Section 4
DS491 Draft Safety Guide: Deterministic SA for NPPs - Step 7

COMMENTS BY REVIEWER				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
France 12	4.2 Line 3	"… Compliance with the ~~deterministic~~ acceptance criteria…"	Delete 'deterministic' in acceptance criteria	YES			
HUN 3	4.3	4.3. *Acceptance criteria should be established for the entire range of operational states and accident conditions~~, including severe accidents~~. These criteria should aim at limiting damage to barriers against the release of radioactive material in order to prevent unacceptable radiological releases. Selection of the criteria should ensure sufficient margin between the criterion and the physical limit for loss of integrity of a barrier against release of radioactive material.*	This is really true for DBA cases, but last sentence may not be fulfilled for DEC2 severe accident so phrase "including severe accidents" should be deleted.	YES			
CAN 50	4.5 Bullet 2	Suggest the following changes, *Detailed/derived technical criteria which relate to integrity of barriers (fuel matrix, fuel cladding, RCS pressure boundary, containment) against radioactive releases or technical criteria which can be applied to preclude failure of barriers, e.g. adequacy of coolant*	Other technical criteria may be developed which are not directly related to barrier integrity but represent sufficient but not necessary conditions for the integrity of the barrier.			X	Confusing. It could be a derived criteria for integrity of barriers

		inventory in secondary circuit for PHWR.					
GER 19	4.5	—Detailed/derived technical criteria which relate to integrity of barriers (fuel matrix, fuel cladding, RCS pressure boundary, containment) against radioactive releases. They are typically proposed by the designer and subsequently approved by the regulatory body for use in the safety demonstration.	Detailed/derived technical criteria (e.g. max. cladding temperatures, max. fraction of cladding oxidation, max. hydrogen concentration, etc.) ion, are often regulatory requirements, too.		Addressed in the comment below (FIN-1)		
FIN 1	4.5 *Bullet 2, 2nd sentence*	Detailed/derived technical criteria which relate to integrity of barriers (fuel matrix, fuel cladding, RCS pressure boundary, containment) against radioactive releases. They are defined by regulatory requirements or ~~They are typically~~ proposed by the designer and subsequently approved by the regulatory body for use in the safety demonstration.	Many such criteria (e.g. peak cladding temperature < 1200 C) are defined by the regulatory requirements	YES			
CZ 13	4.5. *Bullet 1, 2nd sentence*	High level (radiological) criteria which relate to radiological consequences of plant operational states or accident conditions. They are usually expressed in terms of ~~releases~~ activities or doses typically defined by law or by regulatory requirements.	Clarity of the text.	(YES)	"…usually expressed in terms of ~~releases~~ activity levels or doses typically…"		
France 13	4.5 Both bullets	- High level (radiological) criteria which relate to radiological consequences of plant operational states or accident	To be in accordance with existing practices.			X	*See comments above (FIN-1, CZ-13).* ***First bullet:*** *The clarification*

		conditions. They are usually expressed in terms of releases or doses typically defined by law or by regulatory requirements. Such criteria can be quantitative or qualitative (for example: no need for emergency protective measures, limitation of consequences in area and time) - Detailed/derived technical criteria which relate to ~~integrity of barriers~~ safety functions …	More general than 'integrity of barriers' as safety function covers confinement which is related to integrity of barriers. It would be worthwhile not to limit criteria to one safety function				*may be not necessary.* ***Second bullet:*** *Maybe too general.*
FIN 2	4.6 *First sentence*	The radiological acceptance criteria should be expressed in terms of effective doses, equivalent doses or dose rates to nuclear power plant staff, general public or *as appropriate* environment, including non-human biota. The doses are required to be within prescribed limits and as low as reasonably achievable in all plant states, SSR-2/1 (Rev.1), Req. 5 [1].	Clarity Add. "as appropriate" It is not common that dose limits are presented to environment, including non-human biota.		"… power plant staff, the general public or the environment, including non-human biota, as appropriate. The doses are required to be within		
CZ 14	4.7	Radiological acceptance criteria expressed in terms of doses may be conveniently transformed into acceptable release~~s~~d activities of~~or~~ different radioactive isotopes in order to decouple nuclear power plant design features from the characteristics of the environment.	Releases are expressed in activities of individual radionuclides taking into account their different radiological risk.		(see CZ 13) "…transformed into acceptable activity levels ~~releases~~ for different radioactive isotopes		

GER 20	4.7	4.7. Radiological acceptance criteria expressed in terms of doses may be conveniently transformed into acceptable releases for different radioactive isotopes in order to decouple nuclear power plant design features from the characteristics of the environment.	Meaning of the colored part of the sentence is unclear.				
CZ 15	4.9 *2nd sentence*	They should be more restrictive than for DBAs since ~~their~~ frequencies of their appearances are higher.	Clarity of the text.			X	The change seems unnecessary
CZ 16	4.10	The radiological acceptance criteria for DBAs to be established should ensure that very restrictive ~~dose~~ design limits, according to Req. 19 § 5.25 from SSR-2/1 (Rev.1) [1], are met.	There are no any "dose" limits in the referred document Req. 19 § 5.25 from SSR-2/1 (Rev.1) [1.]		*Note: Covered by the resolution provided to the comment below (CAN 17)*		
CAN 17	4.10	4.10. The radiological acceptance criteria for DBAs ~~to be established~~ are typically less restrictive than those for AOOs but should ensure that ~~very restrictive dose limits, according to~~ Req. 19 § 5.25 from SSR-2/1 (Rev.1) [1], ~~are~~ is met.	Use of "very restrictive" is questionable since AOO limits are more restrictive (para 4.9).	YES			
14	4.12	Technical acceptance criteria should be set in terms of the variable or variables that govern the physical processes that challenge the ~~integrity of the barrier~~ safety functions. It is a common engineering practice to make use of surrogate variables to establish an acceptance criterion or combination of criteria that, if not exceeded, will ensure the the	More general than integrity of barriers			X	*In this paragraph, the use of "integrity of the barrier" seems more adequate*

		~~integrity of the barrier~~ safety functions. Examples of surrogate variables are: peak cladding temperature, departure from nucleate boiling ratio or fuel pellet enthalpy rise. When defining these acceptance criteria, a sufficient conservatism should be included to ensure that there are adequate safety margins to the loss of ~~integrity of the barrier~~ the safety functions					
GER 21	4.13 *Bullet 4* *Bullet 7*	□ Criteria related to integrity of nuclear fuel located outside the reactor: adequate subcriticality, adequate water level above the fuel assemblies, and adequate heat removal □ … □ Criteria related to integrity of the containment and limitation of releases to the environment: duration and value of maximum and minimum pressure, maximum pressure differences acting on containment walls, avoiding containment low-pressure, leakages, concentration of flammable/explosive gases, and acceptable working environment for operation of systems.	Addition of some criteria for the sake of completeness		***Bullet 4:*** *"…*the reactor: adequate subcriticality, adequate water inventory ~~level~~ above the fuel assemblies, and adequate heat removal		***Bullet 7:*** *Unnecessary clarification*
CAN 51	4.13 Bullet 2	Suggest the following changes, *Criteria related to integrity of fuel cladding: minimum departure from nucleate boiling ratio, maximum*	For PHWR, the Departure from Nucleate Boiling (DNB) does not generally lead to		***First change*** *accepted* (…nucleate boiling ratio…)		***Second change:*** *Better not to indicate an specific value*

		cladding temperature, maximum local cladding oxidation. For some designs (i.e., a PHWR), the acceptable minimum departure from nucleate boiling ratio may be one.	significant immediate clad temperature increases. Minimum ratio of DNB				
CAN 52	4.13 Bullet 3	Suggest the following changes, *Criteria related to integrity of the whole reactor core: adequate subcriticality, maximum production of hydrogen from oxidation of claddings, maximum damage of fuel elements in the core, maximum deformation of fuel assemblies (as required for cooling down, insertion of absorbers, and de-assembling), calandria vessel integrity (for PHWR)*	For PHWR, the integrity of the calandria vessel is also important to maintain the geometry of the reactor core.	X			
UKR 5	Para 4.13 *Bullet 7*	*To extend the criteria related to integrity of the containment and limitation of releases to the environment with the* "isolation of the containment, maximum temperature in the containment"	To cover all possible criteria for containment integrity		"…environment for operation of systems, ~~isolation of the containment,~~ maximum temperature in the containment"		~~isolation of the containment~~ *(penetrations) covered with "leakages"*
CZ 17	4.14	For postulated initiating events occurring during shutdown operational regimes or other cases with disabled or degraded integrity of any of the barriers, more restrictive criteria should be preferably used, e.g. avoiding	Not valid for fresh fuel.			X	*It may contain UO_2 fuel partially irradiated and MOX*

		boiling of coolant in open reactor vessel or in the spent fuel pool, or avoiding uncovery of spent fuel assemblies.					
ENISS	4.15 *line 2*	In particular, technical acceptance criteria .. with higher ~~probability~~ frequency of occurrence. For AOO there should be	In the whole document, "frequency" should preferably be used instead of "probability".	X			
ENISS	4.15 *line 5*	For DBA, and for design extension conditions without significant fuel degradation, ~~there should be no (or limited) consequential damage to the RCS, containment integrity should be preserved, and damage of the reactor fuel should be limited~~ barriers to the release of radioactive material from the plant should maintain their integrity to the extent required to meet Req. 4.10 or 4.11. For design extension conditions …	As written, this requirement may be misunderstood. Obviously, damages to the RCS are not prevented when the PIE is a LOCA. Containment integrity is not preserved in DEC events with postulated containment bypass.		"… ~~damage of the reactor fuel should be limited~~ barriers to the release of radioactive material from the plant should maintain their integrity to the extent required (see §4.10 and §4.11).		
ENISS	4.17	Although the assessment … with the ~~probability~~ frequency of the loads they have to bear.	See comment 4.15/2			X	