

CP&L

Carolina Power & Light Company

P. O. Box 1551 • Raleigh, N. C. 27602

MAY 11 1988

LYNN W. EURY
Senior Vice President
Operations Support

SERIAL: NLS-88-119
10CFR50.62

United States Nuclear Regulatory Commission
ATTENTION: Dr. Thomas E. Murley
Director, Nuclear Reactor Regulation
Washington, D. C. 20555

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 & 50-324/LICENSE NOS. DPR-71 & DPR-62
COMPLIANCE WITH THE TECHNICAL AND SCHEDULE REQUIREMENTS OF THE ATWS RULE

Dear Dr. Murley:

The Nuclear Regulatory Commission issued a Safety Evaluation Report (SER) for the Brunswick Steam Electric Plant Unit 2 on April 8, 1988 regarding recirculation pump trip instrumentation. In the SER, the Staff concluded that the type of signal conditioning (Rosemount analog transmitter/trip units) provided for the Brunswick ATWS design does not meet the diversity requirements of 10CFR50.62 in that diversity, to the extent reasonable and practicable, has not been provided. The NRC granted a one-cycle extension for Unit 2 to allow the Company time to achieve compliance with the ATWS Rule.

The Company disagrees with the conclusions of the Staff for the reasons stated in Enclosure 1 and requests reconsideration of the Staff position. An identical system is planned to be installed during the upcoming Unit 1 outage scheduled to commence in November, 1988. Therefore, the Company requests to delay implementation of the ATWS rule for one additional operating cycle for Unit 1 if this appeal is denied. Justification for this extension is provided in Enclosure 2.

It is requested that your response to this appeal, and the one cycle extension if necessary, be provided no later than June 15, 1988 to minimize the impact on the upcoming Unit 1 outage.

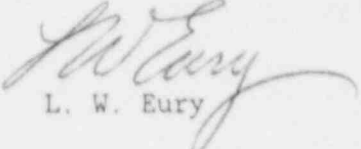
In accordance with the requirements of 10CFR170.12, a check for \$150 is also enclosed.

*A055 w/ check
1/1 \$150
#954690*

8805180217 880511
PDR ADQCK 05000324
P DCD

Please refer any questions regarding this submittal to Mr. Stephen D. Floyd at (919) 836-6901.

Yours very truly,


L. W. Eury

LWE/SDF(\cor\)

Enclosures

cc: Dr. J. Nelson Grace
Mr. W. H. Ruland
Mr. E. D. Sylvester
NRC Document Control Desk
R. F. Janecek (BWR Owner's Group)



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

May 16, 1988

Trace

I talked to Carolina Power & Light, and they said page 3 was their internal distribution list. After the document became final they forgot to re-paginate. We don't need page 3 in this document. I recommend we accept it as submitted.

Eric Sylvester

x 21455

ENCLOSURE 1

Carolina Power and Light Company believes the design of the ATWS system installed in Unit 2 and planned to be installed in Unit 1 meets the requirements of the ATWS rule (10CFR50.62) for the reasons stated below.

The ATWS rule requires an alternate rod injection (ARI) system that is diverse (from the reactor trip system) from sensor output to the final actuation device. The Staff has concluded that the Brunswick Plant design does not meet this requirement in that Rosemount analog trip units are used in both the reactor trip system and the ARI system. Appendix 1 to the April 8, 1988 SER states that an "...acceptable level of component/hardware diversity can be achieved in accordance with combinations of allowable methods such as energization states, AC versus DC power, functional capability, and the use of components from different manufacturers." The Company contends that diversity does exist between the Brunswick Plant reactor trip and ARI systems based on the following:

1. The reactor trip system de-energizes to actuate whereas the ARI system energizes to actuate.
2. The reactor trip system is DC powered whereas the ARI system is AC powered.
3. The reactor trip system utilizes a one out of two twice logic scheme whereas the ARI system utilizes a two out of two logic scheme.
4. Rosemount analog trip units are only used in the reactor pressure and reactor level trip channels of the reactor trip system. The following reactor trip channels are available to trip the reactor and do not employ a Rosemount analog trip unit.
 - a. High Neutron Flux
 - b. Turbine Stop Valve Closure
 - c. Turbine Control Valve Fast Closure
 - d. Main Steam Line Isolation
 - e. Scram Discharge Volume High Water Level
 - f. Main Steam Line High Radiation
 - g. Manual Scram
 - h. Reactor System Mode Selector Switch in SHUTDOWN

Therefore, equipment diversity is achieved in the majority of the reactor trip system channels. The NRC concern centers on the potential for a common mode failure of the Rosemount analog trip units such that the reactor pressure and reactor level trip channels would not be available in either the RPS or ARI system. Table 1 (Reference NEDC-30844) shows that even if a common mode failure of the Rosemount analog trip units in the ARI system and the RPS were to occur, a scram signal would be initiated by at least one remaining channel in the RPS that does not utilize Rosemount analog trip units. The common mode failure of concern to the Staff would not prevent a reactor scram because there is equipment diversity to provide a scram signal for the postulated ATWS initiating events, even if the common mode failure were to occur.

As shown above, the ARI system is functionally and logically diverse from all RPS channels. In addition, as discussed above, the ARI system is equipment diverse from a sufficient portion of the RPS channels to provide a scram signal if a common mode failure of the Rosemount analog trip units were to occur. In essence, the NRC is requiring additional equipment diversity. The Statements of Consideration to the ATWS rule state that "Equipment diversity to the extent reasonable and practicable to minimize the potential for common cause failures is required from the sensors to and including the components used to interrupt control rod power or vent the scram air header." CP&L has concluded that it is not "reasonable and practicable" to provide additional equipment diversity for the following reasons.

1. The common mode failure of concern to the Staff does not prevent a reactor scram for the postulated ATWS initiating events.
2. The Company has recently completed a Level 1 PRA for the Brunswick Plant. The significance of the common mode failure concern has been assessed by determining the change in core damage frequency (CDF) for two cases. Case 1 assumed an ARI system beta factor (common cause factor, which includes common mode failure) of 0.2 from NEDC-30844. The selection of this factor is conservative since the actual contribution of common mode failure would be less than the total common cause failure potential. Case 2 assumed a beta factor for the ARI system of zero (i.e., all common cause and common mode failure is eliminated). This factor is also conservative since merely providing equipment diversity in the analog trip units would not remove all common mode failure or common cause failure potential. The combined conservatism of the two cases serves to exaggerate the perceived benefits of removing common mode failure potential by replacing the analog trip units. Even so, the following results demonstrate the insignificance of removing

the potential for common mode failure of the Rosemount analog trip units.

<u>CASE</u>	<u>CDF</u>
Case 1 - Beta = 0.2	2.38E-5
Case 2 - Beta = 0.0	2.36E-5

The difference between the two cases is $2.0E-7$. Given the negligible improvement in CDF, we do not consider it reasonable to provide additional equipment diversity. The fault tree for the above assessment is depicted in Figure 1.

3. The Company has also evaluated the cost of providing additional equipment diversity. It would cost the Company approximately \$675,000 per unit for engineering, procurement and installation of an analog trip unit of a different manufacturer in order to reduce the potential for common mode failure. Since we believe the ARI system is diverse from the RPS for the reasons stated above, and since additional equipment diversity provides negligible improvement in CDF, we do not believe it is reasonable or practicable to incur the cost of additional diversity.

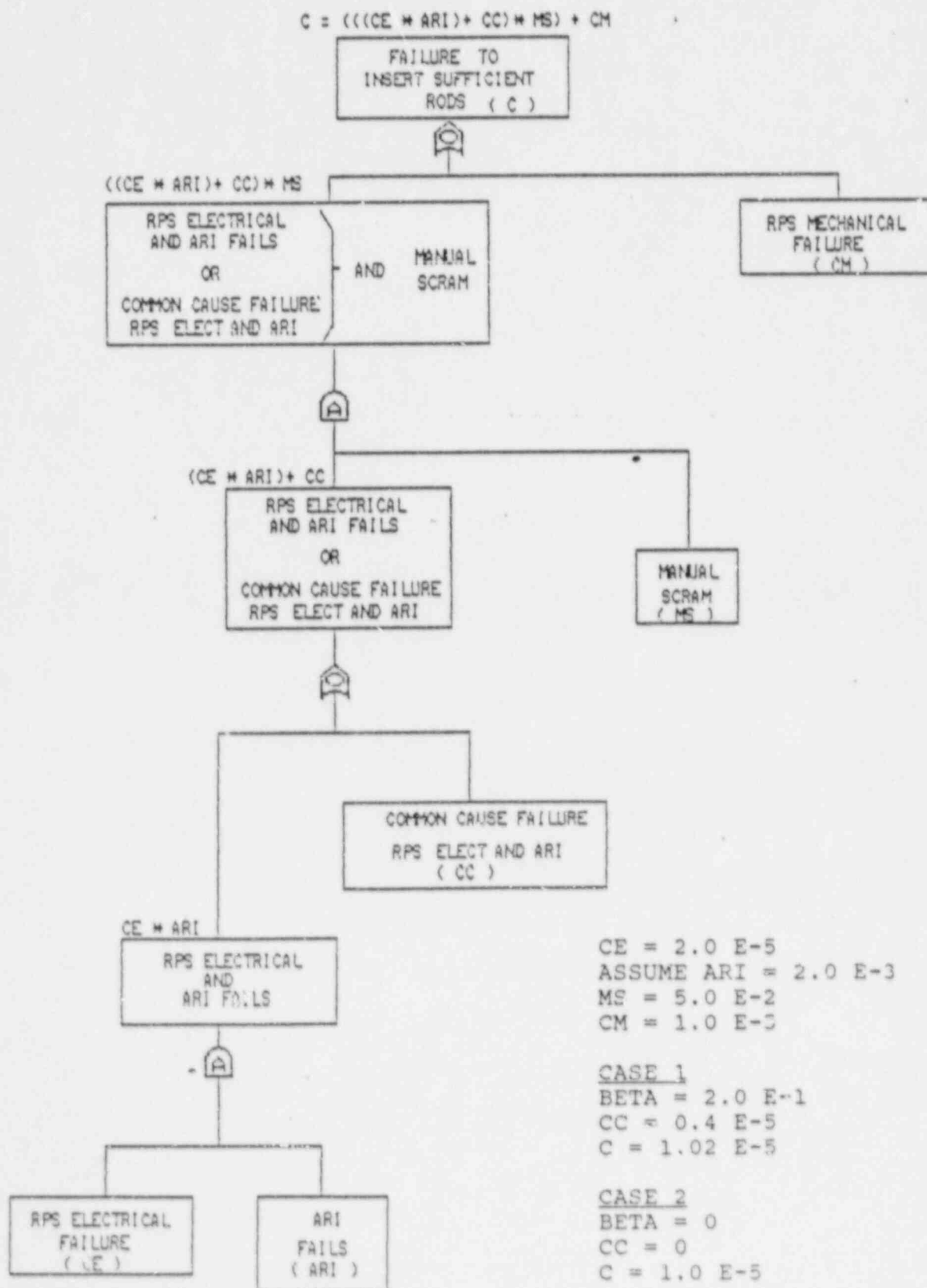
In summary, the Company believes the ARI system is diverse from the RPS and, therefore, meets the requirements of 10CFR50.62. The Staff position that additional equipment diversity is needed does not meet the test of "reasonable and practicable" discussed in the Statements of Consideration to the ATWS Rule because of the high cost incurred in achieving essentially no safety improvement and the fact that the common mode failure of concern would not prevent a reactor scram for the postulated ATWS initiating events.

TABLE 1

SENSOR DIVERSITY FOR INITIATING EVENTS

Initiating Events	SCRAM SENSORS FOR INITIATING EVENTS							
	Pressure or Differential Pressure Transmitters and Trip Units			Pressure, Position or Micro Switch Contact Opening		Neutron Flux or Radiation Sensors		
	High Reactor Pressure	Reactor Level > Level 8	Reactor Level < Level 3	Turbine Control Valve Oil Pressure Set Point	Turbine Stop Valve Position < 90% Full Open	MSIV Position < 90% Full Open	APCH > Set Point	MSIV High Radiation > Set Point
MSIV Closure	X		X			X	X	
Turb Trip (with bypass)	X			X	X		X	
Generator Trip (with bypass)	X			X			X	
Pressure Regulator Failure (Primary pressure decrease) (MSIV closure trip)	X		X			X	X	
Pressure Regulator Failure (Primary pressure decrease) (Level 8 trip)	X				X		X	
Pressure Regulator Failure (Primary pressure increase)	X						X	
Feedwater Flow Control Failure (High reactor water level)	X				X		X	
Feedwater Flow Control Failure (Low reactor water level)	X		X			X		X
Loss of Condenser Vacuum	X				X	X	X	
Loss of AC Power (Loss of transformer)	X		X		X	X		
Loss of AC Power (Loss of grid connections)	X		X	X	X	X	X	

FIGURE 1



ENCLOSURE 2

The ATWS Rule requires justification if the schedule calls for final implementation later than the second refueling outage after July 26, 1984. A final schedule can then be mutually agreed upon by the Commission and licensee. Carolina Power and Light Company believes justification exists for mutually agreeing to an implementation date coincident with startup for Unit 1 Reload 7, currently scheduled for the Spring of 1990, based on the following:

1. The Company was not notified of the NRC decision that the ARI system design did not meet the ATWS Rule requirements until April 8, 1988.
2. The next refueling outage for Unit 1 is currently scheduled to commence November 11, 1988. We have estimated it will take approximately 7 months to redesign the system to utilize analog trip units from a different manufacturer, 4 months for final design review and acceptance, and 6 months for procurement. Insufficient time remains to accomplish these tasks before the next outage if our appeal for acceptance of the current design is rejected.
3. The ATWS rule acknowledged the time it takes to design, procure, and install ATWS modifications by allowing two refueling intervals to accomplish the work. The above schedule is consistent with this time interval.
4. The Company intends to install the as-designed system during the next refueling outage. The as-designed system provides substantial compliance with the ATWS rule. As discussed in Enclosure 1, the NPC desired changes to the as-designed system provide only negligible improvements in safety. Therefore, allowing CP&L an additional outage to perform the modifications to the ARI system does not result in a significant risk to the public health and safety.