



NRC Staff – PWROG Meeting (April 10, 2010)

- SECY 11-0014 addressed a long standing question from ACRS regarding CAP, “is defense in depth compromised because a plant must have an intact containment (single barrier) to achieve core cooling.”
- SECY vote stated that the definition of DID does not state that the compensatory measure must be independent.
- SECY vote also confirmed that reliance on CAP is not a safety issue, however directed that the staff “would use the improved guidance that resulted from ACRS recommendations to include margin and uncertainty determinations in CAP calculations.”
- The Commission selected of Option 1 of SECY 11-0014 thus endorsing enclosure 1 to SECY 11-0014 which provides technical guidance (draft) on the use of CAP.

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- Endorsement of Option 1 also means that CAP is a “forward fit”, not a “back fit”.
- CAP guidance applies if the CLB of the pump NPSH is changed (e.g. EPU, license amendments, GSI-191).
- Draft guidance was forwarded to PWROG in NRC letter dated March 24, 2010 (ML100740516).
- Draft guidance was revised in March, 2012 to provide clarifications, in particular by the addition of CAP process flow charts to distinguish between vapor pressure portion of CAP and beyond vapor pressure portion of CAP and when the guidance requirements apply under what portions of CAP.

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- Draft Guidance – Important Items
 - 1) $\text{NPSHR}_{3\%} + \text{uncertainty} = \text{NPSHR}_{\text{eff}}$
What are uncertainties
(combined effect of temperature, inlet geometry, dissolved gas, wear ring clearance, pump speed, vendor test instruments)
 - 2) Flow rate for the NPSHA analysis
 - 3) Calculating NPSHA – 95/95 tolerance limit
 - 4) Assurance that containment integrity is not compromised
 - 5) Operator actions acceptable
 - 6) $\text{NPSHA} < \text{NPSHR}$ (eff or 3%) acceptable for short period (if justified by tests)
 - 7) Assure no pre-existing leak (if using CAP)
 - 8) Maximum Erosion Zone

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- Draft Guidance – Important Items
 - 9) Estimate NPSH margin (via a comparison of realistic calculation with Monte Carlo 95/95 analysis)
 - 10) Assurance of pump operability for total mission time
- Draft Guidance – Where PWROG input is required
 - 1) Determine uncertainty that can be used to develop $NPSHR_{eff}$ for pumps at PWRs who might require CAP. Provide justification for uncertainty (is it 21%, higher, lower, what is it for PWR pumps?)
 - 2) Determination of pre-existing leaks for plants proposing to use CAP above the vapor pressure portion.

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- Current Status of EPU applications – PWRs

Reviews completed for St. Lucie 1 & 2, Turkey Point Units 3 & 4. No CAP required for St. Lucie. Turkey Point uses vapor pressure portion of CAP. 21% uncertainty applied for pump uncertainties.

Crystal River review in progress.

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- Current Status of EPU applications – BWRs

Restarted EPU reviews for Monticello and Browns Ferry. Monticello attempts to model the pump uncertainties by on CFD analysis are not having success. Monticello is proposing to use 21% uncertainty based on reviews being jointly conducted with BWROG.

Reviews completed for NMP-2, and Grand Gulf. No CAP required for either of the plants. 21% uncertainty applied for both plants.

Applications expected this year - Peach Bottom, LaSalle Units 1 & 2