Mr. Mark A. Peifer
Vice President and Director
Industry and Government Relations Division
Institute of Nuclear Power Operations
700 Galleria Parkway, NW
Atlanta, GA 30339-5957

Dear Mr. Peifer:

SUBJECT: REQUEST FOR REVIEW OF RELIABILITY STUDY: NUREG-1715, VOL. X, COMPONENT PERFORMANCE STUDY — AIR-OPERATED VALVES, 1987–1998 (DRAFT)

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	LOWER BOUND	MEAN	UPPER BOUND
NUREG/CR-4550	5.4E-3	2E-3	4.8E-3
PWR RI SYSTEMS			
auxiliary feedwater (AFW)	4.6E-6	1.8E-3	6.9E-3
high pressure injection (HPI)	4.8E-6	1.2E-3	4.7E-3
residual heat removal (RHR)	6.1E-5	5.2E-4	1.3E-2
chemical and volume control system (CVCS)	3.5E-7	3.4E-3	1.5E-2
component cooling water (CCW)	6.7E-5	5.8E-3	2.1E-2
BWR RI SYSTEMS			
reactor core isolation cooling (RCIC)	3.5E-4	3.0E-3	7.7E-3
high pressure coolant injection (HPCI)	4.3E-4	3.6E-3	9.5E-3
low pressure core spray (LPCS)	2.9E-15	2.1E-3	1.2E-2

- *Failure rate trends*. Failure rates, as a function of component-years, were compared among the PWR plant age groups (3 groups of approximately equal size from older to newer plants by commercial operation date). For PWRs, the review of plant age groups did not show evidence of increasingly higher failure rates for any plant age group due to aging mechanisms. For BWRs, failure data was too sparse for trending failure rates.

- *Common-cause failures*. The number of complete AOV common-cause failures (CCF) identified in this report is consistent with the expected number based on the CCF database parameters for the combined PWR and BWR complete failure population used in this report.

The technical insights that support this goal include:

- *Leading contributors to failure.* The evaluation of PWR AOV subcomponent (e.g., valve body and pneumatic operator) failure patterns demonstrated that failures of pneumatic-operator subcomponents were the biggest contributors (greater than three-fourths) to AOV failures. BWR AOVs also showed that valve operators were the biggest contributor, although the number of failures (6) was sparse.

- *Failure trends.* For the PWR RI systems during the 1987-1995 period, there was no discernible failure trend. For BWR RI systems, no trending was determined due to sparsity of failure data.

- *Failure causes.* Failure of AOVs in PWR RI systems was mainly due to age/wear causes (47%).

- *Probability of failure on demand*. The AOV mean probabilities of failure on demand used in plant-specific IPE studies were compared with the results of this report. The PWR IPE mean values were generally consistent with the results of this report and the NUREG/CR-4550 generic values. No comparison was made with BWR IPE mean values as few BWR plants IPEs provided AOV failure probabilities on demand.

We are specifically interested in your comments regarding the technical adequacy of the modeling and data analysis and the appropriateness of the risk-important findings and conclusions. To meet our planned publication schedule, we would appreciate receiving your comments within 60 days of your receipt of this letter.

The Office of Nuclear Regulatory Research plans to update these and other related studies on a regular basis. These updates will continue our support of the NRC commitment to use operating experience in risk-informed regulatory activities.

A copy of this draft report and letter are being placed in the Public Document Room, NRC Headquarters, 11555 Rockville Pike, Rockville, MD, 20852. If you have any questions related to this report, please contact Mr. James R. Houghton of my staff at 301-415-6353 or e-mail at jrh2@nrc.gov.

Sincerely,

Thomas L. King, Director
Division of Risk Analysis and Applications
Office of Nuclear Regulatory Research

Attachment: As stated
cc w/o att:
A. Thadani, RES
M. Federline, RES
S. Collins, NRR
R. Zimmerman, NRR
B. Sheron, NRR
J. R. Johnson, NRR

IDENTICAL LETTERS DATED: / /00

SUBJECT: REQUEST FOR REVIEW OF RELIABILITY STUDY: NUREG-1715, VOL. X, COMPONENT PERFORMANCE STUDY — AIR-OPERATED VALVES, 1987–1998 (DRAFT)

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IDENTICAL LETTERS

Mr. Mark A. Peifer
Vice President and Director
Industry and Government Relations Division
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700 Galleria Parkway, NW
Atlanta, GA 30339-5957

Mr. Ralph E. Beedle
Nuclear Energy Institute
1776 I Street, N.W.
Suite 400
Washington, DC 20006-3708

Dr. Theodore U. Marston
Vice President and Chief Nuclear Officer
Electric Power Research Institute
3412 Hillview Avenue
Palo Alto, CA 94304

Mr. James Lang
Director
Electric Power Research Institute
1300 W. T. Harris Blvd.
Charlotte, NC 28262

Mr. Gary Vine
Sr. Washington Presentative
Electric Power Research Institute
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Suite 805
Washington, DC 20036

Mr. David A. Lochbaum
Union of Concerned Scientists
1616 P Street, N.W.
Suite 310
Washington, D.C. 20036-1495

Mr. J.J. Kelly, Manager
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Framatome Technologies, Inc.
P.O. Box 10935
Lynchburg, VA 24506-0935

Mr. Andrew P. Drake, Project Manager
Westinghouse Owners Group
Westinghouse Electric Corporation
Mail Stop ECE 5-16
P.O. Box 355
Pittsburgh, PA 15230-0355

Mr. Dennis Townsend
General Electric Nuclear Energy Owners Group
GE Nuclear Energy
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Mr. Ralph E. Beedle
Nuclear Energy Institute
1776 I Street, NW
Suite 400
Washington, DC 200006-3708

Dear Mr. Beedle:

SUBJECT: REQUEST FOR REVIEW OF RELIABILITY STUDY: NUREG-1715, VOL. X, COMPONENT PERFORMANCE STUDY — AIR-OPERATED VALVES, 1987–1998 (DRAFT)

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Dr. Theodore U. Marston
Vice President and Chief Nuclear Officer
Electric Power Research Institute
3412 Hillview Avenue
Palo Alto, CA 94304

Dear Dr. Marston:

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Mr. James Lang
Director
Electric Power Research Institute
1300 W. T. Harris Blvd
Charlotte, NC 28262

Dear Mr. Lang:

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Sr. Washington Representative
Electric Power Research Institute
2000 L St., NW, Suite 805
Washington, DC 20036

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Union of Concerned Scientists
1616 P Street, NW
Suite 310
Washington, DC 20036-1495

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B&W Owners Group Services
Framatome Technologies, Inc.
P.O. Box 10935
Lynchburg, VA 24506-0935

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Mr. Andrew P. Drake, Project Manager
Westinghouse Owners Group
Westinghouse Electric Corporation
Mail Stop ECE 5-16
P.O. Box 355
Pittsburgh, PA 15230-0355

Dear Mr. Drake:

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Mr. Dennis Townsend
General Electric Nuclear Energy Owners Group
GE Nuclear Energy
175 Curtner Avenue
M/C 187
San Jose, CA 95125

Dear Mr. Townsend:

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ABB Combustion Engineering Owners Group
c/o Gordon Bischoff, CEOG Project Manager
M.S. 9615-1932
2000 Day Hill Road
Windsor, CT 06095

Dear Mr. Bischoff:

SUBJECT: REQUEST FOR REVIEW OF RELIABILITY STUDY: NUREG-1715, VOL. X, COMPONENT PERFORMANCE STUDY — AIR-OPERATED VALVES, 1987–1998 (DRAFT)

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REMARKS

REQUEST FOR REVIEW OF RELIABILITY STUDY: NUREG-1715, VOL. X, COMPONENT PERFORMANCE STUDY — AIR-OPERATED VALVES, 1987–1998

FROM: (Name, org. symbol, Agency/Post)	**Room # - Bldg.**
	Phone #