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Docket No. 50-346

License No. NPF-3

Serial No. 1535

June 6, 1988

United States Nuclear Regulatory Commission
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Subject: Fire Protection - Request for Additional Information (TAC
Nos. 60994, 60995 and 61745)

Gentlemen:

The NRC transmitted a Request for Additional Information (RAI) regarding the Davis-Besse Fire Protection Program in letter dated December 17, 1986 (Log No. 2166). In letter dated May 23, 1988 (Serial No. 1497), Toledo Edison stated that the final response to address the remaining part of the RAI, Question 1, was undergoing final review and would be issued by June 6, 1988. Enclosure 1 provides the final response to this question and completes Toledo Edison's response to the RAI. Please contact Mr. R. W. Schrauder, Nuclear Licensing Manager, at (419) 249-2366 if there are any questions.

Very truly yours,

MAL:tlt

Enclosure

cc: DB-1 Resident Inspector
A. B. Davis, Regional Administrator
A. W. DeAgazio, NRC/NRR D-B Project Manager
D. J. Kubicki, NRC/NRR Staff Reviewer

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ENCLOSURE 1
Response to NRC Question 1
from RAI dated December 17, 1986

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Response to NRC Question 1

Question 1 - Time for Operator Actions

Where credit is taken for manual actions to achieve safe shutdown, provide the time limit and basis to accomplish the action before an unrecoverable plant condition occurs.

Response

In letter dated May 27, 1987 (Serial No. 1361), Toledo Edison stated that there are two post-fire shutdown procedures, i.e., AB 1203.02, "Serious Station Fire," and AB 1203.26, "Serious Control Room Fire." These procedures identify the manual operator actions necessary to achieve safe shutdown in the event of a fire in any given fire area.

AB 1203.26 was reviewed by the NRR and Region III staffs and determined to be acceptable as documented by Inspection Report No. 83-16, dated August 30, 1984 (Log No. 1-1024) and the Safety Evaluation Report for the Davis-Besse Fire Protection Program Corrective Action Plan dated September 23, 1983 (Log No. 1375). The NRC's approval of this procedure was based on a walk-down that verified that the minimum manpower required by the procedure was capable of performing the identified tasks in the necessary time frame. During the meeting on February 17-18, 1987, Mr. Dennis Kubicki, the NRC Staff Reviewer, stated that AB 1203.26 was acceptable based on the previous review conducted by the NRR and the Region III staffs. Consequently, this response addresses the evaluation performed for AB 1203.02.

To substantiate the acceptability of AB 1203.02, Toledo Edison committed to identify the manual operator actions for a fire in areas other than the Control Room, the time to implement these actions, and the time before an unrecoverable plant condition would occur if the associated manual operator action(s) was not performed. The acceptance criteria and evaluation results are discussed below.

Acceptance Criteria

Based on NRC guidance provided in the February 17-18, 1987 meeting, the time for implementation of the manual operator actions is considered to be acceptable if the associated unrecoverable plant condition would not occur: 1) for at least 1 hour for manual operator actions to be completed inside the area containing the fire, or 2) for at least 30 minutes for manual operator actions to be completed outside the area containing the fire. The 1-hour criteria would also apply to manual operator actions where access and egress routes are through the area containing the fire. Toledo Edison committed to justify the acceptability of those manual operator actions that did not satisfy this NRC guidance.

Time To Reach An Unrecoverable Plant Condition

For the purpose of this response, an unrecoverable plant condition is defined as the loss of any shutdown function(s) for such a duration as to ultimately cause the reactor coolant collapsed liquid level to fall below the top of the active fuel height of the core and subsequent breach of the fuel cladding. Maintaining the reactor coolant level above the top of the core ensures adequate core cooling and fission product boundary integrity. The analysis to determine the time to reach the unrecoverable plant condition is based on the assumption that a fire in a given fire area causes safe shutdown equipment in that fire area to assume its most detrimental position due to a credible fire-induced failure, as discussed in Toledo Edison letter dated May 27, 1987, Question 23 (Serial No. 1361). Additionally, the analysis of the time to reach an unrecoverable plant condition does not take credit for any manual operator actions, which are defined as actions taken outside the Control Room.

As discussed in the NRC meeting on October 29-30, 1987, post-fire shutdown procedure, AB 1203.02, is an interim procedure and is periodically revised to reflect the upgraded and additional fire protection features required to satisfy 10CFR50, Appendix R. The response to this NRC question, therefore, reflects the planned upgrade and additional fire protection features, which will exist by restart from the sixth refueling outage.

The analysis has not taken credit for decay heat removal via the primary-side feed and bleed cooling. Only secondary-side heat removal through the steam generators is relied upon in this analysis.

The results of this evaluation show that an unrecoverable plant condition could occur due to the fire-induced loss of any one of the following shutdown functions referred to in 10CFR50, Appendix R, Section III.L.2, without the timely completion of the associated manual operator actions:

1. Decay heat removal from the core (e.g., loss of the ability to supply auxiliary feedwater to the steam generators.)
2. Supporting functions necessary for the operation of the safe shutdown equipment required in the event of a fire (e.g., Service Water System, Component Cooling Water System)
3. Reactor coolant make-up capability (e.g., loss of the ability to add borated water to the reactor coolant system via the makeup and high pressure injection pumps)

The results of the analysis demonstrate that the core remains subcritical for at least 2 hours due to control rod insertion. No credible fire-induced failure would create an overcooling event so severe as to cause a return to criticality. Plant conditions beyond 2 hours were not evaluated since 2 hours is sufficient time to perform any manual operator actions specified by AB 1203.02. Possible loss of subcriticality by credible fire-induced failures other than an overcooling event will be determined and appropriate corrective actions taken prior to restart from the sixth refueling outage.

It should be noted that certain manual operator actions specified by AB 1203.02 are necessary to establish the aforementioned shutdown functions. Pending the completion of the associated manual operator actions, one or more of the performance goals specified by 10CFR50, Appendix R, Section III.L.2 may not be maintained at all times and the reactor coolant process variables may temporarily exceed that predicted for a loss of normal A. C. power specified by 10CFR50, Appendix R, Section III.L.i. The degraded shutdown functions would be restored so as to return the reactor coolant process variables to those predicted for a loss of normal A. C. power and to return the plant to within the Appendix R performance goals. However, the reactor coolant inventory may not be restored to within the pressurizer level indications for an extended time. Nonetheless, the fission product boundary would not be affected and an unrecoverable plant condition as defined above would not occur. As discussed with NRC Staff members on April 27 and May 3, 1988, this is considered to satisfy the intent of 10CFR50, Appendix R.

Time to Perform Manual Operator Actions

There are a total of 374 manual operator actions for 26 fire areas identified in AB 1203.02. In the event of a fire, only those actions specified for the respective fire area containing the fire are to be performed.

The estimated time to perform each manual operator action is based on a walkdown of certain actions specified by AB 1203.02. The time to perform those manual operator actions that were not part of the walkdown were conservatively estimated based on similar or more complex actions whose times have been measured. The time to perform a manual operator action is based on the time to reach and locate the specified equipment and the time to place that equipment in operation. The walkdown did not actually operate equipment such as opening valves or tripping breakers. Consequently, the times to perform the manual operator actions are based on the times to reach and locate the equipment and the following assumed durations: 3 minutes to manually operate valves, and 10 minutes to establish temporary ventilation; no additional time was included for tripping a breaker.

Evaluation Results

Nineteen (19) manual operator actions that currently do not satisfy the aforementioned NRC guidance and whose resolution is not currently identified by the Davis-Besse Appendix R Compliance Assessment Report have been identified. Attachment 1 identifies these 19 actions by fire area, the applicable acceptance criteria, the proposed resolution and whether the proposed resolution following implementation has been confirmed to satisfy the acceptance criteria.

Of these 19 actions, 6 will be resolved by modifications such that manual operator actions outside the Control Room would not be required. One modification involves adding solenoid-operated flow control valves to the auxiliary feedwater system that can be operated from the Control

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Room in the event of a fire. These components will be installed prior to restart from the current fifth refueling outage. The other modifications involve rerouting or fire wrapping certain circuits which are scheduled to be completed prior to restart from the sixth refueling outage.

An additional 8 manual operator actions will be resolved by the installation of cavitating venturis in the auxiliary feedwater system. These cavitating venturis will extend the time to reach an unrecoverable plant condition associated with these 8 actions such that the time satisfies the acceptance criteria provided by the NRC. These cavitating venturis will be installed prior to restart from the current fifth refueling outage.

The remaining 5 actions will be resolved by studies and possible testing. These studies or possible testing will address a fire-induced loss of the Service Water System and the ventilation systems required for the Component Cooling Water System and Service Water Pump Rooms. This effort will establish better data on the limiting times for these systems to be placed into operation in the event of a fire and will determine that the time to reach an unrecoverable plant condition for these 5 actions satisfies the aforementioned NRC guidance, or will identify appropriate corrective actions. These studies and any identified corrective actions will be completed prior to restart from the sixth refueling outage.

Additionally, AB 1203.02 will be revised prior to restart from the fifth refueling outage to specify the operation of the motor-driven feedwater pump in certain fire areas. This will eliminate certain manual operator actions specified by AB 1203.02, thereby simplifying AB 1203.02 and enhancing the overall capability to respond to a fire.

From this review, Toledo Edison also determined that the single generator provided to power the temporary ventilation specified by AB1203.02 is not sufficient and is too difficult to maneuver. Two new gasoline-engine powered electric generators, mounted on two-wheel dollies to facilitate their movement, have been purchased. Prior to restart from the current fifth refueling outage, the generators will be placed in the plant, and the implementation of necessary procedures and operator training to use the generators will be completed.

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Attachment 1

ATTACHMENT 1
MANUAL OPERATOR ACTIONS REQUIRING RESOLUTION

ATTACHMENT 1

AB 1203.02 MANUAL OPERATOR ACTIONS REQUIRING RESOLUTION

FIRE AREA	REQUIRED MANUAL ACTION	SHUTDOWN FUNCTION	APPLICABLE ACCEPTANCE CRITERIA	PROPOSED METHOD OF RESOLUTION	SATISFIES ACCEPTANCE CRITERIA Post-6th RFO
Fire Area A	Depower and manually position MS-106	Reactor Heat Removal	30 Mins	AFW Cavitating Venturi	Yes
Fire Area BF	Depower and manually close SW-1399	Supporting Function	30 Mins	SW Study	Pending study
Fire Area BF	Start the Backup SW Pump	Supporting Function	30 Mins	SW Study	Pending study
Fire Area D	Depower and open manually position MS-106	Reactor Heat Removal	30 Mins	AFW Cavitating Venturi	Yes
Fire Area DB	Depower and open AF-3870	Reactor Heat Removal	30 Mins	AFW Cavitating Venturi	Yes
Fire Area DF	Depower and manually position valve MS-106	Reactor Heat Removal	30 Mins	AFW Cavitating Venturi	Yes

ATTACHMENT 1

AB 1203.02 MANUAL OPERATOR ACTIONS REQUIRING RESOLUTION

FIRE AREA	REQUIRED MANUAL ACTION	SHUTDOWN FUNCTION	APPLICABLE ACCEPTANCE CRITERIA	PROPOSED METHOD OF RESOLUTION	SATISFIES ACCEPTANCE CRITERIA Post-6th RFO
Fire Area DJ	Depower and manually position valve MS-106	Reactor Heat Removal	30 Mins	AFW Cavitating Venturi	Yes
Fire Area EE	Depower and manually open AF-608	Reactor Heat Removal	30 Mins	AFW Cavitating Venturi	Yes
Fire Area F	Depower and manually open AF-3870	Reactor Heat Removal	30 Mins	AFW Cavitating Venturi	Yes
Fire Area G	Depower and manually position MS-107	Reactor Heat Removal	30 Mins	Flow control valve	Yes
Fire Area II	Depower and manually close SW-1399. In the event fire is located in Room 53 such that access to valve is not possible, manually close valves SW-630, 631 and 632 in Room 334	Supporting Function	1 Hour	SW study	Pending study

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FIRE AREA	REQUIRED MANUAL ACTION	SHUTDOWN FUNCTION	APPLICABLE ACCEPTANCE CRITERIA	PROPOSED METHOD OF RESOLUTION	SATISFIES ACCEPTANCE CRITERIA Post-6th RFO
Fire Area Q	Depower and open AF-3870	Reactor Heat Removal	30 Mins	AFW Cavitating Venturi	Yes
Fire Area Q	Depower and open damper HV-5597	Support Function	30 Mins	Circuit Keroute	Yes
Fire Area R	Disconnect wire for governor control valve and regulate flow using local speed knob	Reactor Heat Removal	30 Mins	Flow control valve	Ye
Fire Area R	Start Backup SW Pump	Supporting Function	30 Mins	SW study	Pending study
Fire Area R	Depower and open damper HV-5305A	Supporting Function	30 Mins	Circuit fire wrap	Yes
Fire Area T	Start the unaf- fected CCW Pump at the breaker and place that train equipment in service.	Supporting Function	30 Mins	Circuit fire wrap	Yes

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AB 1203.02 MANUAL OPERATOR ACTIONS REQUIRING RESOLUTION

FIRE AREA	REQUIRED MANUAL ACTION	SHUTDOWN FUNCTION	APPLICABLE ACCEPTANCE CRITERIA	PROPOSED METHOD OF RESOLUTION	SATISFIES ACCEPTANCE CRITERIA Post-6th RFO
Fire Area T	Establish temporary ventilation in the CCW Pump Room	Supporting Function	30 Mins	CCW study	Pending study
Fire Area U	Establish temporary ventilation in the CCW Pump Room	Supporting Function	30 Mins	Circuit fire wrap	Yes