BWR OWNERS' GROUP

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U.S. Nuclear Regulatory Commission
Division of Licensing
Office of Nuclear Reactor Regulation
Washington, D.C. 20555

Attention: Darrell G. Eisenhut, Director

SUBJECT: BWR Owners' Group Evaluation of NUREG-0737 Item II.E.4.2.(7)

Gentlemen:

This letter transmits an evaluation performed by the BWR Owners' Group for the following NUREG-0737 item:

II.E.4.2.(7). Containment Isolation Dependability -
Isolation on High Radiation

The submittal of an Owners' Group position developed in response to an NRC requirement does not indicate that the Owners' Group unanimously endorses that position; rather, it indicates that a substantial number of members believe the position is responsive to the NRC requirement and adequately satisfies the requirement. Each member must formally endorse a position so developed and submitted in order for the position to become the member's position.

General Electric will provide sixty (60) additional copies of the attachment in a separate mailing.

Please contact me at (203) 666-6911 Extension 5489 if you have any questions concerning the enclosed information.

Sincerely,

Thomas J. Dente

T. J. Dente, Chairman
BWR Owners' Group

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Enclosure

cc: BWR Owners' Group
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BWR OWNERS' GROUP EVALUATION

OF

NUREG-0737 ITEM II.E.4.2 - POSITION (7)

CONTAINMENT ISOLATION DEPENDABILITY -

ISOLATION ON HIGH RADIATION

ABSTRACT

An assessment was performed to determine the benefits of providing automatic closure of the containment vent and purge valves on a containment high radiation signal. The perceived purpose of the modification as described in NUREG-0737, Item II.E.4.2, would be to provide added assurance that isolation of those valves would occur on high radiation. This assessment shows that, based on the existing design features in the BWR, such an automatic isolation is not necessary because it will not appreciably alter the already low probability of a significant release of radioactivity through these lines. This conclusion was reached as a result of efforts directed to determine the applicable design criteria to implement the requirement. This study applies to plants which utilize Mark I and II containment designs.

INTRODUCTION

This study addresses the implementation of NUREG-0737, Item II.E.4.2.(7), which states "Containment purge and vent isolation valves must close on high radiation signal." In addition, the changes to previous requirements and guidance section of NUREG-0737 states that Position (7) was added to the original requirement in NUREG-0660 "as a result of further staff evaluation of features needed to improve containment isolation dependability." Based on these criteria, efforts were initiated to assess the optimum approach which would mitigate potential offsite radiological releases. The study showed that the addition of automatic isolation on high radiation would not appreciably improve safety.

DISCUSSION

The design basis for the containment purge and vent isolation valves is to provide a protective barrier between the primary containment and the environment for the associated lines leading to the environment. The logic network provided to automate closure of these valves is intended to preclude a significant release of radioactivity to the environment.

Automatic isolation is already achieved through diverse inputs to the containment isolation system which are indicative of a pipe break. For certain size breaks, which would cause either high drywell pressure or low reactor water level, the containment vent and purge lines are automatically isolated on either of those two diverse signals.

The containment vent and purge valves are normally closed. Operation of the valves during power modes, for the purpose of inerting and deinerting the containment, is limited by technical specifications. For many plants, the operation of these valves is limited to 90 hours per year. They are also normally open during startup. Smaller vent valves (typically 2½ inches or less) are periodically used to maintain proper pressure suppression control. Since these valves are also normally closed, the likelihood of a radiological release through the valves as a result of a break is small.

For all breaks, there are several diverse methods for detection of primary coolant boundary leakage that indicate to the operator that a high radiation condition in the containment may exist. These methods include integrated sump discharge monitoring, containment atmosphere radiation monitoring, effluent monitoring and containment atmosphere temperature monitoring. When the operator receives an abnormal reading on any of these monitors, he could manually close the large and small vent and purge line valves. This would eliminate any offsite releases for breaks whose leakage exceeds the technical specification limit.

Drywell leakage is continuously monitored through integrated readings of sump discharges. The maximum unidentified and identified leak rate is restricted by technical specifications. Continued operation is thereby restricted, when excessive leakage is detected. Thus, the probability of an undetected leak causing an undetected release is low.

The containment atmospheric monitoring system is an alternative method for detecting drywell leakage. Alarms provide notification to the operator. This system is also controlled by technical specification operability limits.

The effluent monitoring system provides continuous indication and recording of actual release to the environment. Operating procedures and technical specifications require termination of releases and or shutdown, if effluent release limits are exceeded.

If a break less than the technical specification limit is not immediately isolated by the operator, the offsite dose is small compared to 10CFR100 dose limits. A conservative radiological analysis was performed for a typical plant assuming a leak rate at the technical specification limit. The results of this analysis is .07 Rems* thyroid dose. This is well below the 10CFR100 thyroid dose limit of 300 Rems.

*Analysis is based on the following assumptions:

X/Q	= $2.7 \times 10^{-4} \frac{sec}{m^3}$
Leak rate	= 25 GPM
SGTS filtration efficiency	= 99%
Breathing rate	= 3.47×10^{-4} m^3/sec
Iodine 131 release rate	= 19.9 curies/ hr t=0
Duration of release	= 2 hours

No plate-out or fallout of iodine assumed

CONCLUSION

This study shows that, based on existing monitoring capability and dose considerations, the automatic closure of containment vent and purge valves on high containment radiation is not necessary. Automatic isolation is already provided by diverse signals for certain size breaks. For all breaks, diverse signals, such as high containment radiation and temperature will provide input to the operator to isolate these valves. Even if the break is not immediately isolated, offsite dose effects are well below 10CFR100 limits for breaks whose leakage is within the technical specification limit. Finally, these valves are normally closed thus further reducing the probability of a significant release of radioactivity through these lines to the environment.