Master Resolution Table - DS 381 Safety of Nuclear Fuel Cycle Research and Development Facilities

COMMENTS BY REVIEWER Reviewer: All Country/Organization: All Date: June 2015 AA=Austria, AR=Argentina, CA=Canada, DE=Germany, FR=France, JP=Japan, KR=Korea, SA=South Africa, US=United States; N-NUSSC, W-WASSC, S-NSGC				RESOLUTION			
Comment No.	Para/Line No.	Proposed new text	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
AA-N01	02.010 -	The prospective assessment for radiological environmental impacts should be commensurate with the magnitude of the possible radiation risks arising from the R&D facility~~, applying a graded approach~~	"*applying a graded approach*" looks like a text fragment. Either a predicate for this sentence should be added or the sentence fragment should be deleted.	y			
AA-N02	03.004 -	The siting of ~~a~~ an R&D facility should allow the implementation of physical security measures in accordance with the guidance provided in the IAEA Nuclear Security Series publications Ref. [17]	The changed text should be an, not a	y	This editorial change needs implementation		
AA-N03	04.040 -	For hoods, gloveboxes, and hot cells, the effectiveness of confinement is determined by the air velocity through any opening **and size of the opening**.	The effectiveness of confinement is also determined by the size of the opening – it should be added.	y	..effectiveness of confinement is determined by the size of any openings and the air velocity through them..		
AR-N01	02.012 -	The licensing documentation should also take into account the aspects arising from radioactive waste management during operation and ~~the~~ decommissioning ~~and~~	To enhance that licensing documentation should take into account radioactive waste management through the	y			

		~~radioactive waste management at the facility.~~	whole lifetime of the facility				
AR-N02	02.021 -	Due consideration should be given to the minimization, processing (i.e. pretreatment, treatment and conditioning) of radioactive waste that will be produced during operation and decommissioning of the R&D facility, as well as any legacy material.	To be coherent with 4.129 e)	y	WASSC		
AR-N03	04.136 -	~~Stores~~ Storage facilities for fresh fuel should be designed with fixed, dry and marked locations for the fuel, in accordance with the conclusions…	Wording	y			
AR-N04	04.137 -	In designing ~~Stores~~ storage facilities for fresh fuel, consideration…	Wording	y			
CA-N01	04.003 -	"The main safety functions (see paragraphs 6.37 to 6.53 and paragraphs V.1 to V.10 of Ref. [1]) are those functions, the loss of which, may lead to radioactive or chemical releases or exposures having possible radiological consequences for workers, the public and/or the environment, namely:"	These facilities have usually significant chemical inventories.	y	Clarified in the following paragraph to include biological releases		
CA-N02	04.003 -	"(2) Confinement of radioactive material, including the removal of decay heat, and chemical hazards for the prevention of potentially harmful releases;"	See comment 2	Y	Clarified in the following paragraph to include biological releases		
CA-N03	04.007 -	"Anticipated Operational Occurrences, Design basis accidents and safety analysis 4.7. In the context of nuclear fuel cycle facilities, anticipated operational occurrences (AOOs),	AOOs should be also considered. "Or equivalent" is not clearly defined and therefore should be removed.	y			

		design basis accidents (DBA) and design basis events (DBE), present challenges against which a facility is designed according to established design criteria such that the consequences are kept within defined limits. The specific safety requirements relating to AOOs and DBAs are established2 to ensure that the design keeps radiation exposures from normal operation and accident conditions as low as reasonably achievable. Refs. [13], [14] and [18] provide guidance on specific DBEs of potential relevance."					
CA-N04	04.070 -	"(a) Loss of gas supply to gas actuated safety valves and dampers: In accordance with the safety analysis, valves should be used that are designed to fail to a safe position or include backup compressed air tank;"	Backup air tanks can be used to maintain availability after a loss of the air supply system.	y			
CA-N05	04.112 -	"Determination of the radiological and associated chemical consequences of design basis accidents and design extension conditions for the public and verification that they are within the acceptable limits specified for accident conditions."	"or the equivalent" is not clearly defined and should be removed.	Y	"or equivalent" now covered by DEC, "acceptable" removed for compatibility.		
CA-N06	07.033 -	"(2) Unexpected water accumulation e.g. due to water pipes leaks or fire suppression systems (sprinklers);"	Criticality due to fire systems should be considered.	y			
DE-W01	07.019 - 1.15 , 4.4, 4.37, 7.3, 7.11, 7.12,	Please use the established term '~~operating~~ operational limits and conditions' consistently throughout the document.	2 - Ensuring consistency with the terminology used in the overarching Safety Requirements	y			

	7.15, , Annex II, Annex III		NS-R-5 (Rev. 1) as well in the IAEA Safety Glossary (2007 Edition). The term 'operational limits and conditions' is defined therein.				
DE-W02	02.002 -	Bullet (2): "Fissile materials (if present) have the potential to achieve criticality under certain conditions. The sub-criticality of a system depends on many parameters, including the fissile mass, concentration, ~~geometry,~~ volume, density, geometry and isotopic composition.~~,~~ ~~density and~~ Sub-criticality is also affected by the presence of other materials such as neutron absorbers, moderators and reflectors, see Ref. [9];"	1 – Essential 1st sentence: Rearrangement of para-meters with the objective to bring them in a more logical order. 2nd sentence: The presence of moderators and reflectors play also an important role with respect to criticality, as elaborated in the Safety Guide SSG-27 "Criticality Safety in the Handling of Fissile Material" (Para 1.3). With respect to this proposal, compare also with the IAEA resolution table of Member States comments (April 2015), German comment No. 3. This comment has been accepted but not fully implemented in the latest version of DS381.	y			
DE-W03	02.021 -	"Due consideration should be given to the minimization, processing (i.e. pretreatment, treatment and conditioning) of radioactive waste that will be produced during operation and decommissioning of the R&D facility, as well as any	2 - According to the IAEA Safety Glossary (2007 Edition), the term 'processing' includes 'pretreatment', 'treatment' and	y	WASSC		

		legacy material."	'conditioning'. Concerning these steps, see also Para 4.129 (e).				
DE-W04	03.001 -	1st sentence: "Ref. [12] establishes generic requirements for the safety evaluation of sites for most land-based nuclear installations, including nuclear fuel cycle ~~fuel-cycle~~ facilities."	3 - Wording/Editorial.	y			
DE-W05	04.006 -	Last sentence: "These provisions should ~~be~~ a) be designed to enhance safety, b) be operated to ensure safety is maintained over the lifetime of the facility, and~~;~~ c) not be used for unassessed materials without a modification proposal/safety assessment."	3 - With the original wording, the grammar of the sentence concerning bullet c) is not correct.	y			
DE-W06	04.007 Footnote No. 2	"See paragraphs 6.4–6.9, V.1 of Appendix V and ~~III.10~~ III-10 of Annex III in Ref. [1]."	3 - Delete redundant paragraph in the footnote.	y			
DE-W07	04.010 -	Last sentence: "Annex II ~~in~~ in this guide presents examples of representative safety functions …"	3 - Delete redundant word.	y			
DE-W08	04.012 -	1st sentence: "Paragraph 6.45 in Ref. [1] establishes requirements for all types of nuclear fuel cycle ~~fuel-cycle~~ facilities where criticality is considered; …"	3 - Wording/Editorial.	y			
DE-W10	04.013 -	2nd sentence: "… the effective multiplication factor K_{eff}, which depends on the mass, the distribution and the nuclear properties of the ~~fissionable~~ fissile material, and all other materials with which it is associated."	2 - Elsewhere in the document, the more restrictive term 'fissile material' is used; see definition of this term in the IAEA Safety Glossary (2007 Edition).	y			

			Harmonization of terminology throughout the Safety Guide is recommended, provided that a distinction between 'fissile material' and 'fissionable material' is not justified for physical reasons.				
DE-W11	04.042 -	"… the installation of collection equipment (such as drip ~~drays~~ trays) should be considered …"	3 - Editorial.	y			
DE-W12	04.057 -	1st sentence: "A number of ~~considerations~~ design requirements related to chemical, toxic, flammable and explosive substances are ~~required~~ established in paragraph 6.54 of Ref. [1]."	3 - The proposed changes aim to clarify the meaning of the sentence.	y			
DE-W13	04.071 -	2nd bullet: "Overpressure in ~~glove~~ gloveboxes may cause an increase of airborne contamination and/or concentration of hazardous materials;"	3 - Delete redundant word.	y			
DE-W14	04.072 -	2nd sentence: "A loss of cooling can challenge main safety functions by reducing the safety margin for confinement (and for criticality where there are ~~fissionable~~ fissile materials)."	2 - See our related comment on Para 4.13.	y			
DE-W15	04.100 Footnote No. 6	"Postulated accident conditions that are not considered for design basis accidents, but that are considered in the design process for the facility in accordance with best estimate methodology, and for which releases of radioactive material are kept within acceptable limits. ~~to avoid large or early releases.~~"	2 - Ensuring consistency with the definition of the term 'design extension conditions' in the IAEA Safety Requirements SSR-2/1 (Rev. 1) as endorsed by the CSS (November 2014) and the Board of Governors (March 2015).	Y – definitions now consistent with SSR 2/1 and DS360			

			The definition of this term – as provided in SSR-2/1 (Rev. 1), excluding any reference to core melting – has meanwhile introduced in the Draft Safety Requirements DS478 (revision of NS-R-5 (Rev. 1), latest draft version dated 19 April 2015, see "Note on definitions" therein) and hence adopted to nuclear fuel cycle facilities.				
DE-W16	04.129 -	3rd and 4th sentence: "Specific guidance on predisposal management of radioactive waste from nuclear fuel cycle laboratories is provided in Ref. [25], while guidance which may be relevant to pilot plants can be found in Ref. [26]. IAEA safety standards require the generation of radioactive waste to be minimized in volume and activity, as far as practicable."	3 - Wording 3rd sentence: Grammar. 4th sentence: Clarification that IAEA Safety Standards Series publications are referred to here.	Y y			
DE-W17	04.129 - b	"… Guidance on the handling of ~~fissile~~ waste containing fissile material, including mass control, is provided in Ref. [9]. ~~including mass control.~~ Special requirements apply to ~~fissile~~ such kind of waste, as stated in V.15 of Ref. [1]. The engineered features should provide containment and control of geometry. …"	2 - Clarification/Wording.	y			
DE-W18	04.129 - c	2nd and 3rd sentence: "For the ~~assessment and the~~	1 – Essential 2nd sentence:	Y			

		predisposal management of radioactive waste, consideration should be given to a central waste management area. In this central area, ~~radionuclides in~~ the waste should be characterized ~~and quantified~~ (including any fissile radionuclide content) and classified, and may be treated and subsequently placed in containers for interim storage."	The term 'waste assessment' is very uncommon. We assume that 'waste characterization' is meant. This term is defined in the IAEA Safety Glossary (2007 Edition). Waste characterization is an integral part of predisposal waste management (see Requirement 9 of GSR Part 5). Hence, 'assessment' can be deleted. 3rd sentence: Rather the waste than the radionuclides therein will be treated and placed in containers for storage. The process of waste characterization usually includes the measurement of physical and chemical parameters, the identification of radionuclides, and the measurement of activity content (i.e. quantification); see Para 6.12 of the Draft Safety Guide DS447 (revision of WS-G-2.6, final version endorsed at the 37th CSS meeting held in April 2015). Furthermore,	y	The waste may subsequently be treated and placed in containers in this area, for interim storage.		

			Requirement 9 of GSR Part 5 states: "*At various steps in the predisposal management of radioactive waste, the radioactive waste shall be characterized and classified in accordance with requirements established or approved by the regulatory body.*"				
DE-W19	04.129 - d	1st sentence: "The design of storage areas and waste containers should take account of the radioactivity and other hazards of the waste, even if the storage is intended to be short-term."	2 - Clarification.	y			
DE-W20	04.133 -	2nd sentence: "Features such as easily ~~cleaned~~ cleanable surfaces, strippable coatings, rounded corners etc. should be considered."	3 - Wording.	y			
DE-W21	04.139 -	Last sentence: "In addition, all potentially contaminated surfaces should be made readily accessible ~~for~~ to allow for periodic and eventual decontamination …"	3 - Grammar.	y			
DE-W22	07.017 Footnote No. 8	"Emergency procedures are part of overall emergency arrangements to be established in accordance with the section EMERGENCY PREPAREDNESS AND RESPONSE in Chapter 4."	3 - Citation of the full title of the corresponding section (Paras 4.126 to 4.128).	y	Editorial policy is avoid chapter title references in footnotes. Para given instead.		
DE-W23	07.036 -	"Additional criticality hazards may be encountered when carrying out maintenance work. For example, "if fissile material has to be removed	2 - To be in line with the wording used in Para V.14 of NS-R-5 (Rev. 1), the phrase "approved for	y			

		from equipment only approved containers ~~approved for criticality purposes~~ shall be used", see paragraph V.14 in Ref. [1]. …"	criticality purposes" has to be deleted.				
DE-W24	Ref. [04]	"INTERNATIONAL ATOMIC ENERGY AGENCY, Governmental, Legal and Regulatory Framework for Safety, IAEA Safety Standards Series No. GSR Part 1 Rev. 1, IAEA, Vienna (2015) (2010)"	3 - In the frame of the IAEA Action Plan on Nuclear Safety, GSR Part 1 was revised by amendment (DS462). The final version of DS462 was endorsed by the CSS (November 2014) and the Board of Governors (March 2015). GSR Part 1 Rev. 1 will be published this year.	Y	All references will be reviewed and updated shortly before publication, to ensure they are up to date with other published IAEA standards.		
DE-W25	Ref. [08]	"INTERNATIONAL ATOMIC ENERGY AGENCY, Safety Assessment for Facilities and Activities, General Safety Requirements Part 4, IAEA Safety Standards Series No. GSR Part 4 Rev. 1, IAEA, Vienna (2015) (2009)"	3 - In the frame of the IAEA Action Plan on Nuclear Safety, GSR Part 4 was revised by amendment (DS462). GSR Part 4 Rev. 1 will be published this year.	Y	All references will be reviewed and updated shortly before publication, to ensure they are up to date with other published IAEA standards.		
DE-W26	Ref. [12]	"INTERNATIONAL ATOMIC ENERGY AGENCY, Site Evaluation for Nuclear Installations, Safety Standards Series No. NS-R-3 Rev. 1, IAEA, Vienna (2015) ~~(2003)~~"	3 - In the frame of the IAEA Action Plan on Nuclear Safety, NS-R-3 was revised by amendment (DS462). NS-R-3 Rev. 1 will be published this year.	Y	All references will be reviewed and updated shortly before publication, to ensure they are up to date with other published IAEA standards.		
DE-W27	Ref. [19]	Note: IAEA-TECDOC-727, which is referred to in Para 4.119, was	2 - Update is recommended in order to reflect the current			N	Yes it is old, but there has been no IAEA replacement

		published in 1997, i.e. 18 years ago. Considering the progress in science and technology in this time span, some of the information and data provided therein might no longer be up-to-date. Therefore, it should be examined whether a newer publication exists which could replace the old one.	standards in equivalent non-nuclear industries when evaluating releases of hazardous radioactive chemicals or biological materials, affecting the public or the environment, from nuclear fuel cycle R&D facilities.				
DE-W28	Ref. [26]	"INTERNATIONAL ATOMIC ENERGY AGENCY, Predisposal Management of ~~High Level~~ Radioactive Waste from Nuclear Fuel Cycle Facilities, IAEA Safety Standards Series No. DS447, ~~WS-G-2.6,~~ IAEA, Vienna (2015) ~~(2003) {DS447}~~"	3 - The revision of the Safety Guide WS-G-2.6 by DS447 is almost finished. The final draft version of DS447 was endorsed at the 37th CSS meeting (April 2015) and will most likely be established as an IAEA Safety Standard before DS381 is finalized.	Y	All references will be reviewed and updated shortly before publication, to ensure they are up to date with other published IAEA standards.		
DE-W29	Ref. [31]	"INTERNATIONAL ATOMIC ENERGY AGENCY, Decommissioning of Facilities ~~Using Radioactive Material~~, Safety Standards Series No. ~~GS-R~~ GSR Part 6, IAEA, Vienna (2014)"	3 - Correction of publication title and series number.	Y			
DE-W30	Ref. [36]	"INTERNATIONAL ATOMIC ENERGY AGENCY, Predisposal Management of ~~Low and Intermediate Level~~ Radioactive Waste from Nuclear Power Plants and Research Reactors, IAEA Safety Standards Series No. DS448, ~~WS-G-2.5,~~ IAEA, Vienna (2015) ~~(2003) {when replaced by DS448 this reference should be removed}~~"	3 - The revision of the Safety Guide WS-G-2.5 by DS448 is almost finished. The final draft version of DS448 was endorsed at the 37th CSS meeting (April 2015) and will most likely be established as an IAEA Safety Standard before DS381 is finalized.			N	Cannot reference guidance for NPP and RRs
DE-W9	04.012 -	2nd sentence:	3 - Wording.	y	See para.		

	e	"… (e.g. water from firefighting, see paragraph V.6 in Ref. [1])."					
FR-S01	General	A generic paragraph of awareness about security should be introduced in the document. Security must be taken into account during all phases of the life time of a facility and not only for the siting phase.		Y	Added para 2.15: Security should be taken into account during all phases of the life time of a facility and not only in the siting phase.		
FR-S02	03.004 -	Add in § 3.4 « the siting of a R&D facility should take into account nuclear security threats and allow the implementation… »		Y			
JP-N01	01.015 /11	Annex I shows the typical process route for the two classes of R&D facility covered by this guidance. Annex II gives examples of structures, systems and components important to safety (SSCs) in R&D facilities grouped by process areas. Examples of operational ~~operating~~ limits and conditions (OLCs) for R&D facilities are provided in Annex III.	Editorial. To be consistent with IAEA Safety Glossary 2007 Edition. All other related paragraphs have to be carefully checked (e.g. 4.4, 7.3, 7.11).	Y			
JP-N02	04.060 /2	Rainwater, groundwater, dew condensation water, heating / cooling fluids are all capable of flooding a facility unexpectedly and even condensation can be hazardous in some circumstances.	Dew condensation water on the walls and floors can cause electrical damage of equipment.	y	Condensation is now mentioned in several places in 4.60 and 4.61.		
JP-N03	04.071 /4	Overpressure in ~~glove~~ gloveboxes may cause an increase of airborne contamination and/or concentration of hazardous materials;	Editorial.	y			
JP-W01	04.129 -	Line 2 - Paragraphs 6.31 ~~9.54~~ to 6.34 ~~9.57~~ in Ref. [1].	Para. 9.54 to 9.57 in NS-R-5 (Rev.1) (Ref. [1]) are	y			

			requirements for management of radioactive waste in operation. Resolution of MS comment (Japanese comment No.8) is not reflected.				
KR-N01	General comments	There is no requirement on systems for monitoring the characteristics of the natural and human induced hazards such as the seismic monitoring system (SMS) or automatic seismic trip system (ASTS). Therefore, the requirement for the installation of hazards monitoring systems should be added if it is applicable to fuel cycle R&D facilities by its safety principle.	The SMS (or ASTS) is required to be applied to nuclear power plants, research reactors, and nuclear fuel cycle facilities according to the §5.1 of NS-R-3.			N	SMS (or ASTS) safety systems are not generally required to R&D facilities, by application of a graded approach.
KR-N02	04.013 Page 13	The criticality safety analysis … and during and after ~~DBA conditions~~ DBAs.	The expression “DBAs” rather than “DBA conditions” seems to be more appropriate in this sentence.	y	Abbreviation expanded in accordance with editorial policy		
KR-N03	07.039 Page 53	Any deviation of the radiation levels above the normal ranges (…) ~~for~~ should be detected, have its origin identified …	“for” is deleted, because it seems that “for” is a typographical error.	y			
KR-N04	07.042 Page 54	(c) … and assigning ~~Radiological Protection~~ radiological protection personnel to routine … (i) …with the assistance of ~~Radiological Protection~~ radiological protection personnel; …	Capital letters are modified into small letters because they are common nouns, not proper nouns.	y			
KR-N05	08.002 Page 60	The following measures should be taken during the design, construction and operational stages of R&D	The measures which should be taken during the design, construction	y			

		facilitate eventual decommissioning: … (8) Adequate financial resources for ensuring safe decommissioning.	and operational stages of R&D facility life to facilitate eventual decommissioning can include decommissioning funding, considering "Requirement 9: Financing of decommissioning" in the Ref. [31].				
KR-N06	04.101 Page 31	… Provision should be made for automatic measurement and recording of parameters that are important to safety, allowing remote ~~viewing~~ monitoring if necessary	It is better that "viewing" is replaced with "monitoring" so as to explain I&C systems properly.	y			
KR-N07	04.111 Page 35	In the design and operation of fume-hoods, gloveboxes and (where appropriate) hot cells, the following specific considerations should be taken into account: … (d) Training of operators on procedures to be followed in normal and abnormal ~~situations~~ conditions.	The terms "normal and abnormal situations" should be used consistently in the standards (e.g., "abnormal and accident conditions" in §6.109 of draft NS-R-5 (DS478), "in normal operations, in anticipated operational occurrences and in accident conditions" in §6.109 of draft NS-R-5 (DS478), etc.).	y			
SA-N01	01.009 -	This safety guide applies to the facilities defined in paragraph 1.3 with the exception of irradiators, accelerators, and research reactors, which include criticality mock-ups and radioisotope producers.	Editorial, for clarity.	Y			
SA-N02	02.002 (2)	… including the fissile mass, concentration, geometry, volume, environment, isotopic composition,	Include 'environment' and 'moderators' for completeness.	Y	concentration, ~~geometry,~~ volume, density,		

		density and the presence of moderators and neutron absorbers, see Ref. [9];			geometry and isotopic com-position., ~~, density and~~ Sub-criticality is also affected by the presence of other materials such as neutron absorbers, moderators and reflectors, see Ref. [9];		
SA-N03	04.003 -	… the loss of which may lead to radioactive releases or exposures …	Editorial.	y			
SA-N04	04.003 (2)	Confinement of radioactive material, and the removal of decay heat, for the prevention of potentially harmful releases;	Editorial.	y			
SA-N05	04.004 -	Releases of radioactive, toxic or biologically active materials are all potentially harmful.	Editorial.	y			
SA-N06	04.011 -	… should fulfil the requirements in Appendices I, II, III or IV …	Editorial, for consistency.			N	Editorial advice is lowercase “appendix”
SA-N07	04.011 -	… is used as a ‘deterministic’ safety measure …	Editorial.	Y quote rebalanced			
SA-N08	04.012 - b	For example, control by geometry could be used in the design of furnaces and dissolvers.	Editorial.	y			
SA-N09	04.013 -	… the distribution and the nuclear properties of the fissile material, …	Editorial, for consistency with the usage in the document.	y			
SA-N10	04.053 -	Even if the probability of a fire occurring may be low, …	The use of ‘frequency’ conveys the impression that fires are occurring.	y			
SA-N11	04.072 -	… (and for criticality where there are fissile materials).	Editorial, for consistency with the usage in the document.	y			

SA-N12	04.074 -	The occurrence of potentially damaging dropped loads should be avoided by qualification of cranes, …	Editorial.	Y punctuation			
SA-N13	04.076 -	Measures for maintaining the integrity of commercially supplied equipment …	Editorial, for clarity.	y			
SA-N14	04.076 -	If there is a need for adaptation to their nuclear environment, this should be justified.	Editorial.	y	If there is a need to adapt such equipment to their nuclear environment, this should be justified		
SA-N15	04.086 -	Toxic hazards should be assessed to verify that specific gas concentrations meet the acceptance criteria …	Editorial.	y			
SA-N16	04.105 - f	This can be done by sampling and analysis, and measuring the volume of discharge.	Editorial.	Y punctuation			
SA-N17	04.107 -	Where there is potential for criticality, criticality detection systems, alarm systems and building evacuation systems;	Editorial.	Y punctuation			
SA-N18	04.110 - a	… e.g. good accessibility to and adequate space around equipment, and suitable finishes …	Editorial.	Y punctuation			
SA-N19	04.126 -	Such emergencies include, but are not limited to, criticality accidents and nuclear or radiological emergencies …	Editorial.	Y punctuation			
SA-N20	04.129 - b	Guidance on the handling of fissile waste, including mass control, is provided in Ref. [9].	Editorial, for clarity.	y			
SA-N21	04.129 - b	Examples include filters from hoods, gloveboxes, hot cells and ventilation systems;	Editorial.	y			
SA-N22	04.137 -	– Weighing items for inventory control and verification without the	Editorial.	y	need to transfer fuel to and from		

		need for transfers to and from storage;			storage		
SA-N23	04.138 - a	Consideration of whether maintenance can be carried out remotely or carried out using personal protective equipment.	Editorial.	y	carried out remotely if possible or ~~carried out~~ manually using personal protective		
SA-N24	07.023 (3)	… (see paragraph 5.67 in Ref. [3]) …	Editorial, for consistency with the usage in the document.	y	Made consistent, but all other "paragraph" abbreviated to "para".		
SA-N25	07.039 -	… (e.g. hot spots or slow incremental increases of radiation level) should be detected, …	Editorial.	y			
SA-N26	07.057 -	Where applicable, computer fire modelling may be used to support the fire hazards analysis.	Rephrased as a recommendation.	y	~~Sometimes c~~Computer ~~fire~~ modelling ~~is~~ may be used to support the fire hazards analysis.		
SA-N27	07.059 -	These may cover topics such as eye protection, reaction hazards and toxicity …	Editorial.	Y, punctuation changed	"~~radiological~~" replaced by "radiation" in the same sentence		
SA-N28	07.061 -	Following filter changes, tests should be carried out to ensure that filters are not damaged and are correctly seated. Particulate efficiency tests may be used.	Editorial, for clarity.	Y	"Smoke tests may be used" for even greater clarity		
SA-N29	08.007 -	Specific guidance on the decommissioning process for nuclear fuel cycle R&D facilities is provided in Ref. [33]. Guidance which may relevant to pilot plants can be found in Ref. [34].	Editorial.	y	Split sentence and replaced "which" by "that"		

SA-N30	01.013 -	The guidance in this publication provides examples of the application of a graded approach to nuclear fuel cycle R&D facilities. The graded approach in itself is a requirement in many of the IAEA standards, i.e. Requirement 1 of Ref. [8] and Requirement 6 of Ref. [6].	Clarity	y			
SA-N31	01.015 -	……..Annex I shows the typical process route for the two classes of R&D facilities covered by this guidance……..	Grammar	y			
SA-N32	04.012 - last sentence	When the requirements for a specific pilot facility type are not applicable, the requirements for the control of criticality in Appendix V.1, V.4 and V.5 of Ref. [1] should be used. Some examples of the parameters that should be controlled to prevent criticality include the following:	Grammar	Y	“a” deleted, “control” changed to “prevention”		
SA-N33	04.031 -	…..The dynamic containment should create a gradient for reducing absolute pressures (i.e., creating negative pressure) between the environment outside the building and the radioactive or hazardous material inside the hood, hot cell, or glovebox……	Grammar	y			
SA-N34	04.071 - second bullet	□□Overpressure in gloveboxes may cause an increase of airborne contamination and/or concentration of hazardous materials;	Clarity	y			
SA-N35	04.129 -	……Specific guidance on predisposal management of radioactive waste from nuclear fuel cycle laboratories is provided in Ref. [25], while guidance which may be relevant to pilot plants can be found	Grammar	Y			

		in Ref. [26]…….					
SA-N36	04.129 - c	……In this central area, radionuclides in the waste should be characterized and quantified (including any fissile content) and may be treated and placed in containers for interim storage……	Grammar	y	Paragraph reworded		
SA-N37	04.133 -	……Features such as easily cleanable surfaces, strippable coatings, rounded corners etc. should be considered.	Grammar	y			
SA-N38	04.139 -	…..In addition, all potentially contaminated surfaces should be made readily accessible to allow for periodic and eventual decontamination (e.g. by stripping of paint or coating).	Grammar	y			
SA-N39	06.007 -	The license to operate the R&D facility is generally issued to the operating organization only after successful completion of this third phase. The regulatory body should define hold points and/or witness points as part of the authorization to perform “Hot Commissioning”, coordinated with the proposed commissioning programme.	The license to operate can only be issued after it is shown that the facility can be operated safely during “Hot Commissioning”.			n	SF-1 “an activity may only be commenced once it has been demonstrated to the satisfaction of the regulatory body” SSG-12 “the introduction of nuclear or certain types of radioactive material into the nuclear installation marks a significant step in the commissioning procedure and is often considered the point at which the main regulatory decisions are made”
SA-N40	07.029 -	The assessment, authorisation and	Grammar	Y			

		implementation of modifications should be managed in accordance with a control programme for modifications established by the operating organization…….		inserted “with”			
SA-N41	07.036 -	Additional criticality hazards may be encountered when carrying out maintenance work. For example, “if fissile material has to be removed from equipment only containers approved for criticality purposes shall be used”, see paragraph V.14 in Ref. [1]……	Grammar	y			
SA-N43	07.041 -	Intrusive maintenance and modifications should be regarded as major activities requiring ‘justification’ and ‘optimization of protective actions’ specified in Ref. [6]. The procedures for intervention should include:	Clarity	Y, inserted regarded as			
SA-N44	07.042 - c	…..The boundaries between the areas are regularly checked and adjusted to match current conditions;	Grammar	Y	This paragraph has been rewritten in the “should” form and a duplicate bullet removed.		
SA-N45	07.042 - j	Area monitors are installed detect and warn of airborne contamination (i.e., permanent or mobile);	Grammar	Y	This paragraph has been rewritten in the “should” form and a duplicate bullet removed.		
SA-N46	07.060 -	…..Specific guidance on predisposal management of radioactive waste from nuclear fuel cycle laboratories is provided in Ref. [25], while guidance which may be relevant to pilot plants can be found in Refs. [26] and [29].	Grammar	Y	A number of minor grammatical and style errors in this para. have been fixed.		

SA-N46	07.062 -	…..Facility cleaning methods should be adopted which reduce and/or minimize waste generation, for instance reuse of PPE from clean areas for use more contaminated areas.	Grammar	Y	Cleaning methods should be adopted that reduce and/or minimize the generation of waste, for instance the reuse of washings from clean areas when cleaning more contaminated areas.		
SA-N47	04.050 - Above	Human error	Consider to add Human Error as an Internal Hazard	Y Covered by dedicated section. Extended 4.108 and added a cross-ref from 4.50.	4.108 added R&D facilities are often highly reliant on human operations but such reliance should not preclude the provision of design safety features that minimize the potential for accidents caused by significant human errors.		
SA-N48	04.010 /5	Annex II in this guide presents examples of representative safety functions and their associated structures, systems and components.	The word “in” is repeated.	y			
SA-N49	04.031 /4	The exhaust air should be filtered (see paragraph 4.35.)	“)” missing at end of sentence	y			
SA-N50	04.039 /6	and the ability to perform inspections, maintenance and	Suggest including the word “inspections”	y			

		monitoring.					
SA-N51	04.042 /2	(such as drip trays)	Typo “dray” corrected to “tray”. Consideration should be taken for the need for “safe geometry drip trays”.	y			
SA-N52	04.056 - j		Consideration should be given to the hazards that the inert gas my pose such as asphyxiation.	y			
SA-N53	04.110 - b	Choice of location and clear labelling of equipment so as to facilitate inspection, maintenance, testing, cleaning and replacement;	Suggest including the word “inspection”	y			
SA-N54	07.002 /6	The R&D facility Safety Committee (or equivalent body) should comprise representatives of operations, safety and research functions.	Suggest including “safety” function.	y			
SA-N55	07.053 -	Maintaining a safe distance from radiation sources where practicable	Suggest including an additional bullet point	y			
SA-N56	Annex II Column 3 Row 5	Accessibility/visibility to allow for periodic inspection, maintenance and checks	Suggest including the words “for” and “inspection”	Y	And row 8		
UA-N01	07.036 -	It is proposed to remove “approved for criticality purposes”.	The citation in sentence “For example, “if fissile material has to be removed from equipment only approved containers approved for criticality purposes shall be used”, see paragraph V.14 in Ref. [1]” does not correspond to the text cited. Paragraph V.14 in Ref. [1] states: “If fissile material has to be	y			

			removed from equipment, only approved containers shall be used."				
UA-N02	04.122 -	To extend the first bullet with 1) An approach using the bounding case (worst case approach) with account taken only of those safety features that mitigate the consequences of accidents and/or that reduce their likelihood. If necessary, a more realistic case can be considered that includes the use of some safety and some non-safety features beyond their originally intended range of functions to reduce the consequences of accidents (the best estimate approach). **Mobile or easily displaced or removed neutron absorbers (if applied) should not be credited in safety analysis.**	Para 4.12.h states "The use of mobile or easily displaced or removed solid absorbers should be avoided." If this type of absorbers is applied, it should not be credited in safety analysis.	Y	Mobile or easily displaced or removed equipment should not be credited in safety analysis.		
US-N01	General comment	The document needs to be harmonized with several key documents under development. For example DS360 (Safety of NF Reprocessing Facilities), DS478 (Safety of NF Cycle Facilities); and NST023 (Physical Protection of Nuclear Materials and Nuclear Facilities) are important overlapping documents at different stages of completion that need to be considered for consistencies and harmonization. For example,	Consistency and harmonization with other IAEA documents that are being developed in parallel with DS381.			N	DS360 and DS381 complete a process initiated with the first edition of NS-R-5 several years ago and re-affirmed by several committees since.

		consider publication of DS381 in conjunction with DS478.					
US-N02a	04.025 , 4.105 d and e and others 7.43, 7.54	DS381 mentions monitoring in several instances. However, the document is unclear regarding application of action levels and annual limits for effluent for protection of workers (e.g.; derived annual concentration limits) or annual effluent release limits as well as sampling of biota and flora. References to documents specifying action levels or annual limits (based on national regulations or international guidelines) should be included.	Completeness to address workers safety as well as protection of the public and the environmental focusing on monitoring data and inspection records.	Y 4.25	4.25… monitoring should be provided to ensure compliance with regulatory limits and international practices for exposure limitation including.. 4.47 R&D Facilities should be designed so that effluent discharge limits can be met in normal operation and accidental releases to the environment are prevented….	4.105(d) N	Operational controls covered in 7.43 and 7.53
US-N02b	07.054 - 7.43 ,	DS381 mentions monitoring in several instances. However, the document is unclear regarding application of action levels and annual limits for effluent for protection of workers (e.g.; derived annual concentration limits) or annual effluent release limits as well as sampling of biota and flora. References to documents specifying action levels or annual limits (based on national regulations or international guidelines) should be	Completeness to address workers safety as well as protection of the public and the environmental focusing on monitoring data and inspection records.	y	Added to para 7.37; To ensure effectiveness of these radiation protection measures, action levels and effluent discharge limits should be pre-defined for comparison with results of monitoring.		

		included.					
US-N03	Annex II	Within the Annex II Table, under the "Process Area" heading, the topic of "Radioactive Material Receipt" is included. Several entries for this topic are listed under the heading "OLCs/Comments/other mitigation." Within these comments, information is provided related to the "Transportation rules, regulations, and procedures." It is not clear if the intent of the comment is to simply ensure that the related rules, regulations, or procedures exist, or if they should actually reference the IAEA's SSR-6 transportation regulations. SSR-6 is not referenced within the body of the document, and is thus not included / listed as a reference.	Completeness	Y	Added reference to SSR-6 and footnote: The operator should define rules for the safe transportation of radioactive materials and samples at the facility or IAEA transportation standards [III-2] may be applied in a graded manner.		