

## USA Comments on IAEA Safety Guide DS357: Monitoring and Surveillance of Radioactive Waste Disposal Facilities

COMMENTS BY REVIEWER				RESOLUTION			
Reviewer: USA (Contact: Bobby Abu Eid, U.S. NRC) Country/Organizations: USA/NRC & DOE				Date: 08/16/2011			
Comment No.	Para/Line No.	Proposed new text/Comment	Reason	Accepted	Accepted, but modified as follows	Rejected	Reason for modification/rejection
1	Overall	DS357 Draft Guide is a very useful document and relevant to the intended scope and objective. It covers a wide range of topics and overlapping programs and activities. The U.S appreciates the opportunity to offer “General” and “Specific” comments, presented below, to enhance the document for completeness, consistency, and presentation.	Relevance and usefulness				
<b>GENERAL COMMENTS</b>							
2	General	The scope of the draft guide is somehow inconsistent with the definitions of “monitoring” and of “surveillance” in that it includes (and has as its primary focus) significant aspects of site characterization. As stated in Para. 2.1, the BSS definition of “monitoring” is “ <i>The measurement of dose or contamination for reasons related to the assessment or control of exposure to radiation or radioactive substances and the interpretation of the results.</i> ” Para. 2.6 states that for purposes of this guide the term surveillance	Clarity: Overlap and distinction between characterization activities and activities belonging to monitoring and surveillance.				

	<p>refers to <i>“The physical inspection of a waste management facility in order to verify its integrity to protect and preserve passive barriers.”</i> Thus, neither of these definitions includes site characterization to establish a safety case for a licensing process. However, the utility of coordinating monitoring and surveillance guidance with site characterization activities is apparent. For example, many of the parameters which are measured before site construction to establish a baseline for monitoring are also needed for site characterization activities. Nonetheless, the traditional distinction between monitoring, surveillance, and site characterization should be maintained.</p> <p>Therefore, it is desired to retain the discussions of site characterization; however, the issue of overlap and incorporation of site characterization topic in monitoring needs to be addressed. One option is to discuss characterization aspects in more detail and modify the title of the guide to include “monitoring, surveillance, and characterization.” Alternatively,</p>					
--	---	--	--	--	--	--

		clear distinction between the three activities needs to be recognized and delineated in the text. (See also specific comments for details).					
3	General	The document lacks key aspects of safety and security integration and alignment particularly for the surveillance program in general and the monitoring program under specific emergency conditions. For example, surveillance for site access and potential intrusions (e.g.; intentional/inadvertent) aspects were disregarded in the document. We believe this is an important aspect involving integration of safety and security which needs to be addressed and discussed in some detail. In addition, specific details regarding control and deterioration of fences, barriers, and security needs are lacking.	Completeness: The document needs to address integration and alignment of safety and security aspects pertaining to generic surveillance program and specific monitoring particularly under emergency conditions.				
4	General	Monitoring and Surveillance under Emergency Conditions: The document presented a brief Section (Para 6.14 and 6.15) on “ <i>Monitoring for Emergency Response.</i> ” In addition, surveillance under emergency conditions was hardly addressed. We believe these topics are quite significant and need to be expanded and addressed in more	Completeness: The document needs to address monitoring and surveillance aspects under severe emergency conditions in more detail.				

	<p>detail. In this context, the document could benefit from experience gained from previous accidents particularly recent Fukushima, Japan, accident in relation to the needs for monitoring to protect workers, the public and the environment particularly from off-site releases. The document mentions responsibilities of the “<i>Operator,</i>” for reporting monitoring and surveillance to the regulatory body periodically and reporting unexpected or emergency circumstances. This topic should be discussed further in more detail.</p> <p>Remote technology approaches and methods for surveillance and monitoring under severe emergency situation is also a significant topic to discuss in relation to development of surveillance and monitoring programs. Further, off-site, and beyond boundary surveillance and monitoring including communication and collaboration with stakeholders need to be addressed.</p> <p>The document should also address security and emergency response as examples of where the delegation of authority may be</p>					
--	--	--	--	--	--	--

		<p>considered to other agencies. In brief, the document needs to ensure that emergency preparedness management and arrangements are in place, and are routinely tested.</p>					
5	General	<p>The document lacks organization and consistency in contents and presentation. Considering contents aspect; for example, Chapter 7 on “Development and Implementation of a Surveillance Program” lacks detailed aspects in terms of waste inventory, site intrusion, location and frequencies of surveillance, criteria for performance of barriers and assessment of safety functions in relation to the safety case and the surveillance and monitoring programs. In addition, the document lacks significant aspects pertaining to audits and QA/QC to assess surveillance and monitoring results. Another example is Chapter 9 “Management System” which lacks specifics regarding decision-making and interactions between licensees, operators, regulators, and stakeholders, regarding design and implementation of surveillance and monitoring programs. Such interactions and</p>	<p>Completeness, Quality, Consistency, Clarity, and Edit: Organization and consistency in content, format, and presentation; and appropriate edit of document.</p>				

		<p>communication are necessary during interpretation of data and assessment of results pertaining to safety functions. Further, financial assurance issues were not discussed in order to facilitate long-term monitoring, corrective actions, and maintenance of the disposal facility.</p> <p>In terms of organization and consistency, the document needs to be consistent in use of the terms and to delineate specific areas and responsibilities of overlapping programs.</p> <p>The document presentation can be improved by considering use of a general bullet system across the entire document. It can also be improved in use of acronyms by :</p> <ul style="list-style-type: none"> <li>a. Considering including a list of acronyms in the document. Example, Para 1.3, NORM.</li> <li>b. A consistent approach to spelling out acronyms at first usage in the document is suggested. Several acronyms are used and then spelled out in the text later.</li> </ul> <p>(see also specific comments)</p>					
--	--	--	--	--	--	--	--

6	General	The document needs to update the reference list and use updated references in citation. For example, the document should refer to the updated BSS safety requirements (DS379) and the updated safety case guidance (DS355),	Completeness and quality to update cited references.				
<b>SPECIFIC COMMENTS</b>							
1	1.4 , ln 10 Page 1	Revise sentence to read as follows: <i>“The monitoring and testing programs that are needed to establish baseline conditions and to inform operational management decisions should be put in place during this period.”</i>	Completeness: It is worthwhile to include establishing baseline conditions based on site characterization data, as this is an important aspect of initial monitoring.				
2	1.4, last bullet, ln 10 Page 2	Change “will” to “may”.	The time of license termination may be different for different regulatory schemes.				
3	1.5, ln 4 Page 2	Delete “the” before “basic requirements”	The BSS is not the only source of such requirements and all countries do not use the BSS as the basis for their requirements.				
4	1.11, ln 1- 2 Page 4	Revise the first sentence to read: “This Safety Guide emphasizes integration of monitoring and surveillance with site characterization activities needed for development of the safety case.”	Consistency with the definitions of monitoring and surveillance.				

5	2.4, p. 5; 4.12, p. 14; 6.3, p. 21; 8.7, p. 32; and I-5, p. 40	The document appears to have a mix-up between monitoring and characterization. For example, the section on “ <i>Pre-Operational Period Monitoring</i> ” belongs to site characterization. Therefore, we recommend having an independent Section on “Pre-Operational Site Characterization” and incorporation of 6.3 through 6.6, and other related texts) under this Section. It should be noted that one purpose of the pre-operational site characterization is to establish baseline and natural background conditions at the site.	Distinction between monitoring and characterization: Monitoring is defined in Section 2.3 as “ <i>Continuous or periodic observations and measurements of environmental, engineering, or radiological parameters.</i> ” Most, if not all, of the activities related to “ <i>Pre-Operational Period Monitoring</i> ” are indeed site characterization activities and are neither continuous nor periodic. Therefore, what is being described is site characterization. Characterizing a site is <b>NOT</b> the same as monitoring a site; though characterization data can be used to establish baseline conditions.				
6	2.4, Page 5	Move Para. 2.4, to become Para. 2.2, and revise the first sentence to read: “ <i>Monitoring involves many activities including coordination with site characterization activities and use of characterization data as practicable.</i> ” Add a new second	Consistency with the definitions of monitoring and surveillance.				



		sentence: <i>“Therefore the integration of these activities is discussed in this guide.”</i>					
7	2.12, p. 6	<p>Para 2.12 brings up an important issue pertaining to evolution of the site characterization phase into the monitoring and surveillance programs. The concluding statement made in Para. 2.12, p. 6 <i>“As a result, provision should be made to anticipate the needs of monitoring at later periods of the facility lifetime and to gather monitoring data that informs later planning and actions,”</i> is important and should be discussed in more detail particularly on the use of characterization data to design and plan for monitoring.</p> <p>This topic should be expanded with illustrated examples and more elaboration.</p>	The document needs to have more elaboration, clarification, and explanation of the role of characterization in planning of monitoring and surveillance programs.				
8	2.16, ln 6 Page 7	Revise sentence to read as follows: <i>“...to build confidence that each barrier and its associated safety function(s)...”</i>	It seems more appropriate to state that “building confidence” in barriers or safety functions performance through monitoring rather than “ensuring” performance , as “ensuring aspects” are difficult tasks to meet.				
9	2.17, ln 3	Replace “social aspects” with a	Language: Using the term				

	Page 7	more descriptive term such as <i>“stakeholders’ feedback.”</i>	<i>“social aspects”</i> is inappropriate and does not reflect the intended purpose and meaning of the sentence.				
10	3.2. c) Page 9	Revise sentence to read as follows: <i>“...and coordinate those plans with responsible authorities that should be involved under emergency conditions as well as offsite responders”.</i>	To ensure coordination with responsible authorities and/or agencies under emergency situation and with responders.				
11	3.8, p.10	Suggest deleting first sentence “If the potential exists for an accident...” and revising second sentence. Our suggestion to delete, or revise, this phrase because it is not whether or not the potential for an accident exists that is important, (there is always potential for some type of accident), but the likelihood of an accident to occur.	Clarity and correctness: The first sentence of Sec. 3.8 seems to be unrelated to the rest of the paragraph.				
12	Chapter 4	Suggest adding a paragraph on selection of monitoring locations with illustrative example (possibly between 4.9 and 4.10). The suggested Para is given below: <i>“The monitoring locations should be chosen in a way that reduces uncertainty in the spatial correlation of parameters to acceptable levels so that a high</i>	Completeness and Clarification				

		<p><i>degree of confidence will result from the flow and transport modeling. This can be determined by various statistical methods. For example, groundwater monitoring wells are usually assigned in the following critical locations:</i></p> <ol style="list-style-type: none"> <li><i>1) Source areas, within and immediately down-gradient of source area;</i></li> <li><i>2) Transmissive zones with highest contaminant concentrations or hydraulic conductivity;</i></li> <li><i>3) Fringe portions and boundary of the plume;</i></li> <li><i>4) Areas representative of contaminated and uncontaminated geochemical settings;</i></li> <li><i>5) Areas supporting the monitoring of site hydrogeology;</i></li> </ol> <p><i>or</i></p> <ol style="list-style-type: none"> <li><i>6) Regulatory points of compliance.”</i></li> </ol>					
13	Chapter 4	<p>Suggest adding paragraph on monitoring frequency as given below:</p> <p><i>“The appropriate monitoring frequency can be determined based on the predicted rate with which contaminant concentrations change due to parameters such as groundwater</i></p>	Completeness and Clarification				

	<p><i>flow and natural attenuation processes, the degree to which the causes of this variability are known, the types of evaluations to be performed, the locations of possible receptors, and the remedial action objectives for the site. In situations where the hydrologic, geochemical and contaminant trends are stable and the conceptual site model is verified by existing monitoring data, reductions in sampling frequency may be warranted. In situations where the variability is high, increases in monitoring frequency may be warranted. For example, more frequent monitoring of groundwater elevations may be warranted, particularly during the establishment of baseline conditions, to improve the characterization of groundwater flow patterns. The other factors for determining monitoring frequency include the relevance of performance indicators and the information redundancy. If a performance indicator is not expected to significantly influence the performance assessment of a site, then monitoring frequency for that indicator could be greatly reduced or even eliminated. If</i></p>					
--	--	--	--	--	--	--

		<i>over a period of several years the data trends appear to be stable, a reduction in monitoring frequency may be warranted.”</i>					
14	4.8/ line 3 Page 14	Add: “as well as for geologic repositories”	Completeness: The results of monitoring are also important and applicable for all repositories.				
15	4.10 Page 14	Consider using the following sentence: “ <i>Monitoring programmes should include activities to update and refurbish monitoring technology when possible and when warranted.</i> ”	Monitoring systems may over time degrade, and technology improves.				
16	4.11 Page 14	Add following two sentences to the end of the paragraph: “ <i>It is also important when considering monitoring of a given parameter to clearly understand and communicate to the regulator and stakeholders what type of results would be expected and how the monitoring results will be interpreted. It is also recommended to provide ranges of expected values to assess uncertainties.</i> ”	These aspects are especially important when considering relatively new monitoring techniques for performance confirmation that may require some interpretation to explain the significance of a given result. It also ensures that, prior to carrying out monitoring, careful consideration would be given to what will be expected with consideration of uncertainties.				
17	4.12	Revise the first sentence to read: “The general objective of monitoring programs during the preoperational period is to establish pre-existing levels of	Completeness and explanation of the role of site characterization.				

		contaminants and to establish a baseline for consistency with the definition of monitoring, and to identify parameters that may be indicative of performance in the post closure period. It is noted that site characterization programs typically establish site natural characteristics of features, events and processes...”					
18	4.13, p. 16	The sentence in Para 4.13 “ <i>The duration of post-closure monitoring should also depend on reasonable assumptions on the duration of institutional stability and continuity of knowledge, and its consequent ability to ensure ongoing monitoring and maintenance</i> ” is vague and ambiguous. It is unclear of what is meant by “institutional stability” and the criteria to assess such stability. It is also unclear of necessary actions to take in order to assess duration of post-closure monitoring.	Clarification and addressing ambiguity regarding duration of post-closure period.				
19	Sec. 4.15, p.16	Verb tense	Grammar: In second sentence, “carried” should be “carries”				
20	Sec. 4.17, p. 16	Para 4.17, p. 16 states, “ <i>As appropriate, the possibility of a sudden failure should be taken into account in the design of a monitoring program.</i> ” An example should be given of	Clarification				

		how failure is accounted for in design of monitoring.					
21	4.23 Page 17	Add the following bullet: “Establishing process to verify the qualification and certifications for vendor laboratories.	Need to confirm that laboratories doing sample testing are certified and acceptable to regulators. Part of 4.11 “independent verification of values”.				
22	Sec. 4.23	It is necessary that the bullet points presented under Para 4.23 be discussed with more elaboration and with some illustrative examples. Certain points don’t appear to be covered in the text. For example, identification of monitoring locations and decommissioning of monitoring instrumentation were not addressed. These points represent significant aspects of the monitoring program and needs further elaboration and discussion in either Chapter 4 or Chapter 5.	Completeness				
23	4.23 Page 17	Add the following bullet: “Establishing independent assessment processes for the monitoring program.”	Part of 4.11 “independent verification of values”.				
24	Chapter 5, pp. 19 - 20	Suggest removing Chapter 5 and incorporating its essential content into Chapter 4.	Chapter 5 does not provide substantive monitoring information or independent topics related to monitoring to justify as an independent Chapter. The information provided in Chapter 5 can				

			be easily incorporated into Chapter 4.				
25	5.2 & 5.4 Pages 19 & 20	Para. 5.2, regarding near surface disposal discussion is inconsistent with Para. 5.4, mining residue disposal. It should be noted that mining residues are frequently disposed of in near surface facilities and practical considerations dictate that they will continue to be. Thus near surface facilities are typically used to provide isolation for substantially longer time period than the period given in the document “a few hundred years.”	Clarification and consistency				
26	6.2, Page 21	Delete the last bullet “Provision of an environmental database.”	Redundancy with the first bullet “Baseline”.				
27	6.7, ln 9 Page 23	Revise the first bullet as follows: “ <i>Data for the as-built properties of materials and structures and for confirmation of the performance of elements...</i> ”	Clarity and completeness: An important aspect of operational monitoring is to confirm the as-built properties of materials and structures important to safety functions as compared to what was assumed in the safety assessment.				
28	6.9 Line 4 of Page 24	“... envisaged, including area-wide events (earthquakes, cyclones) that may impact access and offsite support.”	All reinforced by recent earthquake in Japan, an area-wide event can prevent offsite assistance being available and limit worker access to site.				



29	7.1, p. 27	<p>Para 7.1, p. 27 states, <i>“The surveillance program also includes review and assessment of records, trends and performance of different parameters.”</i> Assessment of performance sounds very much like <i>“Performance Assessment (PA).”</i> The definition provided on pp. 5-6 states that <i>“In the context of this Safety Guide the term surveillance refers to: The <u>physical</u> inspection of a waste management facility in order to verify its integrity to protect and preserve the passive safety barriers.”</i></p> <p>Based on the above statement there appear to have an overlap and mix-up between surveillance from one side and monitoring, PA and, inspection &amp; corrective actions on the other. If the surveillance program is not limited to inspections, the definition of level of surveillance should be defined and the distinction between surveillance and monitoring should be made clear.</p> <p>Either change sentence quoted, or change definition of surveillance.</p>	Overlap and mix-up between surveillance and Performance Assessment and Inspection				
30	7.4, p. 27	Delete Para 7.4 , p. 27 which states, <i>“The monitoring and testing programme should start in the pre-operational period during construction to allow detection of</i>	Redundancy & Terminology				

		<p><i>early degradation of the components integrity or to find out the quality of the host rock around the excavations.”</i></p> <p><i>The meaning of this statement is unclear.” As discussed above, the pre-operational period surveillance is synonymous to site characterization.</i></p>					
31	7.6, p. 28	<p>This Section only discusses duration period after closure exclusively. The Section does not describe what actual surveillance activities need to be performed. Therefore, it is necessary to provide a list of surveillance activities under this Section to present adequate information describing what surveillance activities need to be performed.</p>	Completeness				
32	7.11 – 7.16 Page 29	<p>Delete the title “Detailed inspections”. In the first line of Para. 7.12 delete “detailed”. Also delete Para. 7.14, and 7.16.</p> <p>It is unclear as to what the difference is between “routine” and “detailed” inspections. Therefore the document needs to discuss and identify the difference between “Routine” and “Detailed” inspections.</p>	<p>Clarity and completeness: The difference between “routine” and “detailed” inspections is ambiguous and apparently indistinct. A single statement that inspectors should be qualified is adequate enough.</p>				
33	8.1, ln 2 Page 31	<p>Revise sentence to read as follows: “...for the purpose of building</p>	Emphasize the overall goal of monitoring which				

		<i>confidence in safety of disposal facilities and reduction of risk or uncertainty....”</i>	is to build confidence and confirmation of safety functions and to reduce risk.				
34	8.2, p. 31 and 9.2 p. 35	The document uses in Para 8.2 & 9.2 the term “lifetime” in reference to life of facility which seems to have different connotation. In 8.2 “lifetime” seems to include an indefinite far future period, while in 9.2 it seems to only include a period during which active decision-making would still be occurring. Therefore, the document needs to address consistency in use of this term.	Consistency in meaning and use of terms.				
35	8.3 Page 31	Include sentence at end. <i>“Prior to monitoring the potential spatial and temporal variability of the data to be collected and how it will be interpreted, should be well understood and explained to stakeholders.”</i>	Setting reasonable expectations for monitoring is important.				
36	8.7 Page 32	Consider re-editing paragraph 8.7:  1. Complete paragraph to read: <i>“Existing monitoring and surveillance data from comparable types of facilities should also be collected and evaluated during the pre-operational period. This will facilitate the development of monitoring and surveillance programs for the new site.</i>	Editorial/Completeness: While useful to support the safety case, compiling existing data from other facilities is not actually an essential segment of monitoring, surveillance, or site characterization, according to the definitions of those terms. Regarding the				

		<p><i>Comparisons of operating records at nearby facilities can also provide information on the technology used at these equivalent facilities, which can aid in establishing proper safety functions and sustainability requirements for the new disposal facility.”</i></p> <p>2. Delete the last sentence of 8.7  3. We note that this section, has a number of good ideas, and is important to be elaborated on in the document. Therefore, this section should be enhanced by including some examples to link monitoring during the different stages to assumptions made in a safety assessment and the anticipated performance of the barriers and safety functions. A good example, of topic which can be discussed further is the “as-built conditions and performance of disposal system components.” In addition, we suggest rewording 8.7 to address the use of baseline data to establish confidence in performance of the system.</p>	<p>third sentence, the records of facilities which have been operated for only a few decades cannot provide sufficient confidence that a similar facility will perform in a similar manner for hundreds, or thousands of years.</p> <p>For completeness, more elaboration and discussion with illustrative examples are necessary.</p> <p>.</p>				
37	Before 8.8 Page 32	It would be beneficial to add a paragraph before 8.8 to highlight the importance of “monitoring” during the construction phase. During this phase, the emphasis is on confirming as-built conditions to be	Confirmation of as-built conditions compared to assumptions in the safety assessment is a critical activity relevant to safety functions and is worth				

		consistent with assumptions in the safety assessment. The importance of identifying ranges of expected “as-built” conditions should also be emphasized.	emphasizing in this section. Use of ranges of values are important in order to avoid a situation of defending measurements in consideration of “expected” point values.				
38	8.8, p. 32	It is unclear if “performance confirmation program” is synonymous with “monitoring and surveillance program,” or something different that needs to be defined and discussed. In this context, the performance confirmation program” needs to be discussed in some detail.	Clarification: Discussion and definition of the “Performance confirmation program” and how it is related to “monitoring and surveillance program,” if indeed it is an independent program.				
39	8.12 Page 34	Add sentence. <i>“Such communication needs to begin early in the process; it is generally easier to explain potential uncertainties before beginning of the monitoring program than trying to provide an explanation after monitoring begins.”</i>	This emphasizes the need to communicate expected monitoring results and uncertainties early before start of monitoring.				
40	8.13, p. 34	Rewrite Section 8.13	The meaning or purpose of this section is not clear.				
41	8.15, ln 4 Page 34	<i>Modify sentence to read: “...increased sampling frequency for indentifying, and/or confirming, spatial and temporal trends...”</i>	Clarification: It is significant to clarify that understanding trends is important and such trend				

			can be both spatial and temporal.				
42	9.1 First Bullet Page 35	Comment: It should be noted that it may be neither feasible nor necessary for national government agencies to make special provisions for ensuring continuity of resources for tens or hundreds of years. In fact, private companies are frequently the responsible party to ensure resources for waste disposal sites. The regulators can demand financial surety as a licensing requirement. Nevertheless, ultimate Government ownership and responsibility is a durable institutional control and constitutes the requisite provision of resource availability.	Correctness and clarification.				
43	9.5 Line 3 Page 36	“and since <del>and</del> surveillance”	Edit.				
44	Annex I	Annex I Title “ <i>Examples of Monitoring and Surveillance Information Collected for a Geological Disposal Program.</i> ” However, the scope of the safety guide covers a variety of radioactive waste disposal facilities. It is unclear if the scope of this Annex would apply in general to all disposal facilities or just to geological disposal facilities or to radioactive waste facilities in general.	Clarification in scope and application of Annex I				

45	Annex I Page 43	Very little mention of geophysical methods implied or explicitly stated as useful in text. Paragraph I-14 mentions boreholes, but geophysical methods of monitoring changes in barriers and characterizing of ambient conditions are often very important.	Completeness				
46	Annex I Table I-1 Page 45	<p>General comment on Table I-1: More clarity is necessary and inconsistencies within the Table need to be reconciled. Examples:</p> <ul style="list-style-type: none"> <li>a. Nearly all items in first part of Table I-1 should be checked for the pre-operational phase since those types of data and information would be Needed. Need to check the main sentences which will include all bullets.</li> <li>b. We recommend that the generic approach to Table organization be based on phases of facility development (e.g.; site selection, facility construction, operation, closure, and post-closure periods) considering time sequence.</li> </ul>	Table I-1 does not seem to be organized properly. Suggest formatting the Table and/or its re-organization as suggested in the comments.				
47	Table I-1, p. 45	Table I-1 appears to be missing sections, or activities, on the following topical areas:	Completeness				

		<ul style="list-style-type: none"> <li>- Chemical and physical changes to the surrounding geo-sphere and in the atmosphere; and</li> <li>- Radionuclide release detection (measuring radioactivity).</li> </ul> <p>We suggest including the above missing sections.</p>					
48	Para. I-18	<p>Add a bullet:</p> <p>“changes to the flood plain and the magnitude of the 100-year flood”</p> <p>Many of the bullet items in this paragraph contain items that might affect flooding (e.g., land use, drainage, slope evolution etc.) – it seems that flooding could be quite important for certain facilities and it may be useful to have some flooding parameters directly noted in this list.</p>	Completeness				
49	Annex II Para II-1 through II-8 and title Page 51	<p>Considering site description presented in Para II-1 through II-8, the site appears to incorporate significant waste storage aspects. Therefore, based on apparent use of the site for “<i>storage and disposal</i>,” we recommend that Annex II title be modified to indicate “<i>NEAR SURFACE STORAGE AND DISPOSAL PROGRAM</i>”.</p> <p>The items are presented as the intent is temporarily storage of waste in bunkers or holes; and therefore</p>	Need to address and resolve ambiguity to clarify purpose and intent of the site regarding storage (short-term/long-term) and permanent disposal.				



		closure/post-closure may not be expected pending on the outcome of monitoring or waste management decisions. In addition, the Annex uses the term “ <i>storage wells,</i> ” which seems to indicate that it is intended for storage, or for dual purpose storage & disposal. This ambiguity and overlap between “storage” and “disposal” needs to be addressed and clarified.					
50	Annex II Para II-2, line 2 Page 51	“Quaternary rocks” should read Quaternary sediments or Quaternary units.	To avoid implication that the units are indurate and rock-like since it appears as if they are unconsolidated sediments. Paragraph should also make clear that the units are generally unsaturated.				
51	Annex II, pp. 51-59	The example presented in Annex II does not demonstrate significant aspects and key components of the surveillance and monitoring programs discussed in the document. For example: i) the different phases of operation and post-closure are ignored, ii) the uses of the listed monitoring activities as described in detail in Chapter 8 of the document are not included, and iii) surveillance is not part of the this “monitoring and surveillance	Scope, purpose, consistency and completeness of of Annex II.				

		<p>example.” In addition, The “Type of Monitoring” column only has two types: environmental and source. Both types are defined in Chapter 2 as measuring activity or external dose rates, respectively. However, many of the properties listed on page 58 are neither activity nor dose rates. Matter of fact, most of the properties listed in <b>Annex I</b> are <b>not</b> activity or dose rates (e.g., chemistry, stresses, head, etc.), but then Annex II goes on to minimize monitoring these properties.</p>					
52	Annex II Figure II-1 Page 52	<p>The section needs clarification. Figure II-1 requires:</p> <ul style="list-style-type: none"> <li>a. North arrow; some grayscale lettering and lines, and keys are either not legible, or out of focus</li> <li>b. The Table describes upstream and downstream, and there is no indication of flow direction on map; it could be useful to add to the Figure flow direction arrows or a contour or two.</li> </ul>	Incomplete & Unclear Figure.				
53	Annex II, Page 53	<ul style="list-style-type: none"> <li>a. On page 53, line 1, remove “<b>I-3</b>” from paragraph header “EARLY OPERATIONAL MONITORING AND SURVEILLANCE ACTIVITIES.”</li> <li>b. On page 53, line 5 from</li> </ul>	Editorial: Headers are incorrectly inserted or misplaced. Unclear paragraph formatting.				

		bottom, Remove “I-4.” from paragraph header “OPERATIONAL MONITORING AND SURVEILLANCE.”					
54	Annex II Para II-13 Page 53	<ul style="list-style-type: none"> <li>a. First Bullet: “and in total 28 wells has been” should read “have been”</li> <li>b. Last bullet: “Involving the new rainwater collector basin”; the intent of this bullet is not entirely clear.</li> <li>c. Was a new basin constructed? Would it be clearer to revise bullet to read: “Involving construction or monitoring of the new rainwater collector basin”? Consider revising bullets providing clarification of the intent of the bullets presented.</li> </ul>	Grammar & Clarity.				
55	Annex II Para II-16 Page 53	In II-16, rather than use of term “first”, using the term “initial” may be more appropriate as Para II-19 also uses “first” again in describing the chronology of safety assessment.	Consistency				
56	Annex II Para II-21 Page 54	It is unclear whether “corrective actions” were taken because of the probable leak (tritium in wells), or only further monitoring in accordance with a monitoring plan. It is unclear of the purpose of having	Clarification and completeness				

		a new aerosol and soil sampling points as described in paragraph II-22. We suggest providing more discussion and clarification of tests enhancement, as well as causes and effects on monitoring program tests and evolution.					
57	Annex II Para II-25 Page 54	Line 1: In place of “composed of work of”, substitute with “conducted by”	Editorial				
58	Annex II Table II-1 Page 55	<ul style="list-style-type: none"> <li>a. Re-title to indicate “SUMMARY OF STORAGE AND DISPOSAL MONITORING SYSTEM”</li> <li>b. Vast majority of items indicated to be “BASE LEVEL” Evaluation. Base level implies pre-emplacement/pre-disturbance. Text indicates some radionuclide migration which would show disturbance. Should the evaluation column indicate “baseline” and “operational disturbance” monitoring results both? What is baseline vs. base level as used in these tables and text?</li> </ul>	Completeness, consistency, and clarification				