

**Working Copy for Final - ACRS May 21, 2014**  
Public Comments on mPower DSRs

<b>mPower DSRs Section 7.0 , “Instrumentation and Controls - Introduction and Overview of Review Process”</b>						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
Generation mPower	7/23/2013	1.	All Chapter 7 sections and appendices	Numerous editorial inconsistencies throughout DSRs Chapter 7 sections and appendices – some examples provided in the “Recommendation” column	Make the following changes globally: Define acronyms (e.g., “AOO”, “ITAAC, SSC, CCF, FPGA, SAR, TS) when they appear for the first time at x.y section level; then use only the acronym when they occur subsequently. Replace “safety related” with “safety-related” Replace “non-safety-related” with “nonsafety-related” Replace “non-safety” with “common-cause” Replace “single failure criteria” with “single-failure criteria” Replace “software based” with “software-based” Replace “software logic based” with “software-logic-based” Replace “life cycle” and “lifecycle” with “life-cycle”	The staff agrees with the comment and has made numerous editorial changes to address the comment.
Generation mPower	7/23/2013	2.	All Chapter 7 sections and appendices	Generic – Throughout the document, citation of IEEE Standard 379 is inconsistent: some with and others without showing year 2000.	Make citation of IEEE Std. 379 consistent throughout the document	The staff agrees and document dates and revision # will be removed from all RGs and standards and a ‘6-month’ statement will be used. Exceptions are 603-1991 and RG 1.97 (it has discussion of rev 4 & rev 3) to clarify how the list is formulated. Once the application is submitted, the SER will list the latest revision or year for all RGs and standards that will be used.
Generation mPower	7/23/2013	3.	7.0-1, paragraph 2	Need to clarify DSRs Chapter 7 scope	Add a statement to the effect that DSRs Chapter 7 replaces SRP Chapter 7 in its entirety	No change for Chapter 7.0. Throughout the chapter, the Implementation section states in part: “The content of this DSRs section has

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						<p><i>been accepted as an alternative method for complying with 10 CFR 52.47(a)(9) as long as the mPower™ design control document (DCD) final safety analysis report (FSAR) does not deviate significantly from the design assumptions made by the NRC staff while preparing this DSRS section. The application must identify and describe all differences between the standard plant design and this DSRS section, and discuss how the proposed alternative provides an acceptable method of complying with the regulations that underlie the DSRS acceptance criteria. If the design assumptions in the DC application deviate significantly from the DSRS, the staff will use the standard review plan (SRP) as specified in 10 CFR 52.47(a)(9).”</i></p>
Generation mPower	7/23/2013	4.	7.0-1, Item 1, line 1	The design principles listed include all the design principles addressed in the DSRS and the use of phrase “such as” implies that there are others.	Replace “such as” with “of”	<p>This clarifies the intended use of this DSRS</p> <p>The staff agrees and has changed the words based on the comment.</p>
Generation mPower	7/23/2013	5.	7.0-1, Item 3, line 2	Clarification that there are more than one new and advanced reactor designs	Replace “design” with “designs”	<p>The staff agrees and has made the change based on the comment.</p>

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NEI	8/15/2013	6.	I&C System Review Scope, p. 7.0-2	Is the area which specifies attention to software tools and equipment that are used for I&C design or connected to I&C systems/components for testing referring to cyber security concerns? Where are cyber security and computer security reviewed?	(question)	<p>Cyber security requirements are contained in 10 CFR 73.54 and are not evaluated as part of a Design Certification review under Part 52. A COL applicant will need to address cyber requirements as part of their application.</p> <p>Regulatory positions do currently exist regarding Secure Development and Operational Environments (see RG 1.152, Revision 3), which can involve ensuring that superfluous capabilities are not introduced into software and that systems connected to safety systems do not present the potential to degrade the reliable performance of the system. Section 7.2.9 of the DSRS addresses Secure Development and Operational Environments.</p>
NuScale	8/15/2013	7.	I&C System Review Scope Paragraph 2 p. 7.0-2	On page 7.0-2, I&C System Review Scope discusses the use of IEEE 603-1991 concepts for control systems that are not safety-related. The use of IEEE 603-1991 is not appropriate as a basis for reviewing process control systems. Criteria for the design of process control systems should include fault tolerance, such as median signal selectors to minimize control system failures, and performance limits that maintain process conditions within acceptable limits	Revise DSRS to use the appropriate criteria for process control systems as recommended.	<p>SRP Section 7.1, SRP Acceptance Criteria, Item 2, states “Consequently, although these standards are not SRP acceptance criteria for non-safety I&amp;C systems, they are a source of design concepts that may be useful for the reviewer to consider. The scope of IEEE Std. 603-1991 is broader than that of IEEE Std. 279-1971, and the guidance of IEEE Std. 603-1991 is consequently readily</p>

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				during normal plant transients to prevent unnecessary challenges to the protection system. SRP 7.7 addresses requirements for process control systems. NuScale recommends that the DSRs be revised to use the appropriate criteria for process control systems or utilize SRP 7.7.		adaptable for use in the review of non-safety I&C systems."  No changes were made to the document.
NuScale	8/15/2013	8.	Major Differences Between the DSRs and the Standard Review Plan Item 7 p. 7.0-2	This section states "This guidance encompasses all relevant branch technical positions contained in the current SRP." This statement does not appear to be completely accurate. NuScale has reviewed BTP 7-14 and it does not appear to be totally included in the DSRs. BTP 7-20 does not appear to be included in the DSRs guidance either. Other BTPs may not have been encompassed either. This statement may need review to ensure it is accurate as written. If the statement is accurately stated, then a review of the DSRs may be required to ensure that the guidance in the DSRs indeed encompasses all BTPs contained in the current SRP. Please provide clarification in the DSRs as needed.	Clarify the DSRs as needed.	The goal of DSRs was to capture only those portions that were relevant and necessary for SMR from staff guidance, such as SRP, BTP, and ISG into the DSRs. DSRs Section 7.2.1 includes portions of BTP 7-14.  Staff did perform a re-evaluation of BTP 7-14, and subsequently, added a few additional clarifying statements to Section 7.2.1.  BTP 7-20 is no longer used and, therefore, was not considered.  All other BTPs from the SRP have been evaluated and incorporated into the DSRs, as appropriate.
Generation mPower	7/23/2013	9.	7.0-4, line 7	Need to clarify that Table 7-1 includes requirements as well as other NRC guidance	Add the term "and guidance" following "regulatory requirements" (since RGs listed in Table 7-1 are not requirements)	The staff agrees and has made the change based on the comment
Generation	7/23/2013	10.	7.04 – 7.06, Items	Enhance readability	Include chapter numbers parenthetically	Staff agrees with the comment and has

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mPower			1 – 10		while referencing reviews of other areas (e.g., transients and accident analysis will reference Chapter 15 parenthetically). These references should be consistent with interfaces discussed in page 7.0-3, Item 3.	attempted to build in as many cross references as practical.
Generation mPower	7/23/2013	11.	7.0-5, Item 5, lines 6 & 7	Correction of reference to Chapter 7	Replace “Section 7” with “Chapter 7”	The staff agrees and has made the change based on the comment.
Generation mPower	7/23/2013	12.	7.0-5, Item 6	Avoid repetition of organization responsibility for environmental qualification reviews	Delete Item 6 since it is covered in Items 5 and 7, and renumber subsequent items	The staff agrees with the comment and had made the change as recommended.
Generation mPower	7/23/2013	13.	7.0-6, Item 8, last sentence	Clarification of human-machine interface review responsibility	Should this be listed as a separate item (Item 9)?	The staff agrees with the comment and had made the change as recommended.

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Generation mPower	7/23/2013	14.	Generic (e.g., page 7.0-6, Item 1, 1 <sup>st</sup> paragraph, line 6; 2 <sup>nd</sup> paragraph, line10)	Clarification of use of documents that are in effect 6 months before the docket date of the application	Suggest incorporating NEI comment #3 (ML 12142A237) on Introduction to NUREG-0800 Part II which states: “Recommend including text ..... similar to that provided in SRP Chapter 1.0, Item 9, to clarify that although the NRC regulations specify a review of the SRP “in effect 6 months prior to docket date,” the NRC’s practice for implementation of this requirement has been to allow applicants to conduct this evaluation based on the SRP or DSRS in effect 6 months before an application is submitted.”	Staff agrees with the comment; however, no change is needed. NUREG-0800 Chapter 1.0, Section I., item 9 states in part, “The regulations specify that this evaluation is made against the SRP in effect 6 months before the docket date of the application; however, as a practical matter the evaluation should be performed against the guidance in effect 6 months before the submittal date of the application.”  Since NUREG 0800 Chapter 1.0 was designated; Use SRP Section “as-is” in the Applicability column of the mPower Design Specific Review Standard Scope and Safety Review Matrix, there is no need to include this information elsewhere in the DSRS.
NEI	8/15/2013	15.	DSRS Chapter 7 Acceptance Criteria and Review Process, Item 3, p. 7.0-7	3. Level of Review Applied to I&C Systems: If mPower is expected to classify I&C systems, will the regulator challenge or review those classifications?	(question)	Classification of systems should depend on analyses performed outside of Chapter 7 (e.g., Chapters 3, 17 and 19). The Chapter 7 reviewer(s) will be expected to coordinate with other review sections to confirm the correct classifications.

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<b>NEI</b>	<b>8/15/2013</b>	<b>16.</b>	DSRS Chapter 7 Acceptance Criteria and Review Process, Item 3, p. 7.0-7	3. Level of Review Applied to I&C Systems: If RTNSS SSCs are to be reviewed in accordance with DSRS section 3.2 and SRP sections 17.4 and 19.3, what has been done to ensure that the requirement differences between the DSRS and the SRP are incorporated into the RTNSS SSC design reviews?	(question)	RTNSS SSCs are not reviewed in DSRS 3.2, SRP 17.4 or SRP 19.3. The review of these sections provides staff with the applicant’s classification of SSCs. The reviewers of the specific SSC sections use this information to inform the review of SSCs. The staff is not aware of requirement differences between the DSRS and SRP regarding RTNSS. If such differences exist, they will be addressed on a case-by-case basis.
Generation mPower	7/23/2013	<b>17.</b>	7.0-7 through 7.0-11	Clarification of the use of classification scheme associated with 10 CFR 50.69	Clarify how the classification scheme applies if the voluntary rule 10 CFR 50.69 is not adopted by the applicant.	The A1, A2, B1 and B2 classifications in the DSRS appear similar to the classifications established in 10 CFR 50.69 (i.e., use of safety classification and risk significance); however, 10 CFR 50.69 is voluntary. The classification scheme described in the DSRS is intended to apply for the mPower SMR review regardless of whether 10 CFR 50.69 is adopted by the applicant.
<b>NEI</b>	<b>8/15/2013</b>	<b>18.</b>	DSRS Chapter 7 Acceptance Criteria and Review Process, Item 3.A.iii, p. 7.0-8	Typo in the last sentence of the page “rcredited” should be “credited.”	Revise “rcredited” to “credited.”	The staff agrees and has made the change based on the comment.
Generation mPower	7/23/2013	<b>19.</b>	7.0-9, last two lines	Correction to characterization of exponents	Replace 1x10 <sup>-4</sup> and 1x10 <sup>-6</sup> with 1x10 <sup>-4</sup> and 1x10 <sup>-6</sup> , respectively	The staff agrees and made made the change based on the comment.

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NuScale	8/15/2013	20.	DSRS Chapter 7 Acceptance Criteria and Review Process Item 3.B p. 7.0-9	Item 3 defines four basic SSC categories. In Item 3.B, nonsafety-related risk- significant I&C systems are classified as category B1. According to the guidance provided in this section, the NRC staff expects RTNSS systems to be in the scope of the B1 systems. PAM systems are identified as RTNSS category B. PAM displays are safety-related and PAM channels are subject to the requirements of IEEE 497 as interpreted by RG 1.97. SRP 7.5 addresses PAM requirements as a separate category of review. The DSRs should be revised to resolve the apparent criteria discrepancy for PAM systems and/or utilize the guidance in SRP 7.5.	Revise the DSRs to resolve the apparent criteria discrepancy for PAM systems and/or utilize the guidance in SRP 7.5.	Depending on the categorization of the specific PAM variable, it may be either safety or non-safety. Chapter 7 of the DSRs is intended to apply to safety PAM variables.  For B1 PAM variables, the DSRs has supplied a list of possible review criteria.
Generation mPower	7/23/2013	21.	7.0-10, first bullet; 7.0-11, 2 <sup>nd</sup> bullet	Clarification of apparent contradiction related to treatment of spurious failures in digital nonsafety-related control systems. Recent NRC practice on new plants has been to require treatment of multiple spurious failures attributed to non-specific software errors.	Clarify expectations for the treatment of spurious failures in digital nonsafety-related control systems. Specifically, clarify: 1) whether multiple spurious failures attributed to software design errors must be postulated, 2) what criteria apply to the determination of credible and non-credible failures, and what analysis rules apply (i.e., design basis or best estimate) for the treatment of any postulated multiple spurious failures.	This topic is currently being worked in the context of other staff reviews.  Staff is currently pursuing development of additional guidance on this topic. Staff anticipates interaction with the public, including prospective design certification vendors, as the effort proceeds.
Generation mPower	7/23/2013	22.	7.0-10, 2 <sup>nd</sup> bullet,	Correction of grammatical error	Add the word “are” between words “variables” and “within”	The staff agrees and has made the change based on the comment.



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			line 3			
<b>NuScale</b>	<b>8/15/2013</b>	<b>23.</b>	DSRS Chapter 7 Acceptance Criteria and Review Process Item 3.B p. 7.0-10	Item 3.B discusses the use of B1 review criteria for control systems. Control systems should be reviewed as a separate category with the requirements addressed in SRP 7.7. RTNSS category B is for functions required beyond 72 hours.	Clarify whether control systems should be reviewed as a separate category as described.	The B1 classification is recognition that there may be non-safety systems that have a noteworthy contribution to the safety of a plant design. For these systems, additional attention should be paid by both an applicant and the NRC reviewer.  Not all control systems will be considered risk-significant. Non-safety, non-risk-significant systems should be considered as B2 systems for the purposes of the review using the DSRS.
<b>NuScale</b>	<b>8/15/2013</b>	<b>24.</b>	DSRS Chapter 7 Acceptance Criteria and Review Process Item 3.C p. 7.0-12	Programmatic requirements discussed in Item 3.C should be further explained and clarified.	Clarify the scope of programmatic requirements.	No Revision necessary - Clarification and examples of the programs is provided in the introduction to NUREG-0800, “Introduction,” Part 2, which describes the licensing review philosophy and framework to be applied by the staff for new iPWR design certification and combined license applications under 10 CFR Part 52.
Generation mPower	7/23/2013	<b>25.</b>	Table 7.0-1	Consistency in listing regulations’ titles in the left column (within quotations vs. within parentheses for the TMI-related regulations)	Repeat table title on all of table’s pages; Correct inconsistency in listing the regulations	No revision necessary. Not all references have titles; therefore, quotes are used for titles and parentheses are used for describing reference topic areas.
Generation mPower	7/23/2013	<b>26.</b>	7.0-22, Table 7.0-1	Consistency among sections	Add titles for regulations 10 CFR 52.47(b)(1) and 10 CFR 52.80(a)	The staff agrees and has changed the table to add topics within parentheses for 52.47(b)(1) & 52.80(a)

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NuScale	8/15/2013	27.	DSRS Chapter 7 Acceptance Criteria and Review Process Table 7.1 p. 7.0-24	Table 7.1 lists RG 1.105, <i>Setpoints for Safety-Related Instrumentation</i> as the guide for review of DSRs setpoints. Add a note to indicate the additional requirements of RIS 2006-17 and BTP 7-12 also apply. Note that RIS-2006-17 is referenced in Section 7.2.7, Setpoints, however BTP 7-12 is not.	Reference BTP 7-12.	No revision necessary. Table 7.1 only lists regulations and regulatory guides. RIS 2006-17 & GL 91-04 are listed are listed under DSRs criteria in Section 7.2.7, however.  Chapter 7 BTPs were incorporated into DSRs sections, as appropriate. Portions of BTP 7-12 were incorporated into Section 7.2.7 (no reference needed).

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Generation mPower	7/23/2013	1.	7.1-3, <u>REVIEW PROCEDURES</u> , line 3	Correction of grammatical error	Replace “satisfies” with “satisfy”	The staff agrees and has made changes based on the comment.
Generation mPower	7/23/2013	2.	7.1-3, <u>REVIEW PROCEDURES</u> , lines 3 & 4	Correction of inconsistency	Add GDC 19 to currently listed GDCs 10, 15, 16, and 20	The staff agrees and has made changes based on the comment.
Thomas Koshy IAEA	5/14/2013	3.	7.1.5, Acceptance Criteria	Requirements IA Compliance (Addition of consideration) The Clause 5.6 in IEEE Std. 603-1991/2009, Independence, addresses independence between redundant portions of a safety system (clause 5.6.1), between safety systems and the effects of design basis events (clause 5.6.2), and between safety systems and other systems (clause 5.6.3). The Emergency Core Cooling System and Reactor Protection System should be independent in electric power supply and control systems as illustrated in the IEEE Std. 603 1991/2009 (Annex A, Figures A-2 and A-3) should be demonstrated to be free from any common cause failures.  Reasons The figures clearly indicate Emergency core cooling (ECCS) and reactor trip to be separate systems and designate I E power supply for ECCS and different kind of power supply for reactor trip with fail safe features to cause a trip		The figures included in the Appendix to IEEE Std 603-1991 are not recognized as requirements for separation of various safety functions.  Systems performing safety functions will still need to conform to all applicable requirements.

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				<p>when the conditions exceed operational limits. The separation is needed to prevent the common cause failures that could potentially propagate into preventing reactor trip and spreading into emergency core cooling actuations systems. Diversity is essential NRC Information Notice 2009-03 SOLID STATE PROTECTION SYSTEM CARD FAILURE RESULTS IN SPURIOUS SAFETY INJECTION ACTUATION AND REACTOR TRIP describes an event at North Anna Station where a Diode failure caused main feed water system isolation, reactor trip, ECCS actuation and control system prevented resetting Safety Injection signal from the control room. The licensee staff had to rush and locally detach some relays and pull fuses to de-energize circuits to prevent over filling the pressurizer. If ECCS sensors and controls were separate, pressurizer over filling would not be a prompt challenge. While this condition caused the trip and ECCS actuation, it could have possibly caused the opposite or its undesirable combinations. This condition clearly calls for removing any sharing of control systems, process parameter sensors, or power supply between ECCS and reactor Trip system.</p> <p>An over voltage event is described in IN 2006-18: "Significant Loss of Safety-Related Electrical Power at Forsmark Unit 1, in Sweden" IN 2006-18 supplement was issued on August 10,</p>		

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				2007 This is a plant event where a common cause disabled 2 of the 4 uninterruptible power supplies (UPSs) and caused two relief valves to stay open (undesirable failure mode), disabled two of the emergency diesel generators, and lost half of the control room indications. The other two UPSs had the same vulnerability but serendipitously remained available and avoided core damage. The lesson to be learned is the common mode failure vulnerability of power supplies. The Fukushima event further magnifies the common mode failures of power supplies. Therefore, power supply and control system diversity is needed to separate Reactor trip system and ECCS actuation. For example: A DC powered control system logic for ECCS and AC-powered UPSs for reactor trip system could bring diversity.		
Generation mPower	7/23/2013	4.	7.1-5, last paragraph, line 2	Correction of grammatical error	Replace "is" with "are"	The staff agrees and has made changes based on the comment.
NuScale	8/15/2013	5.	III. Review Procedures Remote Shutdown Capability p. 7.1-7	The requirements for remote shutdown capability are not appropriate in this section, which addresses protection system compliance with IEEE 603-1991. The design bases and review criteria are very different for ESFAS vs. remote shutdown equipment, and they should be treated separately for clarity. Review requirements for remote shutdown capability should be addressed in a separate section with reference to applicable	Move the requirements for remote shutdown to the appropriate section of the DSRS.	The staff understands the comment; however, the staff believes that this DSRS section is a reasonable location for this portion of the review. No change has been made.

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Generation mPower	7/23/2013	6.	7.1-8, <u>EVALUATION FINDINGS</u> , line 5	requirements as noted in footnote 2. Please clarify and revise the DSRs accordingly. Correction of grammatical error	Replace “design is conforms to” with “design conforms”	The staff agrees and has made changes based on the comment.
Generation mPower	7/23/2013	7.	7.1-11	Each isolation device being powered by a Safety-related power source could affect some cyber-approved nonsafety-related one-way devices for gateway isolation.	Modify statements to allow isolation devices that have a fail-safe state on a loss of power. Specifically, gateway isolation devices that no longer transmit without power should be acceptable for digital communication pathways.	The DSRs does not prescribe design solutions with respect to devices providing isolation. The DSRs also does not contain staff guidance on review of applicant compliance with the cyber security regulation (10 CFR 73.54).  Note that item 1.B under the DSRs Acceptance Criteria for this section applies to electrical independence. Item 2 of the Acceptance Criteria addresses communications independence and makes no statements regarding whether devices credited for maintaining communication independence need to be powered under all conditions.
<b>NuScale</b>	<b>8/15/2013</b>	<b>8.</b>	III. Review Procedures Electrical Independence Item 3 p. 7.1-12	Item 3 addresses requirements for isolation devices. Add a requirement to verify that isolation devices are used to transmit signals from safety-related independent divisions to non-safety systems. Please clarify and revise the DSRs accordingly.	Add a requirement for isolation devices as described.	No change has been made to the DSRs. The DSRs does not impose requirements on applicants. On page 7.1-12, item 3, the staff changed “The reviewer should verify that isolation devices are used to transmit signals between independent divisions.” to read “The

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Generation mPower	7/23/2013	9.	Pages 7.1-12 through 7.1-15	A communications scheme that has error correction would potentially force a more complex mode of communication, and would inadvertently move us away from their bedrock of simplicity. Error-checking of communications is a practical alternative to error-correcting.	Remove guidance recommending error correction in communications protocol	reviewer should verify that isolation devices are used to transmit signals between independent divisions <u>and/or from safety to other systems.</u> The staff agrees with the comment; however, does not believe any changes are warranted.  The DSRs is not stating that error-correcting capability is required for design acceptance; however, it addresses the possibility that it may be used.
<b>NEI</b>	<b>8/15/2013</b>	10.	7.1.2, III. Review Procedures, Physical Independence, p. 7.1-12	This section does not mention the NRC position on shared impulse lines.	Add a statement and reference to NRC position on shared impulse lines (RG 1.151).	The review of sensing lines using RG 1.151 is located in DSRs Section 7.2.2.  No change has been made to the DSRs.
<b>NEI</b>	<b>8/15/2013</b>	11.	7.1.2, III. Review Procedures, Communications Independence, Item 6, p. 7.1-13 & 14	Item 6 does not include data communication signal or hardware errors that result in alarms for evaluation.	Add requirement for data communication signal or hardware errors to result in alarms.	The DSRs does not impose requirements on applicants.  However, the staff understands the comment and added the following language to Item 6: “Communications equipment failures and message errors that result in alarms should be identified.”
Generation mPower	7/23/2013	12.	7.1-14, Item D, line 7	Consistency with related changes	Replace “deterministic” with “predictable and repeatable”	The staff agrees and has made changes based on the comment.

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Generation mPower	7/23/2013	13.	7.1-14, Item F, line 4	Consistency with related changes	Replace “Determinism,” with “Predictability and Repeatability”	The staff agrees and has made changes based on the comment.
Generation mPower	7/23/2013	14.	7.1-15, <u>Functional Independence</u> , Item 2, 2 <sup>nd</sup> sentence	This sentence suggests that the staff is recommending a communication method rather than a performance characteristic.	Reword the sentence as appropriate	<p>The DSRS reflects the staff’s expectations of the mPower design, and the features that are likely to be used. If the applicant chooses to use the method described as the “preferred” means of one-way data flow, it will facilitate a less resource-intensive review.</p> <p>Alternately, if the applicant chooses to use bi-directional communication between safety and non-safety systems or use software mechanisms to enforce one-way data communications, staff will need to use other review guidance outside of the DSRS to conduct that review. Past experience has shown that those reviews will likely require substantially increased staff review effort.</p> <p>The following language was added to the section to clarify this point: “If bi-directional data communication between systems of different safety classifications is included in the design submitted by the applicant, staff may need to consult review guidance outside of the scope of the DSRS.”</p> <p>Staff also notes that COL applicants who choose to reference design certifications will</p>



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Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
Generation mPower	7/23/2013	15.	7.1-15, <u>EVALUATION FINDINGS</u> , line 7	Consistency with related changes		ultimately need to comply with cyber security requirements. Although cyber security is not reviewed as part of the design certification evaluation, the design certification applicant should be aware of the NRC’s requirements and guidance for cyber security.
Generation mPower	7/23/2013	16.	7.1-17, <u>AREAS OF REVIEW</u> , line 3	Clarification of statement	The need to satisfy RG 1.53 guidance is not addressed in the Acceptance Criteria or elsewhere in Section 7.1.2.  Insert the words “in the safety system” between “redundancy is used” and “to assure”	The staff agrees and has deleted the reference.  The staff agrees and has made changes based on the comment.
<b>NEI</b>	<b>8/15/2013</b>	17.	7.1.3, I. Areas Of Review, p. 7.1-17 & IV. Evaluation Findings, p. 7.1-19	The redundancy requirements described in 7.1.3 do not allow for 2-out-of-2 logic protection circuits to be worked during an innage, as written.	Revise 7.1.3 such that the safety system function is not lost during on-line testing.	No revision necessary. The applicant is required to demonstrate: Section 7.1.3, II.(2) states “removal from service of any component or channel does not result in loss of the required minimum redundancy unless the acceptable reliability of operation of the protection system can be otherwise demonstrated.”  Other IEEE Std. 603 requirements would also have to be demonstrated given a 2-out-of-2 logic design as well as any Chapter 16 technical specification requirements.
Generation mPower	7/23/2013	18.	7.1-17, <u>Review Interfaces</u> , line 1	Consistency with related changes	Replace “determinism” with “predictability and repeatability”	The staff agrees and has made changes based on the comment.

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<b>mPower DSRs Section 7.1 , “Instrumentation and Controls - Fundamental Design Principles”</b>						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
Generation mPower	7/23/2013	19.	7.1-18, <u>DSRS Acceptance Criteria</u> , line 3	Consistency with other sections	Add: , “Application of Single-Failure Criterion to Nuclear Power Plant Protection Systems,” following RG 1.53	The staff agrees and has made changes based on the comment. The title has been added to first occurrence.
<b>NEI</b>	<b>8/15/2013</b>	20.	7.1.3, III. Review Procedures, 2nd paragraph, p. 7.1-18	At the end of the 2nd paragraph it states, “Additional redundancy may be warranted when protection and control systems share common components.” Does this statement refer to sensing or impulse lines as well?	(question)	Yes, however, additional guidance is given for redundant taps and sensing lines in RG 1.151. The review of sensing lines using RG 1.151 is located in DSRs Section 7.2.2.
Generation mPower	7/23/2013	21.	7.1-20	Consistency with other sections	Move “I. AREAS OF REVIEW” ahead of the first paragraph	The staff agrees and has made changes based on the comment.
Generation mPower	7/23/2013	22.	7.1-20, lines 1 and 2	Clarification of statement	Insert the word “safety” between “I&C” and “system”	The staff agrees and will reword based on the comment.
<b>NEI</b>	<b>8/15/2013</b>	23.	III. Review Procedures, Item 6, p. 7.1-22	How much “excess capacity margin” is required for data communication systems?	(question)	NRC has not established a quantitative value for “excess capacity margin”. An applicant should be prepared to explain engineering decisions related to capacity margins provided.
Generation mPower	7/23/2013	24.	7.1-24, <u>Review Interfaces</u> , Item 1	Inconsistent with other sections	Replace determinism with predictability and repeatability	The staff agrees and has made changes based on the comment.
<b>NuScale</b>	<b>8/15/2013</b>	25.	7.1.5 Diversity and Defense- in-Depth	Paragraph 1 states that “the reviewer will focus on the following four points.” However, seven items are listed subsequently. Please clarify.	Clarify the number of points.	The staff agrees and has made changes based on the comment. The word “four” has been deleted.

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<b>mPower DSRS Section 7.1 , “Instrumentation and Controls - Fundamental Design Principles”</b>						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
			III. Review Procedures Paragraph 5 p. 7.1-26			
<b>NuScale</b>	<b>8/15/2013</b>	26.	III. Review Procedures Item 2 Paragraph 1 p. 7.1-27	On page 7.1-27, 1st paragraph, “common-mode failure” is used for the first time. Should this be CCF? If not, provide clear distinction between common- mode failure and common-cause failure. Enhance readability	Provide clear distinction between common-mode failure and common-cause failure.  Define the term “echelons”	The term has been changed to “common-cause failure” .  One other reference later on the same page was also changed.  The staff agrees and has added text to define the term “echelon,” as defined in NUREG/CR-6303.  Added: <i>“Echelons” or “Echelons of defense,” as referred to in NUREG/CR-6303, are specific applications of the principle of defense-in-depth to the arrangement of instrumentation and control systems attached to a nuclear reactor for the purpose of operating the reactor or shutting it down and cooling it. Specifically, the echelons are the control system, the reactor trip or scram system, the Engineered Safety Features actuation system (ESFAS), and the monitoring and indicator system.</i>
Generation mPower	7/23/2013	27.	7.1-27, Item C, line 2			
Generation mPower	7/23/2013	28.	7.1-27, Item E, line 3	Enhance readability	Remove close parenthesis following “capability”	The staff agrees and has made the change based on the comment.
Generation mPower	7/23/2013	29.	7.1-27, Item D	Statement related to application of adequate diversity needs clarification.	Clarify whether the statement “adequate diversity applies to consideration of the	No change. SECY 93-087 proposed a four-point approach to addressing adequate

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mPower DSRS Section 7.1 , “Instrumentation and Controls - Fundamental Design Principles”						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
					software-based development tools used to develop software for computer-based processors or software- developed logic for digital logic devices”) is a requirement for diversity in tools or the ability to credit any tool diversity in the NUREG/CR-6303 analysis.	diversity. In a staff requirement memorandum (SRM) dated July 21, 1993, the Commission approved the modified four-point approach which is repeated in the NUREG/CR-6303. The staff believes the statement “adequate diversity applies to consideration of the software-based development tools used to develop software for computer-based processors or software-developed logic for digital logic devices”) is consistent to the modified four-point approach endorsed by the Commission.
NEI	8/15/2013	30.	7.1.5, III. Review Procedures, Item 3, p. 7.1-27 & 28	The diverse means of safety protection function actuation should also require initiation from a remote location in the event the control room is uninhabitable.	Revise as appropriate.	The goal for the section on the diverse system characteristics is to explain the concept that a diverse means that should be available. Any additional diverse method to shut down the plant from a remote location would be covered as part of the remote shutdown capability design or any additional diverse method of safety actuation from a remote location included in the design.
Generation mPower	7/23/2013	31.	7.1-28, <u>Use of Automation as a Diverse Means</u> , line 1	Correction of grammatical error	Replace “used in the” with “used as the”	No change has been made to the DSRS. The staff agrees and has made changes based on the comment.
Generation mPower	7/23/2013	32.	7.1-28, last line	Correction of grammatical error	Replace “one another” with “each other”	The staff agrees and has made changes based on the comment.

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<b>mPower DSRs Section 7.1 , “Instrumentation and Controls - Fundamental Design Principles”</b>						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
Generation mPower	7/23/2013	33.	7.1-29, Item D, line 5	Enhanced readability	Add a comma following “invalidate”	The staff agrees and has made changes based on the comment.
Generation mPower	7/23/2013	34.	7.1-31, Item ii, line 6	Enhanced readability	Replace “(AS)” with “ESFAS”	The staff agrees and has made changes based on the comment.
Generation mPower	7/23/2013	35.	7.1-33, Item 6, 4 <sup>th</sup> sentence	There is no regulatory basis for the requirement that that an ATWS mitigation system contains provisions for manual control.	Remove the sentence from Item 6 (Conformance with 10 CFR 50.62) guidance	Staff agrees with the comment and will edit the sentence to clarify that ATWS is not specifically required to be initiated from the Control Room.  Modified text: “ <i>The ATWS mitigation systems should include the capability for initiation from the control room and should be testable at power.</i> ”
Generation mPower	7/23/2013	36.	7.1-34, Item 6.C	Consistency with other sections	Replace “fundamental principle” with “concept”	The staff agrees and has made changes based on the comment.

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<b>mPower DSRS Section 7.2, “Instrumentation and Controls - System Characteristics”</b>						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
Generation mPower	7/23/2013	1.	7.2-6, 2 <sup>nd</sup> bullet	Clarification that system maintenance and retirement provisions are COLA action items	Clarify that the bullet, “Provisions are established for system maintenance and retirement” should be treated as a COLA action item, as part of the owner’s cyber security program.	The staff agrees with the comment. Clarification made to section. The statement was added: “Note that actual performance of system maintenance and retirement will be the responsibility of the licensee, and those activities may be subject to other NRC regulations.”  Staff does note that maintenance and retirement provisions are appropriate to plan and factor into system design.
Generation mPower	7/23/2013	2.	7.2-6 through 7.2-11	Introduction of Software Safety Analyses as a parallel activity to the Software Hazards Analyses (described in Appendix A) is another layer of software development paper without a clear distinction from Hazards Analysis and traditional Verification and Validation activities.	Clarify how the Software Safety Analyses and the Software Hazards Analyses (as parallel activities) are distinct from or the same as traditional Verification and Validation activities.	Staff conducted a public DSRS I&C Workshop in November 2013 which addressed I&C Hazards Analysis, and included its relationship to V&V activities. Specifically, page 9 of the handout discussed during the Workshop which can be viewed under ML13317A006, provides a chart that shows the relationship between the HA and V&V. Hazard Analysis is a tool that can be used for system development. V&V is required to independently ensure that the system requirements have been implemented correctly.
Generation	7/23/2013	3.	7.2-7 through 7.2-	Correction of inconsistent spacing between	Delete space between A.i, ii, and iii for	The staff will continue to engage applicants on this topic.  The staff agrees and the change has been

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<b>mPower DSRS Section 7.2, "Instrumentation and Controls - System Characteristics"</b>						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
mPower			13	paragraphs	consistency with similar paragraphs under B through M	made based on the comment.
Generation mPower	7/23/2013	4.	7.2-7, Item B.iv	Clarification of guidance for traceability matrix	Clarify what is meant by "The RTM should justify the origin and rationale of every system requirement"	The staff rephrased the sentence to read: "Where appropriate, the RTM should identify references to analyses and/or supporting documentation that establish the basis for system requirements."  Logical or quantitative analyses may be performed to derive requirements for various specifications that may be tracked in the RTM. In those instances, the RTM should identify the reference to the analyses performed.
Generation mPower	7/23/2013	5.	7.2-9, Item F.v	Clarification of guidance for software unit	Clarify what is meant by "Each software unit should identify measures for traceability to software modules and design features."	The staff agrees and will change the sentence as follows "Traceability between software unit(s) and software module(s) should be established."  Staff notes that the terminology "unit" and "module" may not be standardized throughout the industry.
Generation mPower	7/23/2013	6.	7.2-9, Item F.vi	Clarification of the statement: "The software design ... should not contain any unnecessary functions." This is not consistent with all NRC-approved digital I&C platforms which contain operating systems software that is configurable for a specific-project and contains some unused functionality.	Clarify whether this guidance statement is intended to preclude operating systems software features for configurable systems that may not be used in a specific software instance	The staff has added the following clarifying language: "For pre-developed digital platforms, pre-existing software (e.g., operating system software) may contain features that are not used (or not configured for use) in a specific I&C system. In those instances, the applicant should identify those unused capabilities, evaluate whether those

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mPower DSRS Section 7.2, “Instrumentation and Controls - System Characteristics”						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
Generation mPower	7/23/2013	7.	7.2-11 and 7.2-12, Item K	Item K on I&C System Operations contains aspects that are more appropriately handled as part of the owner’s cyber security program or as COLA action items.	Clarify that Item K guidance on aspects of system operations should be treated as a COLA action item, as part of the owner’s cyber security program or as COLA action items	functions may impact performance of the safety function, and identify any compensatory measures taken.”  The staff partially agrees with the comment. There are aspects of Systems Operations that are appropriately treated under a licensee’s cyber security plan, and others may be addressed as COL action items. However, the DSRS section describes aspects of a systems operation that are appropriate to consider in the planning phases – for example, how to deploy and support the operations of a system. Portions of the DSRS that address provisions for control of unauthorized access would be limited to non-malicious activities.
Generation mPower	7/23/2013	8.	7.2-12, Item L	Item L on I&C System Maintenance contains aspects that are more appropriately handled as part of the owner’s cyber security program or as COLA action items.	Clarify that Item L guidance on aspects of system maintenance should be treated as a COLA action item, as part of the owner’s cyber security program or as COLA action items	Clarification statement has been added that execution of the operation plan activities will be the responsibility of the licensee.  The staff partially agrees with the comment. There are aspects of system maintenance that are appropriately treated under a licensee’s cyber security plan, and others may be addressed as COL action items. However, the DSRS section describes aspects of systems maintenance plan That are appropriate to consider in the planning



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mPower DSRs Section 7.2, "Instrumentation and Controls - System Characteristics"						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
Generation mPower	7/23/2013	9.	7.2-12 and 7.2-13, Item M	Item M on I&C Systems Retirement contains aspects that are more appropriately handled as part of the owner's cyber security program or as COLA action items.	Clarify that Item M guidance on aspects of system retirement should be treated as a COLA action item, as part of the owner's cyber security program or as COLA action items	<p>phases – for example, how to deploy and support the operations of a system. Portions of the DSRs that address provisions for control of unauthorized changes would be limited to non-malicious activities.</p> <p>Clarification statement has been added that execution of the maintenance plan activities will be the responsibility of the licensee.</p> <p>The staff partially agrees with the comment. There are aspects of Retirement planning (and system replacement) that are appropriately treated under a licensee's cyber security plan. Execution of system retirement and replacement would be the responsibility of the licensee. However, there may be aspects of system retirement planning that should be considered in system design.</p> <p>Clarification statement has been added to note that retirement and replacement will be the responsibility of the licensee; however, the vendor may address any design provisions to support system retirement actions.</p>
Generation mPower	7/23/2013	10.	7.2-14, 1 <sup>st</sup> full Para, line 5	This paragraph references IEEE Std. 730-1998, which has not been endorsed by NRC.	Clarify the expectations for the use of IEEE Std. 730-1998 since it has not been endorsed by the NRC in a Regulatory Guide	The staff agrees with the comment. The reference to IEEE Std. 730 has been removed.

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<b>mPower DSRS Section 7.2, "Instrumentation and Controls - System Characteristics"</b>						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
Generation mPower	7/23/2013	11.	7.2-18, Item 1, line 1	Correct incorrect designation of standard	Revise to state: "IEEE Std. 7-4.3.2"	The staff agrees and has made the change based on the comment.
Generation mPower	7/23/2013	12.	7.2-19, <u>Equipment Qualification</u>	RGs 1.89 (harsh environment qualification) and 1.100 (seismic qualification) are not included in review procedures for equipment qualification.	Consider referencing RGs 1.89 (harsh environment qualification) and 1.100 (seismic qualification) for equipment qualification	These topics are reviewed under DSRS Sections 3.10 & 3.11. The "review procedures" identifies the interface with those sections.  No changes have been made to the DSRS.
Generation mPower	7/23/2013	13.	7.2-21, <u>DSRS Acceptance Criteria</u> , Item 1	Item 1 refers to Clause 5.2 (among others) of IEEE 7-4.3.2. However, this clause simply refers back to IEEE 603-1998.	Remove reference to Clause 5.2 of IEEE 7-4.3.2 from Item 1	The staff agrees and the change has been made based on the comment.
Generation mPower	7/23/2013	14.	7.2-22, Item 3, 3 <sup>rd</sup> sentence	There is no practical concept of a "software failure"	Reword sentence to read: "In addition, the reviewer's assessment of reliability should consider the effect of possible hardware failures and software errors and the design features provided to prevent or limit the effects of these failures and errors, and to ensure the I&C system's capability to perform its safety functions."	The staff agrees and has made the suggested change.
Generation mPower	7/23/2013	15.	7.2-25, <u>AREAS OF REVIEW</u> , 1 <sup>st</sup> sentence	Clarification of statement	Reword the existing sentence to read: "The review will evaluate the I&C system's proposed operating bypasses that should be designed to automatically prevent the activation of an operating bypass or, under the right conditions, initiate the appropriate safety function(s) whenever the applicable permissive conditions are not met."	The staff agrees to clarify the statement; however, the suggested language will be modified to indicate "under specified conditions" instead of "under the right conditions".

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<b>mPower DSRs Section 7.2, "Instrumentation and Controls - System Characteristics"</b>						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
Generation mPower	7/23/2013	16.	7.2-25, <u>Requirements</u> , 3 <sup>rd</sup> line	Correction of grammatical error	Replace "Section" with "Sections"	The staff agrees and the change has been made based on the comment.
Generation mPower	7/23/2013	17.	7.2-26, <u>Technical Specifications</u> , line 2	Correction of grammatical error	Replace "if the format" with "of the format"	The staff agrees and the change has been made based on the comment.
NuScale	8/15/2013	18.	7.2.4 Operating and Maintenance Bypasses III. Review Procedures Maintenance Bypass Item 1 7.2-26	Item 1 under <i>Maintenance Bypass</i> is a restatement of IEEE 603-1991, Section 6.7 which applies to sense and command features. The DSRs Item 1 reference to IEEE 603-1991 Section 7.5 is incorrect. IEEE 603-1991 Section 7.5 is applicable to execute features, not sense and command features. IEEE 603-1991, Section 6.7, states that sense and command features shall continue to meet the requirements of 5.1 and 6.3 while in maintenance bypass. Please clarify and/or revise the DSRs accordingly.	Correct the reference to IEEE 603-1991 Section 7.5.	The staff agrees with the comment.  DSRS 7.2.4, Maintenance Bypass, Item 1, has been revised to read as follows:  <i>"While sense and command features equipment is in maintenance bypass, the capability of a safety system to accomplish its safety function must be retained and, during such operation, the sense and command features must continue to meet the requirements of IEEE Std. 603-1991, Sections 6.7. Additionally, provisions for a maintenance bypass should be consistent with the technical specification action statements to meet the requirements of IEEE Std. 603-1991, Sections 7.5."</i>
Generation mPower	7/23/2013	19.	7.2-30, 1 <sup>st</sup> paragraph	Correction of incorrect terminology for mPower design	Replace "safety injection signal" with "emergency core cooling actuation signal"	DSRS has been revised to recognize the mPower terminology as follows e.g., "safety injection signal (i.e., mPower's emergency core cooling actuation signal)"
Generation mPower	7/23/2013	20.	7.2-34, Item 1.A, line 2	Inconsistent with other sections	Replace "This reviewer" with "This review"	The staff agrees and the change has been made based on the comment.

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<b>mPower DSRS Section 7.2, “Instrumentation and Controls - System Characteristics”</b>						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
Generation mPower	7/23/2013	21.	7.2-37, <u>Requirements</u> , Item 3	10 CFR 50.34(f)(2)(xxiii) requires a reactor trip on turbine trip. This does not apply to mPower (mPower reactor will have 100% steam bypass capability and does not need to trip on a turbine trip).	Reword 10 CFR 50.34(f)(2)(xxiii) requirement related to reactor trip on turbine trip	The staff would expect the applicant to address specific conformance with regulatory criteria in the Final Safety Analysis Report. Where a difference exists, an evaluation shall either discuss an acceptable method of complying with those rules or regulations of the Commission or provide the basis for those regulatory criteria not being applicable to their design.
Generation mPower	7/23/2013	22.	7.2-50, line 9	Correction of grammatical error	Replace “allocates” with “allocated”	The staff agrees and the change has been made based on the comment.
Generation mPower	7/23/2013	23.	7.2-53, Item 5	Not applicable to mPower design since it does not have an auxiliary feedwater system	Delete 10 CFR 50.34(f)(2)(xii) requirement for auxiliary feedwater system and renumber subsequent items accordingly	The staff would expect the applicant to address specific conformance with regulatory criteria in the Final Safety Analysis Report. Where a difference exists, an evaluation shall either discuss an acceptable method of complying with those rules or regulations of the Commission or provide the basis for those regulatory criteria not being applicable to their design.
Generation mPower	7/23/2013	24.	7.2-53, Item 7	Primary coolant saturation is not an applicable measure of adequate cooling for the mPower design since the design basis ECC function is to completely depressurize.	Delete “such as primary coolant saturation meters in pressurized water reactors (PWRs),”  Also delete “in PWRs” at the end of the paragraph	The staff agrees and has made the change based on the comment.
Generation mPower	7/23/2013	25.	7.2-54, line 4	Correction of punctuation error	Delete the additional period at the end of the sentence	The staff agrees and has made the change based on the comment.

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Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
NuScale	8/15/2013	26.	7.2.13 Displays and Monitoring III. Review Procedures Item 1 p. 7.2-54	Item 1 contains a reference to a "Subsection (b) below." Please clarify this reference.	Clarify what reference "Subsection (b) below" is.	The staff agrees with the comment and replaced "Subsection (b) below" with "Subsection (3B) under Conformance to IEEE Std. 603-1991, Section 5.8.1, below"
Generation mPower	7/23/2013	27.	7.2-55, Item 3.B, line 1	Correction of grammatical error	Replace "the that" with "that"	The staff agrees and has made the change based on the comment.
Generation mPower	7/23/2013	28.	7.2-58, Item 3, line 7	Correction of grammatical error	Replace "should to evaluate" with "should evaluate"	The staff agrees and has made the change based on the comment.
Generation mPower	7/23/2013	29.	7.2-58, <u>IMI Actions Items</u> , Item 3, line 2	Correction of grammatical error	Delete the phrase "indicator should also show"	The staff agrees and has deleted "The indicator should also show valve" from beginning of sentence.
Generation mPower	7/23/2013	30.	7.2-59, Item 4	mPower design does not include an AFW.	Remove Item 4 and re-number subsequent items accordingly	The staff would expect the applicant to address specific conformance with regulatory criteria in the Final Safety Analysis Report. Where a difference exists, an evaluation shall either discuss an acceptable method of complying with those rules or regulations of the Commission or the basis for those regulatory criteria not being applicable to their design.
Generation mPower	7/23/2013	31.	7.2-63, <u>Requirements</u> , Item 3, line 1	Correction of grammatical error	Replace "requires perform a failure modes" with "requires performance of a failure modes"	The staff agrees and has made the change based on the comment.
Generation	7/23/2013	32.	7.2-63, <u>DSRS</u>	Correction of inconsistency with other DSRS	Replace sentence with: "The applicant	The staff agrees and has made the change

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Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
mPower			<u>Acceptance Criteria, Item 1, last sentence</u>	Acceptance Criteria sections.	should examine the version of RG 1.152 that applies to its application to identify the applicable standards.”	based on the comment.
Generation mPower	7/23/2013	33.	7.2-63, <u>DSRS Acceptance Criteria, end of Item 2</u>	Correction of inconsistency with other DSRS Acceptance Criteria sections.	Add: “The applicant should examine the version of RG 1.22 that applies to its application to identify the applicable standards.”	The staff agrees and has made the change based on the comment.
Generation mPower	7/23/2013	34.	7.2-64, <u>DSRS Acceptance Criteria, Item 3, last sentence</u>	Correction of inconsistency with other DSRS Acceptance Criteria sections.	Replace sentence with: “The applicant should examine the version of RG 1.118 that applies to its application to identify the applicable standards.”	The staff agrees and has made the change based on the comment.
Generation mPower	7/23/2013	35.	7.2-63 & 7.2-64, <u>DSRS Acceptance Criteria</u>	Consistency of font/spacing with other sections.	Verify font/spacing for consistency	The staff agrees and has adjusted the formatting.
Generation mPower	7/23/2013	36.	7.2-66, 4 <sup>th</sup> bullet, line 1	Correction of grammatical error	Replace “verifies” with “verify”	The staff agrees and has made the change based on the comment.

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mPower DSRS Section 7.0 Appendix A, “Instrumentation and Controls - Hazard Analysis”						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
NEI	8/15/2013	1.	Appendix A, p. 7.0 Appendix A-1	Appendix A proposes an integrated approach to hazards analysis. Where has the “integrated hazards analysis approach” been used before? What testing or certifications has it received?	(question)	Staff conducted a DSRS I&C Workshop in November 2013 which addressed I&C Hazards Analysis (HA) and expanded upon the staff’s research into its use. The integrated HA approach has not been used before in NRC digital I&C reviews. This chapter 7 DSRS represents a first of a kind application of HA. The staff will continue to engage applicants on this topic.
Generation mPower	7/23/2013	2.	Appendix A, page A-1, 2 <sup>nd</sup> paragraph, line 6	Enhance readability	Remove the duplicate comma following “FMEA”; Replace “(or assure absence of)” with “(or absence of)”	The staff agrees and has made the change based on the comment.
Generation mPower	7/23/2013	3.	Appendix A, pages A-2 and A4 through A6	The guidance on page A-2 states that Hazards Analysis is “iterative and should be performed at every phase in the system development lifecycle to identify new hazards that could arise as the design is implemented in software and hardware.” This approach will make the hazard analysis an integral part of ITAAC. The form and content of this ITAAC will be important to ensure predictable closure.	Provide guidance on the form and content of the ITAAC for the Hazards Analysis iterations performed for the post-design certification phases in the system development lifecycle to ensure predictable closure criteria.	Staff conducted a DSRS I&C Workshop in November 2013 which addressed I&C Hazards Analysis and its potential inclusion into ITACC. Specifically, page 9 of the handout discussed during the Workshop which can be viewed under ML13317A006, provides a chart that shows the relationship between the HA and V&V. Hazard Analysis is a tool that can be used for system development, whereas ITAAC verifies that the system as built meets the acceptance criteria. Therefore there is no ITAAC for the Hazards Analysis, rather ITAAC for the system developed by using the Hazards Analysis. The staff will continue to engage applicants on this topic.

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mPower DSRS Section 7.0 Appendix A, "Instrumentation and Controls - Hazard Analysis"						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
NEI	8/15/2013	4.	Evaluation Topics, Item 4, p. 7.0 Appendix A-3	Detection of drift requires multiple indications of the same parameter or at least 30 data points of operating experience. Where is the 95% confidence level requirement in this document?	Clarify the 95% confidence level requirement.	No clarification needed. 95% confidence level is discussed in the guidance from RG 1.105 for the use in "Setpoint methodologies" which is under DSRS Section 7.2.7. The staff agrees that the term drift in the context of HA is not needed and will revise item 4 to "Conditions such as degradation, drift, and unacceptable deviation that could lead to unanalyzed system states should be detectable by the I&C system and appropriate intervention provided before impairment or loss of the safety function."
Generation mPower	7/23/2013	5.	Appendix A, page A-3, Items 5.B, 5.C, 5.D; page A-4, Item 8.F; page A-6, Items 1.B and 4.C	Correction of format inconsistency	Correct indentation of the second line for these items	The staff agrees and has made the change based on the comment.
Generation mPower	7/23/2013	6.	Appendix A, pages A-4, A-5 Generic	Correct/verify format for titles throughout DSRS Chapter 7	Revise underlined titles to: " <u>I&amp;C Systems Development Process Contributory Hazards</u> " and " <u>Software-Related Contributory Hazards</u> "	The staff agrees with the comment. Chapter 7 titles have been corrected or verified.
Generation mPower	7/23/2013	7.	Appendix A, page A-6, Item 4, line 2	Correction of format inconsistency	Replace "complexity, e.g.," with "complexity. For example,"	The staff agrees and has made the change based on the comment.
Generation mPower	7/23/2013	8.	Appendix B, page B-1, 4 <sup>th</sup>	Correction of format inconsistency	Revise to read: ".....(IEEE) Std. 603-1991"	The staff agrees and has made the change based on the comment.



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mPower DSRS Section 7.0 Appendix A, "Instrumentation and Controls - Hazard Analysis"						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
			paragraph, line 1			

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<b>mPower DSRS Section 7.0 Appendix B, "Instrumentation and Controls System Architecture"</b>						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
Generation mPower	7/23/2013	1.	Appendix B, page B-1, 4 <sup>th</sup> paragraph, line 1	Correction of format inconsistency	Revise to read: ".....(IEEE) Std. 603-1991"	The staff agrees and the change has been made based on the comment.
Generation mPower	7/23/2013	2.	Appendix B, page B-2, Item 1, last line	Correction of grammatical error	Insert "is" between the words "proposed" and "sufficiently"	The staff agrees and the change has been made based on the comment.
Generation mPower	7/23/2013	3.	Appendix B, page B-2, Item H	Clarification of specific constraints identified in the I&C design that could affect compliance with regulatory requirements	Expand on the discussion of specific constraints on the I&C design resulting from the general plant safety approach by providing some examples of constraints that could affect compliance with regulatory requirements.	This item was incorporated to address the circumstance where the applicant did not incorporate a specific system (e.g., auxiliary feedwater system) in the SMR design that is specifically mentioned in regulation or guidance. The impact to I&C from the general plant safety approach (that potentially eliminated the need for such system(s)) should be identified. Such design approach changes may eliminate / reduce the need for I&C systems and/or increase reliance on other I&C systems.  Statement added to section: "(e.g., if plant system(s) specifically addressed in regulations or guidance are used in a different manner, or not used at all, in the reactor design due to the general plant safety approach, those differences and their impact on the overall I&C design should be identified)"

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mPower DSRS Section 7.0 Appendix C, “Instrumentation and Controls - Simplicity”						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
NEI	8/15/2013	1.	Appendix C	The subject of simplicity in the DSRS is too vague for an applicant to know what is expected. The DSRS states that there “are no regulations, standards, or guidance to address the aspect of simplicity for digital I&C systems.” This appendix adds in an undefined requirement, which an applicant cannot be sure is met until after the NRC review. This could lead to a lengthy review process where the applicant and regulator will submit questions and responses back and forth without knowing the goal of the other party.	This appendix needs to be clarified or deleted. If it is clarified, basic requirements need to be laid out for the applicant.	The DSRS Appendices are not requirements. The appendices are expected to facilitate the applicant providing information in their application that will support staff review of the topics covered in Sections 7.1 and 7.2.  If the applicant chooses to implement relatively complex I&C designs, staff experience has shown that these reviews will require additional information as part of the application and take more effort to complete.  The staff agrees and the change has been made based on the comment.
Generation mPower	7/23/2013	2.	Appendix C, page C-1, line 3	Correction of inconsistency with other sections	Remove the word “other” since simplicity is not a fundamental design principle	The staff agrees and the change has been made based on the comment.
Generation mPower	7/23/2013	3.	Appendix C, page C-2, Item 1, line 2	Correction of inconsistency with other sections	Replace “diversity” with “D3”	The staff agrees and the change has been made based on the comment.
Generation mPower	7/23/2013	4.	Appendix C, pages C-2 through C-5	Five of the six areas related to I&C system design listed on Page C-2 are discussed in more detail on pages C-2 through C-5; the remaining area, hazards analysis, is not discussed in more detailed.	Provide a more detailed discussion of hazards analysis similar to discussion of the other five areas related to I&C system design provided on pages C-2 through C-5	The staff has deleted reference to Hazards Analysis (HA) on page C-2. HA is a tool that may be used to aid in the design of I&C systems, whereas the other items discussed in the section are the design features of the I&C system therefore HA has been deleted from Appendix C. Refer to Appendix A for discussion of HA.
Generation	7/23/2013	5.	Appendix C, page	Clarification of guidance on system hardware	Reword this item for clarity – Does the	The section has been re-written to clarify staff

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mPower DSRS Section 7.0 Appendix C, "Instrumentation and Controls - Simplicity"						
Entity Name	Submittal Date	No.	Section/ Para	Comment/Basis	Public Recommendation	NRC Resolution
mPower			C-3, Item 2.E.ii	and software elements	word "both" in line 2 refer to hardware and software element? Also, should the comma following the word "system" in line 1 be deleted?	intent.
Generation mPower	7/23/2013	6.	Appendix C, page C-3, Items 3 and 3.D	Correction of inconsistency with other sections	Replace "Std. 603" with "Std. 603-1991"	The staff agrees and the change has been made based on the comment.
Generation mPower	7/23/2013	7.	Appendix C, page C-3, Item 3.B	Enhance readability	Replace "or implemented physical uni-directional communication in function processing and critical signal paths" with "or whether physical uni-directional communication in function processing and critical signal paths is implemented"	The staff agrees and the change has been made based on the comment.
Generation mPower	7/23/2013	8.	Appendix C, page C-3, Items E.i. and E.ii.	Correct format inconsistency	Add space between Items E.i. and E.ii.	The staff agrees and the change has been made based on the comment.
Generation mPower	7/23/2013	9.	Appendix C, page C-4	Items 6.B through 6.E are duplicates of Items F.i. through F.v.	Delete Items 6.B through 6.E and renumber subsequent items accordingly	The staff agrees and has deleted items F.i through F.v. based on the comment.