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COMMONWEALTH OF VIRGINIA)
) ss.
CITY OF LYNCHBURG)

1. My name is Jerald S. Holm. I am Manager, Product Licensing, for Framatome ANP ("FANP"), and as such I am authorized to execute this Affidavit.

2. I am familiar with the criteria applied by FANP to determine whether certain FANP information is proprietary. I am familiar with the policies established by FANP to ensure the proper application of these criteria.

3. I am familiar with the FANP information presented to the NRC on April 8, 2004 regarding a revision to the topical report EMF-92-153(P)(A), and referred to herein as "Document." Information contained in this Document has been classified by FANP as proprietary in accordance with the policies established by FANP for the control and protection of proprietary and confidential information.

4. This Document contain information of a proprietary and confidential nature and is of the type customarily held in confidence by FANP and not made available to the public. Based on my experience, I am aware that other companies regard information of the kind contained in this Document as proprietary and confidential.

5. This Document has been made available to the U.S. Nuclear Regulatory Commission in confidence with the request that the information contained in this Document be withheld from public disclosure.

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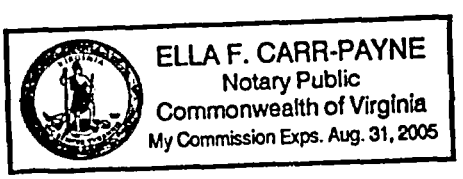
7. In accordance with FANP's policies governing the protection and control of information, proprietary information contained in this Document have been made available, on a limited basis, to others outside FANP only as required and under suitable agreement providing for nondisclosure and limited use of the information.

8. FANP policy requires that proprietary information be kept in a secured file or area and distributed on a need-to-know basis.

9. The foregoing statements are true and correct to the best of my knowledge, information, and belief.

SUBSCRIBED before me this 7th day of April, 2004.

Ella F. Carr-Payne
NOTARY PUBLIC, STATE OF VIRGINIA
MY COMMISSION EXPIRES: 8/31/05



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Extension of the HTP CHF Correlation Ranges

Introduction
Jerry Holm

Motivation for the Change
Rod Kliewer

Description and Justification of the Change
Dave Farnsworth

Conclusion
Jerry Holm

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Why Extend the HTP CHF Correlation Ranges

Rodmon D. Kliewer
Team Leader
Reload Design and Analysis

April 8, 2004

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Methodology

- **General DNB methods**
  - EMF-2310 (P)(A) - safety analyses
  - XN-75-21 (P)(A) - XCOBRA code

- **Setpoint Verification**
  - ANF-87-150 (P) - deterministic methods for Palisades
  - EMF-92-081 (P)(A) - statistical methods for W
  - EMF-1961 (P)(A) - statistical methods for CE

- **DNB Correlation**
  - HTP Correlation {EMF-92-153 (P)(A)} is the principal DNB correlation used with these methods
  - Existing ranges for HTP Correlation
    - Pressure (psia) 1775 to 2425
    - Local Mass Flux (Mlb/hr/ft2) 0.936 to 3.573
    - Inlet Enthalpy (Btu/lb) 382.3 to 649.9
    - Local Quality -0.125 to 0.358

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Challenges

- **Thermal Margin Low Pressure (TM/LP) Trip**
  - Floor pressure down to 1750 psia
  - HTP correlation lower limit: 1775 psia
  - Case pressures are corrected for pressure differences between pressurizer and core exit (approximately 15 to 25 psia)

- **Past Practice**
  - Cases range from ~1750 to 1775 psia
  - Technical arguments were used to buttress validity of analysis conclusions

- **Current Practice**
  - Cases below 1775 psia are treated as non-compliant with our existing topicals and SER restrictions
  - Initiated Condition Report

- **Condition Report**
  - Extensive review of past DNB calculations
  - Found range violations in statistical setpoint applications as well
  - Most challenging conditions summarized in table

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Extent of Conditions

Range Boundary	Most Adverse
Low Pressure (limit = 1775 psia)	1644 psia
High Pressure (limit = 2425 psia)	2441 psia
Low Mass Flux (limit = 0.936 Mlbm/hr-ft^2)	0.651 Mlbm/hr-ft^2
Low Quality (limit = -0.125)	-0.242
High Quality (limit = 0.358)	0.425

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Summary of Need

- **Deterministic methods**
  - TM/LP Floor pressures below 1775 psia should be defended with DNB Correlations having ranges below the existing limit
  - Palisades
- **Statistical methods**
  - Challenges to range limits have been found
  - Currently impacts applications at six plants

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Extension of the HTP CHF Correlation Ranges

D. A. Farnsworth
Framatome ANP

April 8, 2004

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Extension of the HTP CHF Correlation Ranges

Application of the HTP CHF correlation to Operating Plants has resulted in the need to increase the range of the primary independent variables. They are Thermodynamic Quality at CHF, Local Mass Velocity and System Pressure.

Fortunately all of the HTP Data acquired in the Columbia HTP tests was not used. This new (non-correlated) data will be used here to extend the range of the independent variables of the HTP CHF correlation.

- **The Upper Quality Limit, the Lower Pressure Limit and the Lower Mass Velocity Limit will be extended using the new (non-correlated) data.**
- **The Lower Quality Limit and the Upper Pressure Limit will be extended by recorrelation and extension of the existing (correlated) data.**
- **The Upper Mass Velocity Limit will not be extended.**

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HTP CHF Correlation Data Base

Original HTP Data Base

- 1478 Data
- Pressure: 1775 to 2425 psia
- Mass Velocity: 0.936 to 3.573 Mlbm/hr-sq ft
- Quality at CHF: up to 35.8%

Extended Range HTP Data

- 270 Data
- Pressures: 600, 1000 and 1400 psia
- Mass Velocity: down to 0.25 Mlbm/hr-sq ft
- Quality at CHF: up to 58%

Extended Range HTP Data to be Used for Independent Variable Range Extension

- 159 Data
- Pressure: 1400 psia only
- Mass Velocity: down to 0.50 Mlbm/hr-sq ft
- Quality at CHF: up to 52%

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Extending the Upper Limit Quality with Data

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Extending the Upper Limit Quality with Data

Range of Independent Variables for the HTP CHF Correlation As Approved with Original Data

	As Approved		Extended	
Independent Variable	Minimum Value	Maximum Value	Minimum Value	Maximum Value
System Pressure, psia	1775	2425	1775	2425
Mass Velocity, Mlbm/hr-sq ft	0.936	3.573	0.936	3.573
Thermodynamic Quality at CHF	-0.125	0.358	-0.125	**0.515**

The Maximum Value in Thermodynamic Quality at CHF for the HTP CHF Correlation with New (Uncorrelated) Data is 0.515

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Extending the Lower Limit Mass Velocity with Data

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Extending the Lower Limit Mass Velocity with Data

Range of Independent Variables for the HTP CHF Correlation As Approved with Original Data

	As Approved		Extended	
Independent Variable	Minimum Value	Maximum Value	Minimum Value	Maximum Value
System Pressure, psia	1775	2425	1775	2425
Mass Velocity, Mlbm/hr-sq ft	0.936	3.573	**0.498**	3.573
Thermodynamic Quality at CHF	-0.125	0.358	-0.125	**0.515**

The Minimum Value in Local Mass Velocity for the HTP CHF Correlation with the New (Uncorrelated) Data is 0.498 Mlbm/hr-sq ft

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Extending the Lower Limit Pressure with Data

Range of Independent Variables for the HTP CHF Correlation As Approved with Original Data

	As Approved		Extended	
Independent Variable	Minimum Value	Maximum Value	Minimum Value	Maximum Value
System Pressure, psia	1775	2425	**1385**	2425
Mass Velocity, Mlbm/hr-sq ft	0.936	3.573	**0.498**	3.573
Thermodynamic Quality at CHF	-0.125	0.358	-0.125	**0.515**

The Minimum Value in System Pressure for the HTP CHF Correlation with the New (Uncorrelated) Data is 1385 psia

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Trends When Extending the HTP Correlation

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Trends When Extending the HTP Correlation

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Extending the Lower Quality Limit

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Extending the Lower Quality Limit

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Extending the Upper Pressure Limit

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Summary

Original Ranges

Range of Independent Variables for the HTP CHF Correlation As Approved with Original Data

Independent Variable	Minimum Value	Maximum Value
Pressure, psia	1775	2425
Mass Velocity, Mlbm/hr-sq ft	0.936	3.573
Thermodynamic Quality at CHF	-0.125	0.358

Ranges Extended with New (Uncorrelated) Data

Range of Independent Variables for the HTP CHF Correlation With New (Uncorrelated) Data

Independent Variable	Minimum Value	Maximum Value
Pressure, psia	**1385**	2425
Mass Velocity, Mlbm/hr-sq ft	**0.498**	3.573
Thermodynamic Quality at CHF	-0.125	**0.515**

[ ]

Range of Independent Variables for the HTP CHF Correlation

[ ]

Independent Variable	Minimum Value	Maximum Value
Pressure, psia	1775	**2540**
Mass Velocity, Mlbm/hr-sq ft	0.936	3.573
Thermodynamic Quality at CHF	**No Lower Limit***	0.358

[*]

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Conclusion

It has been shown here through both the application of new (uncorrelated) data and [ ] that the HTP correlation can be extended to the following ranges and statistical parameters.

Range of Independent Variables for the HTP CHF Correlation

Independent Variable	Minimum Value	Maximum Value
Pressure, psia	1385	2540
Mass Velocity, Mlbm/hr-sq ft	0.498	3.573
Thermodynamic Quality at CHF	No Lower Limit*	0.515

[*]

Statistical Parameters for the HTP CHF Correlation

	Original Data	Extended Data Base
Number of Data	1478	1637
Mean P/M CHF	0.994	0.984
P/M Standard Deviation	0.073	0.082
DNBR Design Limit	1.141	1.139*

* 1.141 will be retained

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SUPPLEMENTARY INFORMATION