October 4, 1979

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Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 324
LICENSE NOS. DPR-72 AND 61
HIGH ENERGY LINE BREAK ENVIRONMENTAL EFFECTS ON CONTROL SYSTEMS

Dear Mr. Denton:

This letter responds to your September 17, 1979, letter on the subject of a "potential unreviewed safety question on interaction between non-safety grade systems and safety grade systems." This potential problem was further addressed in IE Information Notice 79-22, dated September 14, 1979. This report also contains the more specific and comprehensive information and analysis requested by your staff during a September 20, 1979, meeting on this issue.

The assessment has not identified any impact on safety actions or analysis conclusions which would increase the consequences (calculated peak cladding temperature, peak containment pressure, peak suppression pool temperature, or radiological release) of any SAR events. In particular, the assessment concludes that:

1. No previously performed safety analyses would be adversely affected by the failure of non-safety equipment due to environmental effects of high energy pipe breaks (HEPB's), and

2. No previously identified safety limits would be violated by the subject effects.

The attached tables identify the systems examined at the Brunswick Plant and their potential for failures which could affect safety system performance for a variety of postulated high energy pipe breaks, locations, and sizes. Table 1 describes those non-safety systems which have been examined and found to have at least the potential for interaction, while Table 2 lists those systems for which no system failure can affect a safety system response.

It will be noted that there are no entries where a postulated non-safety system failure could adversely affect safety system

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performance. This results from the almost complete decoupling of the BWR nuclear steam supply and containment system from non-safety BOP equipment and functions.

A number of observations should be made even in light of the successful evaluation.

1. It should be noted that the criteria and suggested NRC Staff evaluation basis involved in this assessment are new recently evolved requirements from RG 1.70, Rev. 2.

   Previous plant design bases for non-safety equipment established a "fail as is" mode rather than the present "fail in worst position." This is a rather arbitrary and extremely conservative requirement.

2. Evaluation of plant safety as regards HEPB's have been conducted in recent years. Comprehensive analyses were submitted to the NRC Staff and their approval was documented in individual plant SER's. Reevaluation here for more severe criteria has confirmed the previous safety audit.

3. The BWR includes a number of inherent characteristics which are specifically important to this issue:

   a. Thorough evaluation of outside containment line breaks for radiological reasons has resulted in a set of comprehensive, sensitive leak detection and isolation systems on BWR's;

   b. The BWR does not depend on non-safety equipment for safety actions;

   c. The separation of protection systems from control systems has long been a rule relative to safety function reliability;

   d. As previously noted, HEPB analyses have been performed and verified physically at BWR facilities;

   e. The BWR has treated intersystem relationships in considerable detail in a standard SAR section, the Nuclear Safety Operational Analysis (NSOA). This systematic evaluation of the BWR system has proven to be very valuable relative to environmental impacts effects analysis;

   f. Transient and accident analyses of BWR's are conservatively bounded in most cases with respect to non-safety system performance.

In summary, this submittal is the result of an extensive reevaluation of the potential impact of non-safety systems on safety functions. The previously approved safety evaluations remain valid. Further dialogue or discussions in this area, if necessary, should be conducted after the Lessons Learned Task Force recommendations and the Bulletin & Orders analysis tasks are resolved.

Yours very truly,

M A McDuffie

for E. E. Utley
Executive Vice President
Power Supply & Customer Services

JSB/CSB/jnh*

Sworn to and subscribed before me this 4th day of October, 1979.

My commission expires: October 4, 1981.

Franklin Murray
NOTARY PUBLIC

FRANKLIN MURRAY
NOTARY PUBLIC
WAKE COUNTY, N. C.

TABLE 1 ENVIRONMENTAL INTERACTION

Non-Safety Systems	Location	Main Steam Line				Feedwater			LOCA Inside Breaks		RWCU	RCIC	HPCI
		Inside Small	Inside Large	Reactor Bldg.	Turbine Bldg.	Inside	Reactor Bldg.	Turbine Bldg.	Sml	Lrg	Outside	Outside	Outside
Recirc System													
·Pumps	DW	2	2	4	4	2	4	4	2	2	4	4	4
·Valves & Opers.	DW	3	3	4	4	3	4	4	3	3	4	4	4
·MG Sets	TB	4	4	4	4	4	4	4	4	4	4	4	4
·MCC	TB	4	4	4	4	4	4	4	4	4	4	4	4
·Flow Con. Sys.	CR	4	4	4	4	4	4	4	4	4	4	4	4
·Con. Inst. Tmitters	RB	4	4	2	4	4	2	4	4	4	4	2	4
Feedwater Delivery													
·Flow Elements	TB	4	4	4	2	4	4	2	4	4	4	4	4
·Level	DN/RB	2	2	4	4	2	4	4	2	2	4	4	4
·Pumps	TB	4	4	4	2	4	4	2	4	4	4	4	4
·Valves & Opers.	TB	4	4	4	2	4	4	2	4	4	4	4	4
·MCC	TB	4	4	4	4	4	4	4	4	4	4	4	4
·Flow Con. Sys.	CR	4	4	4	4	4	4	4	4	4	4	4	4
·FW Heating	TB	4	4	4	2	4	4	2	4	4	4	4	4
·Instrument Air	TB/RB	4	4	2	2	4	2	2	4	4	4	4	4
·Con. Inst. Tmitters	TB/RB	4	4	2	2	4	2	2	4	4	2	2	2
Turbine Pressure Controls													
·Bypass Valves	TB	4	4	4	2	4	4	2	4	4	4	4	4
·Pressure Sensors	TB	4	4	4	2	4	4	2	4	4	4	4	4
·Control System	CR	4	4	4	4	4	4	4	4	4	4	4	4
·EHC	TB	4	4	4	2	4	4	2	4	4	4	4	4
Neutron Monitoring													
·LPRMS & Cables	DW/RB	2	2	2	4	2	2	4	2	2	2	2	2
·IRMS & Cables	DW/RB	2	2	2	4	2	2	4	2	2	2	2	2
·RPIS/RW Blk. Mon.	DW/RB	2	2	2	4	2	2	4	2	2	2	2	2
Reactor Protection													
·Turbine Scram	TB	4	4	4	2	4	4	2	4	4	4	4	4
·ML Set	CB	4	4	4	4	4	4	4	4	4	4	4	4
Reactor Man. Con.	RB/CR	4	4	2	4	4	2	4	4	4	2	2	2
SRV Sys.(Non-ADS)	DW/RB	3	3	4	4	3	4	4	3	3	4	4	4
RBCCW	RB	4	4	2	4	4	2	4	4	4	4	4	4

Non-Safety Systems	Location	Main Steam Line				Feedwater			LOCA Inside Breaks		RWCU	RCIC	HPCI
		Inside Small	Inside Large	Reactor Bldg.	Turbine Bldg.	Inside	Reactor Bldg.	Turbine Bldg.	Sml	Lrg	Outside	Outside	Outside
RWCU	DW/RB	3	3	2	4	3	2	4	3	3	2	4	4
Circ Water	TB	4	4	4	2	4	4	2	4	4	4	4	4
HVAC	All	2	2	2	2	2	2	2	2	2	4	2	2
SLC	DW/RB	3	3	2	4	3	2	4	3	3	4	4	4
AC Aux. Electric	RB/TB	4	4	4	4	4	4	4	4	4	4	4	4
Cond. Tfer. & Storage-Demin. Water	TB/RB	4	4	4	4	4	4	4	4	4	2	4	4
Main Turbine & Contr.	TB	4	4	4	?	4	4	2	4	4	4	4	4
Main Cond. & Control	TB	4	4	4	2	4	4	2	4	4	4	4	4
Instrument Air													
·Compressors	TB	4	4	4	4	4	4	4	4	4	4	4	4
·Controls	TB/RB/DW	4	4	2	2	4	2	2	4	4	4	4	4
Fire Protection	TB/RB/DB	4	4	2	2	4	2	2	4	4	2	2	2
CRD Hydraulic (Non-Scram)	RB	4	4	2	4	4	2	4	4	4	4	2	4
RV Head Vent	DW	2	2	4	4	2	4	4	3	3	4	4	4
Suppression Pool													
·Temp. Mont.	RB/Torrus	3	3	4	4	3	4	4	3	3	4	4	4
·Level Mont.	RB/Torrus	3	3	4	4	?	4	4	3	3	4	2	2

1 - Environmental induced malfunction may provide an adverse response
2 - Environmental induced malfunction will not provide an adverse response
3 - System is qualified for adverse environment
4 - System will not experience adverse environment
5 - No system failure can affect safety system response

TABLE 2

System	Any High Energy Break
Lighting	5
Communications	5
Service Air	5
Equipment Drain Piping	5
Drywell Temp. Monitoring	5
Under Vessel Maintenance Equipment	5
Process Computer	5
Area Radiation Monitoring	5
Process Radiation Monitoring (Non-safety Part)	5
Sampling Systems	5
Maintenance Monorails	5
Environs Monitoring	5
Potable Water	5
Screen Wash	5
Hydrogen Cooling	5
Condenser Priming	5
TBCCW	5
Stator Cooling	5
Offgas	5
Radwaste	5