

FEB 06 2001

LRN-01-0041
LCR H00-009



United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

**SUPPLEMENTAL INFORMATION
REQUEST FOR CHANGE TO TECHNICAL SPECIFICATIONS
EMERGENCY CORE COOLING SYSTEMS SURVEILLANCE REQUIREMENTS
HOPE CREEK GENERATING STATION
FACILITY OPERATING LICENSE NPF-57
DOCKET NO. 50-354**

This letter forwards additional information for consideration by the NRC staff during their review of the subject amendment request. These reports from the fuel vendors provide the analyses supporting the proposed reduction in the surveillance criteria for the Hope Creek Core Spray subsystem.

Attachment 1 is a copy of a GE Nuclear Energy letter JEL-104-1, subject "Non-proprietary report on the Hope Creek Core Spray Pump Flow Degradation Impact Evaluation".

Attachment 2 is copy a of Westinghouse letter WPS-01-005, subject "Impact of Degraded Core Spray Delivery on the Westinghouse ECCS Performance Analysis for Hope Creek with Fuel Bundles PA and PB" (proprietary).

Attachment 3 is a copy of Westinghouse Letter WPS-01-006, subject "Affidavit in conformance with the provisions of 10CFR Section 2.790 contained in Westinghouse, CE Nuclear Fuel Projects letter to D. Notigan, Public Service Electric and Gas Company; "Impact of Degraded Core Spray Delivery on the Westinghouse ECCS Performance Analysis for Hope Creek with Fuel Bundles PA and PB", WPS-01-005 dated January 25, 2001."

As WPS-01-005 contains information proprietary to Westinghouse Electric Corporation, it is supported by an affidavit signed by Westinghouse, the owner of the information.

This letter forwards Proprietary Information in accordance with 10CFR 2.790. The balance of this letter may be considered non-proprietary upon removal of Attachment 2.

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FEB 06 2001

Document Control Desk

2

LRN-01-0041
LCR H00-09

The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR 2.790 of the Commission's regulations.

Accordingly, it is requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with Section 2.790 of the Commission's regulations. Correspondence with respect to the copyright or proprietary aspects of WPS-01-005 or the supporting affidavit should reference WPS-01-006, and should be addressed to Mr. Richard M. Matheny, Westinghouse Electric Company, Nuclear Fuel, 2000 Day Hill Road, Windsor, CT 06095.

Attachment 4 is a copy of Westinghouse Letter contained in Attachment 2 which has been redacted and therefore can be treated as non-proprietary.

Should you have any questions regarding this request, please contact Mr. John Nagle at 856-339-3171.

Sincerely,



Gabor Salamon
Licensing Manager

Attachments (4)

This letter forwards Proprietary Information in accordance with 10CFR 2.790. The balance of this letter may be considered non-proprietary upon removal of Attachment 2.

FEB 06 2001

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3

LRN-01-0041
LCR H00-09

C w/o Attachments 2 and 3

Mr. H. Miller, Administrator - Region I
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. R. Ennis
Licensing Project Manager - Hope Creek
U. S. Nuclear Regulatory Commission
One White Flint North
Mail Stop 8B1
11555 Rockville Pike
Rockville, MD 20852

USNRC Senior Resident Inspector - HC (X24)

Mr. K. Tosch, Manager IV
Bureau of Nuclear Engineering
P. O. Box 415
Trenton, NJ 08625

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LRN-01-0041
LCR H00-09

Attachment 1

GE Nuclear Letter JEL-104-1

1/16/2001



JEL-104-1
January 16, 2001

Mr. Don Notigan
Mail Code N/20, TB-2
PSEG Nuclear L.L.C.
Hope Creek Generating Station
End of Alloway Creek Neck Rd.
Hancocks Bridge, NJ 08038

SUBJECT: Non-Proprietary Report on the "Hope Creek Core Spray Pump
Flow Degradation Impact Evaluation"

REFERENCE: PSEG Purchase Order No. 4500090278 dated 10/25/2000

Dear Don:

Attached is the non-proprietary version of the letter report "Hope Creek Spray Pump Flow Degradation Impact Evaluation". This non-proprietary report is final deliverable under the PSEG Purchase Order No. 4500090278. The non-proprietary version of this report is provided at the request of Mr. Shie-Jeng Peng.

If there are any questions regarding the evaluation please contact me at your convenience.

Yours truly,

James E. Leonard
Technical Project Manager
GE Nuclear Energy
(408) 925-2164
james.leonard@gene.ge.com

4.0 Analysis

There are two parts to the evaluation. The first part is to prepare a revised CS analytical flow curve that bounds the possible shortfall in the CS system performance. The second part is to evaluate the impact of the degraded CS flow curve on the Hope Creek ECCS-LOCA analysis using the revised CS flow curve. They are discussed below.

1) Prepare revised CS flow curve to be used for the evaluation:

A revised CS analytical flow curve is conservatively drawn below the degraded pump curve with similar pump curve characteristics, and below the FSAR LOCA analysis assumed CS flow curve. Figure 1 shows this revised CS flow performance curve.

2) Evaluate the impact of the degraded pump flow using the revised CS flow curve:

For the limiting case (maximum recirculation suction line break) from the Hope Creek FSAR LOCA analysis the integrated ECCS flow for both CS and LPCI required to reflood the hot node and terminate core heatup at that time was determined. This was accomplished by using the CS and LPCI flow versus time prediction from SAFE for the limiting Channel A DC source failure case. Using trapezoidal integration the total integrated ECCS flow was calculated up to the reflooding time of hot node.

Then, a reduced integrated CS flow was calculated for this limiting case, using the revised CS flow curve, applied by a conservatively calculated reduction factor for a lower CS flow rate. This reduction factor is based on the flow reduction from the degraded pump flow to the revised CS flow described above at various pressure points during CS injection. Again, using trapezoidal integration the reduced CS flow versus time was integrated. A longer hot node reflooding time was calculated such that the total integrated ECCS flow for both CS and LPCI meets or exceeds the value calculated from the FSAR LOCA analysis case.

Finally, the impact on the calculated PCT, peak local oxidation fraction and CWMWR was evaluated. Assuming a heatup rate based on the FSAR heatup rate (Reference 2) the PCT impact is calculated to be no more than a 10°F increase. This delta PCT can be used as an adder to the current Hope Creek licensing PCT per 10CFR50.46 reporting requirements. A bounding peak local oxidation fraction of 1.5 % is documented in Reference 1. This value is bounding for a 10°F increase in PCT as is the bounding value of 0.10 for CWMWR.

5.0 Conclusion

Based on the above evaluation it is concluded that the impact of the degraded pump curve on licensing PCT at Hope Creek would be no more than 10°F and the peak local oxidation and CWMWR remain unchanged.

The verification package is included in DRF L12-00875-00.

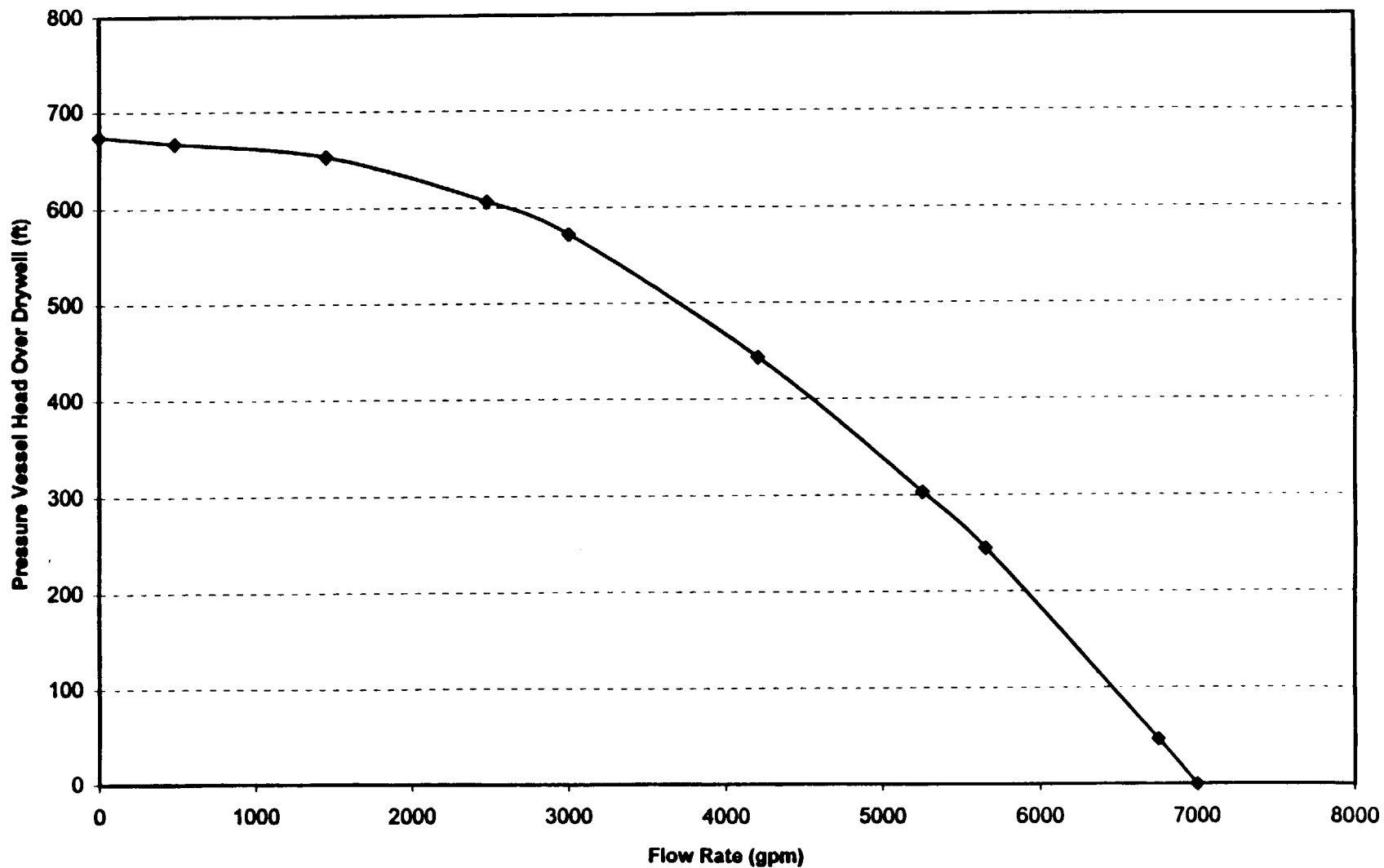
Prepared by: W.M. Wong
W.M. Wong
55706, MC 772

Verified by: F. M. Paradiso
F. M. Paradiso
56953, MC 772

Approved by: S.C. Moen
S.C. Moen
51622, MC 772

Figure 1 Revised Core Spray Flow Curve

Revised CS performance curve



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LRN-01-0041
LCR H00-09

Attachment 4

Westinghouse Electric Letter

WPS-01-004

January 18, 2001



Westinghouse Electric Company
Nuclear Fuel
CE Nuclear Fuel Projects

2000 Day Hill Road
Windsor, CT 06095
USA

January 18, 2001
WPS-01-004

Mr. D. Notigan
Nuclear Department
Public Service Electric and Gas Company
End of Alloway Creek Neck Road
Hancocks Bridge, NJ 08038-0236

Subject: Impact of Degraded Core Spray Delivery on the Westinghouse ECCS Performance Analysis for Hope Creek with Fuel Bundles PA and PB

References:

1. CE NPSD-866-P, "HCGS LOCA Analysis Report," March 2000. (Proprietary)
2. CE NPSD-840-P, "Conditions for Design Public Service Electric Gas Hope Creek: Base Document," March 2000. (Proprietary)

Dear Mr. Notigan:

An analysis has been performed to assess the impact of a degraded Core Spray (CS) delivery curve. The reason for doing this analysis is to provide an ECCS performance analysis for Hope Creek with fuel bundle PA and PB that includes a bounding, i.e. degraded, CS delivery. The results of this analysis will be to assess and quantify the impact on Peak Cladding Temperature (PCT), core-wide oxidation and cladding oxidation for a CS delivery that is expected to bound actual degraded CS delivery.

Background:

Routine surveillance results of the CS system showed a degradation of the CS delivery. PSEG informed Westinghouse (W) that future surveillance results may be less than the CS delivery used in the W ECCS performance analysis. PSEG requested W to assess the impact of a conservatively degraded CS delivery on the W ECCS performance analysis results.

Design Input:

The ECCS performance analysis for fuel bundles PA and PB, introduced in Hope Creek Cycle 10, is documented in Reference 1.

The CS delivery used in the Reference 1 analysis is in the conditions for design report for Hope Creek, Figure 3.4-5 of Reference 2. This is the same as Figure 6.3-9 of the Hope Creek UFSAR.

Table 6.3-2 of the UFSAR specifies the minimum rated flow at vessel pressure: 6250 gpm at 105 psid. From a telephone conversation with PSEG, PSEG indicated that this analysis should use a degraded CS delivery that bounds the measured degraded flow of 6058 gpm at 105 psid.

Methodology:

The methodology used to determine the impact of the degraded CS delivery on the results and conclusions of the ECCS performance analysis, Reference 1, is as follows:

- 1 Identify the portions of the analysis that are sensitive to changes in the CS delivery. That is, if the CS delivery were degraded, what part of the Reference 1 analysis would be impacted enough to challenge the conclusions of Reference 1.
- 2 Generate a degraded CS delivery curve that bounds 6058 gpm at 105 psid.
- 3 Assess the impact of the degraded curve on the portions of the analysis identified in Step 1, above. This assessment is made with a combination of computer case runs and engineering evaluation.

Analysis:

The ECCS performance analysis for fuel bundle PA and PB, initially loaded in Hope Creek for Cycle 10, was reviewed to determine which portions of the analysis need to be reviewed for impact of the degraded CS delivery curve. The Hope Creek ECCS performance analysis included verification of the limiting break size, calculation of the PCT, Maximum Cladding Oxidation, Maximum Core Wide Oxidation, and calculation of the Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) limit for the Hope Creek PA and PB fuel bundles.

The same CS delivery curve, Reference 2, was used for each portion of the ECCS performance analysis. The primary impact of a degraded CS is to increase the PCT results due to delayed core reflood and diminished CS heat transfer performance. The impact on core-wide oxidation, cladding oxidation and MAPLHGR will be secondary, and a function of the increased PCT. Therefore, review of the PCT results for the break size spectrum is sufficient to identify the portion of the analysis that is most likely to impact the conclusions of Reference 1.

The limiting break size (highest PCT) is the full double-ended guillotine break. This is taken as the break to assess the impact of degraded CS on PCT. Phenomenologically, the

Small Break LOCA (SBLOCA) and Large Break LOCA (LBLOCA) are different,
[
]
]

The core spray delivery used in the W ECCS performance analysis was based upon Figure 6.3-9 of the Hope Creek UFSAR, transmitted in Reference 2. The Reference 1 analysis and degraded CS delivery curves are provided as Figure 1.

[
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]
]

Therefore the results of the core-wide oxidation, cladding oxidation and MAPLHGR in Reference 1 remain applicable with the degraded CS depicted in Figure 1.

An evaluation of the degraded CS on the spray heat transfer coefficients used for Reference 1 was also made. [

] Therefore, it is concluded that the spray heat transfer coefficients used in the Reference 1 analysis remain valid.

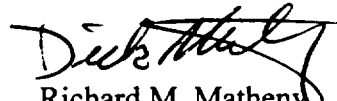
Results and Conclusions:

Based upon this assessment of degraded core spray on the ECCS performance analysis for Hope Creek, Reference 1, it is concluded [

] These results demonstrate acceptable ECCS Performance with degraded CS delivery. The verification status of this analysis is complete.

Should you require additional information or further clarification, please do not hesitate to contact Stephen Rigby at (860) 687-8077 or me at (860) 687-8017.

Best Regards,


Richard M. Matheny
Project Manager

cc: S.J. Peng (PSEG)
D. Ebeling-Koning (W)

FIGURE 1



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LRN-01-0041
LCR H00-09

Attachment 3

Westinghouse Electric Letter

WPS-01-006

January 25, 2001



Westinghouse Electric Company
Nuclear Fuel
CE Nuclear Fuel Projects

2000 Day Hill Road
Windsor, CT 06095
USA

January 25, 2001
WPS-01-006

Mr. D. Notigan
Nuclear Department
Public Service Electric and Gas Company
End of Alloway Creek Neck Road
Hancocks Bridge, NJ 08038-0236

Subject: **Affidavit in Conformance with the provisions of 10 CFR 2.790 contained in Westinghouse, CE Nuclear Fuel Projects letter to D. Notigan, Public Service Electric and Gas Company; "Impact of Degraded Core Spray Delivery on the Westinghouse ECCS Performance Analysis for Hope Creek with Fuel Bundles PA and PB", WPS-01-005 dated January 25, 2001**

Reference: WPS-01-005 letter dated January 25, 2001

Dear Mr. Notigan:

Included with this letter is subject proprietary affidavit that supports Reference 1.

Should you have any questions or require additional information or further clarification, please do not hesitate to contact Stephen Rigby at (860) 687-8077 or me at (860) 687-8017.

Best Regards,

A handwritten signature in cursive script that reads "WR Matheny Sr".

Richard M. Matheny
Project Manager

cc: S.J. Peng (PSEG)
D. Ebeling-Koning (W)

Attachment - As stated



I, Philip W. Richardson, depose and say that I am the Licensing Project Manager 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 described 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. 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.

The information for which proprietary treatment is sought, and which document has been appropriately designated as proprietary, is contained in the following:

- *Westinghouse Electric Company, CE Nuclear Fuel Projects letter to D. Notigan, Public Service Electric and Gas Company, "Impact of Degraded Core Spray Delivery on the Westinghouse ECCS Performance Analysis for Hope Creek with Fuel Bundles PA and PB," WPS-01-005, dated January 25, 2001.*

Pursuant to the provisions of Section 2.790(b)(4) of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information included in the document listed above should be withheld from public disclosure.

- i. The information sought to be withheld from public disclosure is owned and has been held in confidence by CENP. It consists of information concerning an assessment of the impact of a degraded core spray delivery curve on ECCS performance analyses at Hope Creek.
- ii. The information consists of analyses or other similar data concerning a process, method or component, the application of which results in substantial competitive advantage to CENP.
- iii. The information is of a type customarily held in confidence by CENP and not customarily disclosed to the public.
- iv. 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.
- v. 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 that provide for maintenance of the information in confidence.
- vi. Public disclosure of the information is likely to cause substantial harm to the competitive position of CENP because:
 - a. A similar service is provided by major competitors of CENP.
 - b. Development of this information by CENP required thousands of dollars and many manhours of effort. A competitor would have to undergo similar expense in generating equivalent information. In order to acquire such information, a competitor would also require considerable time and inconvenience to develop a suitable analyses methodology and the supporting test data.



- c. The information consists of an evaluation of a conservatively degraded core spray delivery on the plant's emergency core cooling system performance analysis. The availability of such information to competitors would enable them 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 technical analysis in support of their processes, methods or apparatus.
- d. 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.
- e. Use of the information by competitors in the international marketplace would increase their ability to market similar services 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 licenses.

Philip W. Richardson
Licensing Project Manager

Sworn to before me this 25th day of January 2001.

Notary Public

My Commission expires: **JOAN C. HASTINGS**
~~NOTARY PUBLIC~~
MY COMMISSION EXPIRES SEP. 30, 2002

Attachment 2

Westinghouse Electric Letter

WPS-01-005

January 25, 2001

This attachment contains proprietary information and shall be withheld from Public Disclosure in accordance with the provisions of 10 CFR 2.790