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August 28, 2007 (3:37pm)

OFFICE OF SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

August 22, 2007

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD  
and the UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the Matter of )  
PPL SUSQUEHANNA LLC ) Docket Nos. 50-387 -388  
Susquehanna Steam Electric Station ) Units 1 and 2; ASLB  
 ) No. 07-854-01-OLA-BD01

Office of the Secretary  
Mail Stop O-16 C1  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001  
Attn: Rulemaking and Adjudications Staff

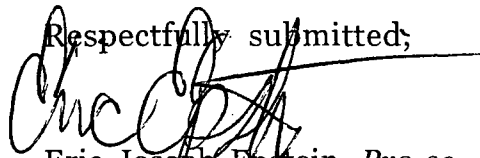
**Eric Joseph Epstein's Affirmative Duty & Obligation to Keep the Nuclear Regulatory Commission, Atomic Safety & Licensing Board Panel, Parties Informed of Significant Developments:**

**Re: PPL Susquehanna LLC's Proposed Amendment Requests for the Susquehanna Steam Electric Station's 1 & 2 Would Increase Thermal Power to 3,952 Mega-Watts Which Is 20% Above the Original Rated Thermal Power (RTP) 3,293 MWt, And Approximately 13% Above the Current RTP of 3,489 MWt, Docket Nos. 50-387 PLA-6110 and 50-388**

Dear Sir or Madam:

Enclosed for filing in the above-stated matter, and consistent with Eric Joseph Epstein's affirmative duty and obligation to keep the Nuclear Regulatory Commission, Atomic Safety and Licensing Board Panel and parties advised of significant developments relevant to the proceeding, is an original and five copies of the "Potential Adverse Flow Affects From Nuclear Power Plants" and Proposed Remedies.

Respectfully submitted,



Eric Joseph Epstein, Pro se  
4100 Hillsdale Road  
Harrisburg, PA 17112  
(717)-541-1101 Phone

Template=SECY-037

SECY-02

***Potential Adverse Flow Affects From Nuclear Power Plants,  
Project # 691, ADAMS Accession No.: MLO71710615  
Re: PPL Susquehanna LLC Proposed Amendment Requests for  
the Susquehanna Steam Electric Station's 1 & 2 Would  
Increase Thermal Power to 3,952 Mega-Watts Which Is 20%  
Above the Original Rated Thermal Power (RTP) 3,293 MWt,  
And Approximately 13% Above the Current RTP of 3,489 MWt,  
Docket Nos. 50-387 PLA-6110 and 50-388***

## **I. Introduction**

Mr. Epstein has an affirmative duty and obligation to keep the Nuclear Regulatory Commission, Atomic Safety and Licensing Board Panel and parties advised of significant developments relevant to the proceeding. (1)

## **II. Emerging Technical Challenge Relating to PPL Susquehanna's Proposed Uprate**

Enclosed is a relevant and timely communication (2) from the Nuclear Regulatory Commission (NRC) to the BWR Owners Group (BWROG) about experimental power uprates at boiling water reactors (BWRs). (3) The NRC has approved experimental power uprates (EPU) at Dresden, Quad Cities, Brunswick, Hatch, and Vermont Yankee -- and is currently recommending and reviewing an EPU for the Susquehanna Electric Steam Station (SSES).

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<sup>1</sup> Duke Power Co. (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-143, 6 AEC 623, 625-26 (1973); Georgia Power Co. (Alvin W. Vogtle Nuclear Plant Units 1 and 2) ALAB-291, 2 NRC 404, 408 (1975). Duke Power Co. (Catawba Nuclear Station, Units 1 and 2); ALAB-355, 4 NRC 397, 406 n. 26 (1976.) See also Tennessee Valley Authority (Phipps Bend Nuclear Plant, Units 1 and 2).ALAB-752, 18 NRC 1318 (1983); Tennessee Valley Authority (Browns Ferry Nuclear Plant, Units 1, 2, and 3), ALAB-677, 15 NRC 1387, 1388 (1982.)

<sup>2</sup> Mr. Epstein became aware of the document on August 20, 2007, but it appeared in the July 26, 2007, folder in ADAMS.

<sup>3</sup> Please refer to Enclosure 1, from John A. Grobe, Associate Director for Engineering and Safety Systems, Office of Nuclear Reactor Regulation.

Last month the NRC identified and reported (4) to the BWROG:

"The acoustic resonance phenomenon that causes adverse flow effects in nuclear power plants is highly complex and requires extensive analyses."

And, "...scale model testing (SMT) and analytical tools have not matured sufficiently to allow minimal error and uncertainty valves to be used in their application."

In short, the NRC has conceded and acknowledged to having neither an analytical nor modeling clue as to what will occur when a BWR cranks its output up, i.e., PPL Susquehanna LLC Proposed Amendment Requests for the Susquehanna Steam Electric Station's 1 & 2 Would Increase Thermal Power to 3,952 Mega-Watts Which Is 20% Above the Original Rated Thermal Power (RTP) 3,293 MWt, And Approximately 13% Above the Current RTP of 3,489 MWt, Docket Nos. 50-387 PLA-6110 and 50-388. The NRC's current approach to "immature" and inadequate scale model testing is to conduct full-scale testing at nuclear power plants in the neighborhoods surrounding the SSES.

The second page of the NRC's letter outlines seven topics the NRC has identified as requiring further investigation. Clearly, an agency with safety as its top priority, and protection of public health as its primary mission, should require definitive answers about these "threat areas" before allowing the SSES to wander into uncharted territory. Proper protection of public health and safety dictates that the NRC do more than merely raise questions. The NRC must answer those questions at the Susquehanna Steam Electric Station to ensure safety margins are retained when boosting the reactors' output.

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<sup>4</sup> The distribution list does not include PPL Susquehanna, but it does include PPL's vendors and industry representatives e.g., EPRI and GE Energy.

There has been no information or data relating to this emerging issue presented in this case.

Please note that the NRC, in the second to last paragraph of “ Potential Adverse Flow Affects From Nuclear Power Plants,” the NRC stated, “We would appreciate receiving your comments within one month such that the NRC staff can prepare the proposed RIS in a timely manner.” (5)

Certainly an uprate and license extension that will be in effect for decades can wait an additional 90-180 days for the RIS and PPL’s site-specific review. (6)

### **III. Proposed Remedies**

1) Mr. Epstein respectfully requests that PPL’s application be held in abeyance until points 1 through 3 and points 5 through 7 identified in the NRC’s Communication, “Potential Adverse Flow Affects From Nuclear Power Plants,” (Project # 691, ADAMS Accession No.: ML071710615,) have been formally reviewed by a Regulatory Issue Summary.

2) Mr. Epstein respectfully requests that the NRC direct PPL Susquehanna to conduct a site- specific evaluation of the SSES within 90 days after the completion of the RIS, and evaluate points 1 through 3 and points 5 through 7 identified in the NRC Communication, “ Potential Adverse Flow Affects From Nuclear Power Plants,” (Project # 691, ADAMS Accession No.: ML071710615).

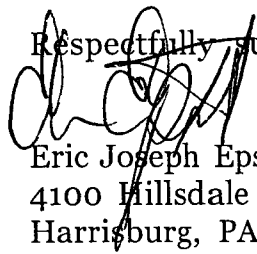
3) Mr. Epstein respectfully requests that approval of the EPU be delayed until the RIS and NRC’s review of PPL’s site specific studies are completed.

5 <sup>\_\_\_\_\_</sup> Nearly a decade after the NRC approved power uprates at Dresden, Quad Cities, and Brunswick, and years after the steam dryer at Quad Cities shook itself apart (three times), the NRC is requesting “timely” data response.

For purposes of the request, “timely” means 90 days after the NRC issues its Regulatory Issue Summary.

6 PPL Susquehanna has applied to the Nuclear Regulatory Commission (NRC) for permission to run the Susquehanna Steam Electric Station until 2043 [Unit-1] and 2045 [Unit-2].

Respectfully submitted,



Eric Joseph Epstein, *Pro se*  
4100 Hillsdale Road  
Harrisburg, PA 17112

I hereby certify that on August 24, 2007, a copy of Eric Joseph Epstein's Reply Petition for Leave to Intervene, Request for Hearing, and Contentions regarding the matter of the PPL Susquehanna LLC Proposed Amendment Requests for the Susquehanna Steam Electric Station's 1 & 2 Would Increase Thermal Power to 3,952 Mega-Watts Which is 20% Above the Original Rated Thermal Power (RTP) 3293 MWt, And Approximately 13% Above the Current RTP of 3,489 MWt, Docket Nos. 50-387 PLA-6110 and 50-388 was sent via electronic mail, USPS and by overnight delivery with tracking numbers to:

Office of the Secretary  
U.S. Nuclear Regulatory Commission  
One White Flint North, Floor 16  
11555 Rockville Pike  
Rockville, Maryland 20852  
Attn: Rulemaking and Adjudications Staff

Office of the Commission  
Appellate Adjudication  
US NRC - Mail Stop 0-16 C1  
Washington, DC 20555-0001

Office of the Secretary of the Commission  
U.S. Nuclear Regulatory Commission  
Mail Stop O-16 C1  
Washington, D.C. 20555-0001  
Attn: Rulemaking and Adjudications Staff

ALJ US NRC  
G. Paul Bollwerk, III, Esq.,  
Chair  
Mail Stop T-3 F23  
Washington, DC 20555-0001

US NRC  
Office of the General Counsel  
Lloyd B. Subin, Esquire  
Mail Stop O-15 D21  
Washington, DC 2055-0001

ALJ US NRC  
Dr. Richard F. Cole  
Mail Stop T-3 F23  
Washington, DC 20555-0001

David Lewis, Esquire  
PPL c/o Pillsbury, Winthrop et al  
2300 N. Street, NW  
Washington, DC 20037

ALJ US NRC  
Dr. Lester S. Rubenstein  
Mail Stop T-23 F23  
Washington, D.C. 20555-0001

ALJ US NRC  
Dr. Lester S. Rubenstein  
1820 Avenida del Mundo  
Coronado, CA 92118

cc:

Paul O. Swartz  
Executive Director  
Susquehanna River Basin Commission  
1721 North Front Street  
Harrisburg, PA 17102-2391

Michael Brownell  
Chief, Water Resource Management Division  
Susquehanna River Basin Commission  
1721 North Front Street  
Harrisburg, PA 17102-2391

Paul E. Russell, Esquire  
PPL Electric Utilities Corporation  
Two North Ninth Street  
Allentown, PA 18101-1179

James J. McNulty, Secretary  
Pennsylvania Public Utility Commission  
Commonwealth Keystone Building  
400 North Street  
Harrisburg, PA 17120

DEP - RCSOB  
Cathleen Myers, DEP  
Deputy Secretary  
PO Box 2063  
Market Street  
Harrisburg, PA 17105-2063

**ENCLOSURE 1**

July 18, 2007

Mr. Randy C. Bunt, Chair  
BWR Owners' Group  
Southern Nuclear Operating Company  
40 Inverness Center Parkway/Bin B057  
Birmingham, AL 35242

SUBJECT: POTENTIAL ADVERSE FLOW EFFECTS IN NUCLEAR POWER PLANTS

Dear Mr. Bunt:

Between 2002 and 2006, the Quad Cities Nuclear Power Station, Units 1 and 2 (Quad Cities), boiling water reactor (BWR) nuclear power plants experienced severe degradation of the steam dryers and main steam line relief valves during extended power uprate operation. To resolve this problem at Quad Cities, main steam system modifications were necessary to reduce the pressure loading on the steam dryer and vibrations in main steam line piping and components. Further, Palo Verde Nuclear Generating Station, Unit 1, pressurized water reactor (PWR) nuclear power plant experienced damage from adverse flow effects in a shutdown cooling line resulting from acoustic resonance with subsequent plant modifications performed to address the problem. As a result of these operating experience issues, the nuclear industry and U.S. Nuclear Regulatory Commission (NRC) staff are evaluating potential adverse flow effects from hydrodynamic loads and acoustic resonance in nuclear power plants in much more detail than in the past.

The acoustic resonance phenomenon that causes adverse flow effects in nuclear power plants is highly complex and requires extensive analyses to evaluate its potential impact on nuclear power plant structures, systems, and components over a wide frequency range. Further, scale model testing (SMT) and analytical tools have not matured sufficiently to allow minimal error and uncertainty values to be used in their application. This has resulted in the need to have significant margin available in stress analyses performed on nuclear power plant components (primarily BWR steam dryers) to account for errors and uncertainties. Consequently, applicants for power uprates, design certifications, construction permits, and operating licenses have a significant challenge in addressing potential adverse flow effects on nuclear power plant structures, systems, and components for their specific applications.

The NRC staff has updated Regulatory Guide 1.20, "Comprehensive Vibration Assessment Program for Reactor Internals During Preoperational and Initial Startup Testing," and the Standard Review Plan (SRP) in Sections 3.9.2, "Dynamic Testing and Analyses of Systems, Structures, and Components," and 3.9.5, "Reactor Pressure Vessel Internals," to incorporate lessons learned from operating experience and the review of power uprate submittals. However, the NRC staff believes that additional generic communication would be helpful to the nuclear industry in addressing potential adverse flow effects in an adequate manner in power uprate and new reactor applications for BWRs and PWRs. Therefore, the NRC staff is considering the preparation of a Regulatory Issue Summary (RIS) to discuss the evaluation of potential adverse flow effects for power uprates and new reactors.



The NRC staff is considering addressing the following topics in the RIS:

1. Pressure Fluctuations and Vibration in Plant Systems (including the construction and validation of a small SMT facility, and method and approach for the measurement of plant-specific data to determine pressure fluctuations and vibration that can impact structures, systems, and components)
2. Design Load Definition for Steam Dryers (including the development of an analytical methodology to calculate fluctuating pressure loads on the steam dryer that is validated against SMT data and plant-specific instrumented steam dryers)
3. BWR Steam Dryer Stress and Limit Curves (including the performance of a finite element analysis using appropriate damping values, justification of bias error and uncertainty for each category of the stress calculation on a frequency-specific basis, and development of limit curves based on plant data accounting for bias errors and uncertainties as well as concentration and weld size factors)
4. PWR Steam Generator Stress and Design Margin (including the evaluation of the dynamic response, stress, and design margin of the internal components in steam generators)
5. Evaluation of Other Plant Components (including the evaluation of potential adverse effects from pressure fluctuations and vibration on piping and components in reactor coolant, steam, feedwater, and condensate systems, such as safety relief valves, power-operated valves, and sampling probes)
6. Power Ascension Data (including the development of power ascension procedures with limit curves and frequent data collection, walkdowns, and hold points for data evaluation and NRC staff interaction)
7. Monitoring of Potential Adverse Flow Effects (including the development of proactive methods for identifying acoustic resonance or severe hydrodynamic loading prior to component failure)

If you have any suggestions regarding these considerations, we would appreciate receiving your comments within one month such that the NRC staff can prepare the proposed RIS in a timely manner.

Please contact Kamal Manoly, Chief, Mechanical & Civil Engineering Branch, Division of Engineering, Office of Nuclear Reactor Regulation, at 301-415-2765, for any additional information.

Sincerely,

*/RA/*

John A. Grobe, Associate Director  
for Engineering and Safety Systems  
Office of Nuclear Reactor Regulation

Project No. 691

cc: See next page

The NRC staff is considering addressing the following topics in the RIS:

1. Pressure Fluctuations and Vibration in Plant Systems (including the construction and validation of a small SMT facility, and method and approach for the measurement of plant-specific data to determine pressure fluctuations and vibration that can impact structures, systems, and components)
2. Design Load Definition for Steam Dryers (including the development of an analytical methodology to calculate fluctuating pressure loads on the steam dryer that is validated against SMT data and plant-specific instrumented steam dryers)
3. BWR Steam Dryer Stress and Limit Curves (including the performance of a finite element analysis using appropriate damping values, justification of bias error and uncertainty for each category of the stress calculation on a frequency-specific basis, and development of limit curves based on plant data accounting for bias errors and uncertainties as well as concentration and weld size factors)
4. PWR Steam Generator Stress and Design Margin (including the evaluation of the dynamic response, stress, and design margin of the internal components in steam generators)
5. Evaluation of Other Plant Components (including the evaluation of potential adverse effects from pressure fluctuations and vibration on piping and components in reactor coolant, steam, feedwater, and condensate systems, such as safety relief valves, power-operated valves, and sampling probes)
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If you have any suggestions regarding these considerations, we would appreciate receiving your comments within one month such that the NRC staff can prepare the proposed RIS in a timely manner.

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Sincerely,  
*IRA*

John A. Grobe, Associate Director  
for Engineering and Safety Systems  
Office of Nuclear Reactor Regulation

Project No. 691

cc: See next page

**ADAMS ACCESSION NO.: ML071710615**

**NRR-106**

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NAME	MCase	PHiland	JGrobe			
DATE	7/6/07	7/9/07	7/18/07			

Letter to Randy C. Bunt from John A. Grobe dated: July 18, 2007

SUBJECT: POTENTIAL ADVERSE FLOW EFFECTS IN NUCLEAR POWER PLANTS

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Kamal Manoly

Thomas Scarborough

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Matthew Mitchell

John Honcharik

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BWR Owners' Group

Project No. 691

Mr. Doug Coleman  
Vice Chair, BWR Owners' Group  
Energy Northwest  
Columbia Generating Station  
Mail Drp PE20  
P.O. Box 968  
Richland, WA 99352-0968  
[DWCOLEMAN@energy-northwest.com](mailto:DWCOLEMAN@energy-northwest.com)

Mr. Amir Shahkarami  
Executive Chair, BWR Owners' Group  
Exelon Generation Co., LLC  
Cornerstone II at Cantera  
4300 Winfield Road  
Warrenville, IL 60555  
[amir.shahkarami@exeloncorp.com](mailto:amir.shahkarami@exeloncorp.com)

Mr. Richard Libra  
Executive Vice Chair, BWR Owners' Group  
DTE Energy - Fermi 2  
M/C 280 OBA  
6400 North Dixie Highway  
Newport, MI 48166  
[librar@dteenergy.com](mailto:librar@dteenergy.com)

Mr. William A. Eaton  
Entergy Operations Inc.  
P.O. Box 31995  
Jackson, MS 39286  
[weaton@entergy.com](mailto:weaton@entergy.com)

Mr. Richard Anderson  
First Energy Nuclear Operating Co  
Perry Nuclear Power Plant  
10 Center Road  
Perry, OH 44081  
[randerson@firstenergycorp.com](mailto:randerson@firstenergycorp.com)

Mr. Scott Oxenford  
Energy Northwest  
Columbia Generating Station  
Mail Drp PE04  
P.O. Box 968  
Richland, WA 99352-0968  
[wsoxenford@energy-northwest.com](mailto:wsoxenford@energy-northwest.com)

Mr. James F. Klapproth  
GE Energy  
M/C A-16  
3901 Castle Hayne Road  
Wilmington, NC 28401  
[james.klapproth@gene.ge.com](mailto:james.klapproth@gene.ge.com)

Mr. Joseph E. Conen  
Regulatory Response Group Chair  
BWR Owners' Group  
DTE Energy-Fermi 2  
200 TAC  
6400 N. Dixie Highway  
Newport, MI 48166  
[conenj@dteenergy.com](mailto:conenj@dteenergy.com)

Mr. J. A. Gray, Jr.  
Regulatory Response Group Vice-Chair  
BWR Owners' Group  
Entergy Nuclear Northeast  
440 Hamilton Avenue Mail Stop 12C  
White Plains, NY 10601-5029  
[JGray4@entergy.com](mailto:JGray4@entergy.com)

Mr. Ken A. McCall, Program Manager  
GE Energy  
M/C A-16  
3901 Castle Hayne Road  
Wilmington, NC 28401  
[kenneth.mccall@ge.com](mailto:kenneth.mccall@ge.com)

Mr. Tim E. Abney  
GE Energy  
M/C A-16  
3901 Castle Hayne Road  
Wilmington, NC 28401  
[tim.abney@ge.com](mailto:tim.abney@ge.com)

4/17/07

GHNE

Project No. 710

cc:

Mr. George B. Stramback  
GE-Hitachi Nuclear Energy Americas LLC  
1989 Little Orchard Street  
M/C HME  
San Jose, CA 95125-1030  
[george.stramback@ge.com](mailto:george.stramback@ge.com)

Mr. James F. Harrison  
GE-Hitachi Nuclear Energy Americas LLC  
Project Manager - Fuel Licensing  
P.O. Box 780  
M/C A45  
Wilmington, NC 28401  
[james.harrison@ge.com](mailto:james.harrison@ge.com)

Ms. Patricia L. Campbell  
Washington Regulatory Affairs Director  
GE-Hitachi Nuclear Energy Americas LLC  
1299 Pennsylvania Avenue, NW  
9th Floor  
Washington, DC 20004  
[patricia.campbell@ge.com](mailto:patricia.campbell@ge.com)

Mr. Andrew A. Lingenfelter  
Manager, GNF Fuel Engineering  
P.O. Box 780  
M/C F12  
Wilmington, NC 28401  
[andy.lingenfelter@gnf.com](mailto:andy.lingenfelter@gnf.com)

Mr. Robert E. Brown  
Senior Vice President, Regulatory Affairs  
GE-Hitachi Nuclear Energy Americas LLC  
P. O. Box 780, M/C A-30  
Wilmington, NC 28401  
[Bob.Brown@ge.com](mailto:Bob.Brown@ge.com)

06/22/07

BWRVIP

cc:

Randy Stark, EPRI BWRVIP  
Integration Manager  
Raj Pathania, EPRI BWRVIP  
Mitigation Manager  
Ken Wolfe, EPRI BWRVIP  
Repair Manager  
Larry Steinert, EPRI BWRVIP  
Electric Power Research Institute  
P.O. Box 10412  
3420 Hillview Ave.  
Palo Alto, CA 94303

Paul J. Davison  
BWRVIP Executive Oversight Committee  
PSEG Nuclear, LLC  
Salem/Hope Creek Nuclear Station  
11 Yubas Ave.  
Burlington, NJ 08016

Bob Geier, Technical Chairman  
BWRVIP Assessment Committee  
Exelon Corporation  
Cornerstone II at Cantera  
4300 Winfield Rd.  
Warrenville, IL 60555

Denver Atwood, Technical Chairman  
BWRVIP Repair Focus Group  
Southern Nuclear Operating Co.  
Post Office Box 1295  
40 Inverness Center Parkway  
(M/S B031)  
Birmingham, AL 35242-4809

Jeff Goldstein, Technical Chairman  
BWRVIP Mitigation Committee  
Entergy Nuclear NE  
440 Hamilton Ave. (M/S K-WPO-11c)  
White Plains, NY 10601

Charles J. Wirtz, Chairman  
Technical Chairman BWRVIP Integration  
Committee  
FirstEnergy Corp.  
Perry Nuclear Power Plant  
(M/S A250)  
10 Center Road  
Perry, OH 44081

Amir Shahkarami, Executive Chairman  
BWRVIP Integration Committee  
Exelon Corporation  
Cornerstone II at Cantera  
4300 Winfield Rd.  
Warrenville, IL 60555-4012

Robert Carter, EPRI BWRVIP  
Assessment Manager  
Jeff Landrum, EPRI BWRVIP  
Inspection Manager  
EPRI NDE Center  
P.O. Box 217097  
1300 W. T. Harris Blvd.  
Charlotte, NC 28221

Richard Anderson, Executive Chairman  
BWRVIP Assessment Committee  
Vice President, Nuclear  
FirstEnergy Service Co.  
Perry Nuclear Power Plant (M/S A-PY-290)  
10 Center Road  
Perry, OH 44081

Joe Donahue  
BWRVIP Executive Oversight Committee  
V. P., Nuclear Engineering & Services  
Progress Energy, Inc.  
410 S. Wilmington St. (M/S PEB6)  
Raleigh, NC 27601-1849

Dennis Madison  
BWRVIP Executive Oversight Committee  
Site Vice President  
Southern Nuclear Operating Co.  
Edwin I. Hatch Nuclear Plant  
US Hwy 1 N  
Baxley, GA 31515-2010