October 23, 1984

DCR 016

Docket Nos. 50-277
and 50-278

Mr. Edward G. Bauer, Jr.
Vice President and General Counsel
Philadelphia Electric Company
2301 Market Street
Philadelphia, Pennsylvania 19101

Dear Mr. Bauer:

SUBJECT: NUREG-0737, ITEM II.K.3.16-REDUCTION OF CHALLENGE AND FAILURE OF RELIEF VALVES

Re: Peach Bottom Atomic Power Station, Units 2 and 3

As a result of the TMI-2 accident, it was concluded that in a boiling water reactor (BWR), failure of a safety/relief valve (SRV) to close would be the most likely cause of a small-break Loss-of-Coolant Accident (LOCA). At the time, the operating history of SRVs had been poor, resulting in a relatively high failure rate per challenge.

NUREG-0737, Item II.K.3.16 required BWR licensees and BWR operating license applicants to investigate the feasibility of a number of actions and modifications to reduce challenges to SRVs. The objective of the task was to effect sufficient changes so as to substantially reduce challenges to SRVs by an order of magnitude. This evaluation was performed by the BWR Owners Group (BWROG-8134).

By letter dated April 23, 1984, we sent you our generic Safety Evaluation (SE) of the BWR Owners Group study, endorsing three specific modifications along with an effective preventative maintenance program. Our letter requested that you advise us of what actions you have taken or propose to take to reduce challenges and failures of SRVs in your facilities. You responded by letter dated June 19, 1984.

We have reviewed your response and conclude that, in total, the actions you have taken or have committed to take will achieve the objective of NUREG-0737, Item II.K.3.16. Therefore, we consider this task resolved for Peach Bottom Units 2 and 3. For your information we have enclosed our generic Safety Evaluation (Enclosure 1) which was previously sent to you on April 23, 1984.

Sincerely,

/s/

John F. Stolz, Chief
Operating Reactors Branch No. 4
Division of Licensing

Enclosure:
As stated

cc w/enclosure:
See next page

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ENCLOSURE 1

SAFETY EVALUATION REPORT
OPERATING BWR LICENSEES RESPONSE
TO THE STAFF RECOMMENDATIONS
TO ITEM II.K.3.16 OF NUREG-0737,
"REDUCTION OF CHALLENGES AND
FAILURES OF RELIEF VALVES-FEASIBILITY
STUDY AND SYSTEM MODIFICATION"

BACKGROUND

The BWR Owners' Group has performed a detailed feasibility study of system modifications and safety/relief valve design modifications to reduce relief valve challenges and failures. In addition, General Electric performed a detailed evaluation, considering design transients, transient frequency and number of initial and subsequent SRV actuations to determine the maximum benefit achievable by using each system modification.

The staff has reviewed these system design modifications in detail. Some system modifications are very complex in nature and do not provide maximum benefit to reduce relief valve challenges. The staff has considered the system modifications based on the maximum benefit, simplicity and their effectiveness to reduce relief valve challenges and failures significantly.

We find the following system modifications acceptable to reduce SRV challenges and failures.

(1) Low-Low Set (LLS) Relief Logic System or Equivalent Manual Actions

(2) Lower the reactor pressure vessel water level isolation setpoint for main steam isolation valve closure from Level 2 to Level 1

(3) Increase safety/relief valve simmer margin

(4) Preventive Maintenance Program

The implementation of these system modifications would reduce significantly subsequent SRV actuations for plant transients, reactor isolations and improve overall SRV performance. The General Electric evaluation concerning maximum benefit available from such system modifications appears to be reasonable, and estimates a reduction in SRV challenges and failures by a factor of eight. These system modifications do not compromise relief valves operation or other systems performance.

EVALUATION

Operating BWR plants listed in Enclosure (3) provided their response to the staff request (2) implementating the staff recommendations to reduce relief valve challenges and failures.

Table-1 lists the staff recommended modifications implemented by all facilities. Some licensees have implemented plant specific additional

modifications based on the BWR Owners' Group study. These additional modifications will provide additional benefit to reduce relief valve challenges and failures. These are:

(1) Analog Transmitter/Trip Unit System

Some operating BWRs use direct acting pressure, differential pressure and water level switches as input into the reactor protection, main steamline isolation and emergency core cooling systems. Monthly surveillance tests have caused spurious reactor scrams, isolations and challenged to relief valves.

This modification would reduce spurious reactor scrams and isolations. Thus it will help reduce relief valve challenges.

(2) Reduced MSIV Testing Frequency

A reduction in the MSIV test frequency would result in a reduction in number of isolation events.

(3) Improved the drywell pneumatic system

This would reduce an inadvertent SRV actuation.

(4) Improved control circuitry for Dresser Electromatic relief valves

(5) Lowered RPV isolation setpoint from 880 psig to 850 psig.

This would reduce spurious isolation events.

(6) Redundant RCIC system

These plant specific additional modifications are acceptable. However, their contribution to reduce relief valve challenges and failures is not significant relative to their complexity.

We find the licensees response acceptable to reduce relief valve challenges and failures. Also these system modifications do not compromise relief valve operation or other systems performance. Furthermore, we find that these modifications do not:

(1) Involve a significant increase in the probability or consequences of an accident evaluated;

(2) Create the possibility of an accident of a type different from any evaluated previously; or

(3) Involve a significant reduction in a margin of safety.

TABLE - 1

NUREG - 0737 ITEM II.K.3.16

"REDUCTION OF CHALLENGES AND FAILURES OF RELIEF

VALVES-FEASIBILITY STUDY AND SYSTEM MODIFICATION"

PLANT	STAFF RECOMMENDED MODIFICATION				ADDITIONAL MODIFICATION BY LICENSEE
	LLS Relief Logic System Or Equivalent Manual Action	MSIV Closure from Level 2 to Level 1	Increase Safety/Relief Simmer Margin	Preventive Maintenance Program	
Browns Ferry 1/2/3	X	X	X	X	Reduced MSIV Test Frequency
Brunswick 1/2	X	Under Review	X	X	
Cooper Station	X	X	X	X	Analog Transmitter/Trip Unit System

PLANT	STAFF RECOMMENDED MODIFICATION				ADDITIONAL MODIFICATION BY LICENSEE
	LLS Relief Logic System Or Equivalent Manual Action	MSIV Closure from Level 2 to Level 1	Increase Safety/Relief Simmer Margin	Preventive Maintenance Program	
Dresden 2/3 BWR/3	X	N/A Note - 1	X	X	Analog Transmitter/Trip Unit System
Duane Arnold	X	X	X	X (Stringent leakage acceptance criteria)	Lowered RPV isolation setpoint from 880 psig to 850 psig
Fitzpatrick	X		X	X	Analog Transmitter/Trip Unit System
Hatch 1/2	X	X	X	X	(1) Analog Transmitter/Tri Unit System (2) Improved the drywell pneumatic syste

PLANT	STAFF RECOMMENDED MODIFICATION				ADDITIONAL MODIFICATION BY LICENSEE
	LLS Relief Logic System Or Equivalent Manual Action	MSIV Closure from Level 2 to Level 1	Increase Safety/Relief Simmer Margin	Preventi e Maintenance Program	
Millstone 1 BWR/3 *Isolation Condenser	X	N/A Note -1	X	X	
Monticello BWR/3	X	N/A Note - 1	X	X	
Nine Mile Point 1 BWR/2 *Isolation Condenser				x	Improved control circuitry for Dresser Electromatic relief valves
Oyster Creek 1 BWR/2 *Isolation Condenser					
Peach Bottom 2/3	X	X	X	X	(1) Analog Transmitter/ Trip Unit System

PLANT	STAFF RECOMMENDED MODIFICATION			ADDITIONAL MODIFICATION BY LICENSEE
	LLS Relief Logic System Or Equivalent Manual	MSIV Closure from Level 2 to Level 1	Increase Safety/Relief Simmer Margin	Preventive Maintenance Program	
Pilgrim 1 BWR/3	X	N/A Note - 1	X	X	
Quad Cities 1/2 BWR/3	X	N/A Note - 1	X	X	(1) Analog Transmitter/Tri Unit System (2) Redundant RCIC System
Vermont Yankee					

NOTES:

(1) MSIV Closure from Level 2 to Level 1

This system modification is not applicable to BWR/2-3 because the level instrumentation design for these plants is incompatible with the design described herein.

*(2) BWR/2-3 with isolation condenser design feature would reduce subsequent actuations of relief valves. This would serve the purpose of LLS logic or equivalent manual action.