Comments resolution WASSC November 2010

DS 357 Safety Guide on Monitoring and Surveillance of Disposal Facilities

FINLAND

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Ruokola, Laaksonen, Hutri of.... Country/Organization: STUK, Finland 16.11.2010			Page.... Date:				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
	Page 8, para 3.5, lines 6-9	The regulatory body, as well as other organizations to which responsibilities have been delegated, should be independent of ~~government departments or agencies~~ **organisations** that are responsible for the promotion and development of the waste disposal facility.	Organisations responsible for the promotion and development of the disposal facility need not be governmental	✓			
	Page 14, para 5.2, lines 10-11	...providing confidence in the function of the system for hundreds of years, as well as monitoring radionuclides **in groundwater or in** the surrounding environment.	Monitoring of radioanuclides in downstream groundwaters may be more sensitive indicator than in surrounding environment	✓			
	Page 14, para 5.3, lines 11-12	Monitoring after closure of the facility, if any, ~~should~~ **may** focus on the presence of radionuclides in the environment. **As early releases to the environment are highly unlikely, this**	Explain the main purpose of monitoring.	✓			

		kind of monitoring is rather for the purpose of social reassurance than for ensuring the performance of the disposal system.					
	Page 19, para 7.4, line 2	...to allow detection of early degradation of the components integrity **or to find out the quality of the host rock around the excavations.**	Also the host rock should be subject to surveillance	✓			
	Page 23, para 8.9, line 1	~~During the period after closure~~, **After the completion of the emplacement operations but before the final closure of the disposal facility,** monitoring and surveillance data may be collected...	Performance monitoring and surveillance is much more feasible when the access way to the repository are still open...	✓			
	Page 32, Para I.7, line 2.	"three categories" mentioned but only two are presented		✓	"two categories"		
	Page 33, para I.11. last bullet "	"geochemical disturbance… backfill and seal materials"	could include also materials for strengthening like grouts/shotcrete	✓	(primarily the introduction of air but also of backfill, materials for strengthening like grouts/shotcrete, seal materials and of the waste itself)		
	Page 34, para I.16, lines 3-4	"…grondwater will flow **around or** through the disposal facility…"	water will not flow e.g. through bentonite or other EBS	✓			
	Page 35, Table 1	heading line, "post-closure^3" subscribt 3, should obviously be 1		✓			
	Pages 36-37	In Table 1, add brackets or delete all X under Post-closure on page 36 and all X under Post-closure until "Activity concentration in groundwater" on page 37.	It is not possible to monitor reliably the listed parameters after the permanent closure of a geological repository	✓			

ENISS Comments

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: Dr. B. Bletz Country/Organization: ENISS			No Pages: 3 Date: 12/11/10				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
General comments		The November version of the draft DS 357 "Monitoring and Surveillance of radioactive Waste Disposal Facilities" has been significantly improved. The draft gives a good overview of what types of monitoring and surveillance systems could be used and where they are useful. The revision was very successful. Only a few further comments are provided below.		✓			
1	1.2	A monitoring and surveillance programme is an important element in ensuring that a disposal facility for radioactive waste provides the required level of safety during its operational and depending on the type of the disposal post-closure phases. The safety principles …	To clarify..	✓			
2	2.2	In the context of this safety guide, the term monitoring refers to *Continuous or periodic observations and measurements of environmental, engineering, or radiological parameters to help evaluate the behaviour of components of the waste disposal system, or of the impacts of the waste disposal system and its operation on the public and the environment during the operational stage and depending on the type of disposal during the post-closure stage*.	To clarify.			✓	It is better to have a more general definition of monitoring. In other parts of the text, as was done in the first comment, it could be clarify.
34	2.8	In this respect the function of surveillance is to contribute to the detection of changes in the	Possible pathways for the release of radionuclides which can be identified by a safety assessment based on FEP. Which	✓	The relevant and expected changes can be identified		

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Reviewer: Dr. B. Bletz Country/Organization: ENISS			No Pages: 3 Date: 12/11/10				
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		engineering structures and systems of the disposal facility, which might affect the radiological performance of the system. The relevant and expected changes can be identified by a safety assessment based on FEP. The surveillance programme is usually implemented through regular inspections of the critical components of the waste disposal facility.	pathways are for the specific disposal the leading pathways and which pathways are not affected or could be excluded by design is a result of the (long term) safety assessment.		by the post closure safety assessment.		
4	2.12	Monitoring and surveillance programmes begin at site characterization phase of disposal facility development and continue to evolve through to the post-closure period depending on the type of the disposal . The data collected and insights derived from monitoring should be integrated into and inform planning decisions made throughout the life-cycle of a disposal facility. As a result, provision should be made to anticipate the needs of monitoring at later periods of the facility lifetime and to gather monitoring data that informs later planning and actions.	To clarify.	✓			
5	Fig 1	Post-closure period… Monitoring of the post closure performance of the disposal facility if applicable – for compliance evaluation and to support subsequent decisions (e.g., scale back monitoring, release from	To clarify and to be consistent with the definition in 1.4.	✓			

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Reviewer: Dr. B. Bletz Country/Organization: ENISS			No Pages: 3 Date: 12/11/10				
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		regulatory control).					
6	8.9	During the first period of the post-closure stage, data continue to be collected to confirm the continuing presence of safety functions, either through direct evidence (i.e. a measurable parameter) or through the collection of data that might cast doubt on safety function performance. These data should be used to verify that the disposal system is functioning as expected. This means that the components fulfil their function as identified in the safety case, and that actual conditions are consistent with the assumptions made for post-closure safety. For example, these data may be used to help support the decision for termination of active institutional controls, by verifying that the disposal system has remained in a passively safe condition for a specified period of time.	To clarify that not the whole post-closure stage a monitoring program is necessary.	✓	This par was already changed according to comment given by Finland.		

SPAIN

COMMENTS BY REVIEWER **Reviewer:** **Country/Organization:** SPAIN/ Consejo de Seguridad Nuclear **Date:** 11/11/10							
Comment Nr.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**

COMMENTS BY REVIEWER **Reviewer:** **Country/Organization:** SPAIN/ Consejo de Seguridad Nuclear **Date:** 11/11/10							
Comment Nr.	**Para/Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
1	Fig. 2	Schematic diagram for a safety case methodology	Figure 2 represents the safety case methodology not the safety assessment one.	✓	Fig 2, - Schematic diagram for a safety case and safety assessment components		
2	6.15	Delete	It is confusing. A tailings dam used for disposal is built in such a way that it does not need an emergency plan after closure that has to be maintained forever. Emergency arrangements have to be in place in the operational period and cease after closure.			✓	The par. is well explained and there are practical examples all around the world where this could happen (e.g. central Asia)
3	Fig. 3	Delete	It is not clear and not sufficiently explained in 8.14. For example, the box that indicates "sensor failure" should indicate "failure of performance criteria" according to 8.13			✓	Fig. 3 provides only an example for a technical decision making process for continuous evaluation of monitoring data.
4	9.1/6	Third bullet should be clarified	It is not clear what the duration of the project is. It maybe thousands of years and that means that something should be implemented in order to keep the records so long time.			✓	Recently approved SSR- 5 (DS354) requires (para 3.15) "…information and records have to be retained at least up until the time when the information is shown to be superseded, or until responsibility for the disposal facility is passed on to another organization. This occurs, for example, at closure of the facility, when all relevant information and records have to be transferred to the organization assuming responsibility for the facility and its safety." In addition para. 3.16 requires: "…The need to preserve the records for long periods of time has to

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							be taken into account in selecting the format and media to be used for records."
5	9.5	It should be clarified	The paragraph does not recommend any way for data management over so long periods of time.			✓	Recently approved SSR- 5 (DS354) requires para. 3.16 requires: "…The need to preserve the records for long periods of time has to be taken into account in selecting the format and media to be used for records." It is not the purpose of this safety guide to provide recommendations on how to preserve the records for long time.
6	Annex II	Change the example	The example should be a generic one for each phase of the disposal facility. El Cabril example is not updated and it gives some wrong information. For example, the installation has no liquid effluents. Also it does not provide information about plans for post-operational monitoring. These plans should be recommended here.	✓	The example will be deleted		

UNITED STATES

COMMENTS BY REVIEWER Reviewer: U.S. NRC (Contact: Boby Abu Eid)	RESOLUTION

Country/Organization: USA / Nuclear Regulatory Commission
Date: November 22, 2010

Comment No.	Para/Line No.	Comments/Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	General	This latest version represents improvement from the previous version. Additional comments and changes are suggested below to improve the document further, particularly on some of the more subtle aspects for implementing monitoring surveillance programs	Overall comments – improvement & optimization of the document for completeness.				
2	Para 1.10, line 10-11	"*geological environment, waste characteristics, and engineered features* ***are of equal or more importance than depth of disposal in assessing the safety of disposal****"*	Rewritten for clarity	✓			
3	Para 2.3	"Performance Monitoring " should be defined not just cite examples	For completeness need to clarify then term *"Performance Monitoring."*	✓	Para 2.3 deleted from the main text		
4	Para 2.5	We suggest deletion of this Para.	Site characterization to be seems out of scope for document.			✓	Site characterization is not the scope of this document but somehow the monitoring initiated at that stage may be continuing and this is why it is mentioned.
5	Para. 2.16 Line 5	note paragraph 2.16 is incorrectly marked as [2.14]; Therefore	Information to ensure each barrier and its associated safety function is	✓			

		modify last Para (page 6) to [2.16] On page 7, add the words to the extent practical" "monitoring and surveillance program should provide, **to the extent practical**, the necessary information..."	performing as planned may not be practical to obtain (e.g., waste' form inside the waste package may be very difficult to monitor). Added phrase provides some needed flexibility for the monitoring and surveillance program consistent with paragraph 6.1				
6	Para. 2.17 Line 3	Replace the word *"requirements"* with ***"concerns"***	The concept of public interest and stakeholder requirements is a bit odd in that these groups do not set requirements – it makes more sense to use the public interest and stakeholder **concerns**.	✓			
7	Para 3.2	We suggest adding: e) provide periodic status reports to regulatory body; and f) implement mitigation strategies as required by regulatory body	For completeness	✓			
8	Para. 3.4 Item (c) Line 1	Revise line to" "provide evidence that addressees external stakeholders and the public concerns that waste"	The words "can satisfy" have been removed in favor of "addresses" – you can address stakeholder concerns, however, satisfying stakeholders is very subjective and may be unattainable with some stakeholders. Revised text gets away from this judgmental situation. You will not be able to satisfy ALL stakeholders (i.e., some have completely opposite views).	✓			
9	Para 3.5, lines 6-9	We suggest deleting the last sentence as the concept is not well explained may cause inconsistency and confusion. Its deletion does	Clarification and consistency with established programs or approaches.			✓	The sentences was modified

		not affect the intent of the paragraph in any significant way. In addition, this sentence may preclude certain programs or approaches currently in place.					according to a comment given by Finland.
10	4.10	Add sentence re: "*Early review and approval of Monitoring program by regulatory body.*"	For completeness	✓	The monitoring program considering all periods of the facility lifetime should be early reviewed and approved by the regulatory body. The monitoring programme should begin as early as possible during the initial site selection process and should evolve through the construction, operation and closure of the facility in an ongoing manner informing and updating data used in the safety case and supporting safety assessments of the facility, as illustrated in Fig. 1. In parallel, the monitoring programme should be periodically reviewed by the regulatory body.		
11	Fig. 1 line 2	Add *" features, events, and processes"* before FEPs	First time used in document			✓	This clarification was done in the previous to the

							Fig para 4.11
12	4.13	This Para should generally discuss criteria and strategy for reduction and eventual termination of monitoring program for different types of facilities.	Completeness			✓	The comment is too broad it will need more specific wording.
13	Para 4.22 6th bullet	Delete "to failures and changes in technology" and replace with: *"to collect information over the relevant time period of the measurements"*	The suggested change provides for an assessment of what is being done and why rather than the previous wording that seem to require one to speculate on what the technology of future might be.	✓	Assessment of the robustness of the monitoring technology over the relevant time period of the measurements		
14	4.22	Verify that all bullet points in summary are discussed in some detail throughout Ch. 4	Some don't appear to be covered in text, as written.			✓	This section deals with general recommendations to design a monitoring program, it is not going in details.
15	Para 6.1 Last Line	Add the word technological before the word reality: *"technological reality"*	The word *"technological"* is an appropriate modifier to "reality" – consistent with the first line of this paragraph.	✓			
16	6.1	Suggest replacing last two sentences with; *"Monitoring expectations are necessarily limited by certain physical challenges and limitations characteristic of different types of facilities;*	Not helpful to characterize as *"problems"*	✓	This sentence was added to the end of the para. The suggested two last sentences were not deleted		
17	Para 6.5 Lines 5-6	We recommend deletion of the sentence *"The scope of this monitoring should be sufficiently broad to allow issues not foreseen*	This sentence seems to invite boundless speculations cumbersome process to plan for monitoring.	✓			

		today to be considered in the future"					
18	Chapter 7	Clarify or define the distinction between "surveillance" and "inspection" Herein, the terms seem to be used interchangeably. Suggest defining "surveillance" to include but not be limited "inspections"	Clarity	✓	The purpose of the surveillance programme is to provide for the oversight of a waste disposal facility to verify its integrity to protect and preserve the passive safety barriers, and the prompt identification of conditions that may lead to a migration or release of radioactive and other contaminants to the environment. The surveillance programme is usually implemented through regular inspections of the critical components of the waste disposal facility. The surveillance programme includes but is not limited to inspections. Visual inspections are an important and effective way of detecting anomalies indicative of potential failures.		

					The surveillance programme also includes review and assessment of records, trends and performance of different parameters.		
19	Section 7.15	Suggest moving to “Detailed Inspections” better named “Detailed Surveillances”	“Special Inspections’ should be in association with unforeseen circumstances and not regularly scheduled.	✓	7.14 Detailed inspections should also be performed at regular intervals throughout the construction of a waste disposal facility, and during any periods of major modification, as well as during any remediation work. This is to ensure that the construction or modification is performed according to approved plans, and have not compromised the components of the disposal facility. The frequency of detailed inspections will be determined on a site specific basis.		
20	8.2 and 9.2	In these two sections the term “lifetime” in reference to life of facility seems to have different connotations. In 8.2 “lifetime”	Consistency: Need to use terminology consistently.			✓	The term “lifetime” has the connotations

		seems to include an indefinite far future, while in 9.2 it seems to only include a period during which active decision-making would still be occurring.					in both para.
21	8.3 line 2	Carry discussion of monitoring redundancy to Chapter 4 and expand.	The concept of monitoring redundancy should be introduced in Chapter 4	✓	A new para was added to chapter 4 saying "In designing the monitoring programme it should be considered that the credibility of monitoring data need to be verified using sufficient redundancy, independent verification of values, use of robust equipment and design, and to the extent possible use of analogue situations."		

GERMANY

	COMMENTS BY REVIEWER Reviewer: S. Geupel, U. Oppermann Country/Organization: Germany - GRS			Page 1 of 10 Date: 2010-11-19	RESOLUTION			
Rele-vance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/reject ion
2	1	General	Replacement "NORM residues" by "NORM waste".	Clarification. See definition given in			✓	Para. 1.3 does reference to a

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Rele-vance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/reject ion
				GS-G-1 [14]. Only waste is disposed off.				darft safety guide under elaboration with such title.
2	2	General	This guide should contain the Chapter "Glossary", analogue to DS379. E.g. monitoring, surveillance, NORM waste, (mine residue disposal facilities), …	Clarification.			✓	There is a rule in the Agency requiring that no more "Glossary" in any safety standards. Everything should be referred to the safety glossary.
2	3	1.4/p.1 1.10/p.1 5.5/1 8,7 …	This safety guide covers … geological and mine residue disposal facilities." "Mining residue disposal facilities …" "The programme of monitoring of a disposal facility for Naturally Occurring Radioactive Materials would … of a disposal facility for uranium or thorium mine residues."	Clarification concerning using the term "mine residue disposal facilities". For information: GS-G-1 doesn't contain the term "mine/mining residue disposal facilities". However, GS-G-3.4 contains the term "surface impoundment (for mining and milling waste)".	✓	Changed "residue" to "waste" everywhere it is elated to disposal.		
2	4	1.3/p.1	"The IAEA is ~~has~~ also develop~~ed~~ing a safety guide on geological disposal facilities for radioactive waste [5], …"	Editorial. Reference [5] is not yet public like e.g. [6] or [7].	✓			

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	COMMENTS BY REVIEWER Reviewer: S. Geupel, U. Oppermann Country/Organization: Germany - GRS			Page 2 of 10 Date: 2010-11-19	RESOLUTION			
Rele-vance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/reject ion
3	5	1.6/1	"The Draft Safety Requirements on … [Reference-Number for DS379], … ."	Editorial. Amendment of Reference DS379 in this Article and in Chap. Reference.	✓			
3	6	1.7/5	5th line "… Safety Report Series No. 64 on Programmes and Systems for ~~Design and Operation of~~ Source and Environmental Radiation Monitoring ~~Programmes~~ [18], and …"	Editorial. Correct citation; add reference to Safety Reports Series No. 64 (see comment No. 32).	✓			
2	7	1.9/5	"Disposal facilities for uranium and thorium mine residues."	Clarification concerning the use of the term "uranium and thorium mine residues". For information: GS-G-1 uses the term "waste from mining and minerals processing". (see comment No. 3)	✓	Changed "residue" to "waste" everywhere it is elated to disposal.		
3	8	1.10 (page 3)	3rd sentence: "… suitability of waste for disposal in a particular disposal facility is required to be demonstrated by the	Amendment. Add reference to Draft Safety Standard DS355 (see comment No. 33)	✓	"… suitability of waste for disposal in a particular disposal facility is required to be demonstrated by		

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			safety case and supporting safety assessment for the facility [19].”	with respect to safety case and safety assess-ment.		the safety case and supporting safety assessment for the facility [4, 14].”		
	COMMENTS BY REVIEWER Reviewer: S. Geupel, U. Oppermann Country/Organization: Germany - GRS			Page 3 of 10 Date: 2010-11-19	RESOLUTION			
Rele-vance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/reject ion
3	9	1.11 (pages 3-4)	2nd sentence: “The safety case includes information needed for siting, construct, operate and close the facility, for supporting decisions on managing the disposal programme, as well as information that are of particular interest to stakeholders [19].”	Add reference to Draft Safety Standard DS355 (see comment No. 33**)** with respect to safety case.	✓	Reference done to [4] SSR on Disposal of Radioactive Waste.		
3	10	1.11 (pages 3-4)	3rd sentence: “… beyond the scope of this guide, however, references [10, 11, 12, 18] direct the reader to such information …”	Include reference to Safety Reports Series No. 64 (see comment No. 32**)** with respect to technical details on monitoring and surveil-lance methodologies^.	✓			
3	11	1.12 (page 4)	“… ~~N~~nor does it focus …”	Editorial.	✓			
3	12	2.14 (page 6)	1st sentence: “… facility after closure”. “To some extent …”	Editorial (missing punc-tuation mark).	✓			

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	COMMENTS BY REVIEWER Reviewer: S. Geupel, U. Oppermann Country/Organization: Germany - GRS			Page 4 of 10 Date: 2010-11-19	RESOLUTION			
Rele-vance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/reject ion
2	13	2.7/1	"In the context of this guide the term surveillance refers …"	Checking. It should be described why it is necessary to have different definitions of the term "surveillance" in DS357 and in GS-G-3.4, Art. I.8 ("Management system for the disposal of radioactive waste"). In GS-G-3.4, Art. I/11 there are also mentioned the terms "surveillance and inspections".			✓	There is not different definition. The definition in GS-G-3.4 is more general. For the purpose of the DS 357 the definition is limited to what is explained in para2.7
2	14	2.12/1 3.1/1 3.2/3 3.3/4	"Monitoring and surveillance programmes begin at site characterizstion…"	Checking. According Art. 1.4, there are only monitoring and testing programmes during "pre-operational period", see [4] - DS354-.			✓	It is obvious that such programmes use to begin at early stage of the design and construction of a disposal facility.

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2	15	3.1/5	"If a change in responsibilities … to ensure that the monitoring and surveillance programmes continue …"	Clarification.	✓			
3	16	3.2 (c) (page 7)	"… system behaviour;"	Editorial (add semi-colon).	✓			
3	17	3.2 (d) (page 7)	"… under their responsibility."	Editorial (missing punc-tuation mark).	✓			
	COMMENTS BY REVIEWER Reviewer: S. Geupel, U. Oppermann Country/Organization: Germany - GRS			Page 5 of 10 Date: 2010-11-19	RESOLUTION			
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3	18	4.10 (page 10)	Delete the first sentence.	Avoidance of redundan-cies. The contents of first and second sen-tence are very similar. The second sentence provides the informa-tion more comprehen-sive than the first one.	✓	The monitoring program considering all periods of the facility lifetime should be early reviewed and approved by the regulatory body. The monitoring programme should begin as early as possible during the initial site selection process and should evolve through the construction, operation and closure of the facility in an ongoing manner informing and updating data used in the safety case and supporting safety assessments of the facility, as illustrated in Fig. 1. In parallel, the monitoring programme should be periodically reviewed by		

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						the regulatory body.		
3	19	4.12 (page 12)	1st line: "The ~~D~~decision to implement …"	Editorial.	✓			
2	20	5.2 (page 13)	2nd sentence: "… robust containment and isolation for limited periods of time, typically up to a few hundred years, are required."	To provide a more specific statement; consistency with the recommendations in Para 2.2 of GS-G-1 (Ref. [14])	✓			

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3	21	5.3 (page 14)	1st / 2nd sentence: "When compared to near surface disposal, geological disposal is suitable for intermediate and high level ~~radioactive~~ wastes that need a greater degree of containment and isolation from the accessible environment in order to ensure long term safety. ~~As an~~ For example, radioactive wastes containing long-lived radionuclides or wastes with ~~high~~ specific activities high enough to generate significant quantitites of heat from radioactive decay, such as ~~those contained in~~ spent nuclear	Clarification. Heat-generating radioactive waste should be explicitly addressed at this point.	✓			

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			fuel, are generally disposed of within deep geological disposal facilities with engineered barriers such that …"					
2	22	5.5/3	"~~It should be recognized that …~~"	This example is a very special case and not a regular disposal facility.	✓			

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3	23	Fig. 2 (page 16)	1st line: "Schematic diagram for ~~a~~ the safety ~~assessment~~ case components and methodology. …"	Fig. 2 illustrates the safety case methodology, not the safety assessment one. Compare with Fig. 2 of DS355 (March 2010) and with Fig. 1 of DS284 (April 2010).	✓	Fig 2. Schematic diagram for a safety case and safety assessment components		
2	24	6.7 (page 17) 6.10 (page 18)	Last dot "Data that … and worker protection." "The monitoring programme … to ensure the safety of workers…"	Checking with regard Paras 1.8 and 2.2 and [13]. E.g. regarding Para 1.8 this guide does not address monitoring for occupational exposure.			✓	The scope of the document does not cover occupational exposure and the draft is not giving any recommendation in this regards. The DS 357 is only mentioning that as part of the

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								monitoring program at the operational stage should cover the control of the occupational exposure without going in details.
2	25	6.15	"For some kinds of disposal facilities (e.g. tailings dams) emergencies can arise rapidly."	Clarification. This case should be excluded by construction of the disposal facility. Emergency can be happen by existing (older) facilities. In this case the recommendation should be described in a special Para but better in a separate Chapter.	✓	For some kinds of existing disposal facilities (e.g. past practices as some tailings dams), emergencies can arise rapidly.		
	COMMENTS BY REVIEWER Reviewer: S. Geupel, U. Oppermann Country/Organization: Germany - GRS			Page 8 of 10 Date: 2010-11-19	RESOLUTION			
Rele-vance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/reject ion
2	26	7.4	"The surveillance programme should start in the pre-operational period during construction …"	Checking, clarification The definition given in Para 1.4, first sentences, don't contain a surveillance programme	✓	7.4 The monitoring and testing programme should start in the pre-operational period during construction to allow detection of early degradation of the components integrity or to		

	COMMENTS BY REVIEWER Reviewer: S. Geupel, U. Oppermann Country/Organization: Germany - GRS		Page 1 of 10 Date: 2010-11-19		RESOLUTION			
Rele-vance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/reject ion
				in the pre-operational period.		find out the quality of the host rock around the excavations. The surveillance programme to be followed when operation of the disposal begin should be defined towards the end of the pre-operational phase [11].		
2	27	7.17	"Special inspections should be performed in case of events like incidents."	Amendment.	✓	Special inspections should be conducted after natural events considered being extreme for the disposal facility environment; such as significant fires, major earthquakes, floods, severe storms, very heavy rainfall or cyclones. Special inspections should also be performed in case of events like incidents….		
2	28	8.2 (page 21)	Last sentences "These changes … and non-human biota exposure to …"	Checking. The term "non-human biota" isn't containing in DS379.	✓	These changes could affect the potential release of radionuclides from disposal facilities and the exposure pathways through which biota and representative person exposure to radionuclides may occur.		
3	29	8.8	"The operational safety case is made prior to obtaining a construction and operation license."	Checking. It is correct that construction license is based on an operational safety case?	✓	"The operational safety case is developing prior to obtaining a construction and operation license." The safety case and safety assessment begun to be developed in an early stage of the facility and its		

	COMMENTS BY REVIEWER Reviewer: S. Geupel, U. Oppermann Country/Organization: Germany - GRS			Page 1 of 10 Date: 2010-11-19	RESOLUTION			
Rele-vance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/reject ion
						evolve in time with the facility construction, operation and closure.		
2	30	Chap. 9	Check all Articles of Chapter 9 concerning the topic "surveillance".	Clarification. Reference [17] contains information on monitoring and on surveillance. See e.g. Art. 2.13, too.	✓	Changed "monitoring" to "monitoring and surveillance"		
3	31	Ref. [8] (page 29)	… Safety Series No. 115, IAEA, Vienna (1996). [under revision, DS379 will supersede]	New BSS are currently under development. (Link: http://www-ns.iaea.org/committees/files/draftcomments/987/BSSDraft4.0.pdf)			✓	The new BSS is still under review and can not be referenced due to its stage of development
	COMMENTS BY REVIEWER Reviewer: S. Geupel, U. Oppermann Country/Organization: Germany - GRS			Page 9 of 10 Date: 2010-11-19	RESOLUTION			
Rele-vance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/reject ion
3	32	Ref. [18] (page 29)	INTERNATIONAL ATOMIC ENERGY AGENCY, Programmes and Systems for Source and Environmental Radiation Monitoring, IAEA Safety Reports Series No. 64, IAEA, Vienna (2010).	Add IAEA Safety Reports Series No. 64 to the list of references (see comments to Paras 1.7 and 1.11).	✓			
3	33	Ref. [19] (page	INTERNATIONAL ATOMIC ENERGY AGENCY, The Safety Case and Safety Assessment for	Add IAEA Draft Safety Standard DS355 to the list of references			✓	We referred to the draft safety requirement on

	COMMENTS BY REVIEWER Reviewer: S. Geupel, U. Oppermann Country/Organization: Germany - GRS			Page 1 of 10 Date: 2010-11-19	RESOLUTION			
Rele-vance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		29)	Radioactive Waste Disposal, Safety Guide, Draft Safety Standard DS355.	(see comments to Para's 1.10 and 1.11).				disposal for radioactive waste
3	34	Annex I: I.3 (page 31)	3rd sentence: "The scope of this monitoring should be sufficiently broad to allow issues not foreseen today to be considered in the future [~~16~~15]."	Text refers to Ref. [15]; compare with Para 6.5.	✓			
2	35	Annex II	Last sentences on page 39 "At the end of 1998 some …"	Amendment. This Draft is dated from 2010, in order that topical information on inventory should be given and not with a regard to the year 1998!			✓	The Annex II was deleted

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Rele-vance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
2	36	After Annex II	Annex III Example of Monitoring and surveillance programme for a "mine residue disposal facilities"	Amendment. Concerning Art. 1.4, this guide includes "mine residue disposal facilities" too. In order that an example of this special disposal facility should be added.	✓	There is a need for voluntaries examples for near surface disposal and mine waste disposal facilities		
2	37	General	General	Amendment.				

	COMMENTS BY REVIEWER Reviewer: S. Geupel, U. Oppermann Country/Organization: Germany - GRS		Page 1 of 10 Date: 2010-11-19		RESOLUTION			
Rele-vance	Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			Amendment of Safety Guide DS355 "The Safety Case and Safety Assessment for Radioactive Waste Disposal"	In DS357 there are many relations to safety case and safety assessment.				
3	38	General	Para 6.3 and Annex I, I.1 contain identical information	Clarification.	✓	Information removed from the Annex and modified according.		
3	39	General	Para 6.5 and Annex I, I.3 contain identical information	Clarification.	✓			

JAPAN

COMMENTS BY REVIEWER Reviewer: Country/Organization: Japan / Nuclear and Industrial Safety Agency (NISA) Date:Nov.25.2010			Page 1 of 10	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	1.3/4 (p.1)	The IAEA has also developed a safety guide on geological disposal facilities for radioactive waste [5], and is preparing a safety guide near surface disposal facilities for radioactive wastes [6].Safety guide on disposal of NORM residue is under planning and ~~, as well as~~ a safety guide on the protection of the public against exposure to natural sources of radiation including NORM residues [7].	References [5] and [6] address "disposal", however [7] addresses "management" of NORM residue. Clarification.			✓	There is no plan for developing such safety guide.

2	1.9 After 3rd bullet (p.3)	Add following texts after 3rd bullet; In this Safety Guide, borehole disposal facilities are not specifically addressed. However, Borehole disposal is not conceptually different from either near surface disposal or geological disposal of radioactive waste. A possible surveillance and monitoring programme suitable for a small scale borehole disposal facility is discussed in other IAEA Safety Standards [X]. [X]: INTERNATIONAL ATOMIC ENERGY AGENCY, Borehole Disposal of Radioactive Waste, IAEA Safety Standards Series No. SSG-1, IAEA, Vienna (2009).	Clarification.	✓			
3	1.10/2 (p.3)	The term geological disposal generally refers to disposal in deep, stable geological formations usually several hundred meters or more below the surface.	Consistency with GSG-1.	✓			

COMMENTS BY REVIEWER	RESOLUTION
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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
4	2.1～2.4 and 2.7 (p.4-5)	The definition of “monitoring” should be arranged properly and mentioned in one paragraph. The definition of “monitoring” and “surveillance” used in this document should be expressed in bold text or in a box.	Many definitions of ‘monitoring’ are mentioned in these paragraphs. This is useful information, however somewhat redundant. In addition, it would be helpful if definitions of “monitoring” and “surveillance” used in this document were specified more clearly. Clarification.	✓	The order of these para was changed for clarity.		

5	3.4/(a) and (b) (p.8)	Concerning specific responsibilities of the regulatory body related to monitoring and surveillance (a) and (b), add some specific examples in order to clarify what kind of materials are to be reviewed. In order to consider domestic guide related to monitoring and surveillance in near future, we would like to know the contents of the requirements, which are made by the regulatory body, for monitoring and surveillance, monitoring and surveillance programmes and reporting arrangements, including arrangements for emergency monitoring.	Clarification.			✓	There is not in this scope of this safety guide to open with examples all of the recommendations given

COMMENTS BY REVIEWER	RESOLUTION
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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
6	3.4/(c) (p.8)	(c) provide evidence ~~that can satisfy external stakeholders and the public~~ that waste disposal facility is being appropriately monitored and controlled by operators, this may include independent monitoring and surveillance.	The original sentences are deemed to be the responsibility of the operator rather than that of the regulatory body.	✓			
7	4.6 (p.9) (or after 4.6)	Add following sentence; "In addition monitoring at alternative facility with similar characteristics or pilot facility may also be useful." In Japan, in 8.3 (iv) of "Basic Guide for Safety Review of Category 2	They are useful to obtain in situ information without disturbance of engineered barriers.	✓			

		Radioactive Waste Disposal" by NSC (August 9, 2010), about revisions of safety assessment after the period for active control," NSC need data on near surface or sub-surface disposal facilities conditions to be obtained indirectly through in-situ tests under the environment, simulating equal conditions of an actual waste disposal facilities or supplemental laboratory tests".					

COMMENTS BY REVIEWER	RESOLUTION
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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
8	5.3 (p.14)	We follow Finland comment.					
9	6.4/ FIG.2 (p.16)	FIG2 is deemed the revision of FIG2 in DS355"The Safety Case and Safety Assessment for Radioactive Waste Disposal (Safety Guide) ". If so, following points should be taken into account. -The caption of FIG2 should be change as follows; *Schematic diagram for a safety assessment methodology.* → ***Components of the safety case***	To be consistent with DS355.	✓	To avoid confusion and discussion on this Fig That is not in the scope of this document we propose to delete this figure in this document.		
		FIG2 has been simplified from Figure2 in DS355 However detail of structure is different from DS355, hence explanation should be informed. (For example direction of arrows, additional arrows between "Iteration and Design Optimization" and "Limits, Controls and Conditions", and "Management of Uncertainty" and "Limits, Controls and Conditions")	FIG2 derives from DS355 hence some information on the revision of the Figure2 in DS355 is needed for making a decision.				
		Add Reference (SSG-X(DS355))	Clarification.				
10	7.5/2 (p.19)	7.5. During the operation of the facility, the surveillance programme should allow the verification that passive safety barriers integrity is protected and	See next comment.	✓			

		preserved. The protective components of the disposal facility could be inspected periodically as part of the surveillance programme, as long as this can be performed on accessible areas and may typically be restricted to disposal infrastructure and those parts of engineered barriers directly accessible from infrastructure.					

COMMENTS BY REVIEWER	RESOLUTION
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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
11	7.6/1 (p.19)	During the period after closure, ~~the protective components of the disposal facility could be inspected periodically as part of the surveillance programme, as long as this can be performed on accessible areas and may typically be restricted to disposal infrastructure and those parts of engineered barriers directly accessible from infrastructure.~~ Actual waste disposal areas or cells containing waste and the emplaced waste forms are usually not accessible for inspection.	According to the definition of "Post-closure" in paragraph 1.4, the whole disposal infrastructure is removed. It should be considered that there is no accessible area hence this situation should be regarded as part of operation.	✓			
12	7.6/1 (p.19)	During the period after closure, the protective components of the disposal facility could be inspected periodically as part of the surveillance programme, as long as this can be performed on accessible areas and may typically be restricted to disposal infrastructure and those parts of engineered barriers directly accessible from infrastructure. Actual waste disposal areas or cells containing waste and the emplaced waste forms are usually not accessible	Clarification. Are alternative facility with similar characteristics and pilot facility assumed as an example of the infrastructure could be inspected?	✓	During the period after closure, waste disposal areas or cells containing waste and the emplaced waste forms are usually not accessible for inspection.		

		for inspection.					

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Country/Organization: Japan / Nuclear and Industrial Safety Agency (NISA)

Date: Nov.25.2010

RESOLUTION

Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
		We recognize that ANNEX I is an example of monitoring parameters by categories and periods of a geological disposal. The Following Comments on ANNEX I (13-16) are comments needed to improve the contents.		✓			
13	ANNEX I (p.31)	EXAMPLE OF MONITORING AND SURVEILLANCE INFORMATION COLLECTED FOR A GEOLOGICAL DISPOSAL PROGRAMME Terms "monitoring" and "surveillance" should be used by the definition in Chap.2.	In this ANNEX there is no differentiation between monitoring and surveillance. They should be differentiated and described.	✓			
14	I.4 (p.32)	Delete the following characteristics from the baseline information. •mechanical properties of the disposal facility structure; •mechanical properties of the engineered barriers; •retention & hydraulic properties of the engineered barriers.	Because I.2 says "This early information is important because it allows an understanding to be developed of the nature and properties of the natural, 'undisturbed' environment of the disposal system." This means characteristics of engineered barriers are not included in the baseline information. Also the context is not consistent with that of the chapter 2.2 of the TECDOC 1208.	✓			
15	I.13 3rd bullet (p.34)	How is extent of the potentially contaminated zone measured?	Clarification.			✓	Is not in this scope of this document to explain how to implement this recommendation.

COMMENTS BY REVIEWER

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RESOLUTION

Country/Organization: Japan / Nuclear and Industrial Safety Agency (NISA) Date: Nov.25.2010							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
16	Addition I.20 (p.35)	Add the following paragraph. "If no method can be identified that respects all monitoring constraints, alternative strategies should be used. The option of constructing, within the confines of the disposal facility or nearby in the same host rock, an extensively instrumented demonstration or 'pilot' facility, avoiding thus any breaching of the real isolation barriers, could be evaluated. Logically this demonstration should take place before the authorization of disposal facility operations; however in some geological disposal programmes the continuation of demonstration and thus the associated monitoring, concurrently with disposal operations in the disposal facility has been suggested. One anticipated advantage of such strategy would be to provide additional confirmation of the reliability of assumptions about **overall system** ~~**waste package**~~ performance."	Most of parameters and process during post-closure shown in Table1 (the importance of the different monitoring parameters during the different periods of development of a geological disposal facility) can not measure directly. Therefore paragraph I.7 in previous draft (DS357(2009.5.6)) deleted in current draft should be recovered here. However the last sentence should be changed as shown in the left column to make sense.	✓			

Reviewer: Country/Organization: Japan / Nuclear and Industrial Safety Agency (NISA) Date: Nov.25.2010							
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection

17	Annex II (p.39)	Safety Guides describe the best practice to meet Safety Requirements. Therefore confirm whether El Cabril is the best practice or not. If El Cabril is only an example, this Annex is not necessary.	Clarification.	✓	Annex 2 was deleted.		

COMMENTS BY REVIEWER	RESOLUTION
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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
18	1.11, 2.17, 8.1, 8.6, 8.12	stakeholders → interested parties	Editorial error.	✓			
19	2.14 (p.6) (bottom one)	2.14 →2.16	Editorial error.	✓			
20	Before 8.4 (p.22)	~~ANALYSE~~ ANALYSIS OF AND RESPONDING TO MAIN OBJECTIVES	More appropriate sub-title.	✓			
21	Reference [4] (p.29)	[4] INTERNATIONAL ATOMIC ENERGY AGENCY, Disposal of Radioactive Waste, IAEA Safety Standards Series No. SSR-5, IAEA, Vienna (2010).[DS354]	Correction.	✓			
22	Reference [5] (p.29)	[5] INTERNATIONAL ATOMIC ENERGY AGENCY, Geological Disposal Facilities for Radioactive Waste, Safety Guide, Draft Safety Standard DS334.	Correction.	✓			
23	Reference [6]	[6] INTERNATIONAL ATOMIC ENERGY AGENCY, Near Surface	Correction.	✓			

	(p.29)	Disposal Facilities for Radioactive Waste, Safety Guide, Draft Safety Standard DS356.					

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Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
24	Reference [14] (p.29)	No. GS-G-1, IAEA Vienna (2009). → No. GSG-1, IAEA Vienna (2009).	Editorial error.	✓			
25	Table I (p.35)	Editorial errors • footnote no.3 → no.1 • to put the check mark X on the right position as it shows the group of parameters or process not each detail item on the group.	Editorial errors	✓			