

# Description of Supplement 2 to STPNOC Risk-Informed Licensing Application to Address GSI-191 and Respond to GL-2004-02

Public Phone Call Meeting with NRC

October 1, 2015

# Introduction and Agenda

- Introduction of STP participants
- Desired Outcomes:
  - NRC staff understand the STPNOC licensing application and the changes from the previous supplement
  - Resolve NRC questions and establish follow-up to resolve questions that remain open
  - Identify steps remaining for going forward with the application

# Introduction and Agenda

- Agenda
  - Overview of changes from November 13, 2013 letter (ML13323A183)
  - Effect on reported results
  - Conservatism and acceptability of revised approach
  - RoverD In-Vessel Cooling Analysis
  - Specific Focus Areas
  - Debris Test Margin
  - Follow-up and Going Forward Actions

# Overview of Changes from November 13, 2013 Letter

- Changed methodology to explicitly incorporate certain deterministically-based elements “Risk over Deterministic” approach (RoverD) that was described in March 25, 2015 letter (ML15091A440)
  - Added the plant-specific testing deterministic basis (Letter Attachment 1-2)
    - Addressed all the NRC content guide questions and responded to earlier RAIs (Letter Attachment 1-5)
  - Added the RoverD risk-informed description (Letter Attachment 1-3)
  - Expanded Defense-in-Depth and Safety Margin discussion (Letter Attachment 1-4)
- Clarification on exemptions
  - Changed exemption to 10CFR50.46 to be to “other requirements” (10CFR50.46(d))
  - Clarified that a specific exemption to single failure is not being requested
- Added proposed Technical Specification change for debris-specific effects (Letter Attachment 3)

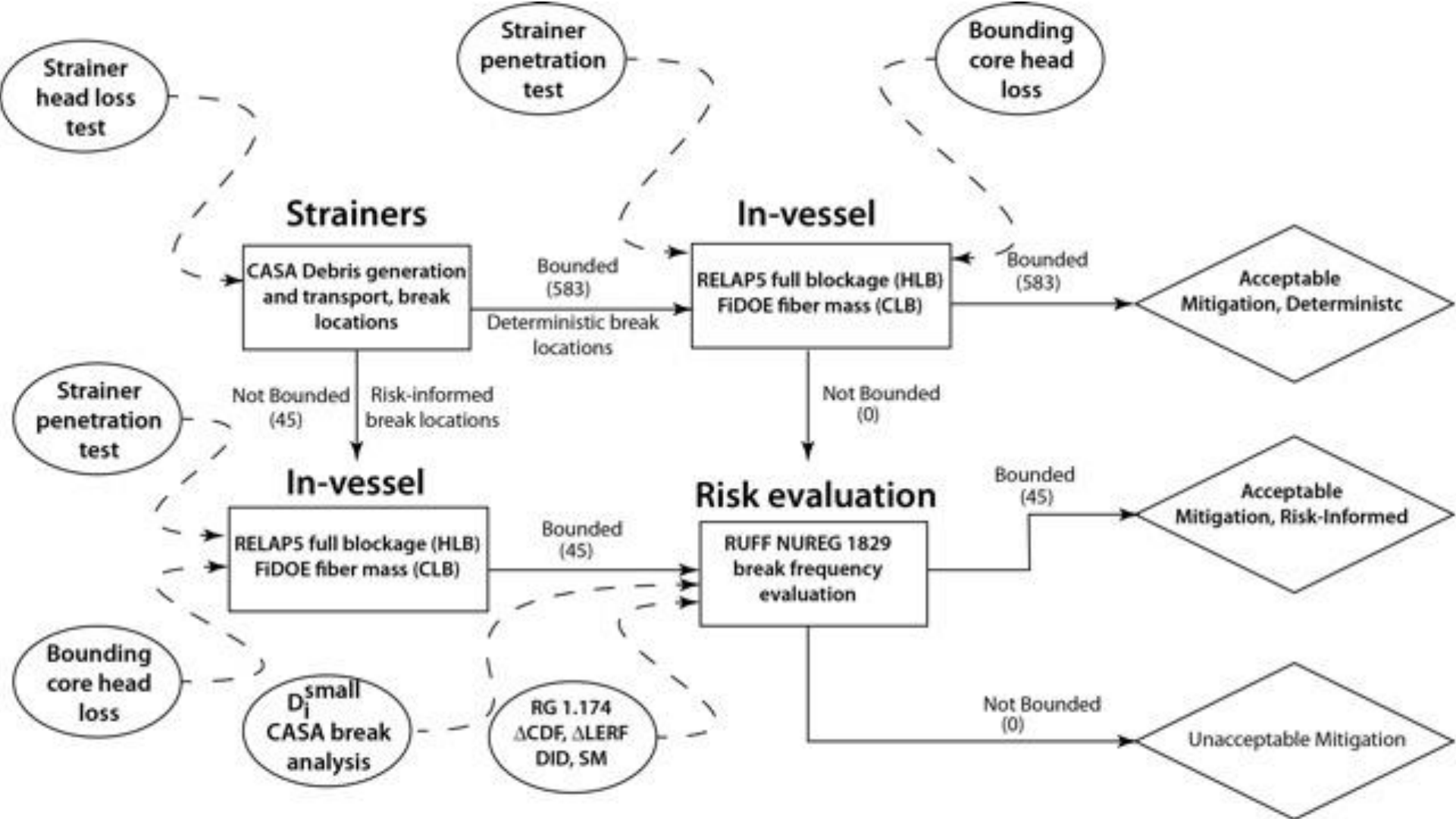
# Overview of Changes from November 13, 2013 Letter

- What is no longer in the scope of the application and should not be part of the review, including RAI responses:
  - CASA Grande calculation of conditional failure probabilities
  - Use of correlations for head loss, including “bump-up” factors
  - Uncertainty quantification of pipe break probability distributions; replaced with conservative estimates
  - Time dependent debris transport
  - Use of STP PRA for calculation of delta CDF; used only for delta LERF
- Applications of CASA Grande that are still used
  - Debris generation
  - Debris arrival to the containment pool (non-time dependent)

# Results with Revised Methodology Remain in RG 1.174 Region III

- Conclusions are unchanged with revised methodology
  - 2015 RoverD:  $\Delta\text{CDF}$ : 1.23E-07/yr,  $\Delta\text{LERF}$ : 3.08E-10/yr
  - 2013 CASA Grande/PRA:  $\Delta\text{CDF}$ : 2.88E-08/yr,  $\Delta\text{LERF}$ : 1.40E-11/yr

# Conservatism and Acceptability of Revised Approach



# Conservatism and Acceptability of Revised Approach

- Deterministically tested debris
  - Qualitative margin evaluation of July 2008 test determined that low density fiberglass is the only debris source term not bounded by the test
- Used weld/break characteristics from NUREG 1829
  - Considers various break types and locations
- Conservatisms used in transport calculation



# RoverD In-Vessel Cooling Analysis

- T-H and Debris Analyses Show Adequate Long-Term Cooling
  - Analysis assuming total blockage of core and core bypass shows that there is sufficient cooling for all HLB and all SLOCA (CLB and HLB)
  - FA tests show that there is insignificant pressure drop for bounding HLB conditions (DEGB, no credit for decay heat at time of recirculation) with 15 gm/FA including chemical effects
  - STP strainer penetration testing shows that for all CLB,  $\ll$  15gm/FA accumulates on the core
    - Shows there is no CLB with potential for in-core debris effects, independent of T-H analysis
- Confirms that all risk-informed debris effects scope is due to blockage at the strainer

# Specific Focus Items

- Breaks that have bounding debris transport fractions do not have direct spill paths to the containment floor
- Transport evaluation included 1, 2, and 3 trains operating
- Transport metrics from NUREG/CR 6772, NUREG/CR 6808, and Stoke's Law were applied.
- Evaluation of transport of unqualified epoxy, particulate, and chips shows sufficient margin
- Erosion Methodology
  - STP conditions are bounded by 30-day erosion testing showing factors below 10%
  - Methodology shown in Table 10 of Att. 1-2 of 8/20/15 letter
  - Early or late arrival is based on initial blow-down to pool or wash down by spray
  - Small and large percentage are the eroded fractions from small and large debris
- Early and late arrival of fines based on initial blow-down to pool or wash down by spray
- Margin evaluation of July 2008 test shows that low density fiberglass is the only debris source term not bounded by the test

# Debris Test Margin

DEBRIS AMOUNTS FOR JULY 2008 TEST		
Debris Item	Debris Amount Test Surrogate Material	Comment
<b>LDFG Fibers</b>		
Total Fines	79.91 ft <sup>3</sup> / Nukon	Not bounding; was based on 7D ZOI
Total Smalls	158.48 ft <sup>3</sup> / Nukon	
<b>Particulates</b>		
Microtherm	33 lbm / Microtherm powder	Not bounding; subsequently shown to be 29.3 lbm more
Marinite Board	182.7 lbm Powdered Marinite board	Bounding; subsequently removed from containment
Latent particulate, dust, dirt	141.1 lbm / Dirt mix	Bounding
<b>Coatings</b>		
Zinc	1,368 lbm / Tin Powder	Bounding; subsequently shown to be 637 lbm less
Polyamide primer	10 lbm / Powder (Acrylic coating)	Bounding
Alkyds	247 lbm / Powder (Acrylic coating)	Bounding
Baked enamel	268 lbm / Powder (Acrylic coating)	Bounding
Epoxy (outside ZOI)	106 lbm / Chips (Acrylic 1/64" to 1/4")	Not bounding; subsequently shown to be 259 lbm more
Epoxy (ZOI)	57 lbm / Powder (Acrylic coating)	
Total powder	1,950 lbm	
Total chips	106 lbm	
<b>Chemical Precipitates</b>		
Sodium Aluminum Silicate	1,432 lbm / WCAP AlOOH	Bounding
Aluminum Oxyhydroxide	143 lbm / WCAP AlOOH	Bounding
Calcium Phosphate	359 lbm / WCAP Ca <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	Bounding

- LDFG fines accounted for in the risk-informed portion
- Microtherm and Epoxy offset by:
  - Marinite
  - Zinc

# Follow-up and Going Forward Actions

- November public meeting to resolve outstanding questions