From:	RILEY, Jim
To:	Cook, Christopher; Miller, Ed
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Subject:	Scenario Based Integrated Assessment Example: Topics for Discussion
Date:	Wednesday, October 23, 2013 3:04:37 PM
Attachments:	NRC Comment Resolution-Table - 1.xlsx

Chris, Ed;

Attached is the matrix we created that describes the comments we have received on the scenario based example. It includes our notes on disposition. We would like to discuss all the comments highlighted in yellow tomorrow. In addition, we would like to discuss the following comments from the latest list of comments sent to us in early October:

- Request: The integrated assessment ISG Section A.1.2.1 includes the following:
  - The availability and reliability of active components (e.g., pumps, valves) should be justified using:
  - •operational data
  - •performance criteria (e.g., see Table A1)
  - •consideration of operational requirements:
  - surveillance
  - inspection
  - design control
  - maintenance
  - procurement
  - testing and test control

  If applicable, licensees should further use the following to justify the availability and reliability of active components and features:
  - incorporation of equipment in plant programs (e.g., whether the component is included in established plant equipment reliability programs or subject to 10 CFR Part 50, Appendix B)
  - conformance to consensus standard developed for similar uses, including emergency uses (e.g., standards developed by the National Fire Protection Association for fire protection equipment)

  In addition, when information is available, the reliability of active components (e.g., failure to start on demand and failure to run once started) should be quantitatively evaluated and documented based on operating experience, testing, and other available information using

traditional probabilistic risk assessment or statistical techniques. In some cases, this information may not be available. In this case, tests or analyses may be appropriate to support quantification of reliability. If information is not available and testing is not feasible, the integrated assessment submittal should: (1) describe why quantification of equipment reliability is not possible or necessary; and (2) justify why the equipment can be reasonably credited despite these limitations.

It is not clear to staff that all aspects of Section A.1.2.1 are addressed in the example and it does not appear that the user would understand all the considerations that should be applied.

Editorial suggestion to address above request:

- To ensure that all sections are addressed by the user in an actual submittal (even if a particular criteria is not addressed in the example), consider including separate subsections for each item.
- Ex:
- 4.1 Overview
- 4.2 Operational data
- 4.3 Performance criteria [this is where table A-1 would be included]
- 4.4 Incorporation in existing plant programs

- Clarification needed: The RRCs are assumed available after 72 hrs. What is the implications of the RRCs for the equipment in the first 72hrs?

- Request: Note that the integrated assessment ISG (section A1.2.1) states what should be provided if reliability cannot be quantified:
  "In this case, tests or analyses may be appropriate to support quantification of reliability. If information is not available and testing is not feasible, the integrated assessment submittal should: (1) describe why quantification of equipment reliability is not possible or necessary; and (2) justify why the equipment can be reasonably credited despite these limitations."

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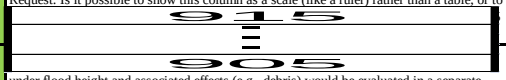
FOLLOW US ON

NRC Comment		Resolution
2	Suggestion: Consider adding a references section to the document	**This will be added to the example.**
3	Request: Add a table of abbreviations	Added in Section 2.0
4	Observation: Use of a single unit site is a limitation because many users of the document will be responsible for evaluating multi-unit sites.	Expanded discussion in Preface regarding need to consider additional factors for multi-unit sites. Also treated in preparer's notes for HRA [TBA]
5	Suggestion: Consider moving this text lower and starting the preface with the purpose of the example.	Text moved.
6	Suggestion: Here and throughout the document, it should be clear that this is an example of an evaluation of mitigation capability using a scenario based approach performed as part of	Expanded background discussion in preparer's note in preface. Also addressed with additional discussion in preface.
7	Clarification needed: The integrated assessment ISG indicates that "When using a scenario-based evaluation to assess mitigation capability, the licensee is responsible for justifying	Add text to Preface
8	Typo: "not" instead of "note"?	Sentence re-written
9	Question/clarification: Why does being a single unit site imply that issues regarding equipment available, resources and effectiveness of human actions need not be addressed?	Sentence re-written
10	Question: There are a few documentation items listed in the ISG that are applicable to any evaluation of mitigation capability (e.g., description of performance criteria used to evaluate mitigation capability, conclusions (including sensitivity studies, as appropriate), defense in depth considerations, and margins). Is this intent to include these pieces of information in this example or to focus on the documentation associated with the scenario-based evaluation only?	**Need to complete. IA Example not mature enough.**
11	Suggestion: Add reference and include the full report name.	See Preface. Also added as reference 1 [TBA]
12	Suggestion: expand and clarify.	Deleted sentence
13	Suggestion: Identify early in this paragraph what the current design basis and licensing basis are. Also consider stating why an integrated assessment was "triggered." However, it is noted that, in actuality, this information would likely be contained in a separate part of the integrated assessment submittal (because the evaluation of mitigation is only one portion of the complete integrated assessment submittal).	Added section on scenario selection. Expanded Table 2-1 to compare key features of CLB and re-evaluated hazard
14	Question/clarification needed: What is meant by "site impact" (e.g., does it mean flood waters exceed site grade or does it mean waters impact safety related SSCs)?	Reworded to clarify. Differentiated between event duration as determined by hazard re-evaluation (hydrologic) and IA definition which includes time to ensure plant is in a safe stable state.
15	Question/clarification needed: Why are these the only key safety functions of interest in this example?	Removed sentence. Added discussion in section 3.2 regarding key safety functions
16	Suggestion: Flood protection actions should be evaluated separately unless they are required strictly for the mitigation action.	Noted in Preface.
17	Suggestion: Consider adding a preparer's note to remind the preparer that the integrated assessment submittal should include a full description of the controlling flood	Added in Preparer's note in section 2 and in preface
18	Suggestion: Describe this as a "scenario-based evaluation" (which is one part of the integrated assessment) rather than an "integrated assessment" so that it is clear that there	Clarified in Preface and other places in document. Need to check for completeness of review
19	Question/clarification needed: Why are these the only key safety functions of interest in this example?	Omitted sentence but need discussion regarding safety function. Added to section 3
20	Question/clarification needed: Why aren't all associated effects (e.g., sedimentation and erosion) included in this list? Consider a preparer's note if all effects are not included here.	Added in Preparer's note. Also added in Section 2
21	Suggestion: Add a comment to provide context for when it is "too late" to implement the proposed strategy (e.g., if actions are not initiated until the flood waters are visible to plant	Show in timeline and focus on margin.
22	Suggestion: The "flood event duration" is a defined term in the ISG (and includes time period before the arrival of flood waters). Consider using a different term to describe the	Clarified to delineate the two terms: Hazard defines "Flood Duration" and IA refers to the "Flood Event Duration"
23	Question/clarification needed: Are there any safety related SSCs located below site grade (e.g., an intake structure)? It is noted that Table 2 provides the elevation at which the intake structure is lost.	Addressed in Facility description.
24	Observation: wind speeds of 40mph can affect human performance (e.g., ability to move around the site).	Two year wind speed acknowledged as part of re-evaluated hazard. **Keep footnote**.
25	Suggestion: Use the same terminology to refer to this facility throughout the document (e.g., in Section 2.3 this is referred to as the SFMS building)	Severe Flood Mitigation System (SFMS) and Severe Flood Mitigation Facility (SFMF)
26	Request: Is it possible to show this column as a scale (like a ruler) rather than a table, or to 	Deleted table and consolidated into table 4-1. Added detailed description to section 2.2
27	under flood height and associated effects (e.g., debris) would be evaluated in a separate portion of the integrated assessment (i.e., the flood protection evaluation).	This will be explained in the preface to the example
28	**Suggestion: Add a preparer's note to indicate that the effectiveness of the flood protection under flood height and associated effects (e.g., debris) would be evaluated in a separate portion of the integrated assessment (i.e., the flood protection evaluation).**	This will be explained in the preface to the example
29	Question/clarification needed: What CLB mitigation equipment?	Briefly added sentence to Section 2.2 identifying CLB flood significant SSCs at a high level
30	Question/suggestion: What is the basis for stating the system is "highly" reliable? Without numerical justification, it is recommended that the word "reliable" be used, if justified.	Deleted
31	Request: Is it possible to break this list up and organize it a bit? Perhaps provide different bulleted lists related for the following (or even a table providing a "summary" of key scenario characteristics): hazard characterization (e.g., bullets related to warning time, event duration, concurrent conditions, gauge	Re-organized and improved grouping based on timeline. Maintained at high level. Detail timeline include in Table 5-1
32	Suggestion: Add a preparer's note to indicate that the effectiveness of the flood protection would be evaluated in a separate portion of the integrated assessment (i.e., the flood	Addressed in Preface
33	Request: Include these items with similar language in Table 2.	Table deleted
34	Question/clarification needed: Is this a permanently installed berm or does it require manual actions? The timeline suggests it needs to be constructed.	Assume berm permanently installed
35	Suggestion: Consider describing agreements that are in place to assure this information is communicated to the site (e.g., if the website is "down").	There is a procedure and memorandum of understanding already in place.
36	Suggestion: Describe the frequency of inspection (e.g., x times per y)	Section removed, not critical to success of scenario.
37	Clarification needed.	Deleted
38	Suggestion: Specify time required to complete shutdown.	Specified in the scenario overview Section 2.2 Timeline has been updated.

39	Suggestion: Provide an expanded discussion of the status of the plant (e.g., RCP seals). Also, provide more details (e.g., describe the water source for makeup). Also describe any considerations associated with reactivity control.	Expanded discussion in section 2.2 and section 3
40	Suggestion: Here, and throughout the document, considering eliminating specific numbers and description of the value that should be included {e.g., [technical specification limit for	Agreed, unless it was required to convey the intent of the example, see section 3
41	Question/clarification needed: Where is this described and justified?	Reference to FLEX eliminated.
42	Suggestion: Change to “Effects”	Changed
43	Question/clarification needed: Are all associated effects considered? Note the definition in the glossary of the ISG.	Noted and extended section
44	Question/clarification needed: Is the equipment also protected from associated effects by virtue of its location?	Yes
46	Question/clarification needed: Are there any concerns about silting of the well?	Well covered. Groundwater filtered naturally. Confirm reasonableness of statement
47	Suggestion: Include in a references section.	Will Add
48	Suggestion: Add text to this preparer’s note to indicate that the effectiveness of the flood protection under flood height and associated effects would be evaluated in a separate	Added to preparer’s note for Section 2
49	Suggestion: Consider the full list of effects contained in the ISG.	Added
50	Question/clarification needed: Seismic category #?	Clarified in section 3
51	Questions/clarification needed: Are there multiple MCCs? Where are they located and how are they protected? How are the DGs connected to the MCCs? How are the MCCs	Expanded description in Section 3. Included line diagram
52	Suggestion: Provide a further basis for this statement.	Basis added in section 3, discussion about topo survey.
53	Question: What about associated effects?	Discussion added - see section 2
54	Observation: Making this assumption does not provide the user of this example with an example of how to justify that roadways, etc. will be open when in fact debris or other obstacles may be present.	Include discussion about site accessibility
55	Question/clarification needed: What about other resources (other than fuel) that may be required to support response at sites?	See section 3 for description
56	Suggestion: Provide examples of “concurrent issues” as part of the footnote.	Deleted
57	Suggestion: Make sure this matches the FAQ response.	Consistent with FAQ
58	Clarification needed:: Expand on this or provide additional information.	All references to FLEX deleted
59	Clarifications needed: • It is not clear if the MCR is abandoned as part of the strategy. • Is the response being controlled from the DG building? • How are parameters being monitored and controlled throughout the event?	1. Section 2 has been revised to address transfer of C and C. 2. The response is being controlled from SFMS 3. All parameters are monitored from SFMS
60	Question/clarification needed: What does this statement mean with respect to the evaluation of mitigation capability once resources from the RRCs can be leveraged?	Fukushima related Orders address the capabilities and implementation of the regional resource centers which will be separately approved. The IA should reference the applicable design and procedures and describe how they will apply and function during a flood. Preparer's note added to Section 2.4
61	Suggestion: Provide a summary of what this implies with respect to the capability of the structure.	This discussion has been rewritten and includes discussion of specific standards
62	Typo: and?	Revised
63	Question/clarification needed: What other equipment is housed in the building? Is any equipment moved from the building to elsewhere on the site?	No, nothing else is moved. Spool piece removed.
64	Suggestion: Provide additional information about the DGs, e.g., specify whether they are air cooled (note: this is already mentioned in Table 6A but would be worth mentioning here). Suggestion: Discuss starting power for the DGs. Suggestion: Confirm that the actions, as described, do not require the DGs to run unloaded (or that they are designed to do so).	Discussion included in Section 3
65	Question/clarification needed: Where is the well located on site?	It is located within the floodplain and shown on the plot plan.
66	Question/clarification needed: Is this normal lighting? If so, why is it used and how is its continued operation justified? If not, how long can it be relied upon? What will be used after that?	This is lighting for the SFMS and is powered from the SFMS MCC. A separate lighting path will be added from the MCC and egress/ingress pathways have also been included in the lighting load (also powered from the SFMS MCC)
67	Question/clarification needed: Are there any water paths from the equipment to the MCCs?	No, see section 3
68	Question/clarification needed: Is this a tank dedicated to the DG building or a normal underground tank? If it is an underground tank, what is the justification for its continued	No, dedicated above ground tank above the flood plain. See section 3
69	Page break temporarily inserted at this point to improve clarity in generated PDF because of the large number of comments on a single page.	OK
70	Suggestion: Provide info to justify the capability to start and run the DGs (e.g., demonstrate the there is capability to handle the starting surge; enough AC with margin to	Discussed in Section 3
71	Question/clarification needed: Where on the flood plain, relative to the location of the plant, are these located?	Will be shown on the plant plan view drawing
72	Question/clarification needed: How is flow controlled? Where is the controller/operator located? Where is the instrumentation providing feedback located relative to the operator?	At the SFMS facility from the instrument panel. See Section 3
73	Suggestion: When describing the capacity of the pump, specify discharge pressure and margin required (e.g., consider providing pump curves). Just to reiterate: numerical values	Providing pump curves is unnecessary; they are available for audit. Will state pump capabilities are described in section 3
74	Suggestion: Note comments provided on previous draft of the document related to this (comment 14 of earlier document). Consider adding a preparer’s note to address that	See table in section 6 regarding active components
75	Suggestion: Add summaries of all procedures referenced in this document (e.g., a paragraph or two for each referenced procedure; the actual procedure is not needed). Eg., consider adding an example table in addition to the preparer’s note in the HRA section:	Included Summary of procedure
76	Clarification needed: Clarify that this statement implies that either DG can power either pump rather than implying that the DG capacity is adequate to power both (elsewhere in	Described in section 3
77	Question/clarification needed: Where is the basis for this conclusion provided?	See Section 2.2
78	Question/clarification needed: Where is the basis for this conclusion provided?	See Section 3
79	Question: Are each of these actions evaluated individually?	will discuss in HRA section and reference here

80	Questions/clarification needed: Where is the key stored? Is there only one key? Who has access to the key? The key is not mentioned in Table 6.	Key has been eliminated
81	Question/clarification needed: How is flow to the SGs being controlled throughout the event? The instrumentation below appears to address sensing and displaying parameters	Discussion has been added to the document.
82	Question/clarification needed: Is cable required for connecting the DGs to any other equipment?	No, described in section 3
83	Question/clarification needed: Clarify how this piece of equipment differs from the SG level monitor referenced below. Also, why aren't PZR level and other instrumentation	Clarified
84	Suggestion: Include core exit thermocouples. At TMI, elevated pressurizer levels did not automatically mean adequate core cooling.	No reason to add core exit thermocouples; this condition is not a severe accident
85	Suggestion: Provide information about procedures that require this information and the resolution of the information for all instrumentation in this table.	This information has been added to Section 3 and maintaining the KSFs in Section 6.
86	Suggestion: Fix cross-reference.	
87	Suggestion: Change to: "A one-line drawing of the flood mitigation system and the electrical system during the flood"	Revised
88	Question: Is this paragraph redundant information?	Revised
89	Observation: This is not a complete sentence.	Revised
90	Request: Provide additional information about how to interpret the staffing information contained in the spreadsheet.	Added discussion to Section 4
91	Question: Should this information be part of a preparer's note rather than in the body of the text?	Revised
92	Suggestion: Sentence needs editing.	Rewritten – See Section 4
93	Clarification needed: Clarify that this does not imply exceptions are asked for during the event or expected as part of the performance of an integrated assessment, but rather it is	Added to preparers note
94	Observation: Some key pieces of information and details are contained in this table that are not reflected in the text of the document.	Consistency between the table and text will be established. The additional information will be added to the text or the table will be referenced in the text for additional information. The table will be revised to enhance clarity and consistency with the body of the example and the graphical timeline.
95	Request: Note earlier comment about a table containing procedure descriptions and summaries.	Procedure summary table will be added.
96	Suggestion: Consider replacing numbers with description of the value that should be included (e.g., [technical specification limit for uncharacterized leakage]).	OK, agree. This approach should be used consistently throughout. (in some places number are requested - see comments 70 and 73
97	Suggestion: Clarify which flood barriers.	OK
98	Question/clarification needed: Is this lighting powered by the flood DGs?	Portable Lighting provided for non-essential activities only. Battery operated and used as required/directed. MCR and egress path light powered from SFMS DG.
99	Suggestion: Note comments provided on previous draft regarding the cold shutdown and use of the SGs.	See Section 3.3
100	Suggestion: Delete "completion of"	Revised
101	Suggestion: Delete "completion of"	Revised
102	Observation: This sentence is confusing.	Revised
103	Clarification needed: Clarify terminology and ensure consistency with the rest of the text.	Revised
104	Observation: This second operations crew is not reflected in the timeline, which shows only one ops crew at 24-30 hours.	Timeline revised to remove second crew reference
105	Question/clarification needed: How does this step relate to the actions at time 24?	This is the time when the switchyard is flooded. The timeline has been revised to clarify and key flood levels can be seen in Section 5
106	Clarification needed: Provide additional discussion of this in the text.	Timeline clarified, discussion will be added Discussion added to section 4 regarding 10 CFR 26.205
107	Suggestion: Include this information in preparer's note.	Example Updated to reflect request
108	Suggestion: Include a failure branch for all top events. If the failure branch goes directly to an adverse ES, provide justification for it being a low probability ES. See additional comment associated with text under Table 5.	A success path diagram has been included to show more detail and replace the event tree. This shows the critical path of event for success. All the actions are highly reliable and have margin.
109	Suggestion: Add a column to document potential failure modes associated with each top event.	The reliability of each top event has been evaluated in accordance with APP A and C and documented in Sections 9 and 10.
110	Observation: The action is time sensitive because, if the action does not occur, 24 hours are not available for site response.	Timeline and actions have been clarified. All actions are time sensitive and the margin has been shown
111	Question/clarification needed: Shouldn't alignment of SG flowpath be included as a success criterion below?	It has been added to the success path in figure 5-1.
112	Question: Why was the failure branch not developed? What if the two normally closed and locked manual valves in the AFW line can't be opened?	A success path has been shown in figure 5-1. See response to 108 above. We demonstrate this is a highly reliable action with margin in Section 8.
113	Suggestion: Short Term AC Power Available should be revised to: "Flood" DGs start and run for the duration of the flooding event (13.5 days). Text states that replacement DGs are available after 3 days. Licensee should confirm that the failure likelihood to start and run at least 3 days is justified to be low.	See response to 108.
114	Observation: A failure branch is included for this top event (though it says here that one is not included).	See response to 108.
115	Suggestion: Well pumps functional should be revised to: Well Pumps start and run for the duration of the flooding event (13.5 days). Evaluation should confirm that the failure likelihood to start and run for 13.5 days is justified to be low.	See response to 108.
116	Suggestion: Provide information about each low probability ES and justification for the conclusion that is it low probability. Request: Tabulate this information. For example:	Added in new table for the success path.

Endstate reference #	Description of end state	Justification for low probability

117	Suggestion: This item (DGs to function) should be revised to: DGs start and run for the duration of the flooding event (13.5 days). The text states that replacement DGs are available after 3 days. Evaluation should confirm that the failure likelihood to start and run at least 3 days is justified to be low.	See response to 108.
118	Suggestion: This item (well pumps to provide water) should be revised to: the Well pumps failing to start and run for the duration of the flooding event (13.5 days). The evaluation should confirm that the failure likelihood to start and run for 13.5 days is justified to be low.	See response to 108.
119	Suggestion: Include down branches for all top events and document low probability end states (as described in comment on previous page).	See response to 108.
120	Suggestion: To provide justification for the availability of equipment during the flood event, consider adding a column to Table 3 (Functional Description of Severe Flood Mitigation System (SFMS)) that describes the protection of each piece of equipment with references to further supporting analysis (as appropriate).	This information is adequately described in the rest of the example.
121	Question/clarification needed: Where and how high?	This is now described in Section 3. See significant flood height table.

122	Questions/clarification needed: Where is the tank located? What is the elevation of the gauge?	Added to section 3.
123	Suggestion: Change to "dipstick."	This is no longer applicable. Component described further.
124	Suggestion: Specify location and elevation of valves.	Will be indicated on plant drawings
125	Suggestion: Provide bases for the statements made in this paragraph.	Revised
126	Suggestion: Provide reference to appropriate section providing evaluation of this action.	Will be covered in the HRA section
127	Question: Will this include the operational requirements described in Section A.1.2.1 of the integrated assessment ISG? Also, note earlier comment suggesting inclusion of procedures and summaries.	See Section 7
128	Suggestion: The two normally closed and locked manual valves in AFW Tee Branch need to be listed in Table 6 All active SSCs (those that must change state) for the flood mitigation path to work must be included.	Updated the table
129	Question/clarification needed: Does this mean this table is not shown in this example (e.g., for brevity) but would need to be shown in an actual submittal? If so, consider including footnotes or a preparer's note.	Not show for brevity. We will state that the actual IA needs to contain this information
130	Question/clarification: Confirm that this is indicating that instrument air is already installed in the plant, so no additional equipment is needed (so long as there's ac power for the compressor). If power is not available, demonstrate that it can be powered by bottles of compressed air or a local accumulator.	IA is part of the normal plant equipment. No additional equipment is needed.
131	Question: Why?	Details provided in Section 4 preparer's notes
132	Question: Why?	Details provided in Section 4 preparer's notes
133	Question: Why?	Details provided in Section 4 preparer's notes
134	Suggestion: Make sure to include all the considerations in Section A.1.2.1 (including operational data, performance criteria (Table A1), operational requirements, incorporation in plant programs, and reliability information).	Added into Section 6 preparer's note
135	Suggestion: The reliability evaluation should include ALL SSCs that must change state for the Flood Mitigation Path to function. For example, the two normally closed and locked manual AFW valves are not included in this Table. In addition, the failure likelihood of the ADVs and MSSVs should be included.	See response above.
136	Suggestion: IEEE-500 is an old data source. The numbers are obtained from expert judgment. Consider adding a preparer's not that the use should validate the applicability of older data or should use more current data sources based on operational experience.	Preparer's Note Added: Standards and references used and to demonstrate reliability are the latest revisions, if possible and available.
137	Observation: The basis provided in the third column addresses both failure to start and recovery.	Reference to recovery has been removed. The equipment is shown to be highly reliable with margin.
138	Question/clarification needed: How is the reduced value justified compared to other SSCs credited plant programs such as the maintenance rule? Observation: Failure data typically does not credit repairs (as done below).	Discussion has been added to the table and data source has been identified.
139	Suggestion: It is not appropriate to build the recovery into the equipment failure rate. Moreover, if equipment recovery is required to ensure sufficient reliability of the strategy, manual actions associated with recovery should be evaluated as part of the evaluation described in Section 10. Suggestion: Showing down branches and providing the additional documentation suggested in Section 5 (i.e., document failure modes in Table 5) will make it clear that the failure of the submersible pump is a failure mode for the top event associated with "equipment alignment" in the event tree and the action associated with repair/replacing the pump is the recovery.	This has been deleted and removed from the example
140	Suggestion: The evaluation should document that multiple spare connectors and cables that are available and accessible during the flood.	Added to Section 3
141	Question: Are there any support systems associated with cooling (once running) or starting the DGs?	No, the diesel is self -contained in this example. Will add a preparer's note stating that the support systems would need to be discussed if these systems were needed.
142	Suggestion: The core exit thermocouples should be included in this list.	No, we don't need them.
143	Request: Note feedback provided in previous NRC comment document, which has not yet been addressed in this version of the document. Particular comments of relevance include comments associated with level of detail and integration of this section with the remainder of the document. Suggestion: Provide additional justification for assumed numerical values (or provide preparer's notes that additional justification would be required in an actual submittal).	Specific numerical values have been removed and guidance has been provided that it is the licensees responsibility to provide these numbers.
144	Question/clarification needed: When will battery connections to ADV solenoids be installed?	See 143
145	Clarification needed: This text is incomplete and confusing. Please clarify.	See 143
146	Observation: Available information indicates that 40mph winds (as described in Table 1) will create a hardship. Even if a decision is made, for the purposes of this example, to reduce the wind speeds considered, justification should be provided for why the wind will not negatively affect manual actions.	The actions in the scenario are all performed indoors and judged to no impact the PSFs of the scenario actions. The licensee must address hazardous conditions if they exist in the scenario.
147	Suggestion: Change to "time and motion"	See 143
148	Suggestion: Specify the document of which App. C is a part.	See 143
149	Observation/suggestion: Per Appendix C of the integrated assessment ISG, for an action to be deemed feasible and reliable it is necessary to also show adequate margin in the timing analysis in accordance with Section C.4 of Appendix C.	Section 7.0 now includes detailed evaluation of timing and time margin.
150	Observation: Awkward text.	Text has been revised.
151	Question/clarification needed: What is the basis for this?	Justification provided. Time margin identified.
152	Question: Is it appropriate to define a delay of more than 30 minutes as failure?	Action and analysis revised to demonstrate time margin and appropriate timing calcs.
153	Suggestion: The following items should be discussed in the same depth of detail that the actions of the dam operations staff actions were discussed.	This section has been rewritten and important information has been included in the detailed evaluation for each action.
154	Observation: Redundant with 10.1.1.2 above.	See 153
155	Observation: After item 10.1.1.4, the numbering is wrong, i.e., the next page starts with another 10.1.1.1	See 153
156	Suggestion: According to the title of this section, these subsection headings should reference actions (e.g., "Operators Shut Down Reactor"), not failures.	Section completely rewritten, comments no longer applicable.
157	Suggestion: This level of information is not sufficiently detailed. Additional information that should be provided includes answers to questions such as: How is the shutdown request communicated from management? Can operators initiate shutdown without management direction? Who is "management"?	See 156
158	Suggestion: Provide information to support this conclusion (e.g., out of the total number of normal shutdowns, how many failures were observed?)	See 156
159	Suggestion: If the purpose is to claim high reliability in accordance with the ISG then the timing analysis must be addressed as commented on earlier page.	See 156
160	Question/clarification needed: Are there any other cues? Are there any backups (e.g., if the "management" fails to communicate with the MCR?)	See 156

161	Suggestion: Describe these kinds of words operationally (i.e., describe how it is determined that procedures are "well-defined"). Operating experience or the CAP can help. For example: "Procedure AOP-XXX has been used for shutting down the reactor since start-up in June of 1982. In that time, fifty-five revisions were made, but only two revisions affected steps X through Y. During that same time there were twenty-eight corrective action items of which two involved operator errors, neither of which were caused by poor wording or logic in the procedure. There have been no corrective action items written against this procedure in the last five years. A survey of 12 currently licensed operators confirmed that the procedure was easy to read and understand." In addition, the information on the frequency of use (in both the MCR and simulator) may provide useful information.	See 156
162	Suggestion: A reference should be made here to the timing analysis, and state that the time required for shutdown averages about XX minutes and the time available is X hours, providing a margin of Y hours and YY minutes.	See 156
163	Page break added so all comments would print cleanly when the PDF is generated.	See 156
164	Suggestion: The comments provided in the previous section (10.1.2.1 Operators Fail to Shutdown Reactor) apply here as well.	See 156
165	Suggestion: According to the title of this section, these subsection headings should reference actions not failures.	See 156
166	Suggestion: The way these sentences are structured it appears that it is being asserted that the action is reliable and additionally there are clear cues, etc. The submittal should be clear in stating the position (the action is reliable), and the basis for the position, without blurring the distinction between the two.	See 156
167	Question/clarification needed: Is it necessary for management to request shutdown cooling? Is the cue the procedure being executed?	See 156
168	Observation: Stress is a PSF, it does not cause PSFs.	See 156
169	Suggestion: Provide supporting justification of feasibility and reliability. The format of Table 9 and supporting Tables 9-A through 9-? or equivalent may be used.	See 156
170	Suggestion: To this point, command and control has not been addressed. There should be a general discussion of the command and control structure that will be used before, during, and after the flood event. That discussion could go here, but may be better in one of the overview sections (2, 3, or 4).	See 156
171	Suggestion: Show the margin between time available and time required for this sequence, e.g., 59 minutes required, 24 hours available, margin of just over 23 hours.	Detailed time margin calculations have been added to section 7.0
172	Suggestion: Since both DGs use the same fuel tank, it's conceivable that they both could fail due to a problem with the fuel. Discuss what is being done to prevent this from happening, and what contingency actions will be taken if both DGs fail to run. This discussion could go earlier in the document.	Further discussion has been provided in revised document. Sections 3 & 4 include discussion on the system design.
173	Suggestion: Describe what's involved in this task.	This task has been removed.
174	Question/clarification needed: Shouldn't there be a step before this one, e.g., Open ADV using Instrument Air"? Isn't N2 a backup? Also, a battery connection to a solenoid is mentioned in the text, but not addressed here. Or will N2 be attached even before they try to open ADV with IA?	This section has been rewritten and the comments are no longer applicable.
175	Question/clarification needed: Open using instrument air? Or is it assumed that instrument air has failed to open the ADV?	See 174
176	Suggestion: Entries in this column should reflect descriptions (facts) rather than conclusions.	
177	Observation: Discussing time required without addressing the time available and time margin has limited value.	Table removed and section rewritten.
178	Suggestion: This column should provide the summary assessment and reference to supporting information (e.g., assessments performed according to the ISG Appendix C). For example, the entry above provides the reference to a supporting assessment but not the overall assessment, while this one omits the reference to a supporting assessment.	See 177
179	Suggestion: Each action should have an associated assessment. Add references for any actions that don't have assessments. Otherwise, there is no basis for the designation of the action as nominal.	See 177
180	Suggestion: Additional justification needed. For example, demonstrate that entire route will be unaffected by flood, driver will not get lost, time available is greater than time required, oil facility providing fuel will not be affected by flood, oil facility will be available 24/7 for notification, etc.	See 177
181	Questions: Do operators do "rounds"? What is the assurance that operator will be available/attentive? Are there multiple people on shift? Are there any cues (e.g., visual or audible alarms) to alert operator that something is wrong in a timely manner?	Additional detail has been provided on dam operator responsibilities. Alarms have been added to back-up tardiness and misdiagnosis.
182	Suggestion: This is a separate action from "Dam Operator Informs State of Dam Breach" and should not be combined.	This table and the corresponding sections have been rewritten. They are no longer applicable.
183	Suggestion: This is a separate action from "Dam Operator Informs State of Dam Breach" and should not be combined.	See 182
184	Suggestion: This PSF is not "NA" because the dam operators must have some instrumentation/displays/controls. In evaluating this PSF, consider questions such as: How many operator errors have occurred due to confusion or misinterpretation of controls or displays?	See 182
185	Suggestion: This is a separate action from "Dam Operator Informs State of Dam Breach" and should not be combined.	See 182
186	Observation: The ERO is not involved in this action. Suggestion: This is a separate action from "Dam Operator Informs State of Dam Breach" and should not be combined.	See 182
187	Observation: 40 MPH wind may have an effect on walking between buildings, probably causing delays.	See 182
188	Question/clarification needed: Is it known how dam operators deal with special fitness issues (e.g., fatigue, fitness-for-duty)?	See 182
189	Question/clarification needed: What about accessibility to telephones, outside lines, procedures, or the contact list?	See 182
190	Suggestion: This highlighted task is the level of detail at which the assessments should be done. Suggestion: The action in this table should be broken down into the three tasks listed in the discussion, with an assessment sheet for each task. For example, action 1 would be "Dispatch crew from TSC to unlock and prepare the facility for use". Discuss who dispatches, who is dispatched, how many, special qualifications, where the keys are stored, whether wind or darkness would have any effect, and all of the other PSFs. Action 2 would be "Align hoses and valves..." and Action 3 would be "Start and run DGs for fifteen minutes.	See 182
191	Question: Should this be the title of Table 9.B-1 below?	See 182
192	Clarification needed: On page 52 (of the original document, not this comment document with different pagination), this number is 59 minutes.	See 182
193	Question/clarification needed: Why NA? The summary contains some of the considerations.	See 182
194	Question/clarification needed: Where are the keys kept? How are they controlled? Is there a backup set of keys?	See 182

195	Question: How is the facility lit when off-site power is lost?	See 182
196	Suggestion: This would be a good place to describe the instruments that will be used to monitor the state of the reactor and how they are powered.	See 182
197	Question/clarification needed: What is the basis for this? Additional information (e.g., operator opinion) needed.	See 182
198	Question/clarification needed: Who is in the student population? Since it is specified that a crew is two engineers, are there any other qualifications in addition to the annual training? Won't they have to be active licenses? Will they be running the plant from the DG facility?	See 182
199	Observation: "NA" not appropriate due to effect of 40mph winds.	See 182
200	Question: Which table?	See 182
201	Observation/question: Fitness also includes fitness for duty (see Section C.3.1.9). Will these engineers be included in the plant's fatigue management program?	See 182
202	Question/clarification needed: How was a crew of two engineers confirmed to be adequate to perform this action?	See 182
203	Questions: Are there any "blind spots" on site, especially in or near the DG facility, MCR, and TSC? What other forms of communication will be available and operable during the event?	See 182
204	Question: Is there any chance that antennae required for communication could be damaged or disconnected by a 40 mph wind?	Wind speed has been judged to not affect the actions, as they are all completed inside.
205	Suggestion: For the sake of completeness, provide the titles of all credited actions. For example, based on the previous comments, the next action (9.C) is to "align valves and hoses in the DG fuel system to feed DGs from day tank", and 9.D is "Start and run DGs for 15 minutes." 9.E would be "Realign WWP for preparation for injection into SG", and 9.F would be installing the spool piece. Keep going until the event is by definition "complete."	A table of all actions with identifiers have been added to Section 7.0
206	Suggestion: This is the preferred level of detail.	This action has been removed
207	Observation: Preparation of the DG facility was addressed in 9.B	See 206
208	Question/observation: Will the Control Room be evacuated? If not, it isn't clear about how the DG crew and the CR and TSC integrate their actions.	See 206
209	Suggestion: Here there should be a discussion about how operators get feedback on valve positions, the level and pressure of the SGs, and any other instruments, displays, and controls needed. NA should not be used. There must be at least enough displays and controls to control the reactor during the flood.	See 206
210	Observation/suggestion: Accessibility is addressed below. Delete text here.	See 206
211	Suggestion: Address under the procedures PSF.	See 206
212	Questions/clarification needed: Are any special qualifications (e.g., license) required? Explain why Training & Experience are nominal for this action. Do all personnel get the annual training? Does the annual training cover this alignment in detail? Who is in the plant population that will get the training? Is there a JPM associated with the alignment?	See 206
213	Observation: Unless all aspects of this action take place indoors, NA is not appropriate.	See 206
214	Question: Are the personnel performing these actions monitored under the fitness for duty rule?	See 206
215	Suggestion: This should be a separate assessment	See 206
216	Suggestion: These write-ups should summarize the most influential PSFs for each action and describe why they won't be an issue. For example, the first three actions have mostly to do with communication, so that should be the focus of discussion for those PSFs, not environmental factors. Comments provided below are consistent with this suggestion.	This table has been removed and included in each individual action. Appropriate details have been provided.
217	Observation: Environmental Factors are just one PSF of many that affect the actions.	See 216
218	Clarification needed: It is not clear what "disposition" means when all PSFs are nominal. Degraded PSFs would need dispositions to demonstrate that the site was doing something to fix it, or putting barriers in place to mitigate failures. It is not clear what the intent of this table, except to show that all PSFs associated with the credited actions are nominal or above.	See 216
219	Clarification needed: There is something missing from the first half of this sentence, and the second part needs justification. What is it about the action that makes it "well proceduralized?" For example, were the dam procedures reviewed by a procedure writer? Or, has the action has been tested during drills without error? Is there something else that confirms the statement that the action is well proceduralized?	See 216
220	Suggestion: Consistent with the suggestion provided in the comment associated with the caption of the table: Focus more on staffing, command & control for this PSF.	See 216
221	Suggestion: Consistent with the suggestion provided in comment associated with the caption of the table: Focus on system interface issues, such as turn-wheels, switches, and training and experience issues, like trouble-shooting. Also consider Diesel generator experience. And whether procedures and equipment are accessible.	See 216
222	Suggestion/question: Consistent with the suggestion provided in the comment associated with the caption of the table: Focus on experience and training in pump testing, etc. Are "how to" guidance and criteria for success proceduralized?	See 216
223	Suggestion: Consistent with the suggestion provided in the comment associated with the caption of this table: Focus on procedures, training, operations experience.	See 216
224	Suggestion: Consistent with the suggestion provided in the comment associated with the caption of this table: Focus on communication and accessibility	See 216
225	Suggestion: Consistent with the suggestion provided in comment associated with the caption of the table: Focus on operations experience, training, qualifications, minimal or error-free history (if true), procedures	See 216
226	Suggestion: Consistent with the suggestion provided in comment associated with the caption of the table: Focus on fitness, training, and experience.	See 216
227	Suggestion: Consistent with the suggestion provided in comment associated with the caption of the table: Focus on procedures, training, experience.	See 216
228	Suggestion: Consistent with the suggestion provided in comment associated with the caption of the table: Focus on procedures, training, experience.	See 216
229	Suggestion: Consistent with the suggestion provided in comment associated with the caption of the table: Focus on procedures, training, experience, interface.	See 216
230	Suggestion: Consistent with the suggestion provided in comment associated with the caption of the table: Focus on what's the cue for the action, and the associated procedures, training, experience.	See 216
231	Question/clarification needed: It is not clear what "resources" are. If this refers to personnel, focus on command & control, planning, communication.	See 216
232	Suggestion: A more explicit explanation is needed in this section regarding how the values and calculations address human performance variability in time required and uncertainty in time available.	This section will need to be rewritten as the rest of the example becomes more finalized. Additional discussion and dialog on methods and what is expected will be required.
233	Suggestion: Change to "time and motion"	See 232
234	Question/clarification: It is difficult to understand this table. Why are there blank cells?	See 232