Westinghouse Electric Company
CE Nuclear Power LLC

2000 Day Hill Road
Windsor, CT 06095
USA

20 November, 2000
LD-2000-0058

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: NOTES FOR NOVEMBER 3, 2000 NRC MEETING REGARDING CE NUCLEAR POWER LARGE BREAK LOCA 1999 EM
(Enclosure 1-P Contains Proprietary Information)

Reference(s):
1) Letter, P. W. Richardson (CENP) to U.S. Nuclear Regulatory Commission Document Control Desk, "Response to Questions Regarding CENPD-132, Supplement 4-P, Rev. 1", LD-2000-0057, November 13, 2000
2) CENPD-132, Supplement 4-P, Revision 1, "Calculative Methods for the CE Nuclear Power Large Break LOCA Evaluation Model", August 2000
3) Letter, P. W. Richardson (CENP) to U.S. Nuclear Regulatory Commission Document Control Desk, "Revision to CE Nuclear Power LLC ECCS Performance Appendix K Evaluation Model", LD-2000-0046, August 30, 2000

On November 13, 2000, CE Nuclear Power LLC (CENP) submitted responses to NRC questions that resulted from a meeting held on November 3, 2000 (Reference 1). The purpose of the November 3, 2000 meeting was to discuss the ongoing review of CENPD-132, Supplement 4-P, "Calculative Methods for the CE Nuclear Power Large Break LOCA Evaluation Model" (Reference 2) and NRC questions on the Revision 1 of the topical report. This topical report was submitted to the NRC on August 30, 2000 (Reference 3). Pursuant to prior agreement, CENP is furnishing one (1) proprietary and one (1) non-proprietary copy of this letter and enclosures to the NRC Document Control Desk and three (3) proprietary copies to Jack Cushing, NRC, CENP Project Manager.

Enclosure 1-P contains a copy of the meeting notes prepared by the CENP representatives to be used as talking points during the meeting. CENP is submitting a copy of these notes for the record and for NRC information and use, as needed. The non-proprietary responses are provided in Enclosure 3.

CENP has determined that the information provided in Enclosure 1-P is proprietary in nature. Consequently, it is requested that Enclosure 1-P be withheld from public disclosure in accordance with the provisions of 10 CFR 2.790 and that this information be appropriately safeguarded. The reasons for the classification of this information as proprietary are delineated in the affidavit provided in Enclosure 2.

T007

If you have any questions regarding this matter, please do not hesitate to call Chuck Molnar of my staff at (860) 285-5205.

Very truly yours,
CE NUCLEAR POWER LLC

Philip W. Richardson
Licensing Project Manager
Windsor Nuclear Licensing

Enclosure(s): As stated

xc: J. S. Cushing (NRC, with 3 copies of Enclosure 1-P)

CE Nuclear Power LLC

Non-Proprietary Notes for November 3, 2000 NRC Meeting Regarding CE Nuclear Power Large Break LOCA 1999 EM

November 2000

CE Nuclear Power LLC
NRC Technical Review Meeting
November 3, 2000

Licensing Review of CENPD-132 Supplement 4-P Revision 1

AGENDA

8:00	Opening Statement by NRC
8:05	Opening Statement by CENP
8:10	Steam Venting Model
9:30	Nitrogen Discharge Model
10:00	Reflood Heat Transfer Model
10:30	Break
10:45	Discuss the Following Items as Needed
	Automated/Integrated Code System
	Replacement of Dougall-Rohsenow
	Hot Assembly Gap Internal Gas Pressure
	Hot Rod Steam Cooling Heat Transfer
	Section 3 - Application Analyses and Other Items
12:00	Lunch
1:00	Clarification and Review of Issues
2:30	Break - CENP Independent Discussion
3:00	Meeting Summary and Finalize Action Items
4:30	Adjourn

CE Nuclear Power LLC
NRC Technical Review Meeting
November 3, 2000

Licensing Review of CENPD-132 Supplement 4-P Revision 1

List of Attendees

Name	Representing	Phone Number
Ernie Jageler	Westinghouse Electric Co.	860-285-2289
Ruben Espinosa	Westinghouse Electric Co.	860-285-4990

Opening Statement

- We are prepared to address and close out any and all questions or issues if possible
- We are prepared to take action items to resolve any remaining items
- We are prepared to meet your requests for supporting information or references
- We have no presentation slides but will speak extemporaneously
- We have one-page bullet summaries of each of the major model elements of our submittal, which Ruben and I will refer to if necessary to cover our points. These pages are essentially the outline of an SER that we would write highlighting the major changes are why they are acceptable.
- We have prepared material to answer Gene Hsii's questions (LN from 10/30) with supporting documentation and reference material
- How best to capture the results of this meeting
    - Copy of materials that we show transmitted later with the meeting summary
    - Add results of any new cases that are needed to the meeting summary
    - Add the meeting summary as an Appendix to the topical report
- Have also brought reference materials with us
    - User documentation topical reports
    - SER's
    - Code listings
    - Selected case results
- Recommend that NRC speak first in each topic area to express the question or concern that needs to be addressed
- Recommend that CENP speak last to summarize closeout or action item if needed

Update Large Break LOCA Appendix K Evaluation Model – 1999 EM

- Reduce Conservatism in Selected Models to Obtain PLHGR Margin Improvement
    1) Process Changes Within the Currently NRC-Approved EM
        - ❖ Automated/Integrated Code System
        - ❖ Explicit NUREG-0630 Cladding Swelling/Rupture
        - ❖ Consistent Modeling of Spray and Spillage into the Containment
    2) NRC-Required Changes
        - ❖ Replacement of Dougall-Rohsenow
    3) Changes Requiring Licensing Review
        - ❖ Hot Assembly Fuel Rod Internal Gas Pressure (thermal-hydraulic blowdown code)
        - ❖ Steam Venting Reflood Thermal-Hydraulics (reduced steam superheat at SG primary exit)
        - ❖ Steam/Water Interaction During Nitrogen Discharge (reduced injection section pressure drop)
        - ❖ Reflood Heat Transfer (improved time-shift term for multiple reflood rates)
        - ❖ Hot Rod Steam Cooling Heat Transfer (improved spatially-dependent data transfer)

Licensing Process Schedule

- Topical Report Submittal
  April 30, 1999
- NRC Acceptance Review
  October 4, 1999
  Scheduled Completion Date: December 31, 2000
- NRC Request for Additional Information
  December 14, 1999
  Response to RAI Transmitted to NRC: February 22, 2000
- NRC Suspends the Licensing Review Process
  March 15, 2000
  Restart September, 2000
  Brief meeting on October 17, 2000
  Scheduled Completion Date in Jeopardy
    - Agreed to review SER for proprietary material
    - Agreed to provide reference material at NRC request
    - Agreed to face-to-face technical review meeting
- NRC Approval of Topical Report Needed to Support Plant Analyses
  December 31, 2000

NRC Guidance from November 17, 1998 Planning Meeting

- No objections to technical aspects of planned EM revisions
- Meeting with CENP customers in January was unnecessary
- Licensing review would be done in-house
- Follow-up conference call on November 18, 1998; CENP received the following SEVEN ITEM NRC POLICY GUIDANCE
  1. NRC acceptance review based on accomplishing licensing with one round of RAIs
  2. NRC requires transmittal of the EM computer codes. CENP provided technical description of workstation requirements
  3. NRC policy allows changes within the context of already approved methods without additional NRC approval, but documentation and configuration control must be in place such that the changes could be audited
  4. Plans to revise the use of discretionary conservatism were acceptable to NRC provided documentation was in place for audit
  5. NRC's policy takes strong exception to non-physical, non-conservative changes that are a consequence of Appendix K modeling
  6. NRC accepts demonstration of retained conservatism as a valid approach to licensing a change, but usually in combination with other justification arguments.
  7. NRC strongly suggested that the model changes be submitted as soon as possible to meet time line discussed at the 11/17/98 planning meeting

Utilities That Will Take Advantage of Improved Model

- Entergy – Arkansas Nuclear One – Unit 2
- Arizona Public Service – Palo Verde Units 1, 2, & 3

Technical Justification of Model Change

COMPERC-II Steam Venting Thermal-Hydraulics

What was changed?

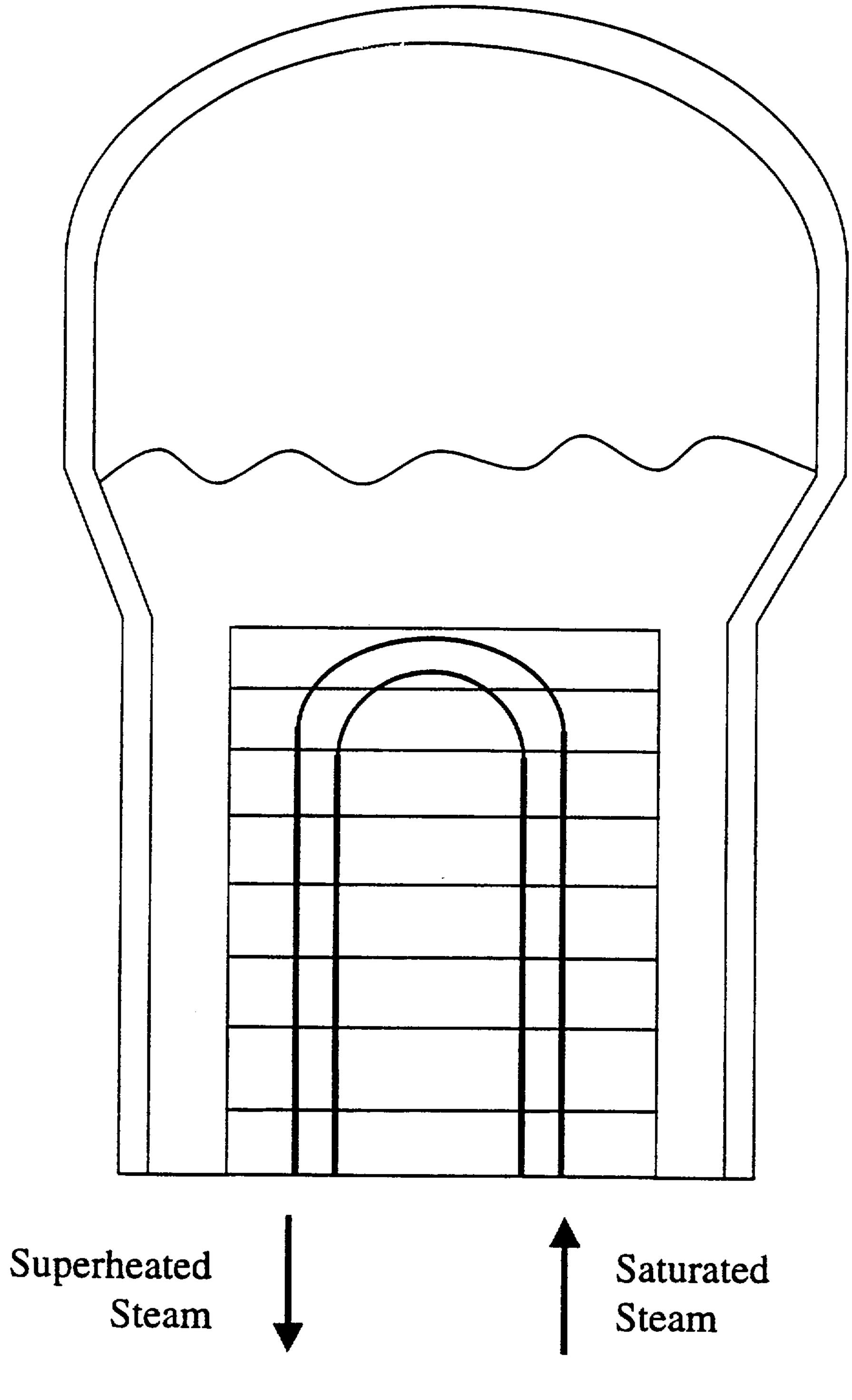
- SG secondary side model was added to COMPERC-II. Model replaces conservative infinite heat source with a finite heat source during reflood period.
- Model represents thermal stratification of SG secondary side consistent with experimental observations.
- Heat transfer implemented using representative correlations.
- Model implemented using conservative assumptions.
- Model reduces the SG tube exit temperature which then reduces the resistance to steam flow, and increases the reflood rate.

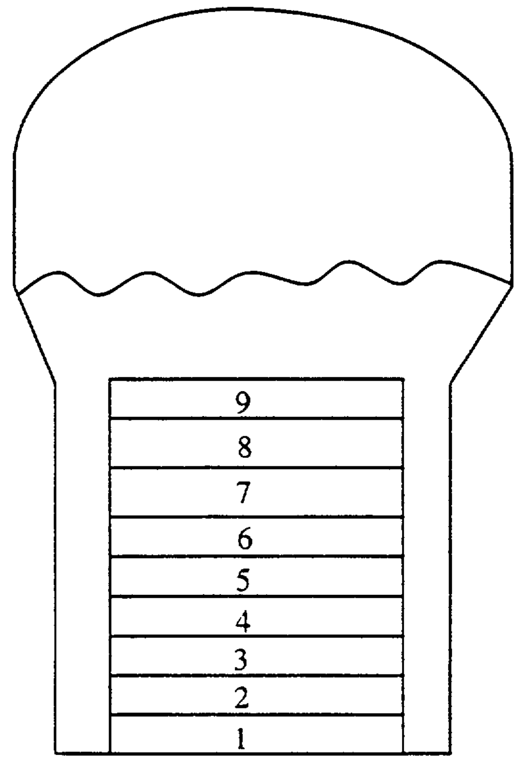
Why is the change reasonable?

- Calculated system response consistent with experimental observations in FLECHT-SEASET tests.
- Model validated by comparison to experimental FLECHT-SEASET test data.
- Model implemented using conservative assumptions. Verified that removal of overly conservative assumptions would significantly improve comparison to experimental data and reduce PCT.
- Appendix K conservative assumptions were not removed or modified.
- TRAC BE calculations show that Appendix K assumptions have at least a 300 °F margin of conservatism on PCT.
- Changes yield a[.]
- Demonstrated in RAI that results are not significantly affected by choice of heat transfer correlations.

Effect of the Change

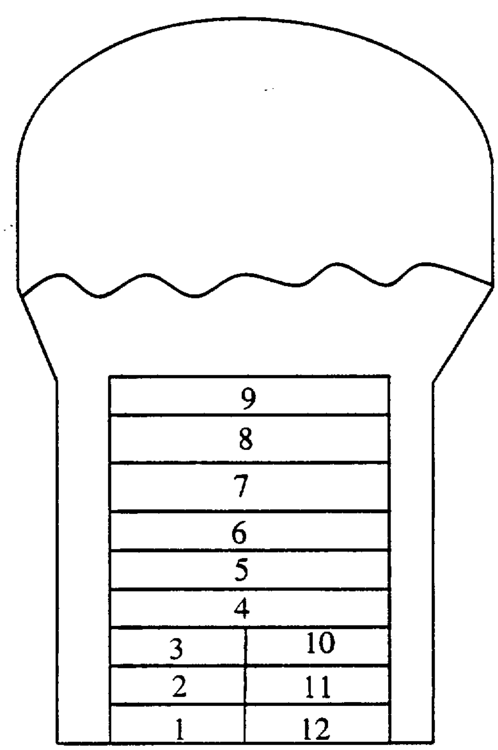
- A[ ]
- Calculation of secondary side[ ]consistent with experimental data.
- Conservative calculation of FLECHT-SEASET test data[.]


Superheated
Steam
Saturated
Steam



SG Secondary Side Without Economizer

SG_NSEC=9, SG_IECON=0



SG Secondary Side With Economizer

SG_NSEC=9, SG_IECON=3

Explanation of the [ ] Assumption at the SG Inlet

- The [ ] assumption at the SG inlet was not modified. It is the same assumption used in the previous version of the code.
- Comparison of loop fluid conditions between old version and new version of code

Model	Previous Version	New Version
Loop Flow	[	
Hot legs		
SG tubes		
Suction and Discharge legs		]

- Large amount of entrained liquid supports assumption that [
  -
  -
  -

  ]

- Hand calculations to illustrate that [ ] at the SG inlet.

  For a LBLOCA reflood calculation, code calculates approximately [

  ]

- Above hand calculation does[

]

The Effect of the New Steam Venting Model on PCT

- The new steam venting model results in a [ ]
- Reasons for the [ ] in PCT
  - [
  -
  -]
- Quantification of the effect
  - [
  -
  -]
- Observations on the Effect of the individual models on PCT
  - [
    -
    -
  -
  -
    -
    -]

Technical Justification of Model Change

Modification of COMPERC-II Steam/Water Interaction during Nitrogen Discharge

Summary

- The scope of the modifications for the injection section delta pressure calculations is limited to the time of nitrogen blowdown. It does not affect the time of SIT discharge or the time of SI pump injection.
- The modified model remains consistent with current SER constraints. The modifications remove some of the conservatism that was left in the model relative to the SER requirements.

History of the Model for all three reflood conditions (SIT, Nitrogen discharge, SI pump)

- [
-
-
-
-]

What was changed?

- COMPERC-II calculation of the injection section delta pressure during nitrogen discharge was replaced with a[ ]
- The injection section delta pressure is the[ ]

Why is the change reasonable?

- There is no experimental evidence that injection section delta pressure increases during period of nitrogen discharge. 2D/3D Program shows the opposite. Nitrogen addition results in a net addition of water into the core. TRAC simulations of PWR and UPTF tests suggest that nitrogen discharge and the resulting surge in core water level are beneficial to core cooling. In the Achilles test, the surge of water into the core also enhanced core cooling.
- On the other hand the injection section delta pressure calculated during nitrogen discharge with the previous model is [ ]
-
- The applicable SER does not explicitly require use of the [ ]
- The SER required delta pressure limit values during SIT discharge and SI pump discharge bound the injection section experimental delta pressure data given in CENPD-132 Volume I, and Supplement 2 to CENPD-132. No data points greater than [ ] were observed in the tests, including cases with non-condensibles injection.
- The injection section delta pressure calculated by the new model during nitrogen injection is larger than the required delta pressure at the end-points.

Effect of the Change

- PCT can be [ ] for plants where one inch/sec time coincides with initiation of nitrogen blowdown. The [ ]
- The injection section delta pressure is calculated consistent with the end-point delta pressure values used by the code.

Reflood Heat Transfer

- Improve the MOD-1C reflood heat transfer model
  - The basic FLECHT correlation for constant flooding rates that is contained within the MOD-1C methodology is unchanged
  - The MOD-2C procedure is changed by improving the "time-shift" equation for variable flooding rates utilizing FLECHT-SEASET and CCTF test data
- The time-shift equation is both empirical and mechanistic
  - The equation contains an empirical elevation dependent correlation adjustment multiplier
  - A reflood mass integral represents the long term flooding rate impact inherent in the constant flooding rate heat transfer correlation
  - Only the empirical elevation dependent correlation adjustment multiplier is improved using the newer FLECHT-SEASET and CCTF test data
  - The new model is developed from one test condition then benchmarked against all of the other test data for multiple reflood rates
- The model change is assessed against all available multiple reflood rate test results from the FLECHT-SEASET and CCTF test programs
  - The range of applicability for the new reflood heat transfer model is expanded compared to the current NRC-accepted model
    - The range of applicability of the basic FLECHT heat transfer correlation is unchanged
    - The original MOD-2C procedure was benchmarked against 3 FLECHT tests with multiple flooding rates
    - These 3 FLECHT tests were forced flooding with only two reflood intervals
    - The second interval was 1 in/sec flooding rate only, only one power level was covered, with very limited ranges in pressure (55-64 psia), peak temperature and inlet subcooling
    - Comparisons were primarily at only one elevation (8 ft) with only selected comparisons at one other elevation (6ft)
  - FLECHT-SEASET data is available for both forced flooding and gravity feed
    - Five of six multiple reflood tests in the unblocked test series were used
    - Two forced reflood tests with variable flooding rates and three gravity reflood tests, one of which simulated a different initial axial temperature distribution
    - In some tests, 3 flooding intervals were simulated with flooding rates as low as 0.62 in/sec, and pressure was extended to as low as 20 psia
    - One test had radial power variation, another had low coolant temperature
    - Test data from these tests were available at eight elevations between 6.49 ft and 11.61 ft elevation, covering 36 separate transient profiles at different elevations and rod locations

- CCTF data was available for full-height core and RCS reflood simulation
    - Four tests were selected based on availability of data and adequacy of test conditions for the range of LBLOCA conditions
    - Test data from these tests are available at four elevations between 3 ft and 10 ft elevation, covering 16 separate transient profiles
- For both FLECHT-SEASET and CCTF conservatism is assured
    - Test measurements and the heat transfer coefficients calculated from the measurements represent the heat transfer coefficients from the highest measured temperatures
    - Fitting of the empirical adjustment multiplier leads to overall conservative comparison to the data
    - That is, the average result of the revised model is the prediction of a lower heat transfer coefficient than measured

- The revised reflood heat transfer model [ ]
    - Depending on location of rupture, the FLECHT heat transfer cooled node PCT is [ ]
    - Depending on location of rupture, the steam heat transfer cooled node PCT is [ ]
- Conservatism of the revised reflood heat transfer model is assured
    - The basic FLECHT heat transfer correlation for constant flooding rates is unchanged and is known to be conservative relative to data and covers the range of parameter variation required for LBLOCA
    - Test data comparisons from multi-rod and multi-assembly test facilities are made only on the test rods with the highest measured temperatures
    - The correlation approach is conservatively biased to underpredict the measured heat transfer coefficients

FRELAPC Computer Code

- Analytical FLECHT Rod Elevation and Power Correction Program
  - Methodology documented in CENPD-213, "Reflood Heat Transfer: Application of FLECHT Reflood Heat Transfer Coefficients to C-E's 16x16 Fuel Bundles," January 1976.
  - Methodology NRC-accepted in SER: K. Kniel (NRC) to A. E. Scherer (C-E), "Application of FLECHT Reflood Heat Transfer Coefficients to CE's 16x16 Fuel Bundle," August 2, 1976
  - FRELAPC was developed to address NRC concerns regarding the application of the FLECHT heat transfer correlation to axially skewed power shapes and to fuel assembly designs different from the FLECHT facility
- Analytical approach is mechanistic
  - Procedure based on an approach developed by L. J. Ybarrondo (Aerojet Nuclear Company), "An Empirical Flooding Heat Transfer Coefficient Including Quench Time Prediction Applicable to a 12-foot Long PWR Core and Including a Modification for Variable Flooding Rates, Short Cores, and Non-symmetrical Power Profiles," November 24, 1971
  - The method identifies the particular FLECHT rod elevation and power level at which the local coolant conditions (integral heatup) and surface heat flux of the STRIKIN-II (or COMZIRC) node of interest are precisely duplicated
  - FRELAPC generates a set of corrected FLECHT elevations and power levels for any fuel assembly design and axial power shape

Process Change within the Currently NRC-Accepted EM

- Three process changes that remain consistent with currently NRC-accepted EM and do not need NRC review
  - Automated/Integrated Code System
  - Explicit NUREG-0630 Cladding Swelling/Rupture
  - Consistent Modeling of Spray and Spillage into the Containment
- These changes will be implemented in both the 1985 EM and the 1999 EM
- Purpose of these changes is to reduce the introduction of conservatism by the analyst
  - Control the interface data transfer process between computer codes, precisely and consistently
  - Eliminate conservative bias in the use of NUREG-0630 cladding rupture and swelling models
  - Eliminate conservative manual estimation of spray and spillage into the containment during reflood by utilizing existing approved methodology with consistent modeling of sources of dispersed water

Technical Justification of Model Change

Replacement of Dougall-Rohsenow Film Boiling Correlation

What was changed?

- Dougall-Rohsenow film boiling correlation was replaced with [ ] correlation in CEFLASH-4A and STRIKIN-II

Why is the change reasonable?

- [ ] correlation developed using large set of data which covers the range of interest in LBLOCA analyses.
- Correlation evaluated at ORNL using THTF test data. [ ] correlation underpredicts most THTF data. Dougall-Rohsenow overpredicts most THTF data.
- Correlation endorsed by NRC in Compendium of ECCS Research for Realistic LOCA Analysis.

Effect of the Change

- Typical effect: PCT [ ]

Hot Assembly Fuel Rod Internal Gas Pressure

- Update the CEFLASH-4A model for the hot assembly fuel rod internal gas pressure
  - Replace constant fuel rod internal pressure with dynamic model
  - The purpose of the change is to achieve consistency between the hot rod heatup calculation of cladding rupture in STRIKIN-II with that in CEFLASH-4A
  - Inconsistent calculation of assembly blockage flow redistribution in CEFLASH-4A when fuel rod cladding rupture is not calculated during blowdown in STRIKIN-II is overly conservative
- Model implemented in CEFLASH-4A is the same model used in STRIKIN-II and previously accepted by NRC for the hot rod heatup calculation
  - Model based on first principles, ideal gas law, including effects of cladding and fuel dimensional changes due to thermal and mechanical expansion and contraction
  - For consistency between CEFLASH-4A and STRIKIN-II, the internal pressure is updated for each radial core region at each time step in response to pre-rupture cladding plastic strain driven by cladding heatup
  - Each fuel node gas gap has an average transient temperature and volume for each time step
- The CEFLASH-4A dynamic model is benchmarked against STRIKIN-II
  - A special case is run where the CEFLASH-4A and STRIKIN-II average rods are initialized with the same stored energy and internal gas pressure
  - The dynamic comparison is very similar for the two codes with CEFLASH-4A having[ ]over the majority of the blowdown transient time period
  - The transient pressures are[ ]
- The dynamic hot assembly fuel rod internal gas pressure model achieves consistent calculation of the time of rupture between CEFLASH-4A and STRIKIN-II
  - The STRIKIN-II hot rod PCT is[ ]compared to a case with inconsistent calculation of blowdown rupture in CEFLASH-4A but reflood rupture in STRIKIN-II
- Conservatism is assured through the conservative nature of the NUREG-0630 and Coffman swelling and rupture models, as required by Appendix K

Technical Justification of Model Change

Hot Rod Steam Cooling Heat Transfer Model Changes

What was changed?

- [
-
-
]

Why is the change reasonable?

- The STRIKIN-II [ ] which is a NRC approved model, was implemented into the PARCH. This implementation improves the consistency of the hot rod temperature calculations in PARCH and STRIKIN-II.
- The transfer of the [ ] improves the consistency between the STRIKIN-II and PARCH calculations.
- The transfer of [ ]

Effect of the Change

- Implementation of the [ ] produces consistent temperatures between STRIKIN-II and PARCH.
- Transfer of [ ] in STRIKIN-II PCT.
- The overall effect of the three changes described above is a [ ]

Section 3 ECCS Performance Analyses

- Consistent with all previous evaluation model submittals to NRC, the application analyses contained in the topical report are representative of the typical CE designed PWR
    - Every CE designed PWR is different
    - Classification is not the standard approach
    - Consistent with the past, this submittal for the LBLOCA evaluation model change is meant to be generic. The results are meant to be representative (not necessarily bounding).
    - Plant specific evaluation model submittals for LBLOCA ECCS performance have not been used previously by CENP
- The 1999 EM Automated/Integrated Code System remains in compliance with all SER's relevant to the 1985 EM and is fully compliant with all current SER constraints and limitations for the 1985 EM
    - Request removal of constraint on non-CENP manufactured fuel
    - Request closure on referencing CENPD-133 Supplement 4-P
- Request approval for using the 1999 EM AICS for 1985 EM analyses
    - Produces nearly the same PCT result as the stand-alone operation of the previous code versions
    - AICS process improvements for the 1985 EM simulation improve PCT results
- Application of the 1999 EM AICS in design analyses requires consideration of the impact of uncertainties in the input parameters compared to standard practice
    - [
    -
    -]
- Worse single failure of ECCS component analyses for the 1985 EM and the 1999 EM are shown
    - For the 1999 EM, the worse single failure is[ ]
- Break spectrum analysis results for the 1999 EM show margin gain
    - [
    -
    -]

- An assessment of overall conservatism in the 1999 EM is given
    - Relaxed three Appendix K requirements
        - Reduce the decay heat multiplier from 1.2 to 1.0
        - Do not use the locked-rotor K-factor for steam venting through the RCS, but assume the pumps are free spinning
        - Do not assume that cooling must be only from steam when the reflood rate is less than 1 in/sec, but assume that FLECHT cooling still applies
    - PCT is [ ] for the non-EM cases in total
    - Since the 1999 EM [ ] it is concluded that the 1999 EM maintains an appropriate amount of overall model conservatism

Current Licensing Issues - 1985 EM

- **Applicability to non-CENP manufactured fuel**
    - One SER constraint (July 31, 1986, Crutchfield to Scherer) limits applicability to only CENP manufactured Zircaloy clad fuel
    - Need approval to apply LBLOCA EM to non-CENP manufactured fuel assemblies so that transition mixed core analyses can be performed in the future
    - CENP does not understand why our implementation of the NRC's required model, NUREG-0630, should be restricted to only CENP manufactured Zircaloy clad fuel
    - Request removing this constraint

Current Licensing Issues - 1985 EM

- **Referencing CENPD-133 Supplement 4-P (Submitted to NRC in April 1977)**
  - CENP did not implement the methodology change between April 1977 and July 1986 because we had not received the SER. Subsequently, the methodology change was made part of the 1985 EM.
  - The SER for the 1985 EM failed to cite in its reference list the supplement for this model change
  - A meeting between Brinkman (CENP) and Collins (NRC) was held on 11/4/98. CENP presented the topical report timeline, a copy of the relevant page from the NRC's status report showing the TAC still open, and a brief discussion of the subject of the topical report supplement.
  - NRC agreed to research how the TAC could have been closed without an SER or rejection letter. NRC has not yet responded.
  - CENP suspects that the reference was either inadvertently omitted from the SER reference list, which contained several other topical reports being accepted as part of the 1985 EM, or an SER was not required since the model change impacted PCT less than the 20°F limit imposed back in the 70's.
  - Both CENP and NRC agree that this issue should be rectified. Request final closure on the issue.

SER Constraints and Limitations

- CENPD-132 Supplement 4-P Revision 1 is acceptable for referencing.
- For completeness, this acceptability includes reference to CENPD-133 Supplement 4-P, submitted in April 1977, but previously omitted in the list of acceptable references.
- The 1999 EM Automated/Integrated Code System (AICS) is approved for use to perform an ECCS performance analysis consistent with the features described in the topical report.
- Also, the 1999 EM AICS is approved for use to perform an analysis consistent with the required and acceptable options and features of the previously accepted evaluation model, i.e., the 1985 EM, which is referred to as the 1985 EM simulation mode of operation including the process improvements available from the AICS at the discretion of CENP
- All current SER constraints and limitations for the 1985 EM will continue to apply for the 1999 EM with one exception:
    - Both the 1985 EM and the 1999 EM can be applied to ECCS performance design analyses with a reactor core containing non-CENP manufactured Zircaloy fuel
- As with all previous CENP ECCS performance evaluation models, the 1999 EM is acceptable for CE four loop plants, dry containments, only a bottom flooding ECCS, and only for ECCS performance analyses
- Also, as with all previous CENP ECCS performance evaluation models, the 1999 EM is acceptable provided a break size spectrum, a time-in-life sensitivity study, and a worst single failure sensitivity study are performed for each complete analysis

AFFIDAVIT PURSUANT TO 10 CFR 2.790

I, Philip W. Richardson, depose and say that I am the Manager, Windsor Nuclear Licensing, of CE Nuclear Power LLC (CENP), duly authorized to make this affidavit, and have reviewed or caused to have reviewed the information which is identified as proprietary and referenced in the paragraph immediately below. I am submitting this affidavit in conformance with the provisions of 10 CFR 2.790 of the Commission's regulations for withholding this information.

The information for which proprietary treatment is sought is contained in the following document:

Enclosure 1-P to LD-2000-0058, "Notes for November 3, 2000 NRC Meeting Regarding CE Nuclear Power Large Break LOCA 1999 EM", November 2000

This document has been appropriately designated as proprietary.

I have personal knowledge of the criteria and procedures utilized by CENP in designating information as a trade secret, privileged or as confidential commercial or financial information. Pursuant to the provisions of 10 CFR 2.790(b)(4) of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure, included in the above referenced document, should be withheld.

1. The information sought to be withheld from public disclosure, is owned and has been held in confidence by CENP. It consists of the methodology for the evaluation of LOCA pursuant to 10 CFR 50, Appendix K, comparisons to experimental data for model verification and comparison to the previously approved methodology.
2. The information consists of test data or other similar data concerning a process, method or component, the application of which results in substantial competitive advantage to CENP.
3. The information is of a type customarily held in confidence by CENP and not customarily disclosed to the public. CENP has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence.
4. The information is being transmitted to the Commission in confidence under the provisions of 10 CFR 2.790 with the understanding that it is to be received in confidence by the Commission.
5. The information, to the best of my knowledge and belief, is not available in public sources, and any disclosure to third parties has been made pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.
6. Public disclosure of the information is likely to cause substantial harm to the competitive position of CENP because:
   a. A similar product is manufactured and sold by major pressurized water reactor competitors of CENP.
   b. Development of this information by CENP required hundreds of thousands of dollars and thousands of man-hours of effort. A competitor would have to undergo similar expense in generating equivalent information.
   c. In order to acquire such information, a competitor would also require considerable time and inconvenience to develop methodology for the evaluation of LOCA pursuant to 10 CFR 50, Appendix K, comparisons to experimental data for model verification and comparison to the previously approved methodology.
   d. The information consists of methodology for the evaluation of LOCA pursuant to 10 CFR 50, Appendix K, comparisons to experimental data for model verification and comparison to the previously approved methodology, the application of which provides a competitive economic advantage. The availability of such information to competitors would enable them to modify their product to better compete with CENP, take marketing or other actions to improve their product's position or impair the position of CENP's product, and avoid developing similar data and analyses in support of their processes, methods or apparatus.
   e. In pricing CENP's products and services, significant research, development, engineering, analytical, manufacturing, licensing, quality assurance and other costs and expenses must be included. The ability of CENP's competitors to utilize such information without similar expenditure of resources may enable them to sell at prices reflecting significantly lower costs.
   f. Use of the information by competitors in the international marketplace would increase their ability to market nuclear steam supply systems by reducing the costs associated with their technology development. In addition, disclosure would have an adverse economic impact on CENP 's potential for obtaining or maintaining foreign licensees.

Further the deponent sayeth not.

Philip W. Richardson
Licensing Project Manager, Windsor Nuclear Licensing

Sworn to before me
this 20th day of November, 2000

Laurie J. White
Notary Public
My commission expires: 8/31/04