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Summary Table of MS Responses to DS 351 Draft 5
Requested 10 December 2009, deadline 12 April 2010

UK

COMMENTS BY REVIEWER Reviewer: Country/Organisation: UK Member States comments DS 351 Date: 31 March 2010				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	General		The UK has no detailed comments to make on DS 351, which appears well written and describes a sensible approach throughout. The UK supports the progress of the current version of DS 351 (Draft 5).	Yes			

FINLAND

STUK

09. 04. 2010

9/0040/2009

IAEA
Wagramer Strasse 5
P.O Box 100
A-1400 VIENNA

Your Ref. 746-J5.03.1, 10.12.2009

IAEA; DRAFT SAFETY GUIDE; REQUEST ON COMMENTS

The IAEA has requested comments from Finland on the draft Safety Guide DS 351 concerning The Use of Graded Approach in the Application of Safety Requirements for Research Reactors. STUK shared the draft within all Finnish stakeholders, but did not receive any comments.

Director Lasse Reiman

Enc. Nil.

Distribution

Through e-mail: Mr David Winfield/IAEA (d.winfield@iaea.org)

STUK: MAx, LR, TVa, KIH, PS

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MEXICO

Mr. David Winfield,
Department of Nuclear Safety and Security
IAEA

Dear Mr. Winfield,

In relation to the IAEA communication No: 746-J5.03.1 about the document for review, entitled “The Use of a Graded Approach in the Application of Safety Requirements for Research Reactors (DS351)” (guide and recommendations). I allow myself to inform that we do not have commentaries to this document.

Best regards,

Ms. Lydia Paredes-Gutierrez, Sc.D.
Director of Technological Research
National Institute of Nuclear Research
Mexic

ROMANIA

GOVERNMENT OF ROMANIA
National Commission
for Nuclear Activities Control

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NO. 1953/VB/
Bucharest, April 20th, 2010

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INFORMATION
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Dear Mr. Winfield,

I am pleased to refer to the IAEA letter dated 10th December 2009 (746-JS.03.1), on the subject of revision of the DS351 **"The Use of a Graded Approach in the Application of Safety Requirements for Research Reactors"**.

In this respect, I would like to inform you that there are no comments on the above mentioned draft.

Looking forward to continuing our co-operation,

Yours sincerely,

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Comments on "The Use of a Graded Approach in the Application of the Safety Requirements for Research Reactors" (DS351 Draft 5)

COMMENTS BY REVIEWER Reviewer: United States of America Country/Organization: United States of America Date: March 2010				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	General	The document is over-reliant on references to other documents. The document is very good at directing the reader to related information in other documents. If DS351 is intended to be a "stand alone" document, serious consideration should be given to the incorporation of information from the referenced documents into DS351.				Partially. Document is a compromise between being overly cumbersome and lengthy by providing all criteria for of GA in DS 351 and referencing others. This aspect was discussed by NUSSC at the DPP stage.	
2	2.2 / 5	Recommend including a definition for the term "Engineering Judgment." The definition should provide clarification on what constitutes engineering judgment. In the case where engineering judgment is used to reach a conclusion of acceptability on an issue important to facility safety, guidance should be provided on the minimum documentation requirements of the rationale used reach the conclusion of acceptability.	Experience with operators (licensees) has demonstrated a varied interpretation on the part of the operators (licensees) of what constitutes "Engineering Judgment." We have found that in many cases when the operator (licensee) uses engineering judgment as the basis for the decision, little if any documentation of the rationale used to reach a decision or	See also response to US NUSSC member review comment #1 on Eng. Judgement. A 'definition', which is not definitely found in the literature, is noted in para 2.2 and it is added that documentation is required. Section 6.0 mention is also modified also.			

COMMENTS BY REVIEWER Reviewer: United States of America Country/Organization: United States of America Date: March 2010				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
			conclusion exists.				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
3	4.6 / 11	(g) appears to be redundant to (b) in the listing of the examples. Recommend deleting (g) from the list since (b) addresses both amount of detail and the degree of review and approval and (g) only addresses redundant element of level of detail.	Both (b) and (g) deal with the "amount" or "level" of detail contained in operating procedures. This appears redundant since amount of detail and level of detail are synonymous terms.	Agree, detected.			
4	6.2 / 10	"…features, to prevent ~~an~~ the escalation ~~from~~ of an initiating event to a Design Basis Accidents and to achieve a stable and…"	As written the sentence does not state "what escalates" to a DBA. The escalation of an initiating event to a DBA is what the ESF is designed to prevent.			Rejected	The sentence is a direct quote from NS-R-4. It is stated that it is an AOO which might escalate to a DBA.

GERMANY

Draft Safety Guide DS351 „ The Use of a Graded Approach in the Application oft he Safety Requirements for Research Reactors, Draft 5, 2009/11/20

COMMENTS BY REVIEWER Reviewer: **Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)** (with comments of GRS) Page 1 of 15 Country/Organization: **Germany** Date: March 31th, 2010				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	General	The DS 351 should take into account the preconditions stated in DPP 351, namely that this new document should provide a guide how to apply the general or grade NPP related requirements for use in connection with RRs (see explanations under Reason).	There are inconsistencies with the DPP351 document: The foreseen adoption of general safety requirements not specially related to research reactors is missing in the scope of DS 351. In opposite, this document focuses on ranking of requirements especially dedicated to research reactors. Whereas, as stated in DPP 351, the aim of DS 351, "is to provide a guidance on grading of a wide range of safety related publications developed mainly for nuclear power plants. While the documents specifically developed for research reactors have already been "graded" in a sense, as they are directly applicable for			Yes	Focus was intended to be NS-R-4 mainly, but other general SGs are referenced throughout. I consider these other references are adequate to cover NPP general requirements which are now in draft 6.

			research reactors, therefore, DS 351 as more general document have to be evaluated in order to determine the degree or extent of their applicability to a particular research reactor installation. The DS 351 should guide knowledgeable but inexperienced users of the IAEA Safety Standards how to adapt general safety requirements, not specifically related to RRs, and how to handle the embedded flexibilities in the RR-specific requirements for use in connection with a specific RR installation."				
2.	General	The methodology for determining the extent of applicability of particular requirement should be proposed.	The criteria for determining the extent of applicability of particular requirement are not clearly defined.			Yes	To explicitly define criteria (which is not done) would require a decision analysis method, e.g. the AHP technique, for each topic. This could be done but require a TECDOC level of detail and so is out of scope.

3.	General	The methodology for the classification of SSC should be more precisely developed.	The analysis and classification of activities and the various systems, structures and components (SSC) in accordance with their importance to safety are either missing or not precisely defined.	Yes	Now added ref [46] to DS367 in para 6.9.		
4.	General	Review of the IAEA document structure on research reactors with respect to duplication of contents and contradictions among documents: Safety Requirements No. NS-R-4 Safety Guide DS351 and the planned Subject-Specific Safety Guides e.g. DS436 on I&C.	Safety Guide DS351 contains guidance on the graded application of the safety-related requirements of the Safety Requirements No. NS-R-4 for Research Reactors (see Section 1.1). As the Safety Requirements NS-R-4 rank above the planned Safety Guide DS351 in the hierarchy of IAEA documents, it is not comprehensible that the requirements of NS-R-4 are to be further downgraded by the subordinate Safety Guide DS351. The Safety Requirements No. NS-R-4 should include all general requirements on a topic, e.g. on I&C. Any necessary supplementations, including the requirements for research reactors that will be graded according to the nuclear risks involved in their		The safety requirements are not downgraded by DS 351? They are used as basis for structuring and formatting of DS2351. It is accepted there is some overlap because of the nature of DS 351. A more detailed TECDOC could then provide more detail than		

			respective designs, should then be addressed in Subject-Specific Safety Guides, such as DS436 for I&C. It does not make any sense that the present DS351 again specifies requirements for the design of I&C systems in research reactors when these requirements are already covered by project DS436 I&C.		a subject specific Safety Guide. NUSSC requested that this overall SG be produced to do that.		
5.	2.3	Move the paragraph to follow paragraph 2.7	In paragraph 2.3 the factors from NS-R-4 are listed (Initially proposed to waive requirements). As these factors are important for the risk screening they are better placed in "Step 1: Facility Hazard Categorization".		Agree, have moved.		
6.	2.6/2	hazard categorization (Step 1), which determines the baseline of the potential radiological hazard.	Comma Missing, the sentence should be rewritten; otherwise is not clearly to understand.		Changed, now is para 2.5.		
7.	3.6/ 4	(…) authorization of initial and routine operation and all proposed modifications, (…)	It should be specified, that all of the proposed further modifications are the subject of authorisation.		Agree, modified.		
8.	3.6, 3.8, 3.9	*No modification proposed.*	Ref. [14] is in revision. As given in DPP to DS416, parts of this reference will be transferred (with parts of other guides, see Ref. [30]) to a new complete, comprehensive and coherent guidance "Licensing Process for Nuclear		Will check before publishing (as with other draft refs.) but could find the Ref.[14] formal revision.		

			Installations". The remaining parts will be also reviewed and then included into a future guide "Functions of the Regulatory Body". Correctness of the citation, in particular the paras cited in para 3.9, should be checked during the further guide development.				
9.	3.6, 3.8, 3.9		Specific to the licensing of the decommissioning of research reactors, specific recommendations on the regulatory review of the safety assessment for decommissioning as given in WS-G-5.2, Chapter 5, should be given in an additional para, inserted after para 3.9.		Included as para. 3.10 and Ref [39] is WS-G-5.2.		
10.	3.9/2	However, each step in the licensing process should be subject to grading by the regulatory body in determining the scope, extent, level of detail and effort that should be devoted to it, depending on the magnitude of the potential risks, (…) Or by the regulatory body in determining the extent of licensing requirements for the particular step, depending on the magnitude of the potential risks, (…)	It should be clarified that the decision on grading of particular step in the licensing process should lie in the responsibility of the regulator. Also the extent of grading should be specified.		Agree, included.		
11.	5.	-/-	Currently, Chapter 5 contains		Agree, have		

			little specific requirements or recommendations. Instead it refers to other Safety Guides. To make a reasonable and readable Safety Guide the chapter should be rewritten incorporating the essential recommendations (regarding the graded approach) from the hazard specific documents (e. g. NS-G-2.13, DS 405, DS 417, NS-G-3.3/DS422).		modified and referenced all those and paragraph is now rewritten to improve clarity.		
12.	5.2	[...] The main siting aspects to be considered are the influences of - potential external events of natural origin, in particular earthquakes; - potential human induced events associated with the particular site[14]; - site meteorological and hydrological characteristics influencing the extent of potential public doses and environmental contamination from facility releases; - population density and population distribution; - other characteristics of the external zone such as ultimate heat sink capability. [footnote 14:] These external events may be due to the proximity of other nuclear facilities, local industries or road transport and air traffic routes.	Typically, seismic events dominate the hazard due to external events and should be mentioned explicitly.	Yes	Modified.		

13.	6.6/20	Systems for confining radioactive material may be graded. This has been discussed in para. 6.4, (Level 4).	This has been discussed in the previous drafts, whereas at the current draft para 6.4 was reformulated and shorted, so there are no adequate explanations.		Corrected into para 6.2.		
14.	6.9/2	The method for grading the safety significance of SSCs, shall be based on ~~Detrmietic~~ deterministic methods (…)	Typing mistake		Corrected.		
15.	several	(…) research reactor (…). Replace "reactor" with "research reactor" in the following sentences: 6.11/3, 6.12/2, 6.15/5, 6.15/8, 6.25/3, 6.25/6, 6.27/5, 6.30/8, 6.37/8, 6.42/1, 6.44/2, 6.45/12, 6.52/3, 6.58/4, 8.4/8 and 8.4/16	Specification is needed.		Corrected all.		
16.	6.14/4	(…) the design basis for reactors posing different potential ~~radiation~~ hazards	All of the potential risks should be taken into account, not only radiation hazards.		Agree, have deleted.		
17.	6.25 (3)	6.25. Grading may be applied in the selection of the design features to meet the radiation protection goals. For example: (1) Low power level reactors with small cores that could be easily removed and packaged may require minimal special provisions for removal and packaging of the core. Therefore the need for high-level radioactive waste facilities will be minimal. (2) Higher power level, pool type	Item (3) is not an example as given in Items (1) and (2), but a requirement for any case of grading - as expressed by the word "must". Therefore, the item number is removed. In the last sentence it is not clear whether interim storage during decommissioning or final storage at a repository is meant. As the text also deals with handling of LLW, interim storage during		Agree, have now deleted (3).		

		reactors that allow for easy access and under-water handling of the core components may require design provisions for disassembling the reactor under the water. Radioactive waste facilities will be an important consideration. ~~(3)~~ In any case provision must be made for handling and display of low-level waste and non-active debris from decommissioning and for <u>interim</u> storage of relatively high-level waste <u>during decommissioning</u>.	decommissioning is assumed.				
18.	6.31/2	(…) and appropriate provisions <u>are</u> made (…)	Typing mistake		Corrected		
19.	6.32/1	The selection and ageing of materials is discussed in paras 6.68 to 6.70 of Ref. [1].	Here, again, the focus is on the NS-R-4, without mentioning NS-G-2.12				Rejected. NS-G-2.12 is for NPP, to minimize the already large number of refs this is omitted as it also has no reference to grading.
20.	6.35/2	(…) ~~shut down~~ <u>shutdown</u> of the facility (…)	Typing mistake		Corrected		
21.	6.55/8	(...) to maintain the reactor in a safe ~~shut down~~ <u>shutdown</u> state	Typing mistake		Corrected		
22.	6.57/1&2	The requirements for the radiation protection systems are specified in paras 6.145 - 6.148 of Ref. [1].	Here, again, the focus is on the NS-R-4, without mentioning e.g. NS-G-2.7				Rejected. As for 19 above NS-G-2.7 is out of scope for RRs and has no reference to

							grading.
23.	6.58 (b), (c), (d)	6.58. For example: … (b) A reactor with various experimental devices: beam tubes and neutron guides, neutron activation analysis (NAA), and radioisotope production (RIP) facilities should require neutron and gamma monitors for the beam tubes and neutron guides and instruments, gamma monitors in the NAA facility and in the RIP handling systems as well as equipment for contamination monitoring. ¶ A low power reactor without beam tubes used only for teaching purposes would need only limited and basic equipment such as gamma monitors at the open pool end or in the control console and contamination monitors. (c) For high power level reactors supplementary monitoring displays outside the control room should be required for displaying and recording radiation conditions at specific locations in the facility for normal operational and accident conditions (large range monitoring). ¶ ~~(d)~~ Such additional radiation monitoring locations may not be required for very low power level facilities (< 50 kW).	The readability of this section might be improved by the following modifications: In sentence (b) a new section should be inserted before defining the condition for the low power reactor without beam tubes. In analogy, sentences (c) and (d) should be combined in sentence (c) with just a section for old sentence (d).		Modified as suggested.		

24.	6.63/1&2	The requirements for the radioactive waste systems are specified in paras 6.162 to 6.166 of Ref. [1].	Here, again, the focus is on the NS-R-4, without mentioning e.g. WS-G-2.7				Rejected. Reference is not focussed on RR and provides no reference of grading so ref[1] is retained as the key reference.
25.	7.37/2	Guidance for fire safety is presented in Ref. [21] and [37]. Add the corresponding reference to the List: 37. INTERNATIONAL ATOMIC ENERGY, Protection against Internal Fires and Explosions in the Design of Nuclear Power Plants, Safety Standards Series No. NS-G-1.7, IAEA, Vienna (2004).	The guidance given on fire safety is included in two guides, the one on fire safety in the operation of NPP [21] and the corresponding design guide to be added as new reference [37]		Added.		
26.	7.39/2	Grading the operational fire protection may be facilitated by provisions incorporated into the design corresponding to the fire hazard analysis required to be performed in [37] and to be periodically updated in [21], as well as by siting considerations.	Fire hazard analysis may demonstrate how to deal with deviations between NPP and research reactors and provide insights for grading. For Ref [37] see comment above		Added.		
27.	7.40/1	7.40. Since fire safety assessment/analysis techniques are well understood, the amount of analysis needed to determine how best to apply the available resources	The term fire safety techniques is not clear, addition provides information what is intended.		Added.		

		can be graded and should employ techniques that have been proven adequate in similar facilities elsewhere.					
28.	7.51	7.51. The requirements for radiation protection are presented in paras. 7.93 to 7.107 of Ref. [1] and in the Basic Safety Standards, Ref. [27]. Guidance for radiation protection is presented in Ref. [19].	Ref. [27] is under preparation, as given in the references list. Modification might be needed as soon as BSS 115 is published (4th quarter 2009 as given in DPP for DS379; Submission of Draft 3.0 for comment in Jan. 2010). *No modification proposed.*		No response needed.		
29.	7.53	7.53. The application of grading to the radiation protection programme should be consistent with the reactor's design and with its utilization Ref. [20], paras 1.5 and 1.9. The environmental monitoring programme will depend also on the location of the reactor. For example; ~~(~~a densely populated site will generally require a more extensive environmental monitoring programme~~)~~.	Ref. [20] is under revision (DS397). In the new version, the content of the given paras might be moved to other paras, necessitating a modification of the para numbers. To improve the readability, the brackets around the last sentence are removed.		Done.		
30.	7.55	7.55. Working areas within a research reactor ~~are~~ should be classified (graded) into supervised and controlled areas according to the magnitudes of the expected normal exposures, the likelihood and magnitude of potential exposures, nature and extent of the required radiological protection procedures. Controlled areas themselves ~~are~~ should be subjected to classification	The given paras 1.7 to 1.9 of Ref. [19] do not refer to the classification of working areas. Area classification is addressed in paras 5.44 to 5.46 and in para 5.48. Following the wording of para 5.44, "reactor" is replaced by "research reactor" and the statement "are" is replaced by		All suggestions done.		

		(grading) according to measures or expected radiological level, Ref. [19], paras. ~~1.7 to 1.9~~ 5.44 to 5.46 and 5.48.¶ For a high power research reactor, it may be necessary to further grade the controlled area into different levels, for example, controlled area levels I, II and III. Residence at controlled area level II may require specific procedures (in addition to those required for area level I) that in s~~a~~ome cases require the use of protective garment, equipment, or tools. Controlled area level III will normally be closed by a physical barrier (e.g. an airlock door) that is opened only by authorized workers. Furthermore, opening of this door during reactor operation may result in an automatic reactor shutdown action. ¶ For low power research reactors, controlled area levels III or II, may not be needed.	"should be". Sentence is divided into 3 sections in order to improve the readability.				
31.	7.63	While selection of materials and the effects of the operating environment on their properties have to be accounted for in the design of all research reactors, the use of a graded approach can be made in developing the in-service inspection and the ageing management programmes during the operating life of the facility.	Modifications and additions (underlined) made for clarification and harmonization with DS 412 (Draft 1, particularly paragraph 1.11).		All suggestions done.		

		Grading may be applied in determining the appropriate frequency of inspections, in selecting detection methods as well as in establishing ageing prevention and mitigation measures, which may be based on the estimated lifetime of the SSCs, their complexity and ease of replacement. In most research reactors, it is feasible to inspect the materials periodically and replace the components, if needed. Grading may also be applicable to the resources needed to implement the ageing management programme. While a dedicated organizational unit may be needed to implement such a programme for higher power research reactors, the ageing management activities for research reactors having a low power may be performed by the maintenance personnel.					
32.	8.1	8.1. The requirements for decommissioning are presented in paras 8.1 to 8.8 of Ref. [1]. Further guidance can be found in Ref. [26].	Ref. [26] - WS-G-2.1 is under revision. As given in DPP for DS-402, publication date will be 2011. This should be mentioned in the reference list and, in addition, the consistency of the document under review with the current draft shall be ensured.		To be checked prior to publication as other draft refs.		
33.	8.1		In addition, other actual special IAEA documents with respect		All now added.		

			to decommissioning should be mentioned which also refer to the graded approach - for example: - WS-G-5.2 (2009) - WS-R-5 (2006) - WS-G-5.1 (2006) The recommendations of these documents should be integrated into the document under review, in particular into the complete chapter 8. *No modification proposed.*				
34.	8.5	8.5. The operating organization should select ~~a decommissioning option~~ the boundary conditions of decommissioning by considering a wide range of issues, including the resources available at the time of implementing the decommissioning. These conditions present opportunities for grading (e.g., based on the present state of the installation and possible future uses of the decommissioned installation or site).	The expression "decommissioning option" should be clarified. The word is used as singular in sentence 1 and as plural in sentence 2.		Agree. Have modified to improve clarity.		
35.	8.6	8.6. The regulatory review of the decommissioning plan should follow a graded approach Ref. [29], para. 3.11, and consider the phases in the fuel storage facility lifetime.	Ref. [29] refers to a new Safety Guide "Storage of Spent Fuel", DS371, which is not yet available on the IAEA web pages. It comprises the revision and combination of SS 116, SS 117, and SS118. As the text is not yet available (provisional		Agree. Deleted reference and changed to Ref [39], now is para 8.5.		

			publication date III/2009) the given para 3.11 cannot be checked. The meaning of the sentence is not clear: - Why is a reference for the regulatory review of the decommissioning plan given that refers only to "Storage of spent Fuel"? - What is the meaning of a "fuel storage facility" with respect to the decommissioning of a research reactor? The text should be clarified. *No modification proposed.*				
36.	I.1 (b)	[…], in the event of loss of off-site electrical power.	Editorial. Letter is missing.		Corrected.		

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: D.N. Polyakov Russia/ SEC NRS			Page 23 of 3 Date: 15.03.10				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	2.3/5	(a) Reactor power, (for pulsed reactors energy deposition and thermal power of subcritical part for accelerator-driven systems would be used);	Subcritical systems driven by a proton accelerator are developed in Russia and some other countries. They are intended for power production and nuclear waste destruction. The systems are considered as research reactors in Russia and should be mentioned separately because they are subcritical on one hand and contains hazardous amount of fission products on the other hand.	Yes, included., now as para 2.7 (a)			
2	2.3/15	(i) Utilization of the reactor (experimental devices, produced radioisotopes, tests, reactor physics experiments);	Produced isotopes affect safety.	Yes	Added radioisotopes.		

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: D.N. Polyakov Russia/ SEC NRS			Page 23 of 3 Date: 15.03.10				
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
3	2.7	Perform a qualitative categorization of the facility hazard, based on the potential radiological hazard, using a multi-category ranking similar to Ref. [11], para. 1.11, Ref. 18 para. 3.6 or Ref. 37 para. 2.19.	There are various systems within IAEA standards and it would be useful to demonstrate various approaches to categorization.			Rejected	Ref. 18 para 3.6 is not relevant as only one category is for RR's
4	References	37. INTERNATIONAL ATOMIC ENERGY AGENCY, Arrangements for Preparedness for a Nuclear or Radiological Emergency, Safety Standards Series No. GS-G-2.1	There are various systems within IAEA standards and it would be useful to demonstrate various approaches to categorization.			Rejected	As above.
5	7.41/2	Guidance for emergency planning and response is presented in Ref. [22], and possible approaches are shown in Ref. [38].	To provide reference to the methods recommended by IAEA experts.	Yes			
6	References	38. INTERNATIONAL ATOMIC ENERGY AGENCY, Methods for Developing Arrengements for Response to a Nuclear or Radiological Emergency, IAEA-TECDOC-953.	To provide reference to the methods recommended by IAEA experts.	Yes			

COMMENTS BY REVIEWER Reviewer: D.N. Polyakov Russia/ SEC NRS			Page 23 of 3 Date: 15.03.10	RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
7	7.43	In conformance with one of the concepts of a graded approach, Ref. [18], paras 3.6 to 3.7 define the concept of nuclear and radiation emergency categorization which provides a basis for developing optimized arrangements for preparedness and response. This concept requires that an emergency planning zone be considered.	Various approaches to categorization are possible.	Yes	Text modified to reflect comment.		
8	7.53/2	The environmental monitoring programme will depend also on the location of the reactor (for sites in a densely populated regions the environmental monitoring programme will generally be more extensive).	More strict.	Yes	Text modified to reflect comment.		

The Use of a Graded Approach in the Application of Safety Requirements for Research Reactors, (DS351)

COMMENTS BY REVIEWER Reviewer: ARPANSA Country/Organization: ARPANSA – Australia		Page.... of 6 Date: 13 April 2010	GENERAL COMMENT RESOLUTION/RESPONSES NOTED BOLDED AND HIGHLIGHTED BELOW
General Comments:			
1	Are the stated objectives of the standard appropriate, and are they met by the document?	This document is not needed and is of little or no value in giving guidance on the topic of grading. The concept itself is simple and straightforward and no general guidance beyond the definition in Reference 2 is needed. **NUSSC had extensive discussions on this and had agreed this topic must be a separate SG. At the 23rd NUSSC meeting, Oct 2009, the proposed that TECDOC for GA application to nuclear facilities based on DS 351 should be considered.** It would be more appropriate for grading to be treated only in the specific research reactor safety guides on particular topics so that the experts on that topic can give particular guidance, and so that the guidance is updated as the specific safety guide is updated. **See above response on TECDOC proposal**. Because writing quality is low and clarity is lacking, it is difficult to discern if the stated objectives are met by the document. **Reviews have improved readability and an independent edit is now underway. Other reviewers have noted clarity.**	

2	Scope and completeness: is the stated scope appropriate, and is that scope adequately covered by the document?	Grading allows for variation in the stringency by which control measures are applied to meet safety requirements. It would seem sensible to outline some process for regulator concurrence in its application. **Paragraphs 3.8 and 3.11/12 already deal with this.** Because writing quality is low and clarity is lacking, it is difficult to discern if the scope is adequately covered by the document. **See 1 above.**
3	Quality and clarity: do the requirements/guidance in the document represent the current consensus among specialists in the field, and are they expressed clearly and coherently?	The document requires considerable work. It is very verbose and repetitive and would tend to confuse rather than clarify. Length from earlier draft is very considerably reduced. There was no prior formal edit as the editor indicated the report style was good.
4	It is recognised that the IAEA does a very thorough edit as a final step before publication and many problems would be caught at that stage. However a preliminary edit, or review to decide if one is needed, would be useful before documents are distributed to Member States. In the current document it is difficult to discern the structural and content issues because of the background of editorial problems. The formal edit, prior to next the SC meeting, is now underway.	

Specific Comments:

Comment No.	**Para/ Line No.**	**Proposed new text**	**Reason**	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/ rejection**
5	1.7	Clarification needed.	Does this say that a graded approach is helpful in determining whether a graded approach is applicable? If not, what does it say? If so, what does it mean?		Agree, now deleted the paragraph.		
6	Title before para 2.4	DESCRIPTION OF THE APPLICATION **OF** A GRADED APPROACH	Assume this is just a typo – “for” instead of “of”	Yes			

Comment No.	Para/ Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
7	2.12	The application of management system requirements should be graded so as to deploy appropriate resources, **considering**:	Too verbose.		Agree, modified.		
8	3.5	Consistency of wording.	The only item in this list that is a function or activity is compliance inspection and even this is qualified by type and frequency, which are not functions or activities		Agree, modified.		
9	4.9	Consider “should” or other terminology.	“Shall” statements are the prerogative of the IAEA Safety Requirements documents. Although a reference is given to a Safety Requirements document, the above statements are written as if they originate in this document.		Agree, modified and changed throughout also.		
10	6.6 Shutdown Function (1) and (2)		The statement that the shutdown function is not gradable is confusing. Perhaps the authors intend to say that it is unacceptable to fail to shut down the reactor when required. This is not, however, in question with respect to grading. Consider the definition from reference 2: **graded approach** 1. For a system of control, such as a regulatory system or a safety system, a process or method in which the stringency of the		This seems very clear, but have added extra words for more clarity.		

Comment No.	Para/ Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
			control measures and conditions to be applied is commensurate, to the extent practicable, with the likelihood and possible consequences of, and the level of risk associated with, a loss of control. Thus the stringency of the control measures and conditions to be applied to the shutdown system should be commensurate with….. Points (1) and (2) of para 6.6 give examples of stringency variation for the shutdown system. If the intent is to distinguish the shutdown function from the shutdown system this should be made clear (if it is considered necessary to make the distinction). At present the wording is confusing and illustrates a lack of precision in the guidance on grading.		Not sure why this was unclear but nevertheless have modified somewhat.		
11	6.6 Core Cooling (2)		The above comment also applies to the statement about core cooling in the same paragraph. The document often confuses normal design choices with grading.		As above the function is clearly stated but have added 'system' also.		

Comment No.	Para/ Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
12	6.15		Do the authors intend to say the safety functions need to be automatic rather than operator-actuated, whereas here it reads as automatic rather than passive? Or do they intend automatic to be synonymous with passive? There are many ambiguities in the document.			Rejected. It says 'or'.	Automatic is not necessarily passive.
13	6.28	Replace 'either' with 'such as at all times that (OR when) fuel …'	Either/or is mutually exclusive so this implies a reactor operating at power with no fuel in the core.	Yes	Have modified.		
14	6.33		Presumably, the document should be providing guidance on determining the stringency of control measures to be applied. Often, the document merely lists topics and says that they should be graded. (This paragraph also says that "facilities will need to include provision for ageing management in provisions for knowledge management" which merits some clarification)	Yes	Have modified.		
15	6.65		This paragraph suggests that a spill of water from the retention tank of a research reactor is acceptable based on consequence analysis. A more comprehensive treatment of grading compatibility with safety analysis and regulatory requirements, which	Yes	Have deleted this item and added D in D information.		

Comment No.	Para/ Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
			includes examples of the application of defence in depth to design requirements for the different type and quantities of radioactive waste generated, would be more useful (refer paragraphs 6.2, 6.3, 6.4 of DS351)				
16	6.66	Paragraph 6.66 currently states: On the design of radioactive waste systems for research reactors, the requirement to handle, store, transport and dispose of radioactive waste and the control of solid, liquid and gaseous effluent discharges are **not gradable**' (emphasis ours) Paragraph 6.66 should be rewritten to be more in keeping with other IAEA publications on waste management systems, or at least contain an explanation as to why, based on the current IAEA approach to waste management, the design requirements are 'not gradable'.	Paragraph 6.66 paragraph is not compatible with the definition of 'a graded approach' given in paragraphs 1.4 and 1.5 or 6.64 of the document. Further, paragraph 6.66 does not make good sense operationally, economically or administratively when considering the different types of wastes generated. Taking some of the examples of wastes arising given in footnote 22, (i) there must surely be a need for a graded approach in the design requirements of waste systems that handle (for example) replaced components from the reactor systems (which may be highly activated) and ionic resins (which may be highly radioactive) compared to paper, gloves and plastics			Rejected. The requirement is not gradable but the design details are. Paras 6.64/65 say exactly this.	

Comment No.	Para/ Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
			used during operations (which may have low levels of surface contamination). (ii) The same comment applies (for example) to liquid from lubricants used in machinery from active zones (which may contain activated oils), compared to waste from laundry operations (which is aqueous waste and generally contains low levels of radioactivity). (iii) The filter and ventilation systems used to monitor and discharge gaseous wastes are designed to meet regulatory requirements and in general are graded in accordance with discharge authorisations [Reference WS-G-2.3. Regulatory Control of Radioactive Discharges to the Environment]. Additionally, it is generally assumed that all radioactive waste systems will include the necessity for storage of waste. Storage of waste implies			As above for (i). As above for (i). Storage is included in para 6.66 and is referenced	

Comment No.	Para/ Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/ rejection
			surveillance and maintenance of the storage facility and may involve operational exposures to personnel, continuing risks of accidental releases, financial provisions to cover operating costs, continuing reliance on institutional controls and security. The requirements of the design for just this one component of the management system will in most circumstances be graded in accordance with the type of waste i.e. VSLW, VLLW, LLW, ILW and HLW, particularly the requirements related to security.			in para 6.63.	

FRANCE

COMMENTS BY REVIEWER Reviewer: Page Country/Organization: France/ Date:				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1.	General	The guide is difficult to read as there are too many cross-references to the AIEA document NS-R-4 (Safety requirements)		Yes	Now improved somewhat but the nature of the document is such that many references should be provided as there are many safety related topics that are diverse in nature.		
2.	1.2 p. 1	It should be mentioned that the scope of this document covers the research reactor and the associated installations (storage pool and buildings, detritiation facilities, neutronography devices, ect.).				Rejected	Scope is stated as NS-R-4 defined this and does not cover, for instance detritiation facilities.
3.	2.5 (a) p. 5	After the item " Reactor power " add an item "Operating time in power "	Some reactors as CABRI (France) and NSRR (Japan) are pulsed reactors: very large power during a very short operation time (a few ms). So the radiological inventory is limited.			Rejected	Now in para 2.7, deposited energy is already stated and this is the same thing.

4.	2.5 (c) p 5	Replace " The type of fuel element " by " the type of fuel (rods, plates, pebble bed) and its chemical composition (uranium dioxide, aluminum-uranium alloy, silicon-uranium compound) ".	The chemical composition has a great importance (ex : possibility of BORAX accident in case of the use of in aluminum-uranium alloy	Yes	Agree. This was a direct quote from NS-R-4 but nevertheless have now modified. Is now para 2.7		
5.	2. 5 (j) p 5	Location of the site, with potential occurrence of external hazards (including the proximity of other nuclear facilities) and ….		Yes	Added. Is now para 2.7.		
6.	3.4 p 9	Last sentence " External experts, technical safety organization (TSO) or advisory committee…these activities ".		Yes	Added.		
7.	Safety functions p 16	It may be interesting to introduce a new safety function in concern with radiological protection	Even if the three safety function are satisfied, some accident may lead to large irradiation inside the reactor building with associated difficulties to intervene for repair			Rejected	This would be a major change to Agency definitions and is out of scope.
8.	6.36 p 23	Ergonomic principles also concern the writing and the presentation of the operating procedures.				Rejected	Not included in NS-R-4 and is somewhat beyond the detail needed.
9.	6.46 p 25	Sentence to be added It is the safety analysis which allows to identify how and in what extent the prevention can be graded with the potential hazard of the reactor. The acceptability of the addition of all the graded provisions has to be validated by the safety analysis.		Yes	Added first sentence not second as latter is redundant.		

10.	6.46 p 29	At the end of the third sentence, replace " accident conditions " by "accident conditions (DBA and BDBA) " At the end of the sentence " Consequently, the potential release… for the confinement " add " and the need of special devices (iodine traps for examples) ".		Yes, added.			
11.	6.63 p 30	Finish the first sentence by " gamma irradiation, neutron flux and cooling fluid chemistry ".		Yes, modified.			
12.	6.55 p 30	Complete the sentence " If the need … its operational requirement by " with in particular the parameters to be supervised and the needed actions so to keep the reactor in a safe shut down state. "	Example: the complementary control must control the ventilation system (fans, louvres).	Yes modified.			
13.	6.59 p 29	At the end of the sentence " the aim of these requirements…irradiated fuel " add " and experimental devices "	In some RR, a special attention has to be given to the storage of irradiated experimental devices		This is already included.		
14.	7.5 p 35	It has to be said that some RRs need two types of personnel (operators and experimenters). So a special organization is required.		Yes	Modified paras 7.5. and 7.6 to include.		
15.	8.3 p 51	At the end of the paragraph add: " For some RRs, the departure of many staff members must be managed when the reactor is definitively stopped so to keep the installation knowledge during decommissioning operations. "		Yes	Modified to include, now is para 8.2.		

16.		A new chapter " Periodic Safety Review " has to be added between chapter " 7. OPERATION " and chapter " 8. DECOMMISSIONING " with the following recommendations: **Nature of the requirements** XX.1 During the operation of a research reactor, Periodic Safety Reviews (PSR) should be carried out by the operator and the results submitted to the Regulatory Body. XX.2 PSR should also be required after safety significant events (major incident, accident, accident on a similar installation, etc.), large modifications and after a long extended shutdown. XX.3 In the PSR, account should be taken to: ▪ the potential nature and magnitude of the hazards, ▪ the operating experience, ▪ the changes in the regulation and the safety standards, ▪ technical developments and new safety related information from relevant sources ▪ the compliance of SSCs with their design and operational requirements in the safety report and in OLCs, ▪ the outcome of ageing programme.		No.		Yes.	XX.1 to XX.3 are included in or already referenced in sections 4.2, 4.3, 7.57 and 7.62. There is no need to repeat as the format of NS-R-4 is then also not followed.

16 (following)		**Application of grading** XX.4 The time between two PSRs can be graded depending on the potential hazard of the reactor, the operational feedback, the international feedback on similar installations, new R&D findings, the evolution of requirements and operating rules on similar installation, etc. Nevertheless, a maximum delay of ten years between two PSRs seems generally appropriate. XX.5 Similarly, the depth of the review and assessment by the operator for the PSR can be graded, with more details in the analyses on the safety concerns of most importance. XX.6 For some research reactors, implemented with numerous and diverse experimental devices leading to specific modifications of equipments, the check of the compliance of the SSCs (see XX.3 above) should be particularly extended and detailed.		Yes	Some information is already in para 7.62, but this now expanded to include some note of XX.4 to XX.6.		

ARMENIA

COMMENTS BY REVIEWER

Reviewer: H.Malkhasyan — Page 1 of 2

Country/Organization: Armenia/Armenian NPP — Date:

Comment No.	Para/Line No.	Proposed new text	Reason
1.	Para 3.8	The licensing process should be used by the regulatory body to exercise control during all stages of the life time of the reactor, Ref. [30]. This control is accomplished by using the following *steps*:	In order not to confuse with words process and stages used in the first sentence.
2.	Para 4.1.	4.1. Ref. [1], Chapter 4 "Management Systems and Verification of Safety" addresses the elements to be considered, the responsibilities of the operating organization and the interaction with the Regulatory Body. Guidance for establishing, assessing the performance and improving a management system is also provided in Refs. [4] and [5]. Guidance for establishing, assessing the safety management system is also provided in INSAG 13. The elements of Management of Safety for an operating organization include, *but not limited*:	We propose to add reference to INSAG 13, because it provides very clear safety management model and its description.

RESOLUTION				
Comment No.	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
1	Agree, changed			
2	Added Ref [37] in draft 6, INSAG 13			

ARMENIA

COMMENTS BY REVIEWER				
Reviewer: H.Malkhasyan			Page 2 of 2	
Country/Organization: Armenia/Armenian NPP			Date:	
Comment No.	Para/Line No.	Proposed new text	Reason	As
3.	Para 6.52	Redundancy is another means of grading I&C systems. Two-out-of-three redundancy is often used in reactors that need to operate continuously to minimize spurious trips and to allow for I & C testing and/or maintenance on power. On the other hand, a reactor operated a few hours per week or intermittently may not need such features because spurious shutdowns may be less of a problem and so a one-out-of-two redundancy may be selected.	Just propose to exclude the last sentence "Excessive redundancy increases cost and complexity.", because safety standards should mainly focus on safety issues as financial ones will be solved apart of them.	

RESOLUTION				
Comment No.	**Accepted**	**Accepted, but modified as follows**	**Rejected**	**Reason for modification/rejection**
3	Modified to reflect other levels of redundancy often used and now mentioned operational complexity before cost. Cost is still retained as this is reality in practice.			

The Use of a Graded Approach in the Application of the Safety Requirements for Research Reactors (DS 351)

A. **General Comments:**

1. There should be a Regulatory Document on functions of Regulatory Bodies e.g., Consenting Process, Regulatory Inspection & Development of Regualtory Documents.
2. Consistent approach for giving the reference number may be followed. e.g. NSR-4 on Page 8 item no. 3.2

Addressed in Rev.6, 19/8/2010

B. **Pagewise Comments**

COMMENTS BY REVIEWER

Reviewer : AERB
Country/Organization : India/AERB

Page 1 of 1
Date: 01-04-2010

No.	Page/ Para/Line No.	Proposed new text	Reason
1.	1/ para 1.2 line 10	**Add:** Utilization of these research reactor.....neutron radiography and **testing of steam generation and turbine cycle**	In some of the research reactor like FBTR this aspects are also existing but not covered in this definition.
2.	1/ para 1.2/10	**Add: " industrial irradiation facility"**	This aspect need to be defined and clarified at the beginning.
3.	5/ item 2.3 (j)	**Add a new bullet** on "Security Aspects"-	Security aspects also need to be included.
4.	18/ item 6.13/ last two lines.	**Add this sentence-**" The numbers of PIE should be based on current safety standard and operational experience feedback from similar type of reactor"	Several research reactor (like fast reactor) worldwide face similar failure. This kind of failure should be analyzed as operational experience feedback.
5.	20/ item 6.23(e)	**Add:** "(e) The requirement of Sunplementary Control Room"	This requirement should be graded based on safety analysis of the reactor.
6.	20/ Item 6.23(f)	**Add:** "(f): The requirement of reactor control like Manual/ Auto should be mentioned for its grading. added	This requirement is missing from this guide. added also in 6.54
7.	39/ item 7.29	**Add:** "The requirement of Technical specification documents and its adherence should not be gradable."	These aspects are not mentioned. added in para 6.12

1. this is covered by meetings & testing otherwise this is too detailed.
2. added gamma to cover this, 'industrial' is captured generally
3. not included as security is out of NS-R-4
4. added
5. added

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22-04-2010 12:07PM FROM-DAE MUMBAI