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 RECIP. NAME: YOUNGBLOOD, B.J. RECIPIENT AFFILIATION: Licensing Branch 1

SUBJECT: Advises that GE analysis of BWR performance following small break LOCA & LOCA mitigation under degraded conditions is acceptable. Analysis completes until response to close out SER Outstanding Issue 37.

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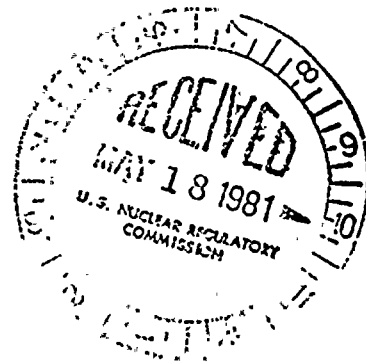
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NORMAN W. CURTIS  
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May 14, 1981



Mr. B. J. Youngblood, Chief  
Licensing Branch No. 1  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Docket Nos. 50-387  
50-388

SUSQUEHANNA STEAM ELECTRIC STATION  
SER OUTSTANDING ISSUE 37  
ER 100450 FILE 841-2  
PLA-761

Dear Mr. Youngblood:

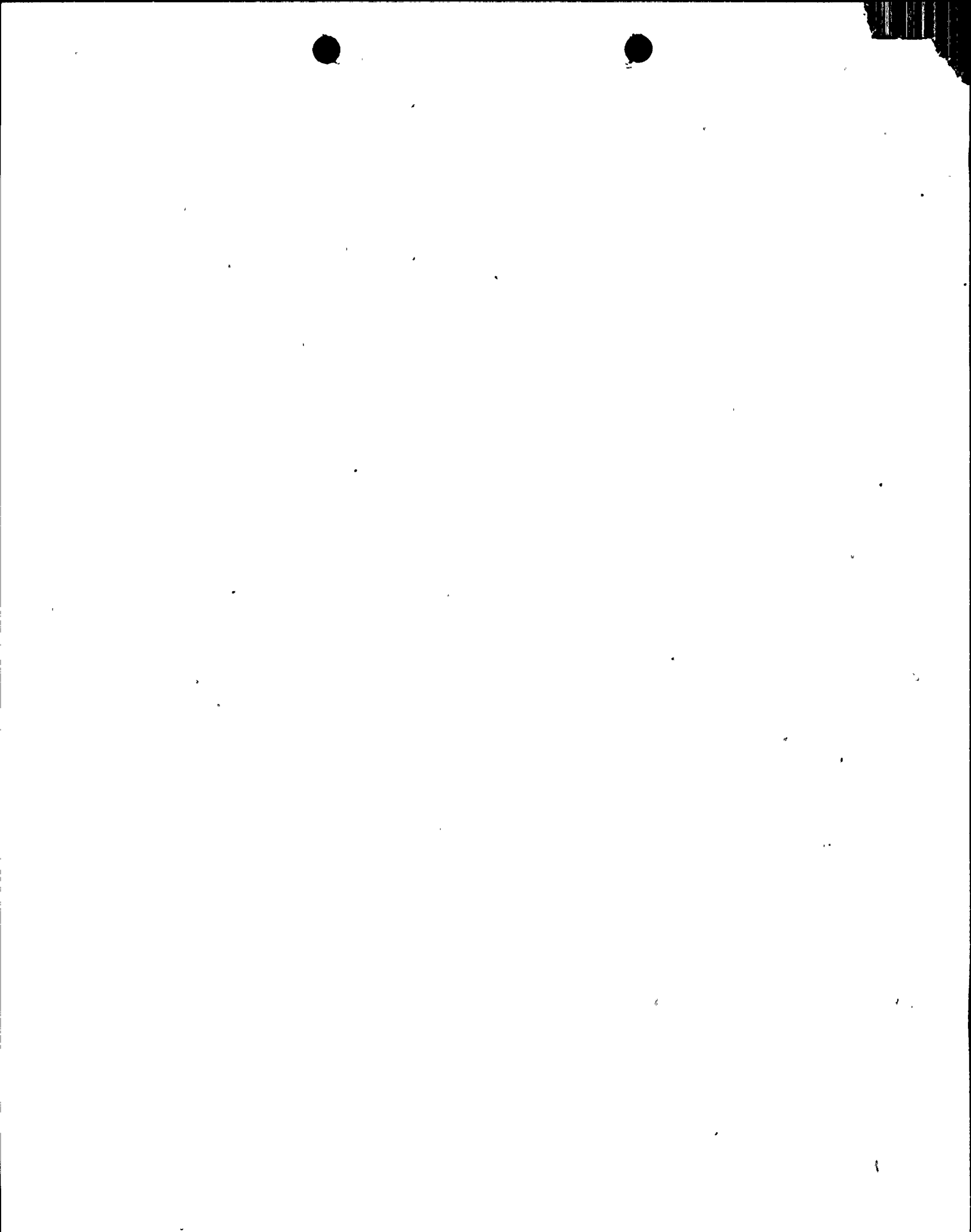
The Susquehanna SER states that "if low pressure coolant injection diversion prior to 10 minutes is allowed by design, then procedural restrictions alone are not sufficient unless analyses are submitted which show compliance with 10CFR50.46 for diversion earlier than 10 minutes."

Analyses of BWR performance following a small break LOCA and LOCA mitigation under degraded conditions have been performed by General Electric as a part of the BWR Owners' Group program. Analyses bases, assumptions and conclusions are discussed in GE report NEDO-24708A, Revision 1, December 1980 entitled, "Additional Information Required For NRC Staff Generic Report On Boiling Water Reactors". Reference is made to Section 3.1.1 (small break LOCA) and 3.5.2 (inadequate core cooling). It should be noted that these analyses were performed utilizing "realistic" assumptions as defined in Sections 3.1.1.3 and 3.5.2.4. The conclusion in Section 3.5.2.1.8 summarizes the capability of the BWR to maintain adequate core cooling, even under severely degraded conditions resulting from multiple failures and operator errors, following a loss of inventory either through a pipe break or through the safety relief valve.

Based on the first group of analyses presented it was concluded that for any plant and any loss of inventory event, the availability of ADS and one low pressure ECC system provides adequate core cooling if no high pressure injection is available. These analyses covered the case of multiple mechanical or electrical failures and operator errors that might have caused the failure of the systems, assumed to be unavailable.

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Mr. B. J. Youngblood  
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The second set of analyses addressed the condition of the vessel being at high pressure with a low water level. It was shown that operator actions, either to initiate high pressure systems or to depressurize the vessel and initiate at least one low pressure system, terminate this condition and assure adequate core cooling. The analyses showed that even for such severely degraded transients there is sufficient time for operator action to mitigate the consequences.

The third set of analyses address the condition of the vessel being at low pressure with a low water level but with the low pressure systems not injecting. It was shown that operator actions either to start the low pressure systems injecting into the vessel or to initiate the high pressure systems, terminate this condition and assure adequate core cooling.

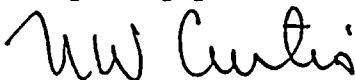
For all analyses, it was shown that the process variable information available to the operator in the control room is sufficient to adequately warn of an inventory threatening event and to present the information the operator needs to assure that appropriate actions are taken to maintain adequate core cooling. The control room indications will not mislead the operator when taking corrective actions. Even under the extremely degraded conditions considered in these analyses, the BWR requires only the most basic operator actions to mitigate the consequences of an inventory threatening event.

If the operator were to divert LPCI prior to 10 minutes post-LOCA, such an action would be considered an operator error. Since the current ECCS performance evaluation already assumes the accident, a loss of offsite power and a worst active single failure, an additional operator error is considered to be an additional Appendix K assumption. It is therefore appropriate that the "realistic" assumption analysis be considered for this situation as stated in the conclusions in NEDO-24708A "for any plant and any loss of inventory event, the adequate availability of ADS and one low pressure ECC system provides adequate core cooling..."

This analysis is deemed acceptable to provide satisfactory assurance of acceptable event consequences, in consideration of the equipment failures and operator errors assumed.

This response completes our action to close SER Outstanding Issue 37.

Very truly yours,



N. W. Curtis  
Vice President-Engineering & Construction-Nuclear

CTC/mks

cc: R. M. Stark - NRC