



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

DEC 6 1985

Docket Nos. 50-440/441

Mr. Murray R. Edelman
Vice President - Nuclear Group
The Cleveland Electric Illuminating Company
P.O. Box 5000
Cleveland, Ohio 44101

Dear Mr. Edelman:

SUBJECT: SUPPLEMENTAL EVALUATION REPORT PERTAINING TO THE PERRY NUCLEAR
POWER PLANT OUTSTANDING ISSUE (21), REANALYSIS OF TRANSIENTS AND
ACCIDENTS; DEVELOPMENT OF EMERGENCY OPERATING PROCEDURES

The NRC staff has reviewed the information furnished with your letters to B. J. Youngblood dated January 10, 1985, September 11, 1985, October 29, 1985, and November 14, 1985, describing the methodology for the development of Perry plant-specific emergency operating procedures, utilizing the NRC approved BWR Owners Group emergency procedure guidelines (EPG). The staff finds that this information resolves SER Outstanding Issue (21) for low power licensing of Perry, Unit 1 with the license condition which follows:

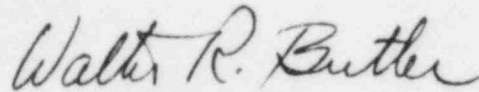
Prior to exceeding 5% of rated thermal power, CEI is required to submit a plant-unique analysis for containment pressure control consisting of: (a) an analysis to determine if suppression pool flashing and hydrodynamic loads, which may result from a rapid depressurization due to venting, will not exceed the design capability of the suppression pool; (b) the prioritization of selected emergency vent paths to minimize radioactive releases; (c) an assessment of flow paths other than the dedicated purge and exhaust lines, such as the drywell and suppression pool spray headers; and (d) an assessment of the effect of containment venting on duct work failure (if used as pathways) and the resulting consequence of subjecting equipment near the failed duct to the steam/radiation environment.

Additionally, prior to licensing, CEI is required to provide a schedule (acceptable to the staff) for furnishing certain additional information dealing with the procedures for alternate shutdown cooling. This additional information should (a) address the advantages and disadvantages of remaining indefinitely at hot condition with an unisolable leak versus proceeding to the alternate shutdown procedure; and (b) clarify and discuss all of the conditions for which the alternate shutdown procedure would (or would not) be employed, and that the plant operator entry conditions are clearly understood in this regard.

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A PDR

Should there be any question pertaining to the enclosed evaluation, which we propose to document in the next Perry SER supplement, please let me know.

Sincerely,

A handwritten signature in cursive script that reads "Walter R. Butler".

Walter R. Butler, Director
BWR Project Directorate No. 4
Division of BWR Licensing

Enclosure:
As stated

cc w/enclosure:
See next page

Mr. Murray R. Edelman
The Cleveland Electric
Illuminating Company

Perry Nuclear Power Plant
Units 1 and 2

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ENCLOSURE 1
SUPPLEMENTAL SAFETY EVALUATION REPORT
PERRY NUCLEAR POWER PLANT UNITS 1 AND 2

13.5.2.2 Reanalysis of Transients and Accidents; Development of
Emergency Operating Procedures

13.5.2.2.1 INTRODUCTION

In NUREG-0887, "Safety Evaluation Report Related to the Operation of Perry Power Plant Units 1 and 2," dated May 1982, the staff reported that the applicant would implement a program of emergency operating procedures (EOPs) based on the Boiling Water Reactors Owners Group (BWROG) Emergency Procedure Guidelines (EPGs) and that the staff had developed draft guidelines for long-term upgrading of EOPs (NUREG-0799) in accordance with the TMI Task Action Plan Item I.C.9. The staff guidelines were issued for public comment, the comments were resolved, and the staff issued NUREG-0899, "Guidelines for the Preparation of Emergency Operating Procedures," in August 1982.

On December 17, 1982, the staff modified the schedule and review requirements for the TMI Task Action Plan by issuing Supplement 1 to NUREG-0737, "Requirements for Emergency Response Capability" (Generic Letter No. 82-33). Supplement 1 to NUREG-0737 required that each applicant and licensee submit a Procedures Generation Package (PGP) at least three months prior to the beginning of formal operator training on the upgraded procedures. Staff guidance for PGPs was provided in NUREG-0899. In accordance with the Generic Letter, the PGP must include:

1. Plant-Specific Technical Guidelines
2. A Writer's Guide
3. A Description of the Program for Validation/Verification of EOPs
4. A Description of the Program for Training on the Upgraded EOPs.

The applicant submitted the Perry PGP for staff review in a letter from M. R. Edelman [Cleveland Electric Illuminating Company (CEI)] to B. J. Youngblood (NRC) dated January 10, 1985. The PGP included:

1. Perry Specific Technical Guidelines
2. Plant Emergency Instructions (PEI) Writer's Guide
3. Verification Plan
4. Validation Plan
5. Training Plan.

A meeting was held in Bethesda on March 7, 1985, to discuss the staff's initial comments on the PGP. As a result of this meeting, the PGP was revised and submitted in a letter from Mr. Edelman to Mr. Youngblood dated September 11, 1985. The staff provided additional comments in a meeting in Bethesda on October 3, 1985, and additional revisions to the PGP were made and submitted in letters from Mr. Edelman to Mr. Youngblood dated October 29, 1985 and November 14, 1985. The staff reviewed these materials to determine the adequacy of the applicant's program for preparing and implementing EOPs.

13.5.2.2.2 PLANT-SPECIFIC TECHNICAL GUIDELINES

The Perry PEIs are based on the BWROG EPGs with the exception of plant-unique deviations. The EPGs are contained in NEDO-24934, Revision 3, December 8, 1982. The staff evaluation of the technical deviations is summarized in the following paragraphs.

Containment Pressure Control

The BWROG EPGs call for emergency containment venting as the last step in a sequence of procedural steps involving operator actions designed to reduce containment pressure. The staff SER on the EPGs established an interim limit of twice the design pressure for venting with the understanding that more precise analyses may be used to establish a venting pressure limit. These analyses, in general, could consider containment integrity structural tests, purge valve operability, and leaktightness of gaskets and seals.

The applicant, in its updated PGP, submitted October 29, 1985, included a copy of a generic calculational methodology for the determination of the primary containment pressure to be used by the operator as the indicator

for the emergency venting action. The applicant states that the value to be used in the Perry PEI will be determined at the time the PEIs are written. The calculational methodology includes analytical procedures for development of the limiting primary containment pressure for each of three considerations. These considerations are: (1) the containment is not expected to fail, (2) the vent path may be operated and is sufficiently sized to remove decay heat, and (3) the SRVs (Automatic Depressurization System) remain operable.

The staff has not performed a detailed review of the generic methodology document; this review will be performed in connection with an anticipated Revision 4 of the generic BWROG EPGs. Our review has, however, progressed to the point that we conclude that the applicant may proceed with its development of the emergency venting procedure. The staff requires the applicant to submit for review the plant-unique analysis and resulting venting pressure value for the Perry facility prior to operation above 5% power. At the same time, the applicant should provide additional information on the following items relative to the emergency venting procedure:

1. A rapid depressurization from venting may result in suppression pool flashing and hydrodynamic loads; the applicant should perform analyses to determine if the resulting hydrodynamic loads exceed the design capability of the suppression pool and submit the results to NRC.
2. The applicant should consider the prioritization of the selected emergency vent paths to minimize radioactive release rates.
3. The applicant should consider flow paths other than the dedicated purge and exhaust lines, such as the drywell and suppression pool spray headers.

4. The applicant should consider the effect of containment venting on ductwork failure (if used as a pathway), and the resulting consequence of subjecting equipment near the failed duct to the steam/radiation environment.

Contingency No. 4, Step C4-2

Contingency No. 4, Core Cooling Without Level Restoration, is entered from Contingency No. 1, Level Restoration, only under the conditions of reactor pressure vessel (RPV) low pressure and decreasing water level (specifically, when the water level drops to the top of the active fuel). To ensure adequate core cooling, the spray mode of core cooling is established using a spray subsystem which draws suction from the suppression pool. The presently-approved generic EPG Step C4-2 in Contingency No. 4 specifies a single plant-unique RPV pressure value to allow rated flow from either a low pressure core spray or high pressure core spray subsystem. When at least one spray subsystem is operating and the RPV pressure is below the specified value, the operator may terminate injection into the RPV from water sources external to the primary containment. The applicant has proposed to refine this step to more precisely define operating limits for each subsystem. Since the intent of the step (e.g., adequate core cooling) is unchanged, the staff finds the modification acceptable contingent upon the condition that the applicant does not deviate from the basis identified in Contingency No. 4 of the generic EPGs for selecting the plant-specific values.

Contingency No. 5

Contingency No. 5, Alternate Shutdown Cooling, is proposed to be deleted from the Perry plant-specific technical guidelines. The reason stated by the applicant for this deletion is that it may not be the appropriate action to take under conditions for which the main condenser is out of service and there is an unisolable break. However, it is our understanding that the applicant's alternate shutdown procedure is being retained in other plant procedures. Contingent on confirmation of this commitment, the staff finds

the deletion from the emergency procedures acceptable on an interim basis. During the longer term, additional background material should be provided by the applicant to justify the deletion. Specifically, the applicant should:

1. Address the advantages and disadvantages of staying indefinitely at hot conditions with an unisolable leak versus proceeding to the Alternate Shutdown Procedure.
2. Clarify and discuss all the conditions under which the Alternate Shutdown Procedure would (or would not) be employed, and confirm that the operator entry conditions are clear in this regard.

We require that the applicant provide a schedule for resolution of each item.

Contingency No. 6

In Contingency No. 6, RPV Flooding, more than one flooding method may be used depending on the status of RPV water level indication. If water level cannot be determined, the RPV is flooded until water level is verified to be increasing or water is flowing through the SRVs. If water level can be determined, flooding may be terminated earlier if core coverage is verified. To provide guidance to the operator in the event the status of the water level indication changes, the applicant has proposed adding a decisional statement which allows the operator to go directly from one set of instructions to the other within Contingency No. 6. Because this additional guidance lessens possible confusion in the execution of the contingency and does not compromise the overall purpose of the procedure, we find this addition acceptable.

An additional change in Contingency No. 6 proposed by the applicant is the deletion of reference to high pressure injection systems (specifically, high pressure core spray and motor-driven feedwater pumps) as RPV flooding sources under ATWS conditions. The reason given by the applicant for this deletion

is the uncertainty in the capacity of the pumps to provide adequate makeup flow. Preference is given to emergency depressurization to a pressure sufficiently low to allow the increased capability of low pressure ECCS operation. The proposed modification applies to only one step in the Perry plant-specific technical guideline for which the minimum number of SRVs required for emergency depressurization can be opened and ATWS conditions exist. Reference to the HPCS and motor-driven feedwater pumps is retained in other sections of Contingency No. 6. The staff agrees that reference to the identified high pressure subsystems under ATWS conditions is not desirable since the addition of cold water under uncertain flow conditions may result in unknown reactivity addition from the injection of cold water. This ATWS recovery strategy remains consistent with the approved generic EPGs and is therefore acceptable.

Secondary Containment Control Guideline

The applicant has proposed to delete this section of the guideline in its entirety. The purpose of this section, as stated in the generic EPG, is to protect equipment in the secondary containment and limit radioactivity release from the primary and secondary containments. The containment systems for Perry include a Mark-III-type containment structure as the primary containment and a secondary containment structure surrounding the primary containment. The annulus between the two containment structures is designed to confine the leakage of airborne radioactive materials from the primary containment. No essential equipment is located within the annulus. Since the Perry design accommodates the stated purpose of this portion of the generic guideline, we concur with the applicant's position that a plant-specific guideline for secondary containment control is not necessary. However, during the longer term, the applicant should consider the applicability of selected portions of the Secondary Containment Control Guideline for events which involve leakage outside both containment structures.

Contingency No. 7

Contingency No. 7 in the generic EPGs, Level/Power Control, contains a reference to the use of Flow Stagnation Power as an indirect indicator of RPV water level (a nominal value of 8% power theoretically corresponds to 0% flow). An indicated power level of less than 8% would indicate the need for RPV flooding as executed through Contingency No. 6. The applicant has proposed deleting this reference since it only serves as a backup to normal water level indication. The staff finds this deletion acceptable since Contingency No. 6 is already called for in the absence of normal water level indication.

Therefore, for the plant-specific technical guidelines section of the PGP review, the staff finds the applicant's program acceptable with the exception that the applicant is required to provide for staff review the plant-unique analysis and resulting pressure value used in the Perry emergency containment venting procedure prior to operation above 5% power. In addition, during the longer term, background material should be provided to justify the proposed deletion of Contingency No. 5 (Alternate Shutdown Cooling) from the Perry PEIs, and additional consideration should be given to the applicability of selected portions of the Secondary Containment Control Guideline for events which involve leakage outside both the primary and secondary containments. This information should be provided on a schedule to be determined.

13.5.2.2.3 PLANT-SPECIFIC WRITER'S GUIDE

The staff reviewed the applicant's submittals addressing the writer's guide for EOPs to determine if it meets the acceptance criteria of the Standard Review Plan. The writer's guide describes the development of EOPs using a two-page and two-column format. On the left page are conditional actions that apply to a range of steps. The right pages contain two column text with the left column holding the instruction steps and the right column holding the contingency steps for conditions where the stated condition, event, or

task in the other column does not represent or achieve the expected results. In addition to format subjects, the writer's guide addresses the different types of steps and how they should be written. The staff determined that if appropriately used, the Perry writer's guide should result in EOPs that are adequately useable, accurate, complete, readable, convenient to use, and acceptable to operators.

13.5.2.2.4 VALIDATION AND VERIFICATION PLANS

The Perry Validation and Verification Plans were reviewed to determine if the plans meet the acceptance criteria of the Standard Review Plan. The verification plan describes the process used to ensure the EOPs correctly implement the technical guidelines and are in accordance with the writer's guide. The Verification Plan described a process by which each procedure is reviewed step-by-step using a verification form containing appropriate evaluation criteria. The discrepancies from the verification are then documented and resolved. The Validation Plan described the process using control room and simulator walkthroughs to ensure the EOPs are useable, correspond to the control room/plant hardware, are compatible with the control room operators, and that there is a high level of assurance that the instructions will guide the operators in mitigating transients and accidents. The staff's review determined that the Perry Validation and Verification Plans provide acceptable methods for accomplishing the objectives of the Standard Review Plan and are therefore acceptable.

13.5.2.2.5 TRAINING PLAN

The Perry Training Plan for the EOPs was reviewed to determine if it met the acceptance criteria of the Standard Review Plan. The Training Plan includes classroom and simulator training on the different operating philosophy of the EOPs when compared with conventional event-oriented procedures and discussions of bases for the operator actions. The Training Plan should provide operators an understanding of the EOPs, their bases, and their use. Therefore, the Training Plan was found acceptable.

13.5.2.2.6 CONCLUSIONS

Based on our review, we conclude that the CEI PGP for the Perry Nuclear Power Plant meets the requirements of Supplement 1 to NUREG-0737 and provides acceptable methods for accomplishing the objectives of the Standard Review Plan for licensing; however, one item needs to be resolved prior to exceeding 5% power and two items should be resolved on a schedule to be worked out with the applicant. The first item deals with the plant-specific calculation of the venting pressure for the containment. The additional items concern the downgrading of the generic guidance for alternate shutdown cooling from the emergency procedures to off-normal procedures and consideration of applicability of selected portions of the Secondary Containment Control Guideline to the Perry facility. Future changes to the PGP and EOPs should be made in accordance with 10 CFR 50.59.

Should there be any question pertaining to the enclosed evaluation, which we propose to document in the next Perry SER supplement, please let me know.

Sincerely,

Original Signed by

Walter R. Butler, Director
BWR Project Directorate No. 4
Division of BWR Licensing

Enclosure:
As stated

cc w/enclosure:
See next page

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