procedures during the operation, closure and post-closure institutional control of radioactive waste disposal facilities include:	Editorial Clarity.		A/M		Text revised.

COMMENTS BY REVIEWER Reviewer: Japan/NRA Country/Organization: Japan/NRA			Page 19 of 44 Date: 26 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
72	II.12/1 (p.78)	A graded approach to preparedness and response is required to ~~shall~~ be developed and implemented…	The statement of "shall" is used in Safety Requirements, unless otherwise citation from Safety Requirements.	A			
73	II.13 a), b) (p.79)	a) a vast area for a near surface ~~waste~~ disposal facility; b) a very long access tunnel for a geological ~~waste~~ disposal facility.	Terminology.		A/M		
74	PURCHASING II.14 (p.79)	Regarding CFIs (Counterfeit and Fraudulent Items), some description or citation of NP-T-3.26* would be useful in this paragraph or elsewhere. * *IAEA Nuclear Energy Series No. NP-T-3.26 "Managing Counterfeit and Fraudulent Items in the Nuclear Industry."*	Improvement and usefulness.	A			
75	III.1/L1 (p.81)	~~[this is an excellent candidate for an annex.]~~ Table 1 describes	Editorial	A			

COMMENTS BY REVIEWER Reviewer: Japan/METI Page 20 of 44 Country/Organization: Japan/METI Date: 27 Jun. 2019				RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
76	Line 9 (p.8)	Modify "research" to "research and development"	More adequately.	A			

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 21 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
77	Line 9 (p.11)	Modify "at the end of active institutional control" to "at any time of active institutional control".	In the next sentence, it is stated that the government should take over responsibility of remaining active institutional control. If this would be the case, the takeover should be fulfilled before the end of active institutional control.		A/M		The text states 'in some instances' so it is just an example and not prescriptive. However, the suggested change could imply that two bodies would be responsible for institutional control and this would be incorrect. The text has been modified to clarify.

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 22 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
78	4.82 / 12 (p.38)	*The following should be provided to the end of the bulleted term (f) of para 4.82*: It should be noted that the latter application is limited when there would be an unexpected reason why retrieval of the emplaced waste packages is desired (e.g. threats to the integrity of packages or any changes in national policy and strategy for radioactive waste management).	There is an argument that "retrievability" runs counter to the primary objectives of geological disposal to provide permanent safety and not to facilitate irresponsible attempts to retrieve the waste or repository materials. It should be recognized that the present consensus among the technical community is that "retrievability" can be considered in geological disposal programme, but that it is not essential for safety. If incorporated, it can be considered consistent with the primary objective of providing adequate long-term safety and security only if it is implemented in such a way as not to reduce the long-term passive safety, to preserve adequate security, and not to impose undue burdens on future generations.		M		The mention of retrievability at this point has been deleted in response to this and other comments and so the suggested additional text is not needed.

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 24 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
79	Para 4.89 (p.40)	Add "pre-closure confirmation of adequate construction of passive safety" and "possible post-closure monitoring".	Those processes are of key factors in order for a regulator as well as other interested parties to accept geological disposal as a final solution. It would be difficult to understand they have been incorporated within existing items a) - aa).	A			
80		Moreover, add "optimization of design and construction of a geological repository".	The "optimization of design and construction of a geological repository" would be one of regulatory requirements in a certain country. This is strongly recommended to be added.		A/M		Change implemented with slightly altered wording

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 25 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
81	Para4.100/ Line 2,3 (p.42) & Line 2 (p.43)	Modify "waste management" to "predisposal management".	Waste management includes disposal. The expression of "waste management and disposal" should be replaced by "predisposal management and disposal".	A			

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 26 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
82	Para 4.102 (p.43, 44)	Add "In-process inspection of backfilling of disposal drift".	Disposal drifts should be adequately backfilled after emplacement of waste and associated engineered barriers in order for the drifts not to become highly-conducted groundwater pathways, either in case of vertical emplacement or of horizontal.			R	Backfill is part of the engineered barrier system so is covered under [h].
83		Add "In-process inspection of plugging of access tunnels".	Access tunnels or shafts, either vertical or horizontal, should be adequately plugged at several points, e.g. boundary of geology, discontinuities, boundary of engineered supports, hydrological boundaries or discontinuities, etc., in order to prevent such a condition that they become leaked nuclides' pathway.			R	This is also covered by [h].

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 28 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
84	Para4.1 10b) (p.46)	… particular uncertainties due to the length of the assessment period, the scale of underground repository associated with relevant area necessary for safety assessment and other factors related to modelling of the long term evolution of the site. (The expression underlined is added and proposed.)	Spatial uncertainty is not explicitly dealt with, differently from temporal uncertainty. Both should be similarly dealt with. The expression proposed is an example. Other ones can be taken into consideration.		A/M		Although it could be argued that these are included within "other factors" the text has been made more explicit.

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 29 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
85	4.110 / 20 (p.47)	*The following underlined should be inserted in the bulleted term e) of para 4.110*: e) The safety case should be reviewed periodically to ensure the validity of the contents, taking into account experiences, new technologies, changes to the regulations etc. <u>The safety case should also acknowledge the existence of any unresolved issues and should provide guidance for work to resolve these issues in future development stages.</u> The reviews should be documented. The management system should include processes and procedures for the safety case to be updated as further information becomes available and for managing uncertainties and risks.	Some uncertainties and open questions are inevitable, particularly at early stages of development. The safety case should clearly acknowledge such uncertainties, showing how they have been identified and taken into account, discuss their implications and explain how any that are critical to safety are to be further addressed or otherwise managed in future development stages. This may include keeping open several alternative facility design options or variants to cope with as yet unresolved uncertainties.		A/M		The essential point of this comment is accepted and text has been added at the end of the bullet point.

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 32 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
86	Line1 (p.51)	…such data can be applied to the particular site of the disposal facility and its immediate surroundings. (Delete "the" between "particular" and "site" in the original expression.)	Careless mistake, probably.	A			
87	Para4.126/ Line1 (p.51)	…during all stages of predisposal management and disposal activities, …	Waste management includes disposal. The expression of "waste management and disposal activities" should be replaced by "predisposal management and disposal activities".	A			
88	Para4.129/ Line9 (p.51)	… prior to intensive investigations.	Probably, the original "intrusive" should be replaced by "intensive", because the replacement makes the meaning more understandable.			R	"Intensive" does not have the same meaning as "intrusive". Intrusive here refers to boreholes or excavations that disturb the geology. But in any case, the sentence has been deleted.

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 33 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
89	Para4.134 (p.52)	Careful undertaking of drilling and excavation and the earliest possible baseline monitoring are recommended to be described e.g. in Para 4.134 or something. Their necessities and points to be addressed are briefly but adequately described.	Negative influence of drilling and excavation to the underground environment should be taken into consideration and, to the extent possible, minimized and, quantitatively, grasped and evaluated. Various kinds of baseline monitoring should be undertaken in an adequately distributed manner at the earliest possible apart from major investigations but according to their evolution.	A			
90	Para4.136/ Line1 (p.52)	The design process for a predisposal management facility or …	"Waste management facility" should be here replaced by "predisposal management facility" because waste management includes disposal and therefore the original expression is duplicated.	A			

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 34 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
91	Para 4.147 (p.54)	… as to avoid unnecessary disturbance of the hydrogeochemical environment and grasp the level and extent of the disturbance to the extent possible. (Add the part underlined.)	It would be necessary for the operator to know the level and extent of disturbance in order to reflect the later safety case and redesign possible.			R	The point is addressed in the preceding sentence.
92	Para 4.148 / 2 (p.54)	"flexibilte" => "flexible"	Must be typo!	A			

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 35 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
93	Para 4.163 i) b. (p.57)	Controlling environmental conditions in the disposal facility (e.g. temperature, humidity, ventilation, groundwater chemistry and hydrology) and performing associated monitoring. (Add the part underlined.)	Only the conditions related to work environment seems to be paid attention to. Those related to long-term post-closure safety also have to be dealt with.			R	This bullet point is referring to waste stores, not disposal facilities. It is very unlikely that groundwater chemistry can be controlled.

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 36 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
94	4.166 / 6 (p.58)	*The following should be provided to the end of the para 4.166:* From the radiation protection and rationalization of physical distribution points of view in geological disposal, it would be desirable that emplacement of waste packages is carried out by remote control in a separate panel to construction and backfilling of disposal tunnels, which are carried out in parallel.	Potential failures and/or accidents should be taken into account when designing the procedures so as to ensure safe operations. Depending on the annual amount of waste and that of excavated rocks to be carried out, it would be more reasonable that the emplacement of waste packages is carried out in a separate panel to construction and backfilling of disposal tunnels, which are carried out in parallel.		A/M		The specific suggestions given are too prescriptive and would not be appropriate in every situation, but the more general point given in the 'Reason' that the procedures should be able to cope with failures and accidents (events) is accepted. Text has been added to this effect.

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 37 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
95	4.168 / 3 (p.58)	*The following should be provided to the end of the para 4.168:* In case of geological disposal, in addition to the received waste and barrier materials, a number of different materials such as cement, steel, organic compounds are used during the period of repository construction operation and backfilling. Some are left deliberately, while others are spilled or left by default. Thus, it is quite significant to identify and document the type and volume of these materials which are brought down underground, and estimates their remaining quantities at the time of backfilling.	The construction and operation processes, and even backfilling of the repository will disturb the properties of the surrounding geological environment such as rock mass and groundwater systems. As a consequence, resultant physico-chemical, hydrogeological and biological processes will occur. In order to evaluate effects of the possible processes, good knowledge is needed of both the baseline conditions at the site and the materials and methods used during the construction, operation and backfilling stages.	A			

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 38 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
96	4.175 / 3 (p.59)	*The following should be provided to the end of the para 4.175:* Thus, baseline data should be established as part of the site characterization activity which includes measurements from local and regional boreholes and surface investigations. However, it is noted that invasive investigations using such boreholes will themselves perturb the natural groundwater system to a degree based on site specific conditions.	Monitoring activities should be started at the earliest time within a repository development program, before the perturbations caused by underground investigations and repository construction and operation begin to be influenced and accumulated. This early information is quite important because it allows an understanding to be developed of the nature and properties of the natural, 'undisturbed' environment of the disposal system.	A			The point has been included and a reference given to SSG-31.

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 39 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
97	Para 4.176 (p.59)	The management system should as necessary include procedures to deal with monitoring of active control systems (e.g. temperature, humidity controls, alarm systems, groundwater conditions), … (Add the part underlined.)	This para deals with disposal facilities, therefore attention should be paid to environmental conditions, especially those related to underground facilities.			R	The monitoring of active control systems is covered and what is now para 4.181 provides (non-exhaustive) examples of what these may be. Although groundwater should be monitored, it is not an active control system. The need to monitor groundwater is addressed in the revised guide.

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 40 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
98	Line 2 (Para 4.177) (p.60)	Main points on monitoring and surveillance during the post-closure period should be described here instead of the sentence that "Further guidance on monitoring and surveillance of radioactive waste disposal facilities is provided in SSG-31 [23]."	Omission of the description should not be permitted here, because it is also the main points to be focused attention to. Attention should be payed to the necessity technologically as well as non-technologically.			R	The object of this Guide is to provide Guidance on the management system, not, the specifics of the activities carried out on site. In this instance the Guidance is that the management system incorporate a system for monitoring. The extent and type of monitoring is not the subject of this Guide.

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 41 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
99	Para II.2. (p.75)	e.g. from construction to operation, from operation to post-closure, from active to passive institutional control	Closure should not be situated as a stage but the last technically important part of operation. Comparison of stages should be made between operation which includes closure and post-closure which might include monitoring. Closure is part of operation.		A/M		It may take several years to close a disposal facility and in reality the activities (e.g. construction, operation, closure) will overlap in time at different places in the facility. The text has been modified consistent with this.

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 42 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
100	r) (p.76)	, closed (or decommissioned in case of accessory surface facilities),	Decommissioning should not be used about an underground facility, which is main among "radioactive waste disposal facilities". The terms, "closed" and "decommissioned" should be expressed rigorously.	A			The use of decommissioning and of closure has been reviewed.
101	t) (p.76)	, and closure (or decommissioning);	Ditto.	A			Ditto.
102	z) (p.76)	(e.g. temperature, humidity, ventilation, groundwater conditions) Instead of "groundwater conditions", "outlet flow" or ""groundwater chemistry" might be replaced.	Underground environmental conditions include those of near field rock, which should be shown understandably.			R	This is a list of environmental conditions to be controlled, it is unlikely that groundwater could be controlled although it should be monitored

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 43 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
103	Para II.10. b) (p.78)	Confirm that conditions of neighboring parts of the emplaced waste packages are in accordance with the design specifications;	The performance of embedded waste packages cannot be directly checked after the emplacement is finished. Conditions related to near field rock neighboring to embedded waste packages can only be measured to the extent possible. Therefore, the safety of the packages would be indirectly estimated, but the robustness of the system makes the safety sufficiently convincing.	A			Text will be modified to make the point clearer, but this is about design confirmation, e.g. are they in the right place.

COMMENTS BY REVIEWER Reviewer: Japan/METI Country/Organization: Japan/METI			Page 44 of 44 Date: 27 Jun. 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
104	[9] (p.87)	Delete "Disposal of Radioactive Waste,"	The expression is incorrect here and should not be expressed.	A			
105	[11] (p.87)	Delete "Disposal of Radioactive Waste,"	Ditto.	A			

Form for Comments
The Management System for the Predisposal Management and Disposal of Radioactive Waste: DS477

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: PAEC Country/Organization: Pakistan/PAEC			Page 1 of 15 Date: 26-06-2019				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	Ref.	The draft versions of IAEA documents at References No/ [4, 18, 19, 22 & 31] have been mentioned	Only approved document should be referred	A			
2	Objectives	In section 1.17 the phrase "… including processing (pre-treatment, treatment, and conditioning)" to be modified as, "…. Including predisposal (pre-treatment, treatment, and conditioning)"	It may be modified			R	Predisposal covers more than just the activities suggested, e.g. storage
3	Scope	i. In section 1.18 the phrase, "This Safety Guide covers management system…" May be modified as, "This Safety Guide provides recommendations on developing and implementing management system…." ii. In section 1.19 the IAEA Safety Standards Series safety standard for Transport [17]. Has been referred. However, the code of IAEA Safety Standards Series safety standard for Transport No TS-G-1.4 has not been mentioned. iii. In section 1.19 the space has not been provided between words "in SSB-47[18]".	i. It may be modified. ii. It may be included. iii. Space may be provided between words.	A A		R	Some of the management system aspects are IAEA "requirements". The proposed change would be an objective not a scope statement.
4	Design of Facilities	The design review of such facilities by the Regularity Body has not been included.	It may be included in Design of Activities			R	This would be part of the iterative assessment process already

Form for Comments
The Management System for the Predisposal Management and Disposal of Radioactive Waste: DS477

COMMENTS BY REVIEWER Reviewer: PAEC Country/Organization: Pakistan/PAEC			Page 2 of 15 Date: 26-06-2019	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
							described in the Guide.
5	Operation of Facilities	The requirements of equipment calibration during the operation of such facilities has not been mentioned.	It may be include in Operation of Activities	A			Text added at para 4.514
6	general	The flow chart may be included for "appendix-II Key management system aspects specific to operation closure and post closure active institutional control of radioactive waste disposal facilities"	Follow chart may be included in Appendix-II		A/M		A Figure has been inserted into the Guide
7	1.2/1-2	The management system is a set of interrelated or interacting elements **(a system) for establishing policies and objectives and enabling** the objectives to be achieved in an efficient and effective manner.	Text modified as per definition of management system. [4]	A			
8	1.3/4	**Managers of the concerned organizations, should demonstrate leadership and commitment to safety [5].**	Proposed text may be added to address requirement for leadership for safety which is missing in the para.		A/M		Text clarified. This is also dealt with in Section 3, 'Leadership for Safety'.
9	1.6	"….. Assessments of the management system (see **section 6**)…"	The relevant section for assessment of management System is detailed in section 6.0 instead of section 4 of this guide no DS 477.	A			
10	1.10/12	"This shall include the clear and unequivocal allocation of responsibilities and the securing of financial and other resources"	May be added for completeness	A			This text is included at what is now para 1.10(c).
11	1.10/29-	These lines should be deleted	Repetition after inclusions	A			Repetition has

COMMENTS BY REVIEWER Reviewer: PAEC Country/Organization: Pakistan/PAEC			Page 3 of 15 Date: 26-06-2019	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
	31		of comment at Sr. 10.				been removed.
12	1.12/4	.. facilities for spent fuel or high level radioactive waste **which** are not yet operating…	Word "which" may be added.		A/M		Text has been deleted in response to other comments.
13	1.12/7	… as knowledge of the development of these facilities is accumulated in the organizations, industry, regulatory body and among the states. In this regard …	Unnecessary long sentence. Text may be modified accordingly.		A/M		Text has been deleted in response to other comments.
14	1.17/1-2	The objective of this Safety Guide is to provide guidance on developing and implementing management systems for safety and protection of human health and the environment during predisposal management and disposal of radioactive waste excluding transport….	To be specific as details are given in scope.		A/M		Revised text is clear and explicit and takes account of other comments received.
15	1.20	Although this safety guide covers radioactive waste management of thorium during the activity mentioned at Sr. No. a) i.e. "Mining and processing of uranium ores and thorium ores" However, thorium has not been included for radioactive waste management in subsequent fuel cycle process mentioned at Sr. No. b) which only specified Uranium conversion.	May be considered			R	The list is only a list of examples so it is not necessary to include everything.
16	1.23	The reference No [2] is found repeated in statement i.e. "……that are required to meet some or all of the requirements established in Refs' [1], ~~[2],~~ [2], [3], [13] and [14]"	Repetition may be deleted	A			
17	1.24/2-10	Section 2 provides recommendations on	Sections are described		A/M		Revised text takes

COMMENTS BY REVIEWER Reviewer: PAEC Country/Organization: Pakistan/PAEC			Page 4 of 15 Date: 26-06-2019	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		the achievement of the fundamental safety objectives. Section 3 provides recommendations on leadership in ensuring safety. Section 4 describes key points for establishing a radioactive waste management system, including the use of integrated management systems, the use of a graded approach, and considerations of goals, strategies, plans and objectives. This section also provides recommendations on the management of resources, the management processes and activities, and documentation. Section 5 provides recommendations on culture for safety. Section 6 provides recommendations on the measurement, assessment, evaluation and improvement of the management system, and the management of contractors and the supply chain.	with a sequence as they are in GSR-3 which is easy to understand that what is included in each section (may be modified as proposed)				account of this and other comments received.
18	2	The responsibility of regulatory body has not been defined regarding oversight for the safe operation of radioactive waste management facility.	It may be defined		A/M		The responsibility of the regulator with respect to radioactive waste management facilities and activities is defined in GSR Part 5. It would be a distraction to reproduce the

COMMENTS BY REVIEWER Reviewer: PAEC Page 5 of 15 Country/Organization: Pakistan/PAEC Date: 26-06-2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
							relevant requirements from GSR Part 5 on this topic in this safety guide which is primarily on the management system. A reference is given.
19	2.1	Replace 2[2] by 2[5] in the bold text above 2.1	The reference of GSR part 2 is at number 5 in the Reference section.	A			
20	2.1 / 5	Safety should be considered **in all business decisions, activities and** associated management system documentation.	'Any' takes a singular object/noun after it. That's why 'any' is replaced by 'all'.	A			
21	2.2	The term "operator's organization" is defined as "operating organization" in draft 2016 revision of IAEA glossary terminology used in nuclear safety and radiation protection	May be considered	A			
22	2.2	The statement "…. Should define and implement an organization's safety policy based on the national policy and strategy". May be modified as "…. Should define and implement an organization's safety policy based on the national policy and strategy **for safety**"	As referred in requirement 1 of GSR part 1 2016May be considered	A			
23	2.4/2-3	… adequate funding is available for	For better understanding		A/M		Adopted with minor

COMMENTS BY REVIEWER Reviewer: PAEC Country/Organization: Pakistan/PAEC			Page 6 of 15 Date: 26-06-2019	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		current and subsequent waste management steps leading to its final disposal.					wording changes (to avoid 'final' disposal).
24	2.9 / 1	Because of the nature of radioactive waste management**,** there may be occasions when no private owner of the waste is identified…	A comma added in first line	A			
25	2.11 / 1	**Under the direction and oversight of senior management…. Or Under the senior management's direction and oversight….**	Grammatical	A			
26	2.11 / 6	…that reflects the characteristics **of waste, waste management facility and site & its vicinity**…	Grammatical			R	The suggested wording is poorer.
27	3	A clause may be added where the leadership/mangers encourages individuals to freely identify the factors that may adversely affect the safety	May be considered			R	The proposed comment is generic. It is not specific to waste management and would, therefore, be better included in DS513.
28	3.1	Replace 2[2] by 2[5] in the bold text above 3.1	The reference of GSR part 2 is at number 5 in the Reference section.	A			
29	3.5 / 2	According to GSR part 2 {3.1 (c)}, setting behavioral expectations is the responsibility of Senior Management not of Managers as stated in para 3.5 of draft guide. It may be rewritten accordingly.	For compliance with GSR part 2		A/M		The text has been revised so it is not inconsistent with GSR Part 2.

Form for Comments
The Management System for the Predisposal Management and Disposal of Radioactive Waste: DS477

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: PAEC Country/Organization: Pakistan/PAEC			Page 7 of 15 Date: 26-06-2019				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
30	3.6 / 7	'…need to achieve the policies, objectives and **safety goals** of the organization.'	The paragraph outlines the Management's role to promote personnel involvement in implementation and development of management system for achieving policies and objectives of the organization. However, it misses the safety point: that is, all of this is done to achieve safety goals and enhance safety performance in particular.	A			Text revised to include.
31	3.6 / 8	'….and to attain higher levels of **safety performance**.'		A			Text revised to include.
32	4	An important element i.e. "Commissioning of facilities" is not covered in management of processes and activities in section 4.	Commissioning of Facilities may also be covered	A			Text has been added.
33	4	Rewrite the heading 'Responsibility for integration of Safety into Management System'. Apply 'Bold' format to the heading.	Formatting	A			
34	4.1/5-8	… during periods of organizational change by ensuring that amongst other things the new staff including leaders and managers possess the necessary competencies and are suitably qualified and experienced.	Excessive use of comma (,)		A/M		The text has been simplified for increased clarity.
35	4.1	Replace 2[2] by 2[5] in the bold text	The reference of GSR	A			

COMMENTS BY REVIEWER Reviewer: PAEC Country/Organization: Pakistan/PAEC			Page 8 of 15 Date: 26-06-2019	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		above 4.1	part 2 is at number 5 in the Reference section.				
36	4.1	Section 4.1 states "Senior management should ensure that the management system continues to be properly implemented, assessed, and improve during periods of organizational change…" *However the referred section of this guide section does not specify how the management system will address the effect on safety with change in senior management*.	May be considered	A			A new sentence has been added to para 4.4.
37	4.1-4.11	According to GSR part 2 {4.2}, Senior management shall be responsible for establishing safety policy. *This point is missing in this section of the draft guide. Hence, the safety policy may be discussed in this section.*	For compliance with GSR part 2			R	Already covered in Para. 2.2 and 4.15.
38	4.1-4.11	GSR Part 2 {4.4} states that 'Senior management shall ensure that measurable safety goals…. are established at various levels in the organization'. *Are the policies established by senior management in this section of the draft guide actually the measurable safety goals? This point should be clarified otherwise a guidance point should be introduced for measurable safety goals.*	For compliance with GSR part 2			R	Already covered in Sections 2 and 5. Explicitly addressed at para 4.18(g).
39	4.2	The reference of safety guide for	The statement "the	A			

COMMENTS BY REVIEWER Reviewer: PAEC Country/Organization: Pakistan/PAEC			Page 9 of 15 Date: 26-06-2019	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		Resource management necessary for managing and controlling radioactive waste has not been mentioned properly.	guidance presented in this Safety guide; the guidance in **Ref. Error! Reference source not found**" should also be modified as "the guidance presented in this safety guide should also be considered"				
40	4.2 / 1	Senior management should put in place arrangements to ensure **that** management at all levels…'	'that' added in 1st sentence	A			
41	4.12	Alignment of paras different from rest of the document	Formatting	A			
42	4.13			A			
43	4.13 / 1	**Senior management** should…	Removal of 'the'	A			
44	4.13 / 10	'… for facilities and **activities; continuous** and demonstrable….'	A semicolon added in place of comma		A/M		Text revised for greater clarity.
45	4.15	A guideline may be added that the policies should be **"available to relevant interested parties, as appropriate".**	May be considered	A			This is covered implicitly by para. 4.18(c) and (i).
46	4.15/k	Commit to provide and promote innovative solutions for radioactive waste management optimization and its minimization	For inclusion of technological advancement and R&D in the policies and strategies			R	The issue is to minimize waste. Whether this is by innovation is irrelevant. The primary aim of the safety standards is safety.
47	4.179	Replace **2[2]** by **2[5]** in the bold text above 4.179.	The reference of GSR part 2 is at number 5 in	A			

COMMENTS BY REVIEWER Reviewer: PAEC Country/Organization: Pakistan/PAEC			Page 10 of 15 Date: 26-06-2019	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			the Reference section.				
48	4.18 / 2	'… the direction for the **organization whilst ensuring** a high level of safety'	Grammatical			R	Whilst is not an improvement over while and in fact is less accepted in countries such as the US.
49	4.20	On guidance about "interaction with interested parties', the first step in the management system should be to identify the interested parties. The consideration of their expectations comes afterwards.	For consistency and better understanding	A			New text has been introduced (at what are now paras. 4.23 and 4.24) to address this comment and closely related comments from other Member States.
50	4.30	Replace **2[2]** by **2[5]** in the bold text above 4.30.	The reference of GSR part 2 is at number 5 in the Reference section.	A			
51	4.30-4.40	In the Integration part, there is no guidance on 'Arrangements in the management system for the resolution of conflict arising in decision making' as required by GSR part 2 (4.10). Guidance regarding the mentioned point may be included in this section.	For compliance with GSR part 2			R	This was omitted because it was generic and not waste management specific. It should be addressed in DS513.
52	4.41	Replace **2[2]** by **2[5]** in the bold text above 4.41.	The reference of GSR part 2 is at number 5 in the Reference section	A			
53	4.48 / 1	Replace **2[2]** by **2[5]** in the 1st line.	The reference of GSR part 2 is at number 5 in	A			

COMMENTS BY REVIEWER Reviewer: PAEC Page 11 of 15 Country/Organization: Pakistan/PAEC Date: 26-06-2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			the Reference section				
54	4.48	In the last line of (4.20), insert the correct inverted commas at the end.	Grammatical	A			
55	4.51 / 1	Waste management activities may vary greatly in size and complexity, **involve a number** of organizations and **continue over extended periods**…'	Removal of unnecessary 'may' from the 1st sentence	A			
56	4.54	These should be included in list • System Descriptions • Site characteristics • Transfer records from previous waste management steps, including waste processing, handling and storage • Disposed of waste packages Records of Evolutions	Records that should be included			R	The first 2 suggested bullets are within the safety case, waste transfer is already included in para' 4.54 and the last bullet only refers to disposal facilities and is included in para' 4.62.
57	4.6 / 5	'…**to a variety of** waste management facility operators.'	Variety and different are synonyms.			R	They are not the same in this context. "Different" could mean another operator doing the same task whereas "variety" implies an operator doing a different task.
58	4.64	The reference of safety guide for resources management necessary for managing and controlling radioactive	The statement "the guidance presented in this Safety guide; the	A			

COMMENTS BY REVIEWER Reviewer: PAEC Page 12 of 15 Country/Organization: Pakistan/PAEC Date: 26-06-2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		waste has not been mentioned properly	guidance in **Ref. Error! Reference source not found**" should also be modified as "the guidance presented in this safety guide should also be considered"				
59	4.64	Replace **2[2]** by **2[5]** in the bold text above 4.64.	The reference of GSR part 2 is at number 5 in the Reference section.	A			
60	4.64	Formatting of heading 'Management of Resources' inconsistent with the rest of the document	Formatting	A			
61	4.66 / 2	The management system… that **there is sufficient number** of personnel, these personnel have…	Grammatical			R	Sentence is correct. Proposal starts in the singular and ends in the plural.
62	4.67 / 6	...and the generation of waste **in case of** operator error.	Grammatical	A			
63	4.67/2-6	…the interrelationships of all steps in the process of waste management, and are aware of the potential consequences for safety, environmental protection, and human health as a result of operator error during waste generation.	Inappropriate sentence			R	The sentence is appropriate and important.
64	4.68 / 2	…qualified to perform their **tasks efficiently.**	Grammatical			R	Sentiment is implicit. "Tasks" are actions whereas "functions" includes

COMMENTS BY REVIEWER Reviewer: PAEC Page 13 of 15 Country/Organization: Pakistan/PAEC Date: 26-06-2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
							duties.
65	4.69/1-3	Human resource planning by senior management for waste management activities of long duration, e.g. disposal, should incorporate measures to ensure the **continuous** availability of a sufficient number of competent personnel.	Text correction			R	"Continuous" and "continuing" have different meanings and "continuing" is correct in this context.
66	4.69 / 5	In these periods**, there is a risk of reduction…**	Grammatical			R	Current wording is correct
67	4.7 (c)	Rephrase as 'resolving any potential conflicts **among requirements** and **within processes** of the management system.'	Grammatical	A			Sentence was OK, but has been broken into two parts for greater clarity.
68	4.71 (b)	Installation of new equipment;	Grammatical			R	Phrase is OK.
69	4.71 (f)	Introduction of additional control points;				R	Phrase is OK.
70	4.77 / 6	Start the reference 4.29 from a new line.	Formatting	A			
71	4.79	The reference of safety guide for Processes for predisposal management and disposal of radioactive waste has not been mentioned properly.	The statement "the guidance presented in this Safety guide; the guidance in **Ref. Error! Reference source not found**" may be modified as "the guidance presented in this safety guide should also be considered"	A			
72	4.8 / 3	'…. all the waste management activities are covered in a comprehensive and coherent manner **and continuously over the period during which** associated safety, human health….'	Grammatical			R	Sentence is OK.

Form for Comments
The Management System for the Predisposal Management and Disposal of Radioactive Waste: DS477

COMMENTS BY REVIEWER Reviewer: PAEC Page 14 of 15 Country/Organization: Pakistan/PAEC Date: 26-06-2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
73	4.80 / 2	'… in order of decreasing **effectiveness:** hazard elimination…'	Use of colon instead of a comma	A			
74	4.80 / 3	In the context of radioactive **waste management,** examples of…	Addition of comma	A			
75	4.81 (b) (d) (e) (f)	Remove 'the' from start	Grammatical	A			
76	4.81 (d)	use semi-colon at the end instead of full stop		A			
77	4.82 / 1	….**sequence of steps involved** and issues…'		A			
78	4.82 (b)	Planning for the sealing of exploration boreholes that are no longer in use and that might affect safety of the disposal system**;**	Use semicolon at the end instead of full stop	A			
79	4.82 (h)	Any requirement…	Use singular noun with 'Any'			R	There may be more than one requirement. The text has been deleted in response to other comments.
80	4.86	The requirement for development of calibration management program for measuring & test equipment MTE use in the facility has not been addressed	It may be addressed in the relevant section	A			Mentioned additionally at what is now para 4.193
81	4.87/4	……implemented, maintained and **continually** reviewed…..	The term continually is more suitable in that context instead of “appropriate”.		A/M		Continuously is the word used in the requirements.
82	4.88/1-6	This para may be omitted.	The context of this para has already been covered			R	It is not agreed that 4.87 covers 4.88 –

COMMENTS BY REVIEWER Reviewer: PAEC Page 15 of 15 Country/Organization: Pakistan/PAEC Date: 26-06-2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			in para 4.87.				they are different.
83	4.94/1-3	This para may be omitted.	Explained process has already been defined in para 4.89.			R	4.89 does not cover 4.94.
84	4.93/ additional line after e)	f) Design and Construction of Drainage system	It's a most significant special process that should be included in special process		A/M		Special processes are examples. Drainage systems are too specific to mention but the point is covered by the maintenance of engineered SSCs.
85	4.94/ 1-2	Processes may need to be derived, if problems arise, for already emplaced waste packages that have to be retrieved and relocated…	Concise		A/M		Text has been improved.
86	4.97/2	"The results should be recorded" should be omitted.	Not relevant			R	It is important special processes are recorded.
87	4.97/2-3	For those special processes where industry standards apply, the requirements of such standards should be complied with conformance to these requirements.	Incomplete sense. It should be made separate para		A/M		The existing words are clear whereas the suggested replacement is confusing.
88	4.134	A para should be added for qualification of data. (i-e. review & qualification of existing or published data, gathering and qualification of new data)	Qualification of data is prime requirement for building confidence on safety assessment results/safety case		A/M		Additional text has been added to the existing paragraph.
89	4.138/5	Development of conceptual design…	Conceptual is term more	A			

COMMENTS BY REVIEWER Reviewer: PAEC Page 16 of 15 Country/Organization: Pakistan/PAEC Date: 26-06-2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			related to design than tentative				
90	4.147	The para 4.147 may be include in monitoring of facilities (4.173-4.178).	The para is explaining monitoring of facility.		A/M		It was considered to move this para but in the end decided to re-write it for better emphasis of the point being made.
91	4.162 & 4.163/1	Prior to emplacing waste packages in a storage or disposal facility, measures should be taken as appropriate to ensure that:	These two paras should be merged to avoid repetition			R	Although they are the same in some parts, they cannot be combined as they deal with different aspects, one being specific to storage and the other disposal. Also, other comments received have requested clarity over which paragraphs apply to storage and which apply to disposal.
92	4.168/1-3	This para may be omitted.	Documentation of inventory has already been asked in 4.152, 4.163			R	Neither of the 2 paras. cited explicitly required the inventory.
93	5.1	Replace **2[2]** by **2[5]** in the bold text above 5.1.	The reference of GSR part 2 is at number 5 in the Reference section.	A			

Form for Comments
The Management System for the Predisposal Management and Disposal of Radioactive Waste: DS477

COMMENTS BY REVIEWER Reviewer: PAEC Country/Organization: Pakistan/PAEC			Page 17 of 15 Date: 26-06-2019	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
94	5.4/1-2	Organizations involved in waste management should have a strong culture for safety, which is a foundation that supports continuous success of activities through the management system	Repetition of "a strong culture of safety"	A			
95	5.6/4	For example in the case of disposal facility, its long term nature (as it extend over a long time period) and diverse nature (includes broad range of activities and possibly a series of organizations), there are different safety hazards to consider.	To more specifically elaborate the nature of disposal system.			R	The existing sentence is OK. The suggested text is not an improvement.
96	5.8 / 2	…. and improve **employees'** motivation and competence.	Grammatical	A			
97	6.1	Replace **2[2]** by **2[5]** in the bold text above 6.1 and also in the 1st line of 6.1.	The reference of GSR part 2 is at number 5 in the Reference section.	A			
98	6.4	Replace **2[2]** by **2[5].**		A			
99	6.4	The reference of safety guide for the processes for measurement, assessment and improvement applicable to the management system for control of waste management, including disposal has not been mentioned properly	The statement "the guidance presented in this Safety guide; the guidance in **Ref. Error! Reference source not found**" may be modified as "the guidance presented in this safety guide should also be considered"	A			
100	6.6	The sentence "where assessments and self-assessments are performed on work	It may be rectified	A			

COMMENTS BY REVIEWER Reviewer: PAEC Page 18 of 15 Country/Organization: Pakistan/PAEC Date: 26-06-2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		processes…" maybe modified as "Where independent assessments and self-assessments are performed on work processes"					
101	6.8 / 5	… programmes within the state and in other states.	Grammatical	A			
102	6.22	Replace **2[2]** by **2[5]** in the bold text above 6.22.	The reference of GSR part 2 is at number 5 in the Reference section.	A			

TITLE: The Management System for the Predisposal Management and Disposal of Radioactive Waste (DS477) - [Status: Step 8]

COMMENTS BY REVIEWER *Country/Organization:* ***Pakistan/PNRA*** *Date:* ***July, 2019***				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Agreed	Agreed, but modified as follows	To be discussed	Justification for modification
1.	Footnote, Page 2	~~1 INTERNATIONAL ATOMIC ENERGY AGENCY, The Management System for the Disposal of Radioactive Waste, IAEA Safety Standards Series No. GS-G-3.4, IAEA, Vienna (2008).~~ 1~~2~~ INTERNATIONAL ATOMIC ENERGY AGENCY, The Management System for the Processing, Handling and Storage of Radioactive Waste, IAEA Safety Standards Series No. GS-G-3.3, IAEA, Vienna (2008). 2 INTERNATIONAL ATOMIC ENERGY AGENCY, The Management System for the Disposal of Radioactive Waste, IAEA Safety Standards Series No. GS-G-3.4, IAEA, Vienna (2008).	The orders in which the footnotes are mentioned in the text is not same as given at the end of the page. Please align the Foot notes on page 2 for GS-G-3.3 and GS-G-3.4 in accordance with the relevant text of para 1.4.	A			
2.	Para 1.14	……..…… considered in developing management systems for predisposal management and disposal of **radioactive waste** ~~activities~~, to give due recognition to the international implications ~~of the activities~~.	The term "disposal of activities" is not normally used in IAEA documents therefore it needs to be modified. This should also be inline with the title of the document.	A			
3.	Para 1.20	f) Management (i.e. processing ~~including reprocessing~~, storage, and disposal) of **radioactive** waste ~~fuel~~;	Reprocessing is not part of radioactive waste management. The terminology 'waste fuel' is not commonly used in the	A			

COMMENTS BY REVIEWER *Country/Organization:* ***Pakistan/PNRA*** *Date:* ***July, 2019***				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Agreed	Agreed, but modified as follows	To be discussed	Justification for modification
		h) Decommissioning ~~and environmental remediation.~~ **g) Environmental remediation**	IAEA documents. therefore these may be deleted. Environmental remediation is a separate topic and may be written separately.				
4.	Para 4.17	b) changes in regulations or in the regulatory body responsible for **ensuring safety of radioactive** waste management and the environment	Regulatory bodies are mainly responsible to ensure safety. Therefore the underlined phrase may be added. It will also elaborate the responsibility of the regulatory body.	A			
5.	Para 4.21	The requirements of some interested parties (e.g. the regulatory body) must be complied with, while the expectations and preferences of some other interested parties may ~~never~~ be complied with **where necessary** ~~entirely~~.	The word "never" is not suitable and may be replaced with "where necessary".		A/M		The comment is accepted. The Text has been revised so that the word 'never' is not used.
6.	Para 4.4	……such as changes in responsibilities and interdependencies between waste management facilities, **waste generators** and processes.	To make in line with para 3.21 of IAEA GSR Part 5 as interdependencies covers all steps from generation to disposal.	A			
7.	Para 4.4	……..... such as changes in responsibilities and interdependencies ~~between~~ **among different steps and processes in radioactive** waste management ~~facilities and processes~~.	The interdependencies are always among the different steps of waste management, therefore the phrase "facilities and process" may be removed.	A			

COMMENTS BY REVIEWER *Country/Organization:* ***Pakistan/PNRA*** *Date:* ***July, 2019***				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Agreed	Agreed, but modified as follows	To be discussed	Justification for modification
			This is also reflected in para 3.22 of SF-1 and para 4.27 of DS477.				
8.	Para 4.52	f) The ~~dose equivalent~~ radiation level at the package surface;	The term "dose equivalent rate" may be replaced with "radiation level" to make it inline with IAEA SSR-6, 2018 edition.	A			
9.	Para 4.89	ab) Emergency Preparedness ac) Hazard Assessment	May be added		A/M		"Emergency preparedness" has been added as a new bullet point (bb). "Hazard assessment" is already covered by bullet point (b) because it is a part of safety assessment and safety case development.
10.	Para 4.93	d) Some waste emplacement activities (e.g. large spent fuel containers ~~and supercontainers~~).	The terminology of 'supercontainer' is not being used in IAEA safety standards, (e.g., IAEA Safety Glossary). May be deleted or it may be defined in this document.	A			
11.	Para 4.101	4.101 Inspections carried out as part of **predisposal** waste management activities should include: a) Inspection at source of items important to safety~~, and human health~~ and environmental protection for which	The phrase "predisposal" makes the sentence more clear. The term human health is normally not used, please	A			

COMMENTS BY REVIEWER *Country/Organization:* ***Pakistan/PNRA*** *Date:* ***July, 2019***				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Agreed	Agreed, but modified as follows	To be discussed	Justification for modification
		the quality is difficult to verify upon receipt; b) Inspection on receipt of items important to safety~~, and human health a~~nd environmental protection, including verification of related certification and documentation; c) Inspection, and testing on receipt, of characteristics of commercial grade items that are important to safety~~, and human health~~ and environmental protection; f) In-process inspection of waste treatment and **conditioning** ~~waste immobilization processes~~;	delete or otherwise define this term. According to definition of "Radioactive waste management" given in IAEA Safety Glossary, 2016, the term conditioning is more broaden to be used.				
12.	Para 4.102	c) Inspection at source of items important to safety~~, and human health~~ and environmental protection for which the quality is difficult to verify upon receipt; d) Inspection on receipt of items important to safety~~, and human health~~ and environmental protection, including verification of related certification and documentation; e) Inspection, and testing on receipt, of characteristics of commercial grade items that are important to safety~~, and human health~~ and environmental protection;	The term human health is normally not used, please delete or otherwise define this term.	A			

COMMENTS BY REVIEWER *Country/Organization:* ***Pakistan/PNRA*** *Date:* ***July, 2019***				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Agreed	Agreed, but modified as follows	To be discussed	Justification for modification
		f) Inspection of installed items that are important to safety, environmental protection or **in** the safety case, including witnessing of equipment and/or system operational tests;					
13.	4.111/line 4 to line 9	The processes and activities that directly determine the level of safety, and human health and environmental protection should be managed carefully. Additionally, the activities involved in assessing and demonstrating safety, and human health and environmental protection should be managed (e.g. site characterization, facility design, environmental impact assessment, establishment of waste acceptance criteria, planned and systematic methods for waste emplacement and inspection, collection of operational data, facility monitoring and the use of surveillance systems)	The original text is confusing.	A			
14.	4.136 to 4.140	Text related to management system may be included.	Text in these section is describing the process of designing rather than the management system for designing phase. Management system related information should be of prime importance rather than the process of designing. facilities.	A			

COMMENTS BY REVIEWER *Country/Organization:* ***Pakistan/PNRA*** *Date:* ***July, 2019***				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Agreed	Agreed, but modified as follows	To be discussed	Justification for modification
15.	Para 4.144	The management system should include a process and procedures to ensure that facilities are constructed in accordance with the conditions of the licence, ~~the assumptions and the~~ design **as described** ~~included~~ in the safety case **and** ~~reviewed~~**/approved** by the regulatory body, and any other relevant requirements (e.g. for environmental protection during site characterization).	The changes will align this para with the Requirement 18 of GSR part 5.		A/M		The text has been made consistent with GSR Part 5
16.	Para 4.149	4.149 The management system should include a process and procedures to ensure that facilities are operated in accordance with **national regulations and international standards,** the conditions of the licence and the assumptions and the designs **as described** ~~included~~ in the safety case ~~reviewed~~**/approved** by the regulatory body.	The changes will align this para with with Requirement 19 of GSR part 5.	A			
17.	Para 4.170	……..... In particular, Requirement 7 of GSR (Part 6) [36] requires that the operator's **integrated** management system covers all aspects of decommissioning.	The changes will align this para To be in line with GSR part 6.	A			
18.	6.6	Please include the information given at para 6.6 of IAEA GSG 3.4.	The para 6.6 of DS 477 is taken from para 6.6 of IAEA GSG 3.3 - The Management System for the Processing, Handling and Storage of Radioactive Waste which does not address the	A			

COMMENTS BY REVIEWER *Country/Organization:* ***Pakistan/PNRA*** *Date:* ***July, 2019***				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Agreed	Agreed, but modified as follows	To be discussed	Justification for modification
			information related to disposal mentioned at para 6.6 of IAEA GSG 3.4 - The Management System for the Disposal of Radioactive Waste.				
19.	6.7	Para 6.7 of IAEA GSG 3.3 may be included with respect to storage and/or disposal.	This para describe the verification and methodology of the waste acceptance criteria of waste packages for storage/disposal and may be included in the DSS477.	A			
20.	6.7(c)	"the operator of the ***predisposal facility and*** disposal facility;"	To make in line with the scope of DSS 477.		A/M		The offending text has been deleted as the point is covered elsewhere.
21.	6.8	In conducting planned reviews of the management system,……***specifically during the period of institutional control.***	For more clarity as mentioned at para 6.10 in IAEA GSG 3.4.		A/M		Comment accepted but a slightly modified text has been adopted.
22.	Para 6.10	a) The waste management activities (e.g. **treatment,** conditioning, ~~packaging,~~ storage) under the control of the organization being assessed;	According to definition of "Radioactive waste management" given in IAEA Safety Glossary, 2016, 'treatment' is an important part of waste management activities. 'Packaging' is a part of conditioning.	A			
23.	Para 6.11	a) ……engineered barrier construction, disposal facility operation, closure and **institutional** control) under the…….	After the closure of the facility, the term institutional control is used. This will	A			

COMMENTS BY REVIEWER *Country/Organization:* ***Pakistan/PNRA*** *Date:* ***July, 2019***				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Agreed	Agreed, but modified as follows	To be discussed	Justification for modification
			align the para with requirement 22 of SSR 5.				
24.	6.11(b)	The safety case and the performance of the waste disposal facility, as may be determined by direct or indirect measures of the performance of the engineered systems, and natural and induced physical behaviours (e.g. groundwater movement, geological response to the heat load on the facility due to waste).	The first sentence of DSS 477 may be modified as per 6.12(b) of IAEA GSG 3.4 as it gives more clarity.	A			The wording has been modified for greater clarity.
25.	Appendix I Para I.1	I.1 The following activities should be considered when a decision is made to carry out ~~operations~~ **activities** involving the management of radioactive **waste** ~~materials~~: …… e) establish steps ~~in~~ for the management of ~~the radioactive materials and~~ radioactive waste;	This will align this Para with the title of this para, i.e., DESIGN STAGE ASPECTS Radioactive material is not in the scope of this document, therefore may be deleted.	A			
26.	Para I.2	I.2 The following activities should be considered when radioactive **waste is first received at** ~~materials are introduced into~~ the facility: …… d) ~~establish and~~ monitor the behaviour of radioactive waste and other hazardous materials related to the radioactive waste;	This will align it with para 1.22(ii) of SSR-5. The word 'establish' does not seem suitable and may be deleted.	A			The point is accepted. The word establish has been deleted. The waste needs to be characterized and subsequently monitored.
27.	Title of Appendix II	KEY MANAGEMENT SYSTEM ASPECTS ~~SPECIFIC TO OPERATION, CLOSURE~~	The title may be modified by deleting the "SPECIFIC TO OPERATION, CLOSURE	A			

COMMENTS BY REVIEWER *Country/Organization:* ***Pakistan/PNRA*** *Date:* ***July, 2019***				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Agreed	Agreed, but modified as follows	To be discussed	Justification for modification
		~~AND POST-CLOSURE ACTIVE INSTITUTIONAL CONTROL OF~~ **FOR** RADIOACTIVE WASTE DISPOSAL FACILITIES	AND POST-CLOSURE ACTIVE INSTITUTIONAL CONTROL OF" as the detail is given in para II.1 of this document.				
28.	General	The terminology "repackaging" used in paras 4.102, 6.15 and II.4 may be defined somewhere in the document.	Repackaging is not addressed either in GSR Part 5 or in SSR 5 or in IAEA Glossary.	A			
29.	General	In some places the term: "safety, and human and environmental protection" (in paras 1.11, 4.10, 4.15, 4.21, 4.23, 4.32, 4.37) is used while in other places the term "safety, and human health and environmental protection" (in paras 4.42, 4.44, 4.45, 4.62, 4.66, 4.87, 4.101, 4.102, 4.104, 4.111, 4.121, 4.130, 4.136, 4.138, 4.183, etc.) is used for the same purpose. There is a need to harmonize the terminology.	For consistency/ harmonization, the term "safety, and human health and environmental protection" may be used throughout the document.		A/M		Just "safety" has been used as this is consistent with IAEA Glossary.
30.	General (Whole DS)	Disposal of Radioactive Waste	In this draft different terminologies are used e.g. "Waste Disposal" and "Radioactive Waste Disposal", "Disposal of Waste" and "Disposal of Radioactive Waste" It is suggested that there should be consistency regarding said terminologies.	A			

COMMENTS BY REVIEWER *Country/Organization:* ***Pakistan/PNRA*** *Date:* ***July, 2019***				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Agreed	Agreed, but modified as follows	To be discussed	Justification for modification
31.	Reference [19]	INTERNATIONAL ATOMIC ENERGY AGENCY, Decommissioning of Medical, Industrial and Research Facilities, IAEA Safety Standards Series No. SSG-49, IAEA, Vienna (in preparation). SSG-49	The reference may be modified as suggested.	A			
32.	Reference [25]	~~NEA, Foundations and Guiding Principlesfor the Preservation of ……..OECD Nuclear Energy Agency, Paris, France (2014).~~	Ref [25] is mentioned in references but has not been referred in the whole DS-477. So it may be deleted.		A/M		It is now referred to in the text.
33.	General Errors	Replace word should with shall in para 6.2 of GSR Part 2 mentioned under para 6.1 of DSS 477.	Instead of reference number ***Error*** is shown	A			
		Replace word vents with events in para 6.7(a) of GSR Part2 mentioned under para 6.1 of DSS 477.	To make in line with para 6.7 of IAEA GSR Part2.	A			

Form for Comments

***The Management System for the Predisposal Management and Disposal of Radioactive Waste* (DS477)**

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Poland / PGE Country/Organization: Poland / PGE EJ1			Page 1 of 17 Date: 2019-06-04				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	1.10, c	In some jurisdictions, ownership (and hence ultimate responsibility) for waste is transferred when the waste changes the official owner ~~hands~~.	To clarify the ownership which is not equivalent to "hands".		A/M		The text has been modified to clarify.
2.	2.1	The fundamental safety objective is to protect people and the environment from harmful effects of ionizing radiation [1]. The operating organization as a legal entity and a licensee bears the final responsibility for achievement of fundamental safety objective. The senior management[4] of the operating~~or~~ organization as a leader of all activities performed at facility and coordinator of whole waste management process is responsible for development~~ing~~ of the objectives, strategies, goals, and plans for activities with a focus on achieving the fundamental safety objective...	Operating organization of the facility as a legal entity is a licensee. Operating organization as a whole is responsible for achievement of fundamental safety objective and development of objectives, strategies, goals, and plans for activities. Senior management here should play the role of coordinator and leader in the development process (see paragraph 2.11) and is responsible for ensuring, that objectives, strategies, goals, and plans for activities, etc. shall be developed. Due to this it should be clarified in the paragraph 2.1 that Operating	A			The text is clear that the operator has the prime responsibility for safety. The footnote explains that the term operator is synonymous with operating organization. For reasons of consistency and others operator is the correct term to use in safety guides related to radioactive waste management. The role of senior management in coordination of activities is mentioned.

COMMENTS BY REVIEWER Reviewer: Poland / PGE Page 2 of 17 Country/Organization: Poland / PGE EJ1 Date: 2019-06-04				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			organization as a licensee bears the final responsibility for fundamental safety objectives achievement, while senior management role is a process coordination as a whole.				
3.	2.3 / 6	Undertaking this task should involve the development of a safety case, which is understood in IAEA Safety Glossary as : *„a collection of arguments and evidence in support of the safety of a facility or activity.* *For a disposal facility, the safety case may relate to a given stage of development. In such cases, the safety case should acknowledge the existence of any unresolved issues and should provide guidance for work to resolve these issues in future development stages"* It may be an report (safety assessment) including consideration of: the characteristics and quantities of the radioactive waste to be managed;	"Safety case" is an artificial term, which true meaning cannot be defined without provision of proper clarification or definition.			R	The Safety Case is clearly defined in the IAEA Safety Glossary and it does not need to be defined again here. The Safety Case for radioactive waste management is well described in the Safety Standards (e.g. GSR Part 5, SSR-5, GS-G-3, SSG-23) and the concept is very well recognized.
4.	2.4	~~Senior management of an~~ Operating organization of the facility which ~~that~~ generates	Operating organization as a legal entity and a licensee bears the final responsibility for ensuring adequate			R	It is implicit that it is the operator/Licensee that is ultimately responsible, but this Guide is about management systems and

COMMENTS BY REVIEWER Reviewer: Poland / PGE Country/Organization: Poland / PGE EJ1			Page 3 of 17 Date: 2019-06-04	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		waste should at the time of waste generation ensure that adequate funding is available for the current waste management step and for subsequent waste management steps leading to and including disposal. ~~Senior management~~ Operating organization of the waste generating ~~organization~~ facility should ensure that adequate resources are available to manage and ensure safety of the facilities and activities. The senior management of the operating organization is responsible for making arrangements to provide sufficient financial resources, ensuring adequate financial resources in time and for planning necessary future funds in advance.	funding for waste management and disposal. (see the comment for paragraph 2.1) Senior management at the Operating organization plays the role of coordinator and process leader in all waste management steps. Senior management is responsible for the making arrangements to provide sufficient financial resources (paragraph 4.65) and necessary funds planning in advance (paragraph 4.74). This not trivial difference among responsibilities of the Operating organization as a whole and Senior management of the facility should be clarified in the safety guide.				this para. clarifies that it is the senior management within the operator/Licensee that has the responsibilities. You cannot divorce responsibilities of the organisation from responsibilities of its managers (includint its Board).
5.	4.2 / 6	"… are subject to the requirements established in GSR Part 2 [5], and the guidance presented in this Safety Guide; the guidance in Ref. **Error! Reference source not found.** should also be considered"	Lost reference during document transformation into pdf format. The reference should be fixed.	A			

COMMENTS BY REVIEWER Reviewer: Poland / PGE Page 4 of 17 Country/Organization: Poland / PGE EJ1 Date: 2019-06-04				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
6.	Sec. 4	"RESPONSIBILITY FOR THE MANAGEMENT FOR SAFETY SYSTEM" … "**Goals, strategies, plans and objectives"** … "Verification"	Section 4 is divided in many subsections and parts, which has its own titles. Font type of the subsections varies in the document, but without proper indication it is really difficult to understand each titled part level in the section and the hierarchy. Some subsection, like "Special processes" (title above paragraph 4.91), "Verification" (title above paragraph 4.104), etc. has no highlighted title at all. The font type and size for the subsections of the same hierarchy and level should be unified in the entire section. Providing numeration or alphabetization for subsections titles (at least for the highest sublevels) would be helpful in the safety guide text perception. Not highlighted subsections titles should be written at least with underlined fonts or different font size, type and style to make it easier find the proper part of subsection in the regular guide text.	A			A check has been made to ensure that the headings follow the requirements for Safety Standards publications.
7.	4.64 / 3	Resource management necessary for managing and controlling radioactive waste is subject to the	Lost reference during document transformation into pdf format.	A			

COMMENTS BY REVIEWER Reviewer: Poland / PGE Page 5 of 17 Country/Organization: Poland / PGE EJ1 Date: 2019-06-04				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		requirements established in GSR Part 2 [5], and the guidance presented in this Safety Guide and in Ref. **Error! Reference source not found.** should be considered.	The reference should be fixed.				
8.	4.77 / 6	"In particular, GSR Part 2 [5] requires in paras. 4.28 – 4.32 that:… …Records to demonstrate that the results of the respective process have been achieved shall be specified in the process documentation.4.29. The sequencing of a process and the interactions between processes shall be specified…"	In the GSR Part 2 [5] citation paragraph 4.29 should be split from paragraph 4.28.	A			
9.	4.79 / 3	Processes for predisposal management and disposal of radioactive waste are subject to the requirements established in GSR Part 2 [5], GSR Part 5 [2], and SSR-5 [3], and the guidance presented in this Safety Guide and in Ref. **Error! Reference source not found.**,…	Lost reference during document transformation into pdf format. The reference should be fixed.	A			
10.	4.80	~~The design of~~ Waste management processes should be developed ~~in general take account of~~ considering the	Hardly understandable sentence. The sentence needs revision and clarification.			R	There are 3 paragraphs: one general, one on predisposal, and one on disposal. Development is an improvement on something that already exists whereas

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Poland / PGE Country/Organization: Poland / PGE EJ1			Page 6 of 17 Date: 2019-06-04				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		~~hierarchy~~ priority and importance of radioactive waste hazard controls measures which involves, in order of decreasing effectiveness~~,~~: hazard elimination, hazard substitution, engineering controls, administrative controls and the use of personal protective equipment.	1) The list of "processes" is provided 4.89. It is unclear how the process, i.e. something related with action, or some activity that continues in time or has defined time frame can have a design. Seems that incorrect term is used. It should be noted, that in some other paragraphs is written about the "process development" which looks more proper term to be used. 2) It should be clarified which processes – waste management, predisposal waste management or waste disposal management, etc. are considered here. It should be clarified which hazards are considered here. 3) The term "hierarchy of hazard controls" is unclear in this context. If it is something related with priority or importance it should be stated so. 4) Replace ";" with ":"				design is producing something new. Para. 4.89 is about management processes, whereas the processes discussed here are processes actually performed on the waste. Text has been added to clarify.
11.	4.81	"4.81 <u>The design of processes for predisposal management</u> should take account of the detailed	Same as above (see comment for paragraph 4.80).			R	This is about 'design', for the reasons given above.

COMMENTS BY REVIEWER Reviewer: Poland / PGE Country/Organization: Poland / PGE EJ1		Page 7 of 17 Date: 2019-06-04		RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
	4.82	sequence of steps that will be involved… … 4.82 The design of processes for waste disposal should take account of the detailed sequence of steps that will be involved…	Hardly understandable meaning of the term "The design of processes". It is proposed to revise usage of this term in the entire subsection "The design of processes"				
12	4.104	If it would be difficult or impossible to verify work processes on completion, or if this would be too late, ~~the design of~~ the workflow chart should include 'hold points' at which the acceptability of important results should be verified before work proceeds. … Hold points may be waived if a satisfactory justification is provided and ~~on grounds of~~ further process safety, ~~and~~ human health and environmental protection, ~~or~~ as well as work quality [or quality of what?] is confirmed, documented and approved.	1) Editorial comment. It is proposed instead of hardly understandable term "the design of workflow" use simple and clear term "workflow chart", "workflow diagram" or "timetable of workflow". 2) Hardly understandable sentence. What is the goal and what should be confirmed, documented and approved – satisfactory justification or process safety, human health and environmental protection, work quality? Also it is unclear what quality needs to be documented and approved – process quality, done work quality or waste package.		A/M		As above, the draft text confused reviewer concerning the distinction between 'management processes' and "waste management processes" - the text has been clarified. This is about "verification", so the hold points are to confirm the waste management process is being carried out as anticipated and there is nothing unexpected. Important parameters should be identified, checked and recorded.

COMMENTS BY REVIEWER Reviewer: Poland / PGE Page 8 of 17 Country/Organization: Poland / PGE EJ1 Date: 2019-06-04				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			It is proposed to review this sentence to clarify the real goal to be achieved and confirmed in order to waive hold points.				
13.	4.109	The ~~senior management of the operator~~ operating organization is responsible for developing, implementing and maintaining a safety case documentation, on the basis of which senior management of the facility provides decisions ~~on~~ regarding facility operation, decommissioning (e.g. for a storage facility) and closure(for a disposal facility) ~~have to be made~~.	Once again mismatched final responsibility (see comments for paragraph 2.1, 2.4) Senior management will not develop a safety report by they own (see paragraph 4.115c) as example). Senior management responsibilities is *"to achieve the organization's goals without compromising safety"*. Senior management shall bear the responsibility of coordination of the development of safety report and shall ensure the safety report is implemented and maintained in the facility. Operating organization is not just senior management, but all the staff and employees and the development, implementation and maintaining of a up-to-date safety report will be a collective challenge (see more about facility staff importance and roles at the paragraphs 4.65-4.69)			R	As noted above, 'operator' rather than 'operating organization' is the correct term to use in this safety guide. Individuals are the physical manifestation of the operator/Licensee on site and are responsible for ensuring the operation is safe. As before, the operator/Licensee's responsibility is implicit, but this safety guide needs to make clear that the responsibility lies with the senior management. The safety case is the collection of safety arguments and it is essential that these are documented. Similarly, it is the responsibility of the senior management to ensure the operator/Licensee carries out its duties.

COMMENTS BY REVIEWER Reviewer: Poland / PGE Page 9 of 17 Country/Organization: Poland / PGE EJ1 Date: 2019-06-04				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			Due to said above: 1) This not trivial difference among responsibilities of the Operating organization as a whole and Senior management of the facility should be clarified in the safety guide. It should be clarified that senior management role is a process coordinator, leader and decision maker. 2) Senior management actual responsibilities should be revised in the entire document to check if there are other incorrect responsibilities assignment or transfer.				
14.	4.115 a)	…The following aspects should be taken into account in developing a management system for the development of the safety case documentation [10]: a) The need for well defined, consistent and transparent criteria according to which the ~~safety case~~ safety of the facility and facility resistance to potential hazard is evaluated and decisions are made;	Sentence is hardly understandable and requires clarification. Not the "safety case" or safety case documentation is evaluated against meeting the defined criteria, but the event, hazard, accident or problem for which the "safety case" documentation is prepared, are evaluated according to the criteria which defines the safety of the facility. In other words, if "safety case" is for fire hazard, not the "safety case" is evaluated, but potential damage caused by fire is evaluated against			R	The Safety Case is clearly defined in the IAEA Safety Glossary and it does not need to be defined again here. The Safety Case for radioactive waste management is well described in the Safety Standards (e.g. GSR Part 5, SSR-5, GS-G-3, SSG-23) and the concept is very well recognized. The safety case is the collection of arguments showing that the facility and its operations are safe. It takes account of all relevant hazards and has to show that the facility meet the relevant safety criteria. In assessing the safety of a facility, a regulator would examine the safety case not the facility itself. The safety case

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Poland / PGE Country/Organization: Poland / PGE EJ1			Page 10 of 17 Date: 2019-06-04				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			criteria which defines safety of the facility; if "safety case" is for flooding hazard, not the "safety case" is evaluated, but potential damage caused by flooding is evaluated against criteria which defines safety of the facility. Due to said above, the guide should be revised against the correctness of the "safety case" term usage and checked if what is written is what was actually thought by authors.				collects all the arguments, makes an overall evaluation, and facilitaites and independent review and judgement by the regulatory body.
15.	4.115 d)	d) The need for transparency and public involvement in the processes for development [?] and review of the safety case documentation;	Public involvement in the development of safety assessment report (or "safety case" documentation) requires additional explanation and clarification. It is understanding that public might be involved in the review, commenting and providing opinion to the safety report according to which safety report might be updated or supplemented. But it is doubtful if public can be directly or indirectly involved in the safety report development process. Moreover, safety report might contain sensitive information related to nuclear material and			R	As above, but the text has been clarified. Interested parties do not generally comment on the process for producing safety cases or become intimately involved in the conduct of safety assessments. However, both the developer of the safety case and the regulatory body do need to take account of the views of interested parties (e.g. the public) and be transparent in providing information and explanations of the reasons for decisions.

COMMENTS BY REVIEWER Reviewer: Poland / PGE Page 11 of 17 Country/Organization: Poland / PGE EJ1 Date: 2019-06-04				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			nuclear security, which should be restricted for public. This mentioned aspects should be added and clarified in the safety guide. **This comment is also related to the paragraph 4.118.** There should not be contradictions among different paragraphs regarding public involvement in the process and level of details which might be disclosed for public audience.				
16	4.118	… To increase transparency, it may also be appropriate to make the safety case documentation available to the public and to ensure that it is prepared in a manner and at a level of detail that is suitable for the intended audience.	Level of details of the safety assessment report or safety case documentation, which might be disclosed and made available to the public should be clarified in the guide (see comment for paragraph 4.115 d)).			R	It is impossible to give examples for every type of facility in this Safety Guide and they need to be assessed on an individual basis. The text has been amended to be consistent with GS-G-3 and expanded to explain its significance to waste facilities.
17.	4.133	A systematic process should be defined and applied for collecting and analysing site characterization and environmental data in support of site selection, and preparation of the site assessment and environmental impact reports as well as for the development of the safety case documentation for	1) Site characterization and environmental data usually are used for the site assessment and environmental impact reports preparation. The required documents should be clarified.		A/M		Text has been added to clarify.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Poland / PGE Country/Organization: Poland / PGE EJ1			Page 12 of 17 Date: 2019-06-04				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		planed waste disposal facility. Such data should be collected prior to facility construction, during the construction, during operation, and after the closure of a disposal facility as required by the national regulation and in volume and scope as defined in the safety case documentation.	2) It is understood that requirements comes from international standards and national regulation. Recommendations provided in safety assessment report (or safety case documentation) should not contradict with these requirements but might clarify and define in more details the period and the scope of data to be collected. Probably not all site characterization data, for example geological data obtained during initial boreholes drilling, may be continuously updated during facility life time. Or boreholes drilling should be continuously repeating as well? **This should be clarified.**				
18.	4.136	The development of the design process for a waste management facility or waste disposal facility should be part of a larger iterative process that also involves site characterization, internal and external hazards evaluation and development of the safety case documentation for the facility. Site knowledge, facility design and arguments concerning safety	There are some unclear parts in the paragraph. 1) It is unclear what does it mean "establishing safety case" and how this "safety case" can be established. 2) It should be clarified which and for what purpose technical specifications should be developed / prepared.		A/M		Text has been added to clarify. Hazard evaluation is part of the safety case.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Poland / PGE Country/Organization: Poland / PGE EJ1			Page 13 of 17 Date: 2019-06-04				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		justification, ~~and~~ as well as human health and environmental protection measures should be refined iteratively to ~~establish~~ develop a robust safety case and well-founded technical specifications [for what?].					
19.	4.177 / 3	The need to develop, initiate and sustain the environment [and site geological?] condition monitoring programme during the post-closure period for a waste disposal facility should also be considered, consistent with the national regulatory requirements and the monitoring scope defined in ~~of~~ the safety case documentation for post-closure period.	See comment 2) for paragraph 4.133. Safety report should define the volume, scope, period, etc. of environment and site condition monitoring. It should be clarified which monitoring programmes should be developed, initiated and sustained during the post-closure period.		A/M		The text has been clarified, a reference to a relevant Safety Guide has been provided, and some additional guidance on the derivation of monitoring programmes has been included. It would be too prescriptive, however, and is not possible other than on a facility/site-specific basis to specify exactly what monitoring should be done.
20.	5.2/2	Add: (eg. by starting each meeting with a question about applications in the field of safety culture or information about implemented modifications in procedures aimed at improving radiological safety and protection of radioactive materials)	A vague statement, not illustrated with examples that would show a specific action.			R	Para' 5.2 sets out the requirements. Later para's state HOW this is to be achieved, e.g. by a no blame culture and a questioning attitude.
21.	5.3/2	Add: The activities listed below should be reported to the management by the lower level	Specific actions should be indicated for the implementation of the tasks in the field of safety culture			R	It is not clear what the lower managers should be reporting, in fact the main point is that all individuals, not just managers,

COMMENTS BY REVIEWER Reviewer: Poland / PGE Page 14 of 17 Country/Organization: Poland / PGE EJ1 Date: 2019-06-04				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		managers and taken into account, for example, in the bonus system.					have a responsibility for safety and have an appropriate culture to improve it.
22.	5.4/7	Add: This should be visible in the remuneration system.	No application embodiment.			R	It is extremely doubtful whether safety and culture for safety should be related to remuneration. It encourages either nil reporting or over reporting depending upon the system. It is the workers who suffer if the facility is not safe and they should not need remunerating or rewarding.
23.	5.5/8	Add: It is recommended to move from the level of passwords to real support e.g. through the bonus system.	No application embodiment.			R	As above.
24.	5.6b/3	Add: Actions in this area should be visible in the concluded contracts.	No application embodiment.			R	Penalties and contractual details are not a subject for this Safety Guide, but text has been added to expand upon the need for a good culture for safety throughout the waste management cycle.
25.	5.6d/3	Add: Observing health and safety should strengthen the culture of safety.	The reason for placing point 5.6d is not clear.		A/M		The meaning is clear that at disposal sites workers may need to focus more on conventional safety than the hazards from radiation (although that is not an excuse for ignoring them). The need for monitoring accidents and near misses has now been included.
26.	5.8/4	Add: This should be visible to employees to specific	No application embodiment.			R	If visibility is part of encouraging the best culture, then it is implicit but so are many other factors and this is just one. The para' is really generic. However, care must be

COMMENTS BY REVIEWER Reviewer: Poland / PGE Country/Organization: Poland / PGE EJ1			Page 15 of 17 Date: 2019-06-04	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		management actions, e.g. in the job evaluation system.					taken with any incentives as described above and, therefore, this text has been deleted.
27.	6.4 / 3	…and the guidance presented in this Safety Guide and in **Ref. Error! Reference source not found**. should be considered.	Lost reference during document transformation into pdf format. The reference should be fixed.	A			
28.	6.11	Reviews of waste disposal management may be focused on, for example: a) The waste disposal activities (e.g. site characterization, disposal concept and facility design, safety case documentation development, research and development,... b) The ~~safety case~~ evaluation of the internal and external hazards, safety assessment of the process, activities and facility operation and the performance of the waste disposal facility as may be determined by direct or indirect monitoring of the disposal system. Performance may be assessed by making comparisons with the technical specifications,… and their expected evolution as documented and considered in	1) Editorial comments. Should be *"Reviews of waste disposal management"* same as in paragraph 6.10 *"Reviews of predisposal management"*. 2) 1st sentence of item b) is unclear in context of paragraph: *"Reviews of waste disposal management may be focused on… the safety case and the performance of the waste disposal facility"* It is unclear how to focus on the "safety case" and how it may help review waste disposal management, since context, content and meaning of the term "safety case" is unclear in this particular situation. It looks that not the "safety case" or not even a "safety report" should be reviewed and focused on, but existing or potential internal and external hazards, their influence to the safety of the facility and the			R	Disposal is a verb. Predisposal is used as a contraction of 'pre-disposal management of radioactive waste' and is a verb. 'Disposal management' is not a necessary term. The other points have been discussed in the earlier responses to comments.

COMMENTS BY REVIEWER Reviewer: Poland / PGE Page 16 of 17 Country/Organization: Poland / PGE EJ1 Date: 2019-06-04				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		the safety case documentation for the facility.	safety of performed activities and operation of the facility.				
29.	6.13b)	A procedure should be established to control non-conforming items including: … b) ~~positive~~ identification of non-conforming items and process equipment (e.g. tagging, labelling, stickers, marking);	It is unclear what does it mean "positive identification" in this context. Can there be "negative identification" then? It is proposed to remove "positive" or replace it with term "clear".	A			"positive" was supposed to mean "clear".
30.	6.25/4	Add: The self-assessment process should be periodically controlled by nuclear regulatory	The lack of external audit proposals makes the process of illusory self-evaluation			R	Whether regulators become involved or not is little to do with the management system. Licensees should not rely on regulatory action to show that they are safe and that their management system is adequate.
31.	II.14	a) Replacement parts or materials may no longer be available… If the original structures, systems and components were procured as commercial grade items without specifically identified requirements, it may be appropriate,… that spare parts or materials are procured on a similar basis.	There is nothing said regarding counterfeit and fraudulent items and spare parts. In case of lack of original spare parts it might become tempting to acquire CFI. The guide should be supplemented by recommendations / restrictions regarding CFI, as well as explanation of the risks should be provided in the guide.	A			Text to reflect the point has been added.

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Poland / PGE Country/Organization: Poland / PGE EJ1		Page 17 of 17 Date: 2019-06-04					
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
32.	III.1	III.1. ~~[this is an excellent candidate for an annex]~~ Table 1 describes a simplified and hypothetical application of the graded application…	Table 1 might be or might not be an annex, but text written as a comment in the brackets "[this is an excellent candidate for an annex]" in the original pdf document, should be removed from the paragraph III.1.	A			

Form for Comments

The Management System for the Predisposal Management and Disposal of Radioactive Waste (DS477)

COMMENTS BY REVIEWER **Reviewer: Nepeypivo M.A.** **Page of** **Country/Organization: Russia /SEC NRS** **Date: 07.06.2019**				**RESOLUTION**			
Comment №	**Para/Line №**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
1)	4.43	The application of the graded approach is intended to guide the degree of control applied to an item, **process and activity** so that it reflects the importance of its function **or risk associated with the process or activity**.	According to definition of the graded approach.	A			
2)	4.43	It is recommended to change the order of the sentences. The second sentence: "Grading means making the stringency of the controls by which the adequacy of such activities is evaluated commensurate with the importance of the activities"…	The explanation of the term "graded approach' should be the first.	A			
3)	4.45	A graded approach should be adopted **on the basis of findings of appropriate safety assessment studies** (e.g. on the basis of the findings of a hazard and operability (HAZOP) study ~~or other appropriate safety assessment studies~~) in applying the management system to aspects of waste **management and** disposal activities such as…	1) The safety assessment studies are required for evaluation hazards and risks associated with the facility, activity, operation or an item failure. 2) There are no specific provisions related only to disposal activity in this para. So, it can be applied to waste management activity.			R	HAZOPs is not the only way of assessing safety significance and therefore it would be wrong to just prescribe HAZOPs. The essential content of HAZOPs is included within

							safety assessment and the nature of some waste management facilities is such that other approaches to safety assessment are sometimes more appropriate and should be used to complement HAZOPs.
4)	4.68	Personnel designated to select **and implement** process technologies..	To include operating personnel into consideration	A			
5)	4.89	Processes should be specified, and the *designated process owner should be identified …*	What does it mean '*designated process owner should be identified'?*	A			
6)	4.110 d)	The management system should identify the process for developing and applying waste acceptance criteria **consistent with, and derived from** ~~commensurate~~ ~~with~~ the relevant safety case	According to Req.20 of SSR-5.	A			
7)	4.120	**According to** ~~Depending on~~ national requirements and arrangements, the operator should develop and maintain documents **of required level...**	The level and scope of the documents are defined by national requirements and arrangements			R	R&D is not restricted to national requirements and arrangements. The need for a top high level document is

							appropriate although there may be further lower level documents as well.
8)	REFERENCES	The following reference is recommended to be included into the REFERENCES list: INTERNATIONAL ATOMIC ENERGY AGENCY, Application of the Management System for Facilities and Activities, IAEA Safety Standards Series No. GS-G-3.1, IAEA, Vienna (2006).	As relevant	A			

Form for Comments

DS477: The Management System for the Predisposal Management and Disposal of Radioactive Waste

COMMENTS BY REVIEWER Reviewer: N Mmutle and T Motsware Country/Organization: National Nuclear Regulator RSA			Page… of… Date: 11 July 2019	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
1	Paragraph 1.19	This safety Guide does not address management system elements required for transport which are covered in TS-G-1.4 [17]	The way it is written gives an impression that the scope is defined in TS-G-1.4	A			The text has been changed.
2	Paragraph 1.24	Recommendations on the measurement, assessment, evaluation and improvement of the management system, and the management of contractors and the supply chain are provided in Section 6 and 4.	Management of contractors and the supply chain are covered in section 4 (from paragraph 4.178)		A/M		Rather than covering every aspect of Section 4 in the Structure, which would be too long, an overarching "management for safety" phrase has been used which would cover management of contractors as well as many other aspects.

Form for Comments

<DS477 THE MANAGEMENT SYSTEM FOR THE PREDISPOSAL MANAGEMENT AND DISPOSAL OF RADIOACTIVE WASTE >

COMMENTS BY REVIEWER **Reviewer:** Bengt Hedberg **Country/Organization:** Sweden/Swedish Radiation Safety Authority			**Page…of…** **Date:** 2019-07-10	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
1	Heading	Propose to revised heading to: "*Leadership and Management for Safety* in Radioactive Waste Management[1]"	To better reflect the link between DS477 and "parent document" (GSR PART 2): *Leadership and Management for Safety*.		A/M		A revised title is proposed taking account of this comment and those from other Member States. As suggested here we have included 'Leadership and Management for Safety' to better link to GSR Part 2. For the same reason and to better reflect the contents of the guide we have also included 'culture for safety'. We have removed the redundancy related to the word 'management' in a way that is consistent with the IAEA Safety Glossary.

[1] "Radioactive waste management" includes disposal according to the IAEA glossary 2007/2016/2018

COMMENTS BY REVIEWER **Reviewer:** Bengt Hedberg **Page…of…** **Country/Organization:** Sweden/Swedish Radiation Safety Authority **Date:** 2019-07-10				RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
2	General	The draft document should better be revised to reflect the development of DS456 now published as GSR Part 2 (i.e. focus changed from "The management system for …" to "Leadership and management for safety"	The development of DS477 started before the changed approach for DS456 was decided. Thus, the current draft should be revised to better reflect these changes.	A			An exercise has been carried out to achieve consistency.
3	General	The current version of the document contains much text that is general in character and should better be removed from this document and integrated in DS513 (see e.g. comment 6 below for one specific example)	The same elements should not be addressed in the same way in two or more documents. Thus, general elements should be addressed in the general safety guide DS513. DS477 should better address radioactive waste management specific elements only.	A			The Guide strives to be specific to waste management facilities only and to avoid generic advice to applicable to all nuclear facilities wherever possible.

COMMENTS BY REVIEWER **Reviewer:** Bengt Hedberg **Page…of…** **Country/Organization:** Sweden/Swedish Radiation Safety Authority **Date:** 2019-07-10				RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
4	General	New/additional text should be added to the document.	New/additional text should be added to the document to better reflect that systems for management of radioactive waste should encompass a cradle-to-grave perspective where several different licensees and/or organisations may be involved, each operating according to their own integrated management system (IMS) under a separate license and responsible for their licensed activities only. The aim should be to better address the relationship between overall responsibilities for management (including disposal) of the waste versus responsibility for safety in specific activities. **See also further explanations to Swedish comments in accompanying explanatory text from SSM, interpreting supporting input from the Swedish Nuclear Fuel and Waste Company, SKB, also enclosed.**	A			The points are already covered, e.g. 1.7(k), but a new Figure has been added to better illustrate the point.

COMMENTS BY REVIEWER **Reviewer:** Bengt Hedberg **Page…of…** **Country/Organization:** Sweden/Swedish Radiation Safety Authority **Date:** 2019-07-10				RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
5	Para 1.10 c)	Delete sentence: "~~... In general, it is preferred that the responsibility for the waste is transferred to the body managing the waste~~. …"	Statement is not justified. Overall responsibility for management of the waste rests with the organisation where the waste arose. Responsibility for safety for the specific activity rests with the organisation/licensee that is managing the waste in the activity at hand. Current text also contradicts what is stated in GSR Part 5, para 3.14.; "Where appropriate, the operator may delegate work associated with the aforementioned responsibilities to other organizations, but the operator has to retain overall responsibility and control."	A			The para' has been modified and also describes how ownership can be transferred. The overriding principle that is emphasised is that responsibility for safety of the waste lies with the operator of the facility where the waste resides irrespective of ownership. Clearly the owner has a responsibility to ensure the operator is competent, but it is the operator managing the waste that has the responsibility.

COMMENTS BY REVIEWER **Reviewer:** Bengt Hedberg **Country/Organization:** Sweden/Swedish Radiation Safety Authority			**Page…of…** **Date:** 2019-07-10	RESOLUTION			
Comment No.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
6	Para 4.74	Propose to delete para 4.73 in this document ~~"4.73 Knowledge management includes the assessment, structuring and integration of data and information into an interpreted, synthesized form that embodies the current knowledge and understanding on the matters concerned. The preservation and transfer of knowledge can also be considered from the point of view of risk management. The risk perspective raises the question of priorities: although ideally all information and knowledge should be preserved, practical efforts should be guided by considerations of the risks arising from the failures in this respect. Sometimes good syntheses of the information and knowledge may be more useful to future generations than the original vast amount of information (e.g. individual waste transfer notes)."~~	The text in the para is generic and not specific for management of (nuclear/radioactive) waste. Although applicable also for waste management, we consider the text in the paragraph to fit better in the general guide DS 513, under development. (This is an example of generic text that we consider to be better addressed in DS513, which is also valid for substantial parts of the current version of DS477.)	A			The Para ' has been removed.

Member State Comments on Draft Safety Guide DS477 – The Management System for the Predisposal Management and Disposal of Radioactive Waste

COMMENTS Reviewers: ONR Page 1 of 11 Organization: Office for Nuclear Regulation, United Kingdom Date: 8 July 2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	General comment		We support the proposal to separate generic management system information from specific information relevant to disposal and pre-disposal of radioactive waste guidance, as discussed at WASSC in June 2019. Given the plan to substantially change the document we have mainly provided suggestions and general comments, as opposed to proposing a large number of specific text changes.	A			
2	General comment		There are interchanges in use between 'authorization' 'licence' and use of language including 'licence conditions'. Recommend terminology is made consistent.	A			The document has been checked for consistency.

3	General comment	'spent fuel'	There are interchanges in language between 'spent fuel', 'waste fuel' and 'waste spent fuel'. Recommend consistent use of 'spent fuel' to align with IAEA Safety Glossary.	A			The text has been changed to be consistent and clear.
4	General comment	'human health and environmental protection'	Inconsistencies in the document with 'human and environmental protection', 'environmental protection' and 'human health and environmental protection'. Recommend change to 'human health and environmental protection'.	A			Just the term "safety" has now been used.
5	General comment	Safety standards should be user friendly to facilitate use by Member States. This draft safety guide (e.g. Section 4) is difficult to read and to identify key messages. A thorough review is recommended to address the following points: 1. Repetition within and between sections. 2. The document contains very detailed technical examples / guidance which are not appropriate in a guide about management systems. 3. Use of long lists.	The proposed changes will improve the user friendliness of the guide.		A/M		The document has been clarified but long lists are still included as thought to be useful and does not affect readability or user friendliness.

6	General comment	Terminology should be reviewed for consistency: all of the terms below are used presumably to mean the same thing, if they are not the difference should be explained: 1. Management system 2. Management system for radioactive waste management 3. Systems for management for safety…. 4. Radioactive waste management system 5. Management for safety system 6. Management system for waste management	We recognize the separate development of the leadership, management and safety culture document – which will address some of the more generic aspects of 'management' which do not themselves pertain specifically to radioactive waste management.	A			A review has been carried out and it should now be consistent.
7	General comment		The draft guidance is set out in a logical manner and will be a useful document.	A			
8	General comment		The requirements of the Draft Safety Guide would appear to be similar to requirements of recognized standards (e.g. ISO standards).	A			
9	Section 1	The introduction is should be edited to be more concise.	The introduction is long and appears to include text that may be better placed in the main sections of the guide.	A			The Introduction has been significantly shortened.

10	1.1	Consider rewriting in terms of the fundamental safety objective of which intergenerational equity is an important part.	As written the document focuses on management of radioactive waste to avoid imposing a burden on future generations. Recognition should be made of the need for protection of current members of the workforce, public and the environment.			R	Para 1.1 includes 'the generations that produce the waste have to seek and apply safe, practicable and environmentally acceptable solutions…'; i.e. the current generation should manage the waste safely and this implies protecting current members of the workforce and the public as well as the environment. There are numerous examples within the Guide where workforce safety is considered, but the relatively unique aspect of radioactive waste management, as compared to other nuclear facilities, is its potential longevity and, hence, potential impact on future generations. The

							text has been slightly modified.
11	1.5 1.6 1.9	Consider moving the information in these paragraphs to the main body of the guide rather than the introduction.	These appear to include guidance and would be better placed within the main body of the guide.	A			This has been done.
12	1.10	Consider if this text is appropriate in the introduction in its current form.	This paragraph comprises a long list of considerations and features of radioactive waste management which does not appear to be well linked to the management system.		A/M		The list is a series of Issues that need to be considered in the management system, e.g. change of ownership and responsibility. The text has been changed to better illustrate the point.
13	1.11	Consider deletion of text.	The majority of this paragraph is about site selection of a disposal site – not management systems.		A//M		Much of the text has been deleted.
14	1.18-1.22	Recommend summarizing and simplifying e.g. 1.18 This safety guide covers management systems for the full lifecycle of radioactive waste management from waste generation and all intermediate steps, processes and activities, up to disposal including continuing institutional controls. 1.20 This safety guide is applicable to all types of activities and facilities	The text is unnecessarily detailed.		A/M		Some simplification has been carried out, but a change of Scope at this time in its production would not be appropriate in response solely to this comment.

		involved in managing radioactive waste. This includes nuclear fuel cycle activities from uranium mining through to reactor decommissioning and non-nuclear activities such as in hospitals and industries involving NORM.					
15	Section 2 Respon-sibility for safety	This section is somewhat confusing as it primarily discusses the responsibility of the licensee (initial bold text) but then comments on the responsibilities of government (2.5, 2.9 and 2.10), which are addressed in GSR Part 1 and GSR Part 3. It may be more simple to have a single paragraph that specifies exceptions to the responsibility resting with the licensee: e.g. • Government takes over records etc. • Orphan sources (there is no licensee) • Government is operator (in this case they are the licensee).	Clarification of text	A			The responsibilities of Government are set out clearly (in one place only), but were primarily related to R&D and have therefore been moved to the later in the Guide.
16	2.8	'…for monitoring and ensuring safety and security.'	Inclusion of safety with security highlights that they are complementary.	A			
17	Section 3	Consider deleting Section 3 and making reference to GSR Part 2 only.	Section 3 appears to be largely generic; the specific information relevant to the guide have been retained and included elsewhere.	A			Large parts of Section 3 have been deleted.

18	Section 4	Provide better separation of text relating to pre-disposal and disposal	Ensure disposal and pre-disposal are adequately considered and distinguished in this section where necessary, including the interface with decommissioning of pre-disposal facilities.			R	Much of the text is generic to both predisposal and disposal and to separate them would result in significant duplication.
19	4.3 c)	'ensuring that health, environment, security, quality, technology and economic requirements are not considered separately from safety requirements…'	Health and environment requirements are missing from the original list of those which should not be considered separately from safety requirements.		A/M		Most of the items fall within the IAEA definition of "safety". (c) has been deleted as it is covered by (a) and the text has been reworded to avoid confusion.
20	4.6	Overlap is noted with Section 2.	Consider simplification of text.		A/M		Section 2 deals with overall responsibilities whereas Section 4 deals with responsibilities within an organization. The text has been modified to better illustrate this point.
21	4.7	Paragraph 4.7 assumes responsibility is vested in one individual; this should be modified to reflect as generic principles which should be reported into senior management.	Overly prescriptive.		A/M		The important aspect here is that senior management appoint an individual who reports directly to them about such

							matters. Although this is prescriptive, it is also good management practice. Similarly, there should be one person identified as responsible to avoid confusion. The text has been changed to clarify the point.
22	4.8	Consider re-wording through removal of "individual".	The use of the word "individual" is not necessary in the context of the long periods of time relating to operation of waste management facilities, especially geological disposal facilities.		A/M		This further emphasizes the point made above and the text has been changed to aid clarity.
23	4.10	Modification suggested to paragraph 4.10 to add "e) Changes in legislation by national or international bodies."	Recognition of the impact changes in legislation may have on facilities.	A			
24	4.12	Consider removing repetition between 2.3 and 4.12.		A			There is some repetition, but early text now refers to the more detailed text later in the document.
25	4.13	Consider removing repetition between 4.8, 4.10 and 4.13.				R	These Paras. deal with different things: 4.8 is about

							defining responsibilities for all activities, 4.10 is primarily about change of ownership, and 4.13 is about goals and strategies.
26	4.15	Consideration including "complying with legislation by national or international bodies" in 4.15b)	Recognition of the impact changes in legislation have on facilities.	A			Text has been changed to cover the point.
27	4.20-4.26	This section should be reviewed to ensure consistency in the use of the terms 'public' and 'interested parties'.	There is a need for clarity on where text is relevant to internal or external stakeholders, or both.	A			A check has been carried out. Although the "public" is one of many interested parties it is a particularly important one and in some cases merits special considerations over other parties.
28	4.21	Consider providing additional guidance on how to identify interested parties and the strategy for interactions with them.	The current text discusses issues that are important when developing a waste management system but it is not clear how this relates to identification of interested parties.	A			Text added.
29	4.25 e)	'e) organizational changes;'	Remove the word 'planned' to broaden the scope of the requirement and reflect unplanned changes.	A			Text has been changed.

30	4.30	Delete "… (e.g. the responsible national and local authorities, regulatory bodies) ..."	This sentence could be read that all regulatory bodies have a role in decision making; the proposed changes would allow for flexibility in a non-prescriptive regulatory system.		A/M		The operator must make the safety related decisions, but it should be recognized that other bodies can influence these decisions. The list is just an example of these other bodies and is not prescriptive.
31	4.30-4.40	Review content of these sections to provide more information on what is meant by "integration"	This text does not provide much guidance on integration (e.g. between safety, environmental protection and the main objective of a business), in most cases the text simply states what a management system should deliver or take into account.			R	The text indicates what "integration" means in the context of waste management sites specifically. Any further guidance would be generic to all nuclear sites and should be covered in DS513.
32	4.35	'Emergency demonstrations and documentation…'	Change in use of language from 'drills and exercises' to demonstrations.		A/M		The text has been changed to better reflect the requirements
33	4.44	Add "l) Potential effects of climate change."			A/M		The suggested change is too broad, but the text has been modified to broaden what was there previously.
34	4.48-4.63	Consideration should be made to specific guidance on 'documentation of the management	Clarification of text	A			New text has been added and sub-

		system' and 'records' (such as waste records) which are to be kept in accordance within the management system.					headings to aid discrimination.
35	4.55	Additional text should be included to take into account potential regulatory requirements for record storage.			A/M		It is implicit that operators should comply with regulatory requirements, but the text has been changed in Para 4.56 and 4.57 to emphasise the point.
36	4.75	Consider revision of this section to focus on potential solutions to the difficulties identified in the list (a) to (g) and include the need for adequate contingency planning in the management arrangements to address funding difficulties.	Whilst this section identifies a number of potential funding challenges, it does not provide adequate guidance on how to address the challenges identified.			R	It is difficult to see what could be said additionally here other than the waste producer should provide a guaranteed source of funds, but this would be too prescriptive for some countries. Para's 4.75 and 4.76 give more detail on funding requirements and the need to consider contingencies.
37	4.76	Consider deleting the second sentence "Because of the difficulties identified in para. 4.75, regulators and governments should ensure that	This document is intended to be guidance on management systems and this section refers to the responsibilities of senior			R	The Guide is for member states. The management systems being discussed are those

		adequate contingency planning is included in these arrangements."	management for resources. Is it also meant to cover the responsibilities of government and regulators? The suggested change in 4.75 should address the issue identified relating to contingency planning.				of the operator as well as the Government and regulators.
38	4.78 b)	'b) May change the physical, chemical or radiological characteristics of the waste;'	Insertion of 'radiological' to reflect properties of radioactive waste (which may change as a result of processing, e.g. ion exchange or filtration)		A/M		"or" changed to "and" as processes could change all three (albeit unlikely).
39	4.80	Remove examples.	Recommend removing the examples of the hierarchy of hazard controls after this sentence quoted. Minimal value added that is specific to the guide title.			R	Examples are thought to be useful to aid understanding.
40	4.82 f)	Replace 'will' by 'may'	4.82 notes steps that 'will' be involved and includes 'retrieval of waste packages in disposal facilities'. This implies retrievability is prescriptive at all lifecycle phases of the disposal facility, the suggested changes would make this less prescriptive.	A			"will" has been changed to "may".

41	4.128-4.135	Separate information on 'disposal' and 'predisposal' siting and site characterization requirements.	The requirements for a disposal site differ from those of a pre-disposal facility, this detail should be distinguished within the guidance and any difference in the management systems highlighted.	A			The text has been changed, but there is little on predisposal site selection as this will be largely generic. The advice is therefore mostly to do with disposal site selection.
42	4.138 a)	'Development of a preliminary (or initial) design, set of technical characteristics and safety functional requirements of the waste disposal facility;'	Change from 'tentative' to "preliminary" or 'initial' design and include 'safety functional requirements' at the first stage of the development process for the design of a waste disposal facility.	A			
43	4.143	'…including those conducted internationally.."	The original text read 'including those conducted in other countries and internationally. The term 'other countries' appears to be redundant.	A			
44	4.151	'Subsequent to the closure of a container and final non-destructive testing or radio-assay an operator may decide there is a need for the attachment of tamper-indicating devices to the container to ensure that it can be verified that its radionuclide content remains as recorded.'	The original text is unduly prescriptive and does not allow for a safeguards regime where tamper-indicating devices are not mandatory, the proposed text allows for this flexibility.	A			

45	II.13	'…cleanliness…'	Typographical error 'cleanness'	A			
46	Appendix 3	In the mining example, there should be mention of: • Work instructions or work procedures. • Records, not just of the measurement, but of the operators training and competency, calibration of the equipment etc. • An explanation of what Categories A to E mean is necessary.	The intent of Appendix 3 is supported and is welcome but appears to be incomplete.		A/M		The definition of categories is now in B.2. A statement has been added to explain the required documentation is just illustrative and is not meant to be exhaustive. An additional reference to the Appendix has been provided in the body of the Guide.

USA Comments on IAEA *DS477* – *Draft Safety Guide: The Management System for the Predisposal Management and Disposal of Radioactive Waste (Revision and combination of GS-G-3.3 and GS-G-3.4) – Member State Review Step#8*

COMMENTS BY REVIEWER Reviewer: Multiple (POC: Boby Abu-Eid; Boby.abu-eid@nrc.gov) Page 1. Of 11 Country/Organization: USA/US NRC Date: July 12, 2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	Title	We suggest DS477 title be modified to read: *"The Leadership and Management Systems for the Predisposal and Disposal of Radioactive Waste."*	Remove redundancy (e.g.; management); add "leadership" to link to GSR Part2 Title (e.g.; *Leadership and Management for Safety)*		A/M		A revised title is proposed taking account of this comment and those from other Member States. We have included 'Leadership' to link to GSR Part 2 and removed the redundancy related to the word 'management' in a way that is consistent with the IAEA Safety Glossary.
2	General Overlap with DS513	We note that this document is in an advanced stage of development (e.g.; at step #8). Since it deals with management systems (though specific to radioactive waste disposal), we note that there is a significant overlap with DS513 (DPP on Leadership Management and Culture for Safety), which is at Step #3. Therefore, we believe there should be harmonization of DS477 with DS513 to ensure	Harmonization and integration of DS477 with DS513 considering interdependence and the latter is in early stage of developmewnt.	A			Agreed. DS477 and DS513 will be consistent and undue overlap should be avoided.

		consistency and minimize redundancy and repetitions. Since DS513 falls directly under GSR Part 2, all generic texts not specific to radioactive waste management should be incorporated in DS513.					
3	General Scope	Before Para 1.18 insert the following para: This guidance does not address management and planning of waste generated after severe accident or after radiological seucrity incident. Though many aspects in this guidance could be appropriate to apply under these conditions.	Recognize in the scope that DS477 did not cover adequately how to manage or conrol radioactive waste generated after severe nuclear accident or after significant radiological incident.	A			Reference to relevant Tecdoc has been included.
4	General Including detailed texts from Safety Requirements (e.g.; copying texts under the key requirements in bold character).	Overall, the Requirements are useful to present; however, information presented after the requirements seemed unusually general, broad, and repetitive. We suggest certain text of generic nature be removed and incorporated in DS513 under development as necessary. Alternatively, we suggest removing, or reducing, the text for certain paras as given in the examples below (e.g.; comments 4a-4d):	Minimizing repetition and redundancies and integrate generic text into DS513 (under development).	A			
4a	Para. 2.9	Delete sentence: In such cases, the government should have identified and delegated clear responsibilities to individuals with strong and effective leadership capabilities to ensure safety.	Stating government should delegate responsibilities to individuals with strong and effective leadership capabilities is stating the obvious (there are many examples like this in the document)			R	Although it could be argued the point is generic, it is not about appointing individuals with strong leadership, it is about appointing individuals with strong leadership "to ensure safety", e.g. it is not about reprocessing the waste as quickly as possible, it is about doing it safely.
4b	Para. 3.1	Managers should also show	One could delete the entire sentence but at least delete			R	This is how

		commitment to the implementation and continuous improvement of the radioactive waste management system ~~by both their words and actions to foster a strong safety culture~~.	some of the words that add very little to the concept.				managers should encourage a good culture for safety (rather than saying one thing and then personally behaving in a contrary manner, e.g. breaking speed limits, not wearing appropriate PPE where required.).
4c	Para. 3.3	The senior management should also regularly seek feedback on how effective the leadership is in ensuring and improving safety and the management system~~, and should take corrective actions as necessary~~.	One could delete the entire sentence but at least delete some of the words that add very little to the concept.			R	Although it could be argued as obvious, there is little point in reviewing if no corrective action is undertaken which would include finding out why the culture is declining.
4d	Paragraphs 4.21, 4.25, 4.44, 4.45, and 4.89	These paragraphs are examples of very long item lists that are just examples – this is quite distracting and not an effective way to communicate this type of information. It would be better to have much shorter lists in the main body of the report and if considered necessary possible an appendix with such extensive lists	Improve conciseness			R	Having these lists as Appendices would make the document even less user friendly. The lists are thought useful as an aide memoire to illustrate the points made and the reader need not read them in detail if not interested
4e	Para 4.74	We recommend deleting this para as it fits in DS513 (see also comment #2).	As mentioned above the generic text would fit better in DS513			R	This is a particularly important management issue relating to radioactive waste management.

							Guidance should be available in the period before DS513 becomes available.
5	Para 2.6, line 2	Modify Para to read: The senior managment of a generator of radioactive waste should liaise with the relevant regulatory body, with brokers contracted for waste handling and disposal and operators of waste management facilities .."	In some countries waste management brokers/contractors are handling waste disposal including its transport. The modified Para recognizes the concept of using brokers/contractors to handle waste and its disposal. In some cases a new contrctor is responsible for both decommissioning and radioactive waste management.	A			
6	General Integration of Aspects of Waste Management with Decommissioning Management (Para 4.169)	The document allocated a small section on "decommissioning and/or closure of facilities (Para 4.169)." We recommend adding the following para at the begening of this section: "The management systems for predisposal and disposal of radioactive waste should be coordinated and harmonizd with the management systems for decommissioning. There are significant overlaps between waste management and decommissioning particularly during decontamination and cleanup activities and during waste treatment, storage, and handling.	Overlaps of radioactive waste management (e.g. during pre-disposal, storage, and disposal) with decommissioning management are well recognized. Information gained from cleanup activities and decommissioning should be exchanged with information gained from cleanup activities and decommissioning should be exchanged with waste managers for early planning about volme and charcateristics of waste to be gereated and decisions about disposal treatments, storage, or disposal options. In addition, cost etimates for decommissioning frequently include costs of waste handling, pretreatment, storage, and transport. Threfore integration, harmonization, and coordinate is necessary and of benefit to both decommissioning and waste management programs.		A/M		These points are accepted. Text has been added to clarify that this paragraph is about decommissioning of radioactive waste management facilities, not decommissioning generally, e.g. of reactors.
7	Para 1.22	Add a new item after c): Performance assessment (PA) of waste disposal facilities.	Many countries use generic PA to ensure long-term safety to meet required dose/safety criteria.		A/M		The text has been modified; safety assessment of disposal facilities is covered by bullet point [e].
8	2.8	Add "and funding" between "should provide for the management" and "that is required."	If a government entity is to control a disposal site following termination of a license, there must be adequate funding to continue the necessary protections and controls.			R	"Should provide for" includes appropriate funding. The Para' does not necessarily mean that the Government itself

							would maintain the control – that could be done by an operating organization or possibly subcontracted.
9	Introduction Para 1.13	After Para 1.14 add a new Para as given below: Predisposal management and disposal of disused radioactive sources presents unique challenges. The Guidance on the Management of Disused Radioactive Sources, which was endorsed by the 61st IAEA General Conference in September 2017 as supplementary guidance to the Code of Conduct on the Safety and Security of Radioactive Sources, may be useful in developing management systems to address predisposal and disposal activities for disused radioactive sources.	Reference to the Guidance on the Management of Disused Radioactive Sources is recommended to help address the known challenges in managing this waste stream. This text could be inserted as a new paragraph after paragraph 1.14, which references the Joint Convention.	A			The reference has been included with modified wording.
10	Para 4.2 Line 3	DS 477 Stated: The processes for fulfilling the responsibilities of senior management in relation to the management and control of radioactive waste are subject to the requirement established in GSR Part 2 [5], and the guidance presented in this Safety Guide; the guidance in this Reference. Error! Reference source not found, should also be considered.	Is Section 4.2 trying to provide responsibility for licensee's senior management? Is the idea establishing accountability for management? (Reference is needed)	A			Yes, the Para' is about ensuring senior management have appropriate responsibility and accountability. Additional reference has been provided.
11	Section 4	There is a lack of discussion concerning occupational safety and the need to manage the radiological protection program with specific emphasis on reducing occupational exposure.	This IAEA safety standard mentions 55 times in some aspect the protection of human health but rarely any discussion of the protection of worker health. Due to the nature of handling radioactive material, a strong occupational safety and radiation protection management program should support and enhance the protection of human health during waste pretreatment and handling, as well as in waste transport and handling during diposal. There is limited mentioning			R	Limiting occupational exposure is a generic issue for all facilities and activities, and should of course be covered by an appropriate safety

			of this in the document (see Para 4.80, 4.140, 4.162, and 4.163). While Para 1.13 and 4.33 cite to GSR Part 3, there are needs for more elaboration and a greater attention to this in discussing what the management system must ensure happens to have an effective program in this safety area (audits, inspections, maintenance of records, etc.).				case and work practices. The requested Guidance on Occupational Radiation Protection is provided in GSG-7.
12	Para 4.15	Modify item a) at begening of Para to read: State that safety has overriding priority while ensuring security, quality, technology, and economic requiements are integrated with the safety requirements to help improve harmnzation and avoid implementation conflict.	The intent of this Para is harmonization to avoid conflict of safety implementation at the expense of jeopardizing security or reducing costs.		A/M		The point is noted and the text has been modified to capture the intent of the comment without being too prescriptive.
13	Para 4.5	Delete the phrase "that covers of all of an organization's operations.''	Certain operations of large organizations could be independent or unrelated to waste management.			R	They may be independent, but there should be a single coherent integrated management system that covers how the organization manages safety (even if it has several components for different facilities and hazards).
14	Para 4.15 c)	Modify to read: c) take account of public and stakeholders' views and attitudes, concerns and expectations about safety, and human and environmental protection, extended restrictions on the use of land and geological natural resources, etc. and other concerns of interested parties;	Use proper inclusive term.	A			The change (to include 'and stakeholders') is accepted. Note also that the terms 'public', 'interested parties' and 'stakeholders' are all propret terms and have have slightly different meanings.

15	Para 4.17 e) and f)	Modify to read: e) technological advances particularly those enhancing safety and reducing cost such as remote and robotic technologies. f) lessons from experience, and peer reviews recommendations.	Completeness and to relate to safety and cost.			R	It is better to be broad in the first instance rather than too specific. The suggested text on technological advancement is too prescriptive, but the point is in any case already covered in bullet points (d) and (e). Peer reviews are covered in bullet point (h).
16	4.12 & 4.18	The document contains lots of repettions. See for example contents of Paras 4.12, 4.16, 4.18 and 4.19. We recommend review the text to minimize repetitions as practicable.	Reduce redundancies and repetitions as much as possible.	A			
17	Para 4.20	Add item e): e) review of implementation issues with regulatory authorities to discuss alternatives or other options for radioactive waste disposal to reduce costs and/or to enhance safety. [N.B: You may also place this Para in the text somewhere else as appropriate].	Senior management responsible for waste handling and disposal may need to discuss alternate options to waste disposal such as onsite disposal option or exemptions for waste handling and disposal.			R	The text commented on is a direct quote from GSR Part 2. The discussion with regulators of options for waste management is not precluded by the Safety Standards.
18	Para 4.25	At the end of Para 4.24 and before 4.25 add Sub-Tilte: Communication:	Organization and edit: Communication is an important topic and presented in two categories: Internal and External.			R	The problem is that the previous para's also deal with communication. To introduce this sub-heading could lead to a belief that all communication is dealt with here, which it is not.
19	Para 4.30	Para 4.30 uses the language "must," we suggest changing the concerned pharse to read: "..the management systems	Proper language use for a guidance.	A			

		should be integrated to include all of these aspects."					
20	Para 4.37	After item d) add: e) Limits and conditions of waste acceptance criteria based on site-specufic analysis, performance assessment, and environmental monitoring data.	Completeness.	A			
21	Para 4.39	Add item f): Site maintenance and controls.	Completenss		A/M		This is one of a range of activities that may need resourcing. An example has been added to bullet point (a).
22	Para 4.43	Modify last sentence to read: "Grading means making the stringency of the controls by which the adequacy of such activities is evaluated commensurate **with the level of potential risk associated with the safety and security concerns such that respources would be prioritized to focus on addressing significant risks to workers, the public and the environment** ~~importance of the activities~~.	Graded approach focuses on significance or importance to risk in order to prioritize resources based on risk significance.		A/M		Point is accepted. The text has been revised consistent with the IAEA Safety Glossary.
23	Para 4.44 k)	Modify 4.44 k) to read: k) consideration of possible human activities and exposure scenarios in a realistic fashion as appropriate.	Emphasize use of realistic exposure scenarios in conducting dose impact analysis.		A/M		The point is valid, but the suggested wording is incorrect. It is the exposure scenarios that need to be realistic, not the consideration.
24	Para 4.46	At the end of Para 4.46 add the following text: ..In addition, waste classes or categories for disposal should consider use of site-specific analysis as well as	Completeness to ensure use of WAC specific for the conceend disposal facility.	A			

		waste radiological, physical, and chemical characteristics to develop waste acceptance criteria (WAC) specific for selected disposal facility.					
25	Para 4.54 a)	Modify to read: Authorization (e.g.; licenses and updated license conditions or amendments).	Completeness to consider license conditions and updated amendments.		A/M		Wording has beenchanged to clarify.
26	Para 4.55	Modify Para to read: Senior management should decide whether the records are to be stored at the waste management facility, elsewhere, or at several diverse locations. **Regulatory authorities should always have access to such records.**	Completeness to ensure that concerned regulators have routine access to records.		A/M		Although not part of the management system the decision upon where and how to record could be affected by the need to be visible to regulators, (but regulators may not have the right to access of everything).
27	Para 4.64 and Para 4.79	This Para is incomplete. The Para reads: Resource management necessary for managing and controlling radioactive waste is subject to the requirements established in GSR Part 2 [5], and the guidance presented in this Safety Guide and in Ref. Error! Reference source not found. should be considered. Please modify the text, provide the reference and correct errors. Sililarly Para 4.79 also stated Error! Reference source not found.	Completeness and error correction.	A			
28	Para 4.77	We recommend deleting Para 4.77 or inserting as a footnote.	Remove repetition and reduncies with texts in safety requiremenbts. This para is copied from GSR Part 2, paras 4.28 – 4.32.			R	This para ' gives more details of the requirements for processes (the subject of the Section). Whilst it

							is lengthy, to remove it would be inconsistent with the approach taken elsewhere throughout the Guide.
29	Para 4.81	Add item l) l) The possible need for waste stabilization and mixing.	Need to add this item to address important practices of waste stabilization and potential mixing.		A/M		Point added at bullet point (e) to maintain most likely sequence of events.
30	Para 4.89 and Para 4.93 a)	MModify Para 4.89 items b); f) and h) as described below: Safety case and performance assessment (PA) development; Traceability of waste and specific data on site conditions as related to waste acceptance criteria; … Retrieval of waste, if necessary. Modify 4.93 a) to read: e) Engineered barriers construction, installation, and maintenance (particularly waste disposal covers).	• Need to consider PA (see also comment above) and site-specific conditions. Retrieval of waste may not be required to address particularly after site closure. • Need to consider maintenance of barriers particularly waste disposal covers.		A/M		Bullet point (b) now includes safety and performance assessment. Bullet point (k) covers WAC derivation, so no need to change (f). Bullet point (h) modified as suggested.

TITLE: The Management System for the Predisposal Management and Disposal of Radioactive Waste [DS477]

COMMENTS BY REVIEWER Reviewer: Waste Management & Decommissioning/World Nuclear Association Page 1 of 11 Country/Organization: World Nuclear Association Date: July 12, 2019				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	1.1, first sentence.	Radioactive waste management activities must be conducted in a responsible manner that avoids placing a greater burden on future generations than the generation responsible for its creation. This will require adherence to rigorous principles in all decision-making processes to adequately incorporate the economic viability of radioactive waste management activities, so that environmental concerns are investigated to resolve negative effects on all stakeholders, an assurance that the technologies employed are sound and up to date, and that such activities reflect the desire and will of the society in harmony with the rule of law [1]. Employing these safe, practicable and environmentally acceptable solutions will better guarantee that an all-inclusive long-term radioactive waste management program is sustained [2]. [1] Sanders, M, & Sanders, C 2016, 'A world's dilemma 'upon which the sun never sets' – The nuclear waste management strategy (part I): Western European Nation States and the United States of America', Progress In Nuclear Energy, 90, pp. 69-97. [2] EUROPEAN ATOMIC ENERGY COMMUNITY, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION,	The proposed new text better gives an overall picture of the discussion that is to follow throughout the document.			R	The Guide is dealing with leadership, management systems and culture for safety, not waste management itself in a generic sense. The proposed new sentence does not mention leadership, management systems or culture for safety.

		INTERNATIONAL MARITIME ORGANIZATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS ENVIRONMENT PROGRAMME, WORLD HEALTH ORGANIZATION, Fundamental Safety Principles, IAEA Safety Standards Series No. SF-1, IAEA, Vienna (2006).					
2	1.2	A management system is an effective tool establishing a framework for the successful integration of interrelated or interacting elements. Developing adequate policies and objectives enables all priorities to be achieved in an efficient and effective manner [4]. As its most basis function, a management system framework should be designed to preserve certainty, while also allowing sufficient flexibility to successfully process change [Sanders, M, & Sanders, C 2019, 'A world's dilemma 'upon which the sun never sets' – The nuclear waste management strategy (part II): Russia, Asia, and the Southern Hemisphere', Progress In Nuclear Energy, 110, pp. 148-169.]	The wording is suggested to better fill out the discussion. Additionally, as a side note, in the quoted paper figure 2 demonstrates the periods of change in a waste management program. Something similar may be of value within the document. Depending on the progression of a program, one is apt to have an increase or decrease of significant changes occurring and this will need to be adequately planned for within a management system, so that processes can successfully track/monitor levels of rapid successive change during certain periods of progression.			R	It is believed that a sentence that management systems preserve certainty while allowing changes does not actually add clarity. The proposed definition is inconsistent with the IAEA definition. The Safety Guide makes clear in several places that the management system should be adaptable to suit changing circumstances. The IAEA is developing a separate Tecdoc to provide a 'roadmap' for the development of radioactive waste management (disposal) facilities, but this is as yet not completed and is too detailed for inclusion in this Safety Guide.
3	1.10 c)	Move last sentence in paragraph after the 4th sentence. Suggested: In general, it is preferred that the responsibility for the waste is transferred to the body managing the waste. However, the responsibility and accountability for waste should be clear and fulfilled at all times. As stated in Requirement 1…	The suggested change better helps with the flow of the paragraph.		A/M		We agree with this comment. The text has been modified in the light of several comments on this part of the Guide. The principle is that the owner has overall responsibility for the waste but the operator/Licensee of the facility where the waste resides is responsible for its safety whilst at the site. There should therefore be clarity over both ownership and responsibility for safety at all times.
4	1.14, entire paragraph	Suggested wording change:	As the Joint Convention does not specifically address			R	The text states that the Joint Convention should be considered (not

		Recognizing the international implication of waste management activities, an adherence to the general principles and steps outlined in The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management [15] will better inform the development and application of a management system for predisposal management and disposal activities.	management systems in the context discussed in the document, a wording change would improve the discussion and make its application stronger.				that it states what management systems should be adopted as it makes no stipulations on management systems). The revised wording is long and no real improvement on what currently exists.
5	4.21 second sentence	Suggested wording change: The requirements of certain interested parties (e.g. the regulatory body) must be complied with, while the expectations and preferences of some other interested parties should be considered and incorporated as deemed suitable and warranted.	The suggested wording better divides the argument of whom one must always follow, while still given deference to other interested parties. One should always consider but the input of interested parties, but may not always need to incorporate it as it may not be warranted for the particular situation.		A/M		The text has been changed to reflect the point.
6	4.68, entire paragraph.	Suggested wording change: A considerable aspect of effective systems management requires that all personnel maintain the requisite knowledge, skills, and attitudes to perform their function properly ["The nuclear power industry's ageing workforce: Transfer of knowledge to the next generation," IAEA, Vienna, IAEA TECDOC 1399, ISBN 92 0 107704 1, ISSN 1011 4289 (2004)]. It is essential that personnel only undertake the performance of activities qualified by training or experience. Therefore, personnel designated to select process technologies for radioactive waste management should be adequately trained and qualified to perform their function. For all stages of radioactive waste management, the operator should ensure that the operating, maintenance and technical staff understand the nature of the waste and its associated hazards, the relevant operating procedures and the associated procedures to be followed in the	The suggested wording change increases the impact of the discussion that all person involved must be adequately trained and that each has the capability to influence the system on a positive or negative basis.		A/M		The suggested wording adds to the length, but the wording has been changed and the importance of relevant experience has now been introduced.

		event of an incident or accident, as well as any potential impact of associated human factor interactions in the performance of such procedures.					
7	4.122, entire paragraph	Suggested wording change: Due to the length of time scales involved, a level of uncertainty is a reality. Care must be taken when "modeling the behavior of the disposal concept/waste package system, the host environment, and any possible contamination risks from any failure of these systems" given that such "modeling is not a precise science, which leaves open areas of interpretation" [M.C. Sanders and C.E. Sanders, "Two Roads in a Yellow Wood: Consent or Science Based Siting", American Nuclear Society, Proceedings of the 17th International High-Level Radioactive Waste Management Conference (IHLRWM 2019), Knoxville, TN, April 14-18, 2019 (ISBN: 978-0-89448-762-0).] Furthermore, uncertainties exist when seeking to determine forward patterns of behavior for human populations, which are subject to future disruption, from the impacts of economic, social, political, technological, and environmental upheavals, including the effects of climate change. The management system should ensure that uncertainties are as far as possible identified and the basis for their estimation is clearly documented.	The wording change helps to inform the discussion on uncertainties that this is a basic reality of dealing in the time scales involved. Furthermore, it highlights specific areas of uncertainties involving human aspects that will need to be properly investigated and planned for, especially with current discussions on the impacts of climate change.		A/M		Para 4.122 is generic to all waste management facilities whereas 4.123 is specific to disposal facilities and text has been added to clarify this.
8	4.128, entire paragraph	Suggested wording change: Siting, financing, designing, constructing, and operating a disposal facility involves the simultaneous functioning of a multitude of sectors, which is conducted over a span of many decades. These resultant multi-faceted parallel approaches require a management system to attain the ability to successfully incorporate the input from a diverse set of stakeholders [M.C. Sanders and C.E. Sanders, "Two Roads in a Yellow Wood: Consent or Science Based	The suggested wording works into the discussion that these processes involved both science and consent-based approaches, that while though employ different focus points must work in tandem for achieving a successful outcome.		A/M		The existing text is generic to all waste management facilities whereas the proposed text deals only with disposal facilities. The proposed text then strays from site characterization to public consultation which is dealt with elsewhere, as is funding, designing and operating. Although it is agreed that site characterization would involve a potentially iterative process involving many sectors of work it is felt this is adequately describe in Para. 4.130 at a

		Siting", American Nuclear Society, Proceedings of the 17th International High-Level Radioactive Waste Management Conference (IHLRWM 2019), Knoxville, TN, April 14-18, 2019 (ISBN: 978-0-89448-762-0)]. The siting and site characterization processes for waste management facilities are integral approaches necessitating the development of a fundamental scientific evidence-based approach, as a chosen site forms part of the disposal system and contributes to the fulfilment of the safety functions for disposal. However, such an evidence-based approach cannot be completely decoupled from a consent-based mechanism for the siting of these facilities. The Joint Convention [15] recognizes the importance of keeping the public informed of siting and disposal activities in their communities. It should be observed that though both the consent and science-based programs have divergent interests, "their focus points do overlap in areas of common concern, where one approach cannot necessarily be detached from the other" [M.C. Sanders and C.E. Sanders, "Two Roads in a Yellow Wood: Consent or Science Based Siting", American Nuclear Society, Proceedings of the 17th International High-Level Radioactive Waste Management Conference (IHLRWM 2019), Knoxville, TN, April 14-18, 2019 (ISBN: 978-0-89448-762-0)].					high level, without being too prescriptive. However, it was felt the existing text dealt with characterization and not enough on siting, and so text has been added concerning this aspect.
9	2.3, third sentence	Query of wording: "Excavation and construction of facilities" What is meant by 'available options for excavation'?				R	There are may ways of excavating a tunnel, e.g. hand quarrying, drill and blast, roadheaders, tunnel boring machines, with many options in between. Similarly, there are probably even more options for supporting tunnels whilst further excavation takes place. No change needed.
10	2.4	Recommendation: It is recommended that the purpose and meaning of the waste hierarchy system should be mentioned in conjunction that these steps in the waste management program		A			The Guide has been re-visited to introduce the concept of waste hierarchy and the overriding principle of safety.

		should always follow this system in the first instance of application, followed by waste treatment and then disposal as a last resort.					
11	2.5	Recommended: Discussion should be included regarding the waste hierarchy. A more detailed presentation should be included on points how to best follow the waste hierarchy principle and requirements, as well and avoid conflicts in seeking proper placement of waste in the correct category.		A			As above.
12	2.8	Concern: This gives the responsibility back to the government, which is not always the best option. This action should only be taken as a desperate last retort. Other better option most likely will be obtained where the government direct/steer the work, in harmony with the nuclear industry as other private capabilities may exist, be planned for, or timelier implemented.				R	The Para. states Government should "provide" for its management, not that Government should carry it out. It is the Government's responsibility to see that it is done.
13	Section 3 – General Comments	1. A general concern with this section is that it only focuses on the management side and not the responsibilities of the worker/people/resources. 2. The importance of knowledge transfer is not addressed. Given the long timeframes involved, it is essential that knowledge is learned, retained and transferred appropriately as the new generations enters the workforce. 3. Currently there is no link between disposal and pre-disposal management. 4. The section should consider defense-in-depth; a holistic view of nuclear waste management is needed to optimize the disposal site barriers.				R	It is primarily a Management Guide and the requirement is specifically about "managers". Furthermore Section 3 only deals with Leadership requirements. Paras. 4.52-4.63 deal with record keeping (and implicitly with knowledge transfer). In terms of leadership, there are no different requirements for pre-disposal compared to disposal facility managers. Leadership and defense in depth are two different subjects.
14	Section 4, General comments	General comments: It is difficult to find the relevant information within the section. A recommendation is to separate the section into pre-disposal and disposal activities. (Hospital and waste treatment facility related guidance vary greatly) Another recommendation is to divide the section into four categories: Generation,			A/M		The Guide could have been divided into the various stages of radioactive waste management, but then many of the management system requirements would be identical and extensive duplication would result. This Guide mirrors the structure of GSR Part 2. However, we have undertaken a review to ensure that the headings in Section 4

		Treatment, Storage, Disposal					comply with the requirements for Safety Standards publications.
15	4.122	The discussion could benefit from some information on how to balance these uncertainties in order to achieve the best available safety within the what one can reasonably achieve. Also, probabilistic risk assessment should be considered when treating/considering uncertainties.			A/M		There are many ways to balance or manage uncertainties and it is beyond the remit of the Guide to prescribe how this should be done However, some text has now been added on the need for a safety case including mention of PRA as a possible way of dealing with uncertainties.
16	Section 5, General Comments	It is recommended to further develop the 'safety culture' discussion to address the needs specific to waste management (i.e., identifying trends and changes over a long time, and to produce a quality waste package.) Also, the discussion should identify the expectation of all levels of management/workers/operators with regard to their involvement in the 'safety culture' (Generic safety culture).		A			It is difficult to identify where culture for safety in radioactive waste management facilities is different to that for other nuclear facilities except that the long term operation of radioactive waste management facilities can lead to a degradation in safety and it is therefore even more important that staff have a culture that promotes monitoring. We have mentioned the ideas mentioned in the comment. More general guidance on safety culture should appear in DS513.
17	Appendix I.3 – C	Mention waste hierarchy. Waste acceptance criteria (one should know the waste root)			A/M		This is really about the need for an integrated waste management plan and the Guide has been altered to reflect this.
18	Appendix I & II	Appendix I (pre-disposal) is not as detailed as Appendix II (waste disposal)		A			Although this is a valid point, it was felt that because of the material available in GSR Part 5 and SSR-5 more detail was required on the management system for disposal facilities.
19	Appendix III, Table 1	1. With regard to mention of mining; what is the intent of this? No guidance on dose rates, etc? 2. Recommended to quantify the level (e.g., low or intermediate) of the ion exchanger 'waste'. 3. It is further recommended to include quantification to better understand what levels are okay and not okay. It is felt that this table could be made more useful by including limits.			A/M		The Appendix was drafted some time ago purely as an illustration of the graded approach in practice at two entirely different types of facilities. It was never the point to give detailed guidance on how to assess those types of facilities. However, we note well (and share) the questions raised at this point and, so, for several reasons (e.g. the clarity of the links between the two

							facility types and radioactive waste management facilities) we are now suggesting deleting the appendix. We prefer instead to point the reader to TECDOC TE-1740, 'Use of a Graded Approach in the Application of the Management System Requirements for Facilities and Activities.
20	General Comments	Consider reworking the organization of the document. Many themes are repeated throughout the document and it would be beneficial to try and combine themes where possible to avoid repetition.		A			An exercise to remove repetition has been carried out.

ENISS comments on
DS 477 The Management System for the Predisposal and Disposal of Radioactive Waste (Step 8) 18 February 2019

COMMENTS BY REVIEWER Reviewer: ENISS members Page 1 of 17 Country/Organization: ENISS 07 2019			Date: 11	RESOLUTION ENISS			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	General	The guide combines predisposal with disposal but recommendations about these two types of installations may differ. A disposal facility is always a project of high political and public awareness. Stakeholder involvement and long lasting planning is needed. However, for a simple predisposal facility e.g. compacting drums for a few years, it will be a normal licensing procedure without stakeholder involvement and may not always require public interest in it. An unfamiliar reader of the standard will not be able to distinguish what is really recommended and what is according the graded approach not needed. A management system for a small facility will be rather limited if needed at all. A management program may be sufficient here. Our suggestion for a better structure to ensure a graded approach between these two types of installations was not followed completely. However the new draft reflects the differences between predisposal and disposal in a better way. As disposal facilities are seldom and unique and a subject of governmental care, predisposal facilities are much more common and there may be hundreds or more such facilities worldwide so it would be wise to concentrate on predisposal facilities and leave out disposal. A great number of provisions of this standard are not specific for predisposal or disposal. They should be deleted as they are already reflected in GSR Part 2.		A	We agree with these general comments and are glad that draft was felt to better reflect the differences between predisposal management and disposal. We believe that this distinction is even clearer in the latest draft at Step 11. We have removed some very general provisions. Some other general points have been made specific to radioactive waste management. Repetition has been reduced where possible, consistent with the structure of GSR Part 2. A definition of Senior Management is provided. The identity of the Senior Management in any particular organization should be identified in the organization's Management System. The draft now emphasizes more strongly that many different organizations may be involved in the different steps of radioactive waste management. The identities of the organizations whose management systems are discussed should now be clear from the text. The Guide is intended to be used by organizations with responsibilities for directing, planning, undertaking or regulating the management of radioactive waste; it is also intended to be used by the suppliers to such organizations of safety related services and products that support radioactive waste management. When referring to all of these organizations the Guide refers to the 'organization'; where the Guide		

		There are a great number of redundancies repetitions in the document. They should be deleted as far as possible. In many paras the senior management is addressed but it is completely unclear which management is meant. Especially predisposal management is done in a great number of different facilities that fulfil only parts of the waste management. In many countries disposal is primarily a responsibility of the government. It is not appropriate to define recommendations regarding disposal in combination with predisposal as in most countries disposal facilities not exist and also siting and construction can only to be expected in the far future. It is not very appropriate to develop a safety standard today about topics which will be relevant in decades. Disposal facilities are always unique and a comparison with international solutions may also not be appropriate. Regarding the management system disposal is completely different. It is nearly excluded that the same organization is doing the planning, construction and operation. In many countries it is the task of the government to care for the whole process of siting, design, construction, operation, decommissioning etc. of a disposal facility. It can not be the responsibility of a single operator or licensee. The document dose not clear distinguish between responsible organisation operator, licensee, and senior management. Regarding the terminology of management systems the term management program has a clear meaning as a subset of a management system. The term management program should not be used ambivalent for waste management. Thus the term waste management program should be avoided.		intends to be more specific, the text specifically identifies the 'licensee' or the 'operating organization' or the 'regulatory body' or to 'supply chain' organizations. The Guide does refer to 'waste management programmes', but it does not use the term 'management program'. We have been careful throughout to distinguish between waste management activities and processes, and management processes. The Guide has been developed consistent with the Safety Glossary, which is now the first reference cited. The Requirements for Predisposal Management of Radioactive Waste are first referred to at para. 1.2.		

		For clarification the terminology "predisposal management" should be incorporated in the text at the very beginning taking into account the IAEA glossary. A number of amendments are listed below.					
2	1.1-1.16	It should be made clear, that the introduction is only a introduction into the topic an is not meant to be a guidance. At the moment it is a mixture of quotations of requirements documents (GSR Part XY) and more detailed advice. IF some text to meant as advice or a guidance then it needs to be incorporated in the main text.	Objective and scope of the guide are clearly stated, so it is not necessary in background section to provide the readers with information that are relevant to the main text, i.e. guidance of the GSR Part 2.	A	The Introduction has been significantly shortened for consistency with the approach now taken in Safety Standards publications. No guidance statements now remain in the Introduction.		
3	1.5	The development of a management system for an organization will also for example take into account:	It is not clear which organisation is meant. In the process of predisposal and disposal of waste hundreds of different organisations are involved (government, regulatory body's, operators, licensees, waste owner, waste producer etc.)	A	The Guide now emphasizes more strongly that many different organizations may be involved in the different steps of radioactive waste management – e.g. see paras 2.9 and 4.4, and Figure 1. The identities of the organizations whose management systems are discussed should now be clear from the text. The Guide is intended to be used by organizations with responsibilities for directing, planning, undertaking or regulating the management of radioactive waste; it is also intended to be used by the suppliers to such organizations of safety related services and products that support radioactive waste management. When referring to all of these organizations the Guide refers to the 'organization'; where the Guide intends to be more specific, the text specifically identifies the 'licensee' or the 'operating organization' or the 'regulatory body' or the 'supply chain' organizations.		
4	1.6	~~Whichever codes, standards and requirements are used in developing the management system, the design of the management system should incorporate systems and processes~~	This is already part of GSR Part 2 and will be definitely repeated in the main text. It should be deleted.	A	The paragraph has been deleted from the Introduction. The first part of the text now appears in revised form at para 5.3. Assessments of the management system are dealt with in Section 7.		

		~~both to comply with all requirements and to demonstrate their compliance. Assessments of the management system (see Section 4) should demonstrate that the management system is performing well, and that the procedures for executing the processes that are controlled under the management system are producing the specified results to satisfy the requirements and achieve intended goals and objectives.~~					
5	1.9	The prime responsibility for properly executing a particular task (e.g. processing (pretreatment, treatment, and conditioning), storage and disposal, and related activities such as characterization of waste, clearance, and the design, construction, commissioning, operation and decommissioning or closure, as applicable, of predisposal management and disposal facilities) rests with the operator. It has to be taken into account that many different organisations are involved in these tasks and they are responsible for only those parts which they execute.	Not all of these tasks are done by one organisation. The text suggests the opposite.	A/M	This text now appears at para. 3.2. Some new text and a figure have been added in Section 2 to emphasize and explain the radioactive waste is typically managed by a series of organizations – see paras 2.7 and 2.8 and Figure 1. See also para. 4.4.		
6	1.9	…to cover all stages of waste management from the generation of waste to its disposal including any active institutional control (if applicable) over the waste disposal facility.	Active institutional control is not applicable for all disposal facilities. In some cases, there will be no active institutional control after closure of a disposal, only passive control.	A	This text has been moved to para. 2.9(c) and substantially revised. We agree with the point being made in the comment. The Guide does not require or recommend there to be a period of active institutional control after closure. The duration of the period of post-closure institutional control is required to be justified in the relevant safety case: see paras 4.23 and 4.24 of SSR 5.		

7	1.9	…and of ~~the~~ any active institutional control in the post-closure period (if applicable).	Active institutional control is not applicable for all disposal facilities. In some cases, there will be no active institutional control after closure of a disposal, only passive control.	A	Repeated comment – see above		
8	1.10	~~The provision of funds and the organizational arrangements for predisposal management and disposal of waste could be given inadequate attention if they were to become decoupled from the benefits drawn from the activity that generates the waste. The organization and funding of the necessary predisposal management and disposal activities could be much more difficult to put into place later.~~ The government has to ensure that decoupling of benefits from the provision of funds for predisposal and disposal doesn't result in insufficient funding for predisposal and disposal.	The government has to take care therefore that the funding is regulated already long before decommissioning.	M	The text has been deleted. Revised text now appears at para. 2.6(a).		
9	1.10 c)	~~In general, it is preferred that the responsibility for the waste is transferred to the body managing the waste.~~	What is important is what it is written in the last sentence of the paragraph *Responsibility and accountability for waste should be clear and fulfilled at all times.* The deleted sentence is superfluous as it suggests that one situation is better.	A	The text has been deleted from the Introduction. The relevant text now appears at para. 2.6(c).		

10	1.10 d)	Because the responsibility for waste can change during its management, the waste generator and any organization authorized to undertake waste management activities need to ensure that waste production is ~~minimized~~ reduced to the extend reasonably possible taking into account other relevant criteria (for instance ALARA) and that conditioned waste is compatible with the waste acceptance criteria of the receiving organization.	Minimization has to be deleted. Otherwise reprocessing of spent fuel is impossible.		The guide now refers to minimizing the generation of waste, consistent with the Safety Fundamentals, SF-1. Para 3.29 of SF-1 states: "Radioactive waste must be managed in such a way as to avoid imposing an undue burden on future generations; that is, the generations that produce the waste have to seek and apply safe, practicable and environmentally acceptable solutions for its long term management. The generation of radioactive waste must be kept to the minimum practicable level by means of appropriate design measures and procedures, such as the recycling and reuse of material." The guide does not exclude the possible generation of secondary radioactive waste. Re-processing of spent fuel does not fall within the definition of radioactive waste management in the Safety Glossary.		
11	1.10 i)	~~Management systems for all waste management activities should encourage the adoption of unified approaches and solutions and international best practices.~~	Delete this para. Best practice of one country must not be a good approach for another country.	A	The text has been deleted.		
12	1.10 j)	Whatever the arrangements, safety and the protection of human health and the environment ~~should always be paramount.~~ must not be compromised.	The requirements of GSR Part 2 should be used correctly.	A	The text has been deleted. The Guide has been reviewed for consistency with GSR Part 2.		
13	1.15	…including ~~the~~ any period of institutional control in the post-closure period of a disposal facility (if applicable).	Active institutional control is not applicable for all disposal facilities. In some cases, there will be no active institutional control after closure of a disposal, only passive control.	M	We understand and agree with the point being made in the comment. All disposal facilities will of course be under active institutional control throughout their operation. The Guide does not require or recommend there to be a period of active institutional control after closure. The duration of any period of post-closure institutional control is required to be justified in the relevant safety case: see paras 4.23 and 4.24 of SSR 5.		

					The text has been moved from the Introduction and now appears consistent with the above at para. 2.6(c).		
14	1.22 k)	The period of institutional control for a disposal facility, covering both any active control…	Active institutional control is not applicable for all disposal facilities. In some cases, there will be no active institutional control after closure of a disposal, only passive control.	M	We understand and agree with the point being made in the comment. All disposal facilities will of course be under active institutional control throughout their operation. The Guide does not require or recommend there to be a period of active institutional control after closure. The duration of any period of post-closure institutional control is required to be justified in the relevant safety case: see paras 4.23 and 4.24 of SSR 5. The text now appears consistent with the above at para. 1.14.		
15	2.1	Safety should be considered ~~first~~ as appropriate in any business decisions, in any activities and in the associated management system documentation.	See 1.10 j)	R	This text now appears at para. 3.3. The comment is rejected because it appears inconsistent with the requirement for optimization (with dose – as a surrogate for safety - being the constraint in constrained optimization), and with ideas in GSR Part 2 to ensure that safety is not compromised in decision making [para 4.9(d)] and on promoting a culture of 'safety oriented decision making in all activities' [para 5.2(g)].		
16	2.3	~~The senior management should ensure that each step of radioactive waste management, from generation to disposal, has consistent objectives and goals in order not to compromise the safety of the subsequent steps in the waste management process.~~	It is impossible for a single senior management to fulfil this recommendation. The senior management can only be responsible for the specific task of its facility.	A	Some new text has been added in Section 2 to explain this point. Para. 2.11 states 'There should be good communication between and amongst decision makers and leaders of the relevant organizations involved in radioactive waste management, and a coordinated approach should be taken, particularly towards radioactive waste disposal.' Also, the guide emphasizes need to have means, such as waste acceptance criteria, for managing the interfaces between the different organizations and radioactive waste management facilities and activities.		
17	3	LEADERSHIP FOR SAFETY	The paras 3.1 - 3.7 are of generic character and give no specific guidance of predisposal and disposal of waste.	A	We are grateful for this comment which is in accordance with the plans described when DS477 was last discussed in detail at the WASSC. At that time, it was expected that a general safety guide, DS513, would be developed in parallel with DS477 and would be published relatively soon after DS477. This, however, is now believed to be very unlikely because development		

					of DS513 has stalled. DS477 is at Step 11 while DS513 is at Step 3. Given this situation and the aims of the DPP for DS477, which include combination of GS-G-3.3 and GS-G-3.4, and in light of some other MS comments, which were aimed at ensuring that material from the two Guides being combined was not lost, these paragraphs have been retained. They will be reviewed as 'inputs' to the process when DS513 development recommences.		
18	4.4	~~Safety should be paramount within the management system, overriding all other demands.~~ Because of a combination of the long term nature of waste management and the probability that the waste may be managed in a number of different facilities prior to disposal, the management system should be capable of dealing with ~~long term aspects, such as~~ changes in responsibilities and interdependencies between waste management facilities and processes.	See 1.10 j) For clarification.	A/M	The text has been deleted from the Introduction. The ideas are now captured at para. 2.7, in the subsection beginning at para. 5.32, and at para. 5.43.		
19	4.5	As a whole, the system should be well-balanced, recognizing the ~~potential~~ needs of other facilities within the waste management process.	Inappropriate advice. It is impossible to take into account "the potential needs of other facilities" i.e. to take into account unknown needs of others.	A	This text has been deleted.		
20	4.6	~~The organizational structure should be justified.~~ The point at which responsibility changes should be clearly defined and documented within the management system,	Organizations are free to choose their structure by themselves.	M/R	The text has been modified and now appears at para. 5.42. Organizations are indeed free to determine their own structures (within any possible constraints imposed e.g. by Government or funding bodies). The idea has been retained not because it implies any external review or control of the organization's structure, but		

		~~ensuring that safety is not compromised.~~	No benefit here in this context.		because understanding the reasons for the structure should help personnel working within the organization to understand and improve the management system. The aim of the management system arrangements around the transfer of responsibility for safety is to ensure that safety is not compromised.		
21	4.7	An individual reporting directly to senior management should have specific responsibility and authority for:	Comment: This para does not reflect the ISO 9001:2015. This Standard does not foresee any longer a quality management representative.	M	This text (with some minor re-wording for increased clarity) now appears at para. 5.10. The immediately following para., 5.11, emphasizes that 'Management systems for radioactive waste management should be designed to ensure continuity in managing facilities and activities, and should contain provisions for managing changes…'		
22	4.8	In deciding on the individual manager to be responsible for the management system for ~~a~~ waste management ~~programme~~ activities or ~~organization~~ the senior management ~~of that organization~~ should ensure, when defining duties, that all the waste management activities within the organization are covered in a comprehensive and coherent manner and that these activities are covered continuously over the period that associated safety, human health and environmental protection, security, quality, human-and-organizational-factor, societal and economic concerns continue. ~~This is especially pertinent for geological disposal facilities where there could be responsibilities that extend for long periods of time.~~	To avoid a mix-up of terms usually used in management area. For clarification Reference to disposal facilities is unnecessary.	M	This text with some revisions for increased clarity now appears at para. 5.9. The Guide does refer to 'waste management programmes', but it does not use the term 'management program'. We have been careful throughout to distinguish between waste management activities and processes, and management processes. The proposed insertion of the words 'within the organization' is not necessary because it is implicit that the organization can only control its own activities. Instead of deletion, the last sentence of the paragraph has been broadened so that it does not only refer to disposal.		

23	4.13	The senior management should recognize that radioactive waste management ~~programs~~ activities may be affected by many factors.	For clarification	M	As noted above, the Guide does refer to 'waste management programmes', but it does not use the term 'management program'. We have been careful throughout to distinguish between waste management activities and processes, and management processes.		
24	4.15 a)	state that safety must not be compromised ~~has overriding priority~~;	See 1.10 j)	R	The text, with minor revisions, now appears at para. 5.18(a). The words "overriding priority" are consistent with GSR Part 2, which includes for example: "Requirement 2: Demonstration of leadership for safety by managers. Managers shall demonstrate leadership for safety and commitment to safety. 3.1. The senior management of the organization shall demonstrate leadership for safety by: (a) Establishing, advocating and adhering to an organizational approach to safety that stipulates that, as an overriding priority, issues relating to protection and safety receive the attention warranted by their significance…"		
25	4.15 k)	commit to minimizing ~~any~~ waste arising as far as reasonable;	It should be made clear, that secondary waste may arise due to the optimization of the process (e.g. radiation protection, economic reasons).	M	The guide now refers to minimizing the generation of waste, consistent with the Safety Fundamentals, SF-1. Para 3.29 of SF-1 states: "Radioactive waste must be managed in such a way as to avoid imposing an undue burden on future generations; that is, the generations that produce the waste have to seek and apply safe, practicable and environmentally acceptable solutions for its long term management. The generation of radioactive waste must be kept to the minimum practicable level by means of appropriate design measures and procedures, such as the recycling and reuse of material." The guide does not exclude the possible generation of secondary radioactive waste.		

26	4.17	The management system for a radioactive waste management ~~programme~~ activities, or for an organization should specify the requirement to periodically review the policies of the ~~programme~~ activities and of the organizations involved in it.	For clarification	M	As noted above, the Guide does refer to 'waste management programmes', but it does not use the term 'management program'. We have been careful throughout to distinguish between waste management activities and processes, and management processes.		
27	4.17 i)	results of internal and external audits, peer reviews and inspections (including those conducted by the regulatory body) of waste management ~~programme~~ activities (including on-site inspections at the facility)	For clarification	M	As noted above, the Guide does refer to 'waste management programmes', but it does not use the term 'management program'. We have been careful throughout to distinguish between waste management activities and processes, and management processes.		
28	4.21	Several broad considerations relating to satisfying the expectations of present ~~and future~~ interested parties should be taken into account when developing the management system for waste management.	It is impossible to foresee the expectations of future interested parties, especially for longer periods, during the developing process of a management system.	A	We agree with the comment. The text has been revised and now appears at 5.27 as 'The expectations of interested parties should be taken into account when developing the management system for radioactive waste management. Aspects that might need to be considered when developing the management system include the following:…'		
29	4.21 g)	~~public concerns and cultural expectations related to restrictions on the use of land and geological resources;~~	Too general. This could be interpreted in various different ways.	M	The text has been revised to include specific examples and now appears at para 5.27(g).		
30	4.21 h)	~~other concerns of interested parties (e.g. cultural expectations about working hours and the composition of the workforce, social expectations about distributing risks and benefits, political choices about activities and sustainable development).~~	Too general. This could be interpreted in various different ways.	M/R	The text has been revised slightly and now appears at para 5.27(h). The text come from para 3.5 (g) of GS-G-3.3 and was evidently considered to be suitable for inclusion in a Safety Guide at that time. The list is only of aspects that "…might need to be considered…". The comment is not specific.		

31	4.23	Through the process and procedures, the organization may understand and give attention to interested parties' needs and expectations as appropriate.	For clarification.	A/M	The text has been revised and now appears at para. 5.23, but see also paras 5.23 through 5.27. The guide states that "The expectations of interested parties should be taken into account…" – this is consistent with the comment, "as appropriate".		
32	4.27	The management system should consider the interdependencies among the various steps and processes in radioactive waste management ~~from waste generation up to and including disposal.~~	It is impossible for a single senior management to fulfil this recommendation. The senior management can only be responsible for the specific task of its facility	M	The text has been revised and now appears at para. 5.33, but see also para. 5.24. The revised text states, "take into account interdependencies between the steps" and then lists what the steps are. The text does not imply that all steps are the necessarily the responsibility of a single organization or senior management. See also the response to Comment 6 of Germany.		
33	4.29	~~The management system should describe the interactions and relationship between the steps in radioactive waste management so that the safety and the effectiveness of the radioactive waste management steps may be considered in integrated manner. This includes the identification of waste streams, the characterization of waste, and the implications of conditioning, storing and disposing of waste. Compatibility and optimization, as discussed in paragraph 3.22 of GSR Part 5 [2], should be addressed and described in the management system.~~	Already in para 4.28	A	The text has been deleted.		
34	4.32	The integrated management system should be developed so that it covers all activities to be carried out during radioactive waste management~~, including disposal~~.	Not appropriate to link predisposal with disposal.	A	The text has been revised and now appears at para. 5.33. The words ', including disposal' have been deleted.		

35	4.33	In developing the management system, senior management should integrate and ensure the coherence of the overall strategy for the waste management ~~and disposal programme~~ with the detailed processes, specific equipment and intended outputs, and the criteria for the characteristics and properties of conditioned waste and waste packages ~~that are set for disposal~~.	Not appropriate to link predisposal with disposal.	M/R	The text has been revised and now appears at para. 5.47. It is important to the effectiveness of radioactive waste management that waste conditioning leads to the production of waste packages that are suitable for disposal.		
36	4.37	~~The management system should provide for the development of detailed processes for waste management to be informed by safety assessment, and there should be an iterative coupling between activity and facility design and safety assessment. For~~	Delete whole para. There is no need for a revised safety assessment when the safety assessment demonstrated the objectives.	R	The Requirements for safety assessment are provided at paragraphs 5.128 and 5.129. The Requirements include that the safety assessments shall be updated 'as necessary'. The paragraph to which this comment is addressed provides guidance that is consistent with the requirements.		
37	4.38	~~The management system should include a process and procedures that provide for this 'design assessment cycle' to be repeated, usually several times. This will result in a set of activities, waste characteristics, facility specifications and associated safety assessments that will guide the development of the entire set of waste management activities.~~	Delete whole para. There is no need for a revised safety assessment when the safety assessment demonstrated the objectives.	R	The Requirements for safety assessment are provided at paragraphs 5.128 and 5.129. The Requirements include that the safety assessments shall be updated 'as necessary'. The paragraph to which this comment is addressed provides guidance that is consistent with the requirements.		
38	4.39	~~When developing the plans, goals and objectives that define the strategy for achieving the integrated objectives of the waste management organization and programme, interactions with interested parties should be considered. Long~~	Delete whole para. Redundant. Appeared several times in the document.	A	The text has been deleted.		

		~~term aspects should also be considered such as:~~					
39	4.40	~~If the waste being managed has long term safety, human health and environmental protection, security, quality, human and organizational factor, societal and economic implications, it should be recognized that people in future generations who were not originally interested parties will inherit responsibility for managing the waste and the associated facilities. The management system should be sustainable and should include provision for its own review in a planned manner to maintain confidence that it will evolve to accommodate changes in management philosophies and strategies to meet the needs of future interested parties.~~	It is impossible to foresee the expectations of future interested parties, especially for longer periods, during the developing process of a management system.	A	The text has been deleted.		
40	4.42	Organizations involved in waste management and disposal should identify the significance of the various facilities (including equipment and waste) and activities to safety, human health and environmental protection, security, and quality requirements. Resources should then be selectively allocated, and processes selectively designed, to control the facilities and activities effectively and efficiently~~, with safety, and human health and environmental protection being of primary importance~~.	For clarification.	A	The text has been revised and now appears at para. 5.54. The words '~~, with safety, and human health and environmental protection being of primary importance~~' have been deleted.		

41	4.47	Appendix III illustrates the graded application	Comment: Additional example from medicine, sealed sources or technical applications should be given.	M	The Appendices have been rationalized so that there is now only one appendix that provides a list of elements of the management system for radioactive waste management which should be applied according to the graded approach.		
42	4.54	Records should also be created and retained to describe the history of waste facilities, such as data obtained during facility design, construction, operation and closure. These records could include for example:	For clarification.	A/M	The text has been revised and now appears at para. 5.66. The words "as appropriate" have been used instead of "for example".		
43	4.57	~~Records that need to be retained for an extended period should be subject to regular, periodic and systematic review to examine the implications of any changes that have occured in regulatory requirements and in legislative, organizational, technical and scientific circumstances.~~	Changes have to be evaluated. This has nothing to do with review of records.	M	The text has been revised and now appears at para. 5.69. The focus is on long-term information retention.		
44	4.75 a)	Senior management should ensure that a management systems for waste management activities include provisions to deal with several funding challenges: ~~a) For various reasons (e.g. bankruptcy, cessation of business), it may not be feasible to obtain the necessary funds from the waste generator, especially if funds were not set aside at the time the benefits were received from the activity that generated the waste, or if ownership of the~~	Delete paragraph. Senior management of predisposal or disposal facilities doesn't have the mandate to state that the polluter pays principle should be applied, nor to apply a tax mechanism – this can only be done by laws and regulations, i.e. by a state.	M	This text comes from both of the Guides that are being combined, GS-G3.4 and GS-G-3.4 to create DS477. The text has been revised and now appears at para. 5.85 of the current draft. We understand and agree with the comment being made that it may be beyond the scope of an operating organization of a radioactive waste management facility to levy taxes or apply the polluter pays principle but, in this case, the senior management referred to would probably be a Government organization, such as a ministry that has a role in directing radioactive waste management. It remains a truism to say that the waste needs to be managed safely even if there is no funding.		

		~~waste (e.g. ownership of spent imported radioactive sources) has been transferred to other parties. The need to apply the "polluter pays" principle and the appropriate means of applying the principle through a tax mechanism could be considered in such cases.~~					
45	4.76	The ~~operator~~ senior management should ensure that adequate commercial arrangements are in place to manage each of the identified waste streams and to ensure that these arrangements are likely to endure for the period required to complete the waste management ~~programme~~	For clarification. For clarification.	A/M	The text has been revised and now appears at para. 5.86. The revised text places responsibility on the operating organization; it is implicit that it is the senior management of the operating organization that should ensure that adequate commercial arrangements are in place. As noted above, the Guide does refer to 'waste management programmes', but it does not use the term 'management program'. We have been careful throughout to distinguish between waste management activities and processes, and management processes.		
46	4.80	An example of hazard substitution would be the use of a linear accelerator instead of a sealed radioactive source for radiation therapy. Examples of engineering controls would be the use of shielding or remote handling technologies. Administrative controls should be used to limit exposure and ensure that doses to workers are consistent with the ~~relevant dose constraint for the situation~~ ALARA principle.	Dose constrains are only one tool in the process of optimisation.	A/M	The text has been revised and now appears at para. 5.92. Dose constraints are no longer mentioned.		

47	4.111	The safety case, together with the management system, should enable the parties involved to judge the level of safety, and human health and environmental protection provided by the waste management ~~programme~~ activities throughout its development and as new information is obtained regarding waste management and disposal. In	For clarification		As noted above, the Guide does refer to 'waste management programmes', but it does not use the term 'management program'. We have been careful throughout to distinguish between waste management activities and processes, and management processes.		
48	4.127	Optimization of radiation protection should be considered at all stages during process development and throughout the lifetime of waste management facilities, including as appropriate site selection and characterization, facility design, construction, operation and decommissioning or closure [2], [3].	For clarification.	M	The text has been revised. Optimization of radioactive waste management is addressed at paras 5.37 and 5.38, and at para. 5.152. Optimization of work processes is addressed at para 5.117.		
49	4.128	Siting and site characterization are important processes ~~for waste management facilities. This is especially the case~~ for waste disposal facilities because….	It is not important for predisposal management facilities.	R	Siting can be important for predisposal waste management facilities as well as for disposal facilities. Consider for example a waste store situated in a residential area, or a waste processing and storage facility at the end of an airport runway – there are real examples not hypothetical situations that would not occur. The hazards that need to be considered depend on the site.		
50	4.136	The design process for a ~~waste management facility or~~ waste disposal facility should be part of a larger iterative process that also involves site characterization and development of the safety case for the facility.	It is not necessary for predisposal facilities.	R	The Requirement for preparation of a safety case for a predisposal management facility is provided at para. 5.128. Other Requirements on predisposal management facilities are described in GSR Part 5. Para. 5.5 of GSR Part 5 states: "The design of the facility, the arrangements for operational management and the systems and processes that are used have to be considered and justified in the safety case."		

51	4.139	The design-safety assessment cycle is usually repeated several times until a coherent set of overall disposal facility design specifications and associated safety assessments are obtained and complied in the safety case to guide the development of the detailed design of the disposal facility.	It is not necessary for predisposal facilities.	R	See comment 50 above		
52	4.143	Before and during the process of designing a waste management or disposal facility, advantage should be taken of lessons learned, and knowledge and experience available from comparable existing facilities and current projects, including those conducted in other countries and internationally when accessible.	For clarification.	R	The text has been revised and now appears at para. 5.171. The proposed addition of the words 'when accessible' is not necessary – it is implicit that experience from other settings cannot be taken into account if it is not available or not accessible.		
53	4.181	…It should be recognized that the prime responsibility for the safe management of radioactive waste still remains with the licensee or owner of the waste, i.e. the organization that contracts the services, items or processes.	For clarification. This depends on the regulatory framework. The owner of the waste generally has the prime responsibility until closure of a final repository, but responsibility for operational safety in a waste facility managing the waste generally lies with the operator/licensee of that facility.	M	The paragraph referred to in the comments relates to the retention of responsibility for safety during the contracting of activities to the supply chain. This is point is now dealt with at para 5.122 by quoting GSR Part 2 paragraph 4.33: "The organization shall retain responsibility for safety when contracting out any processes and when receiving any item, product or service in the supply chain" - see also para 2.6(c) of DS477.		

54	5.4, 5.5	strong safety culture ~~for safety~~	Terminology. Term safety culture is used in the GSR Part 2 - Requirement 14 and in the GSR Part 5.	A	We acknowledge the comment. We recognise that there is inconsistency across IAEA documents in the usage of the terms: safety culture, culture for safety and nuclear security culture - this cannot at present be resolved solely within DS477.		
55	5.6 a)	~~Workers need not only consider immediate and short term safety aspects, but should also consider the longer term safety implications of their activities, which in some instances might not be manifested until several generations later.~~	Workers will not be able to do so.	R	The text (with minor revisions) now appears at para. 6.10. The reason given for the comment is not clear.		
56	6.2	The management system should include provision for its own review in a planned manner to maintain confidence that it is sustainable and will evolve to accommodate changes in management philosophies and strategies ~~to meet the needs of future interested parties.~~	Nobody knows the needs of future interested parties.	R	The text has been revised and now appears at para. 7.4. The text does not imply needing to have prescience of what interested parties may need in the future, but rather that future reviews should be planned wisely so that they can take account of needs at the time.		
57	6.5	Self-assessment of management processes in a waste management activities ~~programme~~ or organisation should include consideration of: ~~any~~ changes in organisational structure or in the assignment of responsibilities and financial liabilities that could have an effect on the management and control of waste management activities. ~~Such changes will have to be considered at national level an even possibly at the international level.~~	For clarification. Changes have to be evaluated, not applicable for any activities, graded approach is needed.	A/M	The text has been revised and now appears at para. 7.6. It is sensible to consider any changes in order to determine if the changes are significant. The words 'where appropriate' have been included.		

58	6.6	Where assessments and self-assessments are performed on work processes used in a waste management ~~programme~~ activities or a waste management organization, the following aspects should be confirmed:	For clarification. See also 6.7-6.9		As noted above, the Guide does refer to 'waste management programmes', but it does not use the term 'management program'. We have been careful throughout to distinguish between waste management activities and processes, and management processes.		
59	Appendix I	Delete Appendix I	Appendix I delivers no specific guidance and is only a repetition of the main text.		The Appendices have been rationalized so that there is now only one appendix that provides a list of elements of the management system for radioactive waste management which should be applied according to the graded approach.		
60	Appendix II	Delete Appendix II	Appendix II delivers no specific guidance and is only a repetition of the main text.	A	Appendix II has been deleted		
61	Appendix II		Appendix II.3 - y), bb) contains information specific to storage facilities and not relevant to disposal facilities as indicated in the title.	A	Appendix II has been deleted		

DS477 "The Management System for the Predisposal and Disposal of Radioactive Waste"
(Draft dated 18 February 2019)
Status: STEP 8

Note: Blue parts are those to be added in the text. ~~Red parts~~ are those to be deleted in the text.

	COMMENTS BY REVIEWER Reviewer: **Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)** (with comments of GRS, BGZ and BfE) Page 1 of 9 Country/Organization: **Germany** Date: 2019-07-10				RESOLUTION			
Relevance	Comment No.	Para / Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification / rejection
2	1	General	The guide combines predisposal with disposal but recommendations about these two types of installations may differ. A disposal facility is always a project of high political and public awareness. Stakeholder involvement and long-lasting planning is needed. However, for a simple predisposal facility e.g. compacting drums for a few years, it will be a normal licensing procedure without stakeholder involvement and may not always require public interest in it. An unfamiliar reader of the standard will not be able to distinguish what is really recommended and what is according the graded approach not needed. A management system for a small facility will be rather limited if needed at all. A management program may be sufficient here. The suggestion for a better structure to ensure a graded approach between these two types of installations was not followed completely. However, the new draft reflects the differences between predisposal and disposal in a better way. A number of provisions of this standard are not specific		A	We agree with these general comments and are glad that draft was felt to better reflect the differences between predisposal management and disposal. We believe that this distinction is even clearer in the latest draft at Step 11. We have removed some very general provisions. Some other general points have been made specific to radioactive waste management. Repetition has been reduced where possible, consistent with the structure of GSR Part 2. A definition of Senior Management is provided. The identity of the Senior Management in any particular organization should be identified in the organization's Management System.		

Relevance: 1 – Essentials 2 – Clarification 3 – Wording/Editorial

			for predisposal or disposal. They should be deleted as they are already reflected in GSR Part 2. There are several redundancies repetitions in the document. They should be deleted as far as possible. In many paras the senior management is addressed but it is completely unclear which management is meant. Especially predisposal management is done in a great number of different facilities that fulfil only parts of the waste management. Regarding the management system disposal is completely different. It is nearly excluded that the same organization is doing the planning, construction and operation. It is normally the task of the government to care for the whole process of siting, design, construction, operation, decommissioning etc. of a disposal facility. The document does not clear distinguish between responsible organisation operator, licensee, and senior management. Regarding the terminology of management systems, the term management program has a clear meaning as a subset of a management system. The Term management program should not be used ambivalent for waste management. Thus, the term waste management program should be avoided.			The draft now emphasizes more strongly that different organizations may be involved in the different steps of radioactive waste management. The identities of the organizations whose management systems are discussed should now be clear from the text. The guide is intended to be used by organizations with responsibilities for directing, planning, undertaking or regulating the management of radioactive waste; it is also intended to be used by the suppliers to such organizations of safety related services and products that support radioactive waste management. When referring to all of these organizations the guide refers to the 'organization'; where the guide intends to be more specific, the text specifically identifies the 'licensee' or the 'operating organization' or the 'regulatory body' or to 'supply chain' organizations. The Guide does refer to 'waste management programmes', but it does not use the term 'management program'. We have been careful throughout to distinguish between waste management activities and processes, and management processes.		
1	2	General	References should be checked. There are many wrong references where GSR Part 2 is linked with reference [2] which should be [5]. For example, page 10, 13, 15, … Also, there are errors is 4.2, 4.64 and 4.79	Wrong references	A	The references have been updated and corrected		
2	3	1.1-1.16	It should be made clear, that the introduction is only an introduction into the topic an is not meant to be a guidance. At the moment it is a mixture of quotations of re-		A	The introduction has been significantly shortened for consistency with the approach now taken in Safety Standards		

Relevance: 1 – Essentials 2 – Clarification 3 – Wording/Editorial

			quirements documents (GSR Part XY) and more detailed advice. If some text to meant as advice or a guidance, then it needs to be incorporated in the main text.			publications. No guidance statements now remain in the introduction.		
2	4	1.3	"… Management for safety includes establishing and applying an effective integrated management system that integrates all elements of management so that requirements for safety are established and applied coherently with other requirements, including those for human performance, human health, environmental and economic aspects, quality and security; and so that safety is not compromised by the need to meet other requirements or demands."	Clarification & important to mention e.g. also economic aspects as co-existing requirements.	A	The full and exact quote from GSR Part 2 is now given at para. 2.3.		
2	5	1.9	"The prime responsibility for properly executing a particular task (e.g. processing (pretreatment, treatment, and conditioning), storage and disposal, and related activities such as characterization of waste, clearance, and the design, construction, commissioning, operation and decommissioning or closure, as applicable, of predisposal management and disposal facilities) rests with the operator. It has to be taken into account that many different organisations are involved in these tasks and they are responsible for only those parts which they execute."	Not all of these tasks are done by one organisation.	A	This quote now appears at para. 3.2. Some new text and a figure have been added in Section 2 to emphasize and explain the radioactive waste is typically managed by a series of organizations – see paras 2.7 and 2.8 and Figure 1.		
2	6	2.3	"The senior management should ensure that each step of radioactive waste management, from generation to disposal, has consistent objectives and goals in order not to compromise the safety of the subsequent steps in the waste management process. This may be ensured by cooperating with licensed facilities for the subsequent waste management steps"	It is impossible for a single senior management to fulfil this recommendation. The senior management can only be responsible for the specific task of its facility.	A	Some new text has been added in Section 2 to explain this point. Para. 2.11 states 'There should be good communication between and amongst decision makers and leaders of the relevant organizations involved in radioactive waste management, and a coordinated approach should be taken, particularly towards radioactive waste disposal.' Also, the guide emphasizes need to have means, such as waste acceptance criteria, for managing the interfaces between the different organizations and radioactive waste management facilities and activities.		
2	7	3.3	"Senior management should promote and exercise open and effective communication at all levels on safety and safety related requirements. Senior management should	It would be useful to give some exam-	A	This text (with some minor re-wording for increased clarity) now appears at para. 4.5. New text that gives guidance		

			share information concerning radioactive waste management to personnel frequently and consistently. Any information with a bearing on safety, human health, environmental protection, security, quality, human-and-organizational-factor, societal and economic elements should be communicated to the personnel and other relevant interested parties [f]. … " [f]: "Interested parties could include suppliers, partners, trade unions, scientific bodies, the public, the media, the regulatory body and other States (especially neighbouring States)."	ples of possible interested parties to avoid confusion for readers with different backgrounds. So, our suggestion is to add a footnote with additional explanation.		on the identification and possible identities of interested parties is given in paras 5.24 to 5.26.		
3	8	4 Caption	"RESPONSIBILITY FOR THE MANAGEMENT FOR SAFETY SYSTEMS"	Wording/Clarification	M	All the headings have been checked and made consistent with those in GSR Part 2 and the other relevant Requirements.		
1	9	4.3 Bullet c)	"c) ensuring that security, quality, technology, leadership, protection of health, human performance, protection of the environment and economic requirements are not considered separately from safety requirements, to help preclude their possible negative impact on safety. "	Please add to be consistent with SSR-2/2 3.5	M	This text no longer appears.		
2	10	4.7	"An individual reporting directly to senior management should have specific responsibility and authority for:"	This para does not reflect the ISO 9001:2015. This Standard does not foresee any longer a quality management representative.	M	This text (with some minor re-wording for increased clarity) now appears at para. 5.10. The immediately following para., 5.11, emphasizes that 'Management systems for radioactive waste management should be designed to ensure continuity in managing facilities and activities, and should contain provisions for managing changes…'		
2	11	4.8	"In deciding on the individual manager to be responsible for the management system for ~~a~~ waste management ~~programme~~ activities ~~or organization~~ the senior management ~~of that organization~~ should ensure, when defining duties, that all the waste management activities within the organization are covered in a comprehensive and coherent manner and that these activities are covered continuously over	To avoid a mix-up of terms usually used in management area and Clarification.	M	This text (with some minor re-wording for increased clarity) now appears at para. 5.9. As noted above in response to the General Comments, the guide does use the term 'waste management programme', but it does not use the term 'management program', and we have		

Relevance: 1 – Essentials | 2 – Clarification | 3 – Wording/Editorial

			the period that associated safety, human health and environmental protection, security, quality, human-and-organizational-factor, societal and economic concerns continue."			been careful throughout to distinguish between waste management activities and processes, and management processes.		
2	12	4.13	"The senior management should recognize that radioactive waste management ~~programs~~ activities may be affected by many factors."	For Clarification	M	This text now appears at para. 5.6. See response to comment 11.		
1	13	4.15 k)	"commit to minimizing ~~any~~ waste arising as far as possible;"	It should be made clear, that secondary waste may arise due to the optimization of the process (e.g. radiation protection, economic reasons).	M	The guide now refers to minimizing the generation of waste, consistent with the Safety Fundamentals, SF-1. Para 3.29 of SF-1 states: "Radioactive waste must be managed in such a way as to avoid imposing an undue burden on future generations; that is, the generations that produce the waste have to seek and apply safe, practicable and environmentally acceptable solutions for its long term management. The generation of radioactive waste must be kept to the minimum practicable level by means of appropriate design measures and procedures, such as the recycling and reuse of material." The guide does not exclude the possible generation of secondary radioactive waste.		
2	14	4.17	"The management system for ~~a~~ radioactive waste management ~~programme~~ activities, or for an organization should specify the requirement to periodically review the policies of the ~~programme~~ activities and of the organizations involved in it."	For Clarification	M	This text (with some minor re-wording for increased clarity) now appears at para. 5.19. See response to Comment 11.		
2	15	4.17 i)	"results of internal and external audits, peer reviews and inspections (including those conducted by the regulatory body) of waste management ~~programme~~ activities (including on-site inspections at the facility)"	For Clarification	A	This text (with some minor re-wording for increased clarity) now appears at para. 5.19(i).		
2	16	4.21	"Several broad considerations relating to satisfying the expectations of ~~present and future~~ interested parties should	It is impossible to foresee	A	We agree with the comment. The text has been revised and now appears at 5.27		

Relevance: 1 – Essentials | 2 – Clarification | 3 – Wording/Editorial

			be taken into account when developing the management system for waste management."	the expectations of future interested parties, especially for longer periods, during the developing process of a management system.		as 'The expectations of interested parties should be taken into account when developing the management system for radioactive waste management. Aspects that might need to be considered when developing the management system include the following:…'		
2	17	4.21 h)	"~~other concerns of interested parties (e.g. cultural expectations about working hours and the composition of the workforce, social expectations about distributing risks and benefits, political choices about activities and sustainable development).~~"	Not adequate in a Safety Guide.	M/R	The text has been revised slightly and now appears at para 5.27(h). The text derives directly from para 3.5 (g) of GS-G-3.3 and was evidently considered to be suitable for inclusion in a Safety Guide at that time. The list is only of aspects that "…might need to be considered…". The comment is not specific.		
2	18	4.23	"Through the process and procedures, the organization may understand and give attention to interested parties' needs and expectations as appropriate."	For Clarification	A/M	The text has been revised and now appears at para. 5.23 but see paras 5.23 through 5.27. The guide states that "The expectations of interested parties should be taken into account…" – this is consistent with the comment, "as appropriate".		
2	19	4.27	"The management system should consider the interdependencies among the various steps and processes in radioactive waste management ~~from waste generation up to and including disposal~~."	It is impossible for a single senior management to fulfil this recommendation. The senior management can only be responsible for the specific task of its	M	The text has been revised and now appears at para. 5.33 but see also para. 5.24. The revised text says "take into account interdependencies between the steps" and then lists what the steps are. The text does not imply that all steps are the necessarily the responsibility of a single organization or senior management. See also the response to Comment 6.		

Relevance: 1 – Essentials 2 – Clarification 3 – Wording/Editorial

				facility				
2	20	4.28	"With the possible exception of emergency situations, waste generators and organizations managing waste should not do anything that will make the waste more difficult to manage at a later stage in the waste management process especially while treating, conditioning or storing it."	Rewording for Clarification	A/M	The text has been revised and now appears at para. 5.35. The revised text is consistent with this comment.		
3	21	4.39	"~~When developing the plans, goals and objectives that define the strategy for achieving the integrated objectives of the waste management organization and programme, interactions with interested parties should be considered. Long term aspects should also be considered such as~~:"	Delete whole para. Redundant. Appeared several times in the document.	A	The text has been deleted.		
2	22	4.44 Bullet h)	"h) the size of the organization, the timeframe for which the organization is expected to exist, the number and complexity of interfaces and the safety culture;"	The management system can be more complex for an organisation that needs to exist for an extended timeframe than for an organisation that only needs to exist for a relative short period (e.g. w.r.t. knowledge management).	R	The text has been slightly revised and now appears at para. 5.56(h). This comment is rejected because the timeframe for which an organization might be expected to exist would always be a matter of speculation and be open to question.		
2	23	4.54	"Records should also be created and retained to describe the history of waste facilities, such as data obtained during facility design, construction, operation and closure. These records could include for ex-ample:"	For Clarification	A/M	The text has been revised and now appears at para. 5.66. The words "as appropriate" have been used instead of "for example".		
2	24	4.57	"Records that need to be retained for an extended period should be subject to regular, periodic and systematic review to examine if they are still up to date taking into account any changes that have occurred in regulatory re-	Rewording for Clarification	A/M	The text has been revised and now appears at para. 5.69: "Information that needs to be retained for an extended period should be subject to regular, peri-		

Relevance: 1 – Essentials | 2 – Clarification | 3 – Wording/Editorial

			quirements and in legislative, organizational, technical and scientific circumstances"			odic and systematic review to examine the implications of any changes that have occurred in the governmental, legal and regulatory framework and in regulatory requirements, and of new organizational, technological and scientific developments."		
2	25	4.70	"Training programmes, procedures and succession plans should be established to ensure that suitable proficiency is achieved and maintained, and to avoid the potential loss of knowledge, practical experience and technical expertise over time. Senior management should make provisions to ensure that training and re-training needs are reviewed on a planned basis and updated as required. Training and re-training should include familiarization with the management system of the organization with the aim to ensure its implementation and to support its use."	Clarification that the training should support the use of the management system. See also GSR Part 2 (4.26)	A/M	The text has been revised and now appears at para. 5.81. The revised para. now makes an explicit link to paras 4.23 and 4.26 of GSR Part 2.		
2	26	4.76	"The ~~operator~~ senior management should ensure that adequate commercial arrangements are in place to manage each of the identified waste streams and to ensure that these arrangements are likely to endure for the period required to complete the waste management ~~programme~~"	For Clarification	A/M	The text has been revised and now appears at para. 5.86. The revised text places responsibility on the operating organization; it is implicit that it is the senior management of the operating organization that should ensure that adequate commercial arrangements are in place.		
2	27	4.80	"An example of hazard substitution would be the use of a linear accelerator instead of a sealed radioactive source for radiation therapy. Examples of engineering controls would be the use of shielding or remote handling technologies. Administrative controls should be used to limit exposure and ensure that doses to workers are consistent with the ~~relevant dose constraint for the situation~~ ALARA principle."	Dose constrains are only one tool in the process of optimisation.	A/M	The text has been revised and now appears at para. 5.92. Dose constraints are no longer mentioned.		
2	28	4.111	"The safety case, together with the management system, should enable the parties involved to judge the level of safety, and human health and environmental protection provided by the waste management ~~programme~~ activities throughout its development and as new information is	For Clarification	A/M	The text has been revised and now appears at para. 5.131(f): "The safety case should also enable the parties involved to judge the level of safety provided by the waste management facility throughout its		

			obtained regarding waste management and disposal."			development and as new information is obtained."		
3	29	4.125	"…such data can be applied to the particular ~~the~~ site of the disposal facility and its immediate surroundings."	Surplus word	A	The text has been revised and now appears at para. 5.150.		
2	30	4.136	"The design process for a ~~waste management facility or~~ waste disposal facility should be part of a larger iterative process that also involves site characterization and development of the safety case for the facility. This may also be applicable for waste management facilities handling spent fuel"	It is not necessary for all predisposal facilities.	M/R	The text has been revised and now appears at para. 5.165. The requirement for a safety case applies to both predisposal management facilities and disposal facilities – references have been added to the relevant Requirement; para. 5.3 of GSR Part 5 [3] and para. 4.12 of SSR-5 [4]. The suggested additional sentence is not necessary; it is implicit for facilities handling spent fuel that has been declared waste, and other spent fuel is beyond the scope of the Safety Guide.		
2	31	5.3 Bullet c)	"c) An organizational culture that supports and encourages trust, collaboration, consultation and open communication"	Clarification what kind of communication. Open communication should be supported.	R	The text now appears at para. 6.3. The comment is rejected because the text is a direct quote from GSR Part 2.		
2	32	6.2	"The management system should include provision for its own review in a planned manner to maintain confidence that it is sustainable and will evolve to accommodate changes in management philosophies and strategies ~~to meet the needs of future interested parties~~."	Hard to know the needs of future interested parties.	R	The text has been revised and now appears at para. 7.4. The text does not imply needing to have prescience of what interested parties may need in the future, but rather that future reviews should be planned wisely so that they can take account of needs at the time.		

Relevance: 1 – Essentials | 2 – Clarification | 3 – Wording/Editorial

2	33	6.6 (from page 65)	"~~Senior management shall conduct a review of the management system at planned intervals to~~ Independent management system reviews and assessments of leadership for safety and of safety culture shall be conducted by the senior management at planned intervals to ensure the effectiveness of the management system, to improve leadership for safety and to foster and sustain a strong safety culture. These reviews shall also confirm the suitability and effectiveness of the management system, and its ability to enable the objectives of the organization to be accomplished, with account taken of new requirements and changes in the organization."	For Clarification	R	The text now appears at para. 7.2. The comment is rejected because the text is a direct quote from GSR Part 2.		
2	34	6.6	"Where assessments and self-assessments are performed on work processes used in a waste manage-ment ~~programme~~ activity or a waste management organization, the following aspects should be con-firmed:"	For Clarification See also 6.7-6.9	A/M	The text has been revised and now appears at paras 7.7 and 7.8.		
3	35	Appendix III		Additional examples from medicine, sealed sources or technical applications could be given.		The Appendices have been rationalized so that there is now only one appendix that provides a list of elements of the management system for radioactive waste management which should be applied according to the graded approach.		