



Docket No. 50-346

License No. NPF-3

Serial No. 987

October 3, 1983

RICHARD P. CROUSE
Vice President
Nuclear
(419) 259-5221

Mr. Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Eisenhut:

This is in response to your letter of February 8, 1983 (Log No. 1222) concerning Resolution of TMI Action Item II.K.3.5 "Automatic Trip Reactor Coolant Pumps" (Generic Letter No. 83-10). Your letter requested that Toledo Edison provide our plans and schedules for resolution of this issue for Davis-Besse Nuclear Power Station Unit 1 (DB-1). The attachment provides our plans and schedules for resolution of Automatic Trip of Reactor Coolant Pumps.

Toledo Edison is currently revising the operating procedures to have operators trip RC pumps on loss of subcooling margin and this will be completed by December 31, 1983. This change resulted from a meeting between the NRC staff and the B&W Owners Group. Toledo Edison will review the results of the resolution and make appropriate procedural changes.

Toledo Edison will submit a report on the applicability of the generic B&W Owners Group report for the 177 fuel assembly lowered-loop units two (2) months after receipt of the report.

Very truly yours,

RPC:GAB

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cc: DBI Resident Inspector

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SUBMITTAL IN RESPONSE

FOR

DAVIS-BESSE NUCLEAR POWER STATION

UNIT NO. 1

FACILITY OPERATING LICENSE NO. NPF-3

This letter is submitted in conformance with 10 CFR 50.54(f) relating to Mr. D. G. Eisenhower's letter of February 8, 1983 (Log No. 1222). This deals with Resolution of TMI Action Item II.K.3.5 "Automatic Trip of Reactor Coolant Pumps" (Generic Letter 83-10).

By *[Signature]*

Sworn to and subscribed before me this 3rd day of October, 1983.

Laurie A. Brudzinski, sec.
Notary Public (*Brudzinski*)

LAURIE A. BRUDZINSKI
Notary Public, State of Ohio
My Commission Expires May 16, 1986

Docket No. 50-346
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PLAN FOR RESOLUTION OF NUREG 0737

Action Item II.K.3.5

"Automatic Trip of Reactor Coolant Pumps"

INTRODUCTION

The criteria for resolution of NUREG-0737, Item II.K.3.5, "Automatic Trip of Reactor Coolant Pumps", are provided in letters from D. G. Eisenhut (NRC) to all applicants and licensees with B&W designed Nuclear Steam Supply Systems (83-10 e and f), dated February 8, 1983. Toledo Edison has been formulating a plan to demonstrate compliance with those criteria. The following represents this overall position and plan.

PLAN FOR TREATMENT OF RC PUMP OPERATION

The treatment of reactor coolant pumps during accidents and transients has received extensive attention over the past several years. The B&W Owners Group has performed analyses evaluating the effect of a delayed RC pump trip using Appendix K assumptions during the course of a small break LOCA accident and has determined that an early trip of RC pumps is required to show conformance to 10CFR50.46 for a range of break sizes. Therefore, to be consistent with the conservative analyses performed, it is our position that the reactor coolant pumps should be tripped if indications of a small break LOCA exist.

The B&W Owners Group maintain that it is highly desirable to maintain RC pump operation during non-LOCA events, as an aid in the mitigation of the transient. Consistent with this philosophy, the concept of subcooling margin was chosen as an indicator for the need to trip RC pumps. It is our intention to demonstrate that this concept is consistent with our philosophy for handling RC pumps during transient conditions and complies with the intent of the criteria stated in Generic Letter 83-10. The symptom approach of subcooling margin, developed as part of the Abnormal Transient Operating Guidelines Program (ATOG), is intended to replace the present guidelines of tripping solely on the presence of a low RC pressure SFAS signal.

It is the position of the B&W Owners Group that manual reactor coolant pump trip can be achieved safely and reliably by the operator. It has been determined that a loss of subcooling margin will occur for those SBLOCAs where a pump trip is required to show compliance with 10CFR50.46.

Toledo Edison will undertake a program based on the above positions to demonstrate that the concept of subcooling margin is an appropriate indicator of the need to trip RC pumps, yet still allows continued RCP operation for most steam generator (SG) tube leaks. If larger leaks or tube rupture/s cause a loss of subcooled margin and RC pumps are tripped,

then they can be restarted after high pressure injection has been initiated and the reactor coolant system (RCS) has been cooled down to regain the subcooled margin. The concept of subcooling margin will be examined for the more likely non-LOCA transients to demonstrate that under realistic conditions an indication requiring RC pump trip is unlikely. This program is also intended to provide the required justification for manual RC pump trip on indication of loss of subcooling margin. Tripping on loss of subcooling margin will assure pump trip prior to the development of system voids. No attempt will be made to demonstrate acceptability of continued RC pump operation during small break conditions. No request for an exemption of 10CFR50.46 will be made to allow continued RC pump operation during SBLOCA.

The specific plan for resolution of the RC pump trip issue is structured to address the specific criterion stated in Generic Letter 83-10. A description of the plan, related to the criteria with which it is intended to comply, follows:

I. Pump Operation Criteria Which Can Result in RC Pump Trip During Transients and Accidents

1. Setpoints for RC Pump Trip:

- a. The RC pump trip criteria, based on loss of subcooling margin, was developed with the intent of assuring that an indication for RC pump trip would occur for those SBLOCAs where pump trip was required to meet the criteria of 10CFR50.46. A spectrum of analyses has been performed using Appendix K assumptions which demonstrate that a loss of subcooling will always occur for small breaks that have the potential to uncover the core and violate 10CFR50.46 criteria if the RC pumps are tripped under certain two-phase conditions. Therefore, it is our position that loss of subcooling can be used as an indicator of the need for RC pump trip. The actual value of the setpoint has been determined to ensure that this indicator will allow continued forced RCS flow during realistic SG tube leaks. Additional analysis will be done to determine if this setpoint will prevent RC pump tripping during a single double-ended SG tube rupture. This setpoint will also be reviewed minimizing the indication for need to trip RC pumps for more likely non-LOCA events such as a mild overcooling transient due to excessive steam flow.
- b. No partial or staggered RC pump trip schemes will be considered except for the extreme case where mechanical damage to the pump is likely as this adds to increased decision making on the part of the operator during transient conditions.
- c. The RC pump trip criteria based on subcooling margin precludes operation of the RC pumps in highly voided system.

- d. A primary objective of this setpoint selection is the avoidance of reactor coolant pump trip for non-LOCA events particularly SG tube leaks. Realistic operator actions in accordance with the ATOG procedures are expected to avoid loss of subcooling and the need to trip the RC pumps for this event. However, if subcooling margin were lost, it would be quickly regained following makeup or HPI initiation, without loss of natural circulation even if RC pumps were tripped and SFAS were actuated. This would allow the restarting of RC pumps. Consequently, reliance on the PORV for depressurization is minimized.
 - e. The significance of primary system voiding due to flashing of hot coolant is discussed as part of operator training. The subject of void treatment in the ATOG guideline is being supplemented by additional guidance on prevention, detection, and mitigation of voids. This is considered to be a post Emergency Operating Procedure implementation issue.
 - f. Actions following containment isolation signals will be reviewed to ensure consistency in the treatment of availability of cooling water and seal injection to prevent pump damage. Instructions for pump trip are provided in the ATOG guidelines in the event of likely mechanical pump damage. Criteria for restart of RC pumps include assuring that cooling water and seal injection are available.
 - g. Instructions for maintaining or reinitiating forced RC flow are contained in ATOG for ICC conditions.
2. Guidance for Justification of Manual RC Pump Trip
- a. A spectrum of small break LOCAs has been analyzed for Davis-Besse Unit 1 using the CRAFT2 code. Using the Appendix K evaluation techniques, there exists a combination of break sizes and RC pump trip times which result in a violation of 10CFR50.46 limits. For the worst break size, i.e., that size which requires the quickest pump trip, trip must occur within 2 minutes of the indication of need for pump trip. As break size decreases, longer time is available for operator action. The critical time period of high void formation (>70% for a raised loop unit) when RC pump trip is not recommended, has also been determined. The critical time period for the break requiring the quickest operation action time is short (5 minutes) when pump trip could result in violation of 10CFR50.46 criteria.
 - b. A best estimate SBLOCA analysis will be performed over the spectrum of sizes determined by the conservative analyses to determine (a) the time available for a required RC pump trip, and the period of time when RC pump trip is not recommended or (b) the lack of indication for a required pump trip. If it is determined that a need for RC pump

trip exists, the time for operator action will be determined and justified by comparison to ANSI Standards and operating experience. An indication of reasonable operator action time is expected to justify manual RC pump trip.

3. Other Considerations

- a. The level of quality of instrumentation, as described in the enclosure to Generic Letter 83-10, used to produce the signal indicating the need for RC pump trip, will be provided by Toledo Edison to supplement the submittal for treatment of RC pumps during transients.
- b. The ATOG guidelines and plant specific Emergency Operating Procedures contain criteria for the timely restart of reactor coolant pumps when conditions which will support safe pump operation exist. Table 6 of the Equipment Operator chapter of ATOG provides the conditions when RC pumps can be restarted. The Plant Limits and Precautions document provide further instruction.
- c. The plant operators will be trained in their responsibility for performing RC pump trip in the event of a small break LOCA. The revised plant procedures (non-ATOG) will require RC pump trip on loss of subcooled margin. Instructions for plant operation are reinforced by regular requalification class and simulator training. Operators will be trained on the concept of RC pump trip on subcooling margin by December 31, 1983.

The Toledo Edison's response to this section of requirements will be reported March, 1984. Toledo Edison will report on the applicability of the generic B&WOG report for 177 fuel assembly lowered-loop units 2 months after receipt of the report from the B&WOG.

II. Pump Operation Criteria Which Will Not Result in RC Pump Trip During Transients and Accidents

Since it is the position of the B&WOG and B&W that the safest method for RC pump operation following SBLOCA is manual trip, the criteria stated in this section will not be addressed.

cj b/12