Changes During Construction

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Background Information:

- NEI correspondence dated October 5, 2010, draft 0A appendix C of NEI 96-07, Guideline for Implementation of Change Control Processes for New Nuclear Plants Licensed Under 10 CFR 52

- NEI correspondence dated September 15, 2010, proposed the design, plan, install and test – but not implementation of proposed plant changes and modifications, process similar to 50.59

- NEI correspondence dated 19 May 2010 stated they are developing a document similar to NEI 96-07 to provide guidance on implementing the Part 52 change control processes.

- Priority on extent of implementation activities that may be performed prior to approval of a requested license amendment.

  design, plan, install, test, implementation

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Present Status
Problem Statement #1

Determine the activities that can be performed by licensees during construction while the NRC is reviewing requested changes to the licensing basis (license amendments).

- CdC WG recommendation for problem statement #1 is to use the definition of construction in 10 CFR 50.10(a) in conjunction with the change process in 10 CFR 52.98 to determine the activities that may be performed during construction while a license amendment request is pending. Specifically, those activities that are "not construction" under 50.10(a)(2) could be performed by the licensee without assurance of approval of the amendment request by the NRC. Those activities include design work for the proposed change, procurement of components, and partial assembly of the system away from the final, in-place location.

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Present Status
Problem Statement #2

Determine if changes should be recommended for the NRC's enforcement policy to provide for enforcement discretion during new plant construction.

- CdC WG recently completed work on a revised enforcement policy statement, continuing to review and evaluate enforcement discretion options available for new nuclear facilities construction

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Present Status
Problem Statement #3

Determine for new plants what revisions to the risk-informed guidance for evaluating changes to the licensing basis should be required and determine the applicability of the 10 CFR 50.59 guidance (NEI 96-07, rev 1).

- Risk informed guidance – work in progress
  - Considering ISG on applicability and use of risk informed metrics
  - Development of illustrative anticipated changes during construction

- Applicability of NEI 96-07 – work in progress
  - Considering ISG on applicability and use of 50.59 or 50.59 like processes
  - Applicability determination criteria
  - Screening criteria
  - Work task flow charting

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Present Status
Problem Statement #4

Establish guidance that should be used for evaluating changes to the severe accident design features (VIII.B.5.c) of each design certification rule (construction & operation).

- Internal workshop on severe accident design features changes, definition of substantial increase – work in progress
- Preliminary thoughts:
  - *Ex-vessel severe accidents* - whether these include, for example, bypass events such as interfacing systems loss-of-coolant accidents (ISLOCA) and thermally induced steam generator tube rupture (ISGTR)
  - *Credible* and *not credible* – if there is a design feature that has been installed to address a severe accident issue (e.g., issues identified in SECY-93-087), and the staff has reviewed the design, then to remove or significantly degrade this design feature may be an example of changing a *not credible* severe accident into a *credible* one

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Present Status
Problem Statement #4 (cont.)

- Preliminary thoughts on some terms (cont.):
  - *Public consequences* - early fatalities, latent cancer fatalities, collective dose (person-rem), and other surrogates including large release frequency (LRF) may be appropriate
  - *Substantial increase:*
    - The staff reviewed the proposed definition from a 1995 NEI letter related to the ABWR rulemaking, and did not feel comfortable with the following words of what is <u>not</u> a substantial increase: "*de minimus* or within the bound of uncertainty of the probability originally calculated…"
    - Participants did not identify a suitable qualitative definition of substantial increase. Nor was there complete consensus of a quantitative threshold between *substantial* and *not substantial*. The consensus is that the full context of the affected sequences (absolute and relative risk impact) should be considered.
    - Should not be necessary for the COL holder to have to re-run severe accident progression codes or consequence codes to evaluate Tier 2 changes.

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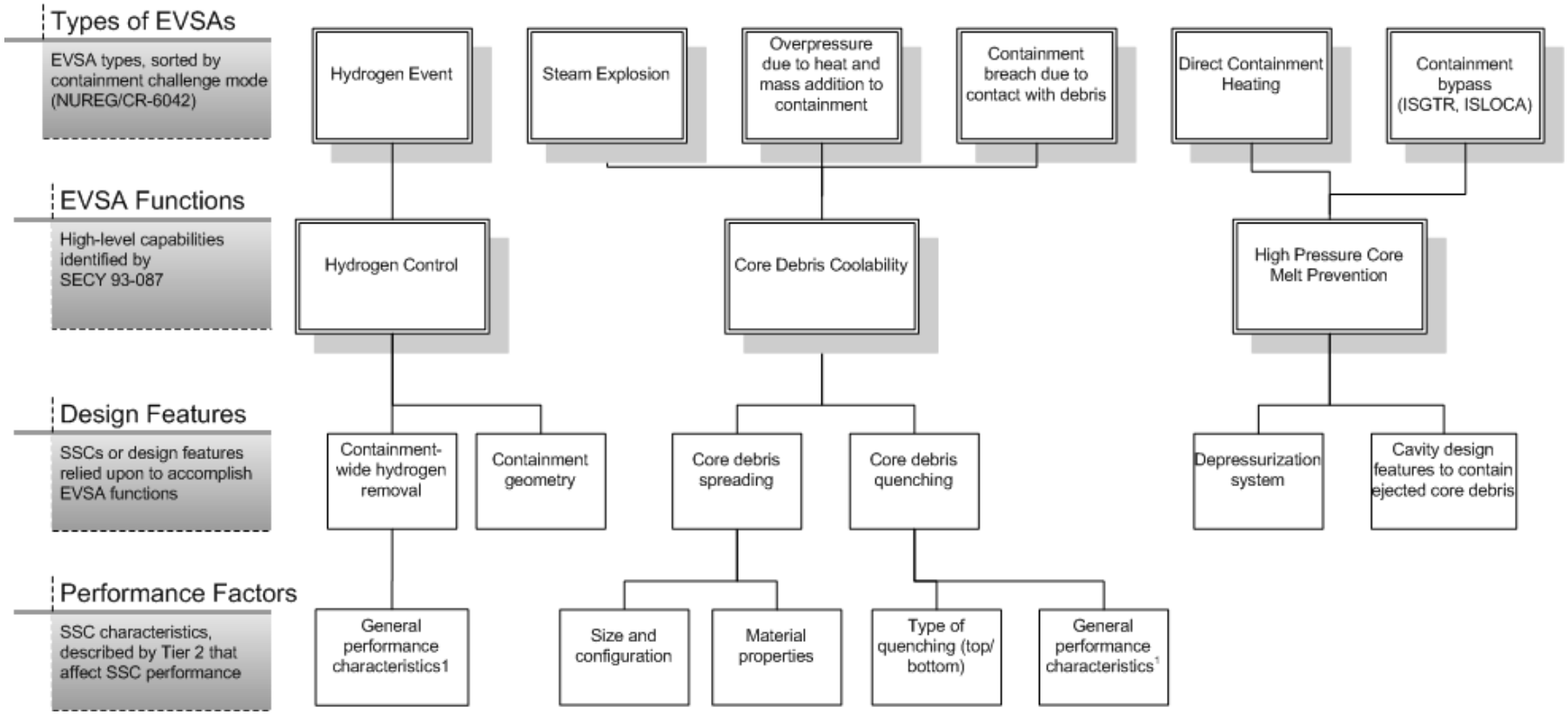
Problem Statement #4 (cont.)
Conceptual framework for guidance



Note: this figure shows the conceptual outline of one possible framework. It does not represent an official staff position or endorsement.

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KEY STEPS TO FRAMEWORK

1. Using either deterministic or probabilistic methods, determine which of the top-level EVSAs are CREDIBLE

    a) For non-CREDIBLE EVSAs, justify why the event is not CREDIBLE based on the reliability / effectiveness of the associated EVSA FUNCTIONS.

    b) For CREDIBLE EVSAs, explain how the EVSA FUNCTIONS minimize the PUBLIC CONSEQUENCES of the EVSA type.

2. Determine a pre-change and post-change value for each PERFORMANCE FACTOR associated with any DESIGN FEATURES that would be impacted by the change

3. Using appropriate quantitative or qualitative criteria, determine whether any EVSA FUNCTION is impacted to a degree that alters the conclusions reached during step 1a. If so, stop. Change requires a license amendment.

4. Using appropriate quantitative or qualitative criteria, determine whether any EVSA FUNCTION is impacted to a degree that alters the conclusions reached during step 1b. If so, stop. Change requires a license amendment.

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GENERIC EXAMPLE

A COL holder proposes to remove automatic actuation of the primary depressurization system (PDS) valves. Manual actuation at 1200 degrees core exit temperature is proposed.

1. Using level 2 PRA:
   - frequency (direct containment heating) < 1 E-8 per year → Non-CREDIBLE
   - frequency (containment bypass) < 1 E-8 per year → Non-CREDIBLE

   What EVSA FUNCTION supports this conclusion? High Pressure Core Melt Prevention.

2. DESIGN FEATURES relied upon to accomplish High Pressure Core Melt Prevention:
   a) PDS
   b) Low core power density
   c) Reactor vessel lower head without penetrations
   d) Torturous pathway from reactor cavity to upper containment

3. Proposed change would impact DESIGN FEATURE (a); therefore, the PERFORMANCE FACTORS for (a) must be quantified. The licensee should provide a comparison of the before and after values of each PERFORMANCE FACTOR.

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EXAMPLE (CONT.)

DESIGN FEATURE: PRIMARY DEPRESSURIZATION SYSTEM		
PERFORMANCE FACTOR	**Before proposed change**	**After proposed change**
Number of valves	2	2
Type of valve	Squib	Squib
Power source	DC	DC
Actuation method	Automatic	Manual
…	…	…
Stroke time	< 15 seconds	< 15 seconds

Does change increase frequency of Containment Bypass or Direct Containment Heating to greater than 1 E-8 per year?

Yes: License amendment required
No: No license amendment required

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Next Steps

Continue dialog and interactions with the public and industry stakeholders on changes during construction

- Review draft revision 0A of NEI 96-07, Appendix C
- Compile and parse illustrative examples of anticipated changes during construction
- Public Mtg on risk informed metrics, ex-vessel severe accidents design features
- Considering two Interim Staff Guidance documents
  - Applicability and use of 50.59 or 50.59 like processes
  - Applicability and use of risk informed metrics
- Approximately every 6 weeks the working group will participate in the Construction Inspection Program (CIP) public meetings