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Subject: Fire Protection; Additional Information on the NFPA Standard Compliance Review.

Gentlemen:

On August 15 and 16, 1989 Toledo Edison met with the NRC to discuss the NFPA Code Compliance Review. Mr. Dennis Kubicki of the NRC verbally requested clarification of some material provided in the July 31, 1989 letter on the National Fire Protection Association (NFPA) standard compliance reviews (Serial Number 1685). In a conference call with Mr. Kubicki on September 14, 1989, Toldeo Edison discussed these clarifications. The clarifications on the NFPA Code Compliance Reviews are presented in Attachment 1.

If you have any questions concerning this matter, please contact Mr. R. W. Schrauder, Nuclear Licensing Manager at (419) 249-2366.

Very truly yours,

KAS/ssg

Attachment

cc: P. M. Byron, DB-1 NRC Senior Resident Inspector
A. B. Davis, Regional Administrator, NRC Region III
D. J. Kubicki, NRC/NRR Staff Reviewer
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ATTACHMENT 1

RESPONSES TO NRC REQUEST FOR ADDITIONAL INFORMATION ON THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARD COMPLIANCE EVALUATION

NFPA 10 - Request:
Standard sections 1.4-3 and 1.4-4 of NFPA 10 involves the accessibility of portable fire extinguishers and was marked as being in noncompliance. Further clarification of the acceptability of this condition was requested.

Response:
The noncompliance is to the strict spacing limits imposed by the standard. The plant configuration does not lend itself to the spacing limits specified by the standard. Toledo Edison has determined by walkdown that the existing situation is acceptable to meet the intent of the standard for accessibility. An additional walkdown with the NRC inspector/reviewer demonstrated the acceptability of the existing situation in meeting the intent of NFPA 10 for adequate spacing.

NFPA 13 - Request:
Standard section 3-16.6.2 of NFPA 13 was determined not to be applicable to Davis-Besse. An explanation was requested for this determination.

Response:
This section of NFPA 13 concerns high temperature sprinklers. No high temperature sprinklers are utilized at Davis-Besse.

Request:
Standard sections 4-3.1.1 through 4-3.6 of NFPA 13 were determined not to be applicable for Room 333. An explanation was requested for this determination.

Response:
Room 333 has a detector actuated deluge sprinkler system installed. The subject sections of the standard address sprinkler location in various ceiling configurations to ensure that the heat of the fire will promptly open or actuate the sprinkler system. These sections do not address detector location as this is specified elsewhere. In summary, the type of suppression system operation utilized in Room 333 is not addressed by these sections of NFPA 13.

NFPA 14 - Request:
Standard sections 3-2.1 and 3-3.4 of the NFPA 14 Code review have a fire hose reach deficiency identified for Room 250. An explanation was requested to describe how this will be overcome by the fire brigade.

Response:
The protection provided by hose stations is not needed in the Service Water/Turbine Building tunnel (Room 250) due to the limited amount of combustibles in the area, the lack of ignition source, the kaowool cable tray covering and the fire suppression capabilities provided at each end of the tunnel. The fire brigade has information provided in the existing pre-fire plans for location of additional hose when needed for certain fire areas. This is described in the pre-fire plans specifically for Fire Area II which contains Room 250.

NFPA 15 - Request:
Standard section 2-1.2 of the NFPA 15 review identified a deficient power supply arrangement that will be corrected by a future modification. A request was made to verify the compliance with future modification to section 2-1.2.

Response:
The scope of the proposed modification is to add batteries with a charging system to the fire water spray release control system per NFPA 15, which requires an approved/listed system. Therefore, compliance with this code section will be accomplished upon completion of the proposed modification.

NFPA 20 - Request:
The sections addressing the electric fire pump controller were not evaluated because a future modification is scheduled to replace the existing controller by restart from the seventh refueling outage. A request was made to address the existing controller so that interim acceptability can be determined.

Response:
A comparison of the existing controller has been made to the appropriate sections of the standard. Although the existing controller is Underwriter Laboratories and Factory Mutual listed the following deviations were identified.

1. The pressure switch used to start the pump is a remote pressure sensing switch that is not listed or approved for fire pump service, although it is listed for fire protection signaling service.

2. Trouble alarms are not transmitted to the central alarming station (Control Room) from the controller. However, a pump running alarm is annunciated in the Control Room.

3. The controller circuitry is arranged to provide for pump shutdown prior to depletion of the water supply from the Fire Water Storage Tank.

The above deficiencies are acceptable in the interim, until restart from the seventh refueling outage, because of the testing requirements and frequency of testing imposed by Technical Specifications. A test is performed every seven days by depressurizing the pressure switch to check the pressure at which the electric fire pump starts. This same testing frequency is used on the diesel fire pump. The starting pressure is recorded and adjusted as necessary to maintain proper sequential starting of the electric fire pump in relation to the diesel fire pump as required by the Technical Specifications. Since the diesel fire pump takes suction from Lake Erie and starts upon low pressure of the fire water loop or low level on the Fire Water Storage Tank, the automatic shutoff of the electric fire pump cannot cause a significant interruption of the fire water supply.

NFPA 27 - Request:
Standard section 71 of the NFPA 27 review identified a deficiency associated with the lack of vehicles for fire brigade use. A request was made to clarify that this was the only deficiency of the fire brigade equipment required by this section.

Response:
As stated in the deviation summary, the only deficiency of section 71 is that vehicles are not used or required for fire brigade use at Davis-Besse.

NFPA 30 - Request:
Standard section 2343 of the NFPA Code 30 review requires a heat actuated automatic shutoff valve for flammable liquid tank connections below the liquid level when the tank is located inside of a building. The tanks located inside Davis-Besse do not have this feature and a request was made for additional justification of this deviation.

Response:
There are three tanks located inside the plant that would be subject to this standard, the two diesel generator day tanks and the turbine lube oil storage tank. The two diesel generator day tanks are safety related and must provide a reliable source of fuel oil to the

associated diesel generator. The use of any automatic shutoff valve would decrease the fuel oil source reliability, and is not desirable for this application. For nuclear safety reasons this standard is not practical for the diesel generator day tanks.

The turbine lube oil storage tank contains a Class III combustible liquid. The 1973 edition of NFPA 30 specifies the heat actuated shut off of the subject valves for indoor tanks containing flammable or combustible liquids. However, the 1984 edition of NFPA 30 limits the use of the heat actuated valves to Class I or Class II liquids. No significant benefit would be realized by the installation of these valves. Further, this installation is not considered to be necessary since the standard no longer specifies such valves for this classification of liquid.

NFPA 50A- Request:
Standard section 8.81 of the NFPA 50A review discussed the hydrogen tanks and mobile units system maintenance and stated the other system components are maintained in accordance with plant procedures. A request was made to more clearly explain the other system components and their procedures.

Response:
The system components include various devices which have individual preventive maintenance procedures to maintain the components. The interval of calibration/checking varies but the longest interval for the installed components on both the turbine and makeup tank hydrogen systems is 60 months. Also, the systems are operated and maintained by the following procedures:

- SP 1106.11, Carbon Dioxide and Hydrogen Systems (System procedure).
- SP 1102.12, Hydrogen Addition and Degasification (System procedure).
- DB-SC-04211, Generator Hydrogen Purity and Leakage Test (Periodic test scheduled every 28 days).

NFPA 51 &
NFPA 51B- Request:
Standard sections 121 and 313 of the NFPA 51 & 51B reviews , respectively, discussed purchasing of approved equipment. Toledo Edison determined that no requirement for approved equipment was explicitly stated in administrative controls. A request was made for a description of the current controls.

Response:
Toledo Edison does have a process whereby all fire protection related equipment purchasing requests are reviewed and approved. This review is documented by a sign-off on the procurement package

that dictates the minimum quality requirements for procurement of the item. Therefore, even though the administrative controls do not explicity require procurement of approved equipment, the specified review ensures this is effectively accomplished where required.

NFPA 69 - Request:

Standard sections 1300 and 3415 (and others) of the NFPA 69 review discuss alarms on fans to monitor air flow in rooms to keep combustible concentrations of hydrogen from occurring. Rooms 333 and 517A do not have alarms on the exhaust fans and a description of the openings in the upper portions of the rooms that provide adequate ventilation was given as the basis for acceptability of the lack of alarms. After a plant walkdown of the two rooms, further justification was requested for Room 333, Seal Oil Room.

Response:
The hydrogen seal oil equipment located in Room 333 normally operates with negligible hydrogen leakage. This is because a vacuum pump is used to extract hydrogen from the oil and the gas is vented out a seal welded line outside the room. If the vacuum pump should fail to operate additional hydrogen would not be released from the oil and the minimal amount remaining would have no release or leakage path to the room. The pipe connections and tank penetrations are either oil covered or are seal welded to reduce leakage. Therefore, under normal operation no significant source of hydrogen release to the room is possible. Additionally, a tour of the room is made periodically and if the ventilation is not operating a portable fan would be installed to maintain cooling in the room. Due to the size of the room, the minimal amount of hydrogen possible in the tank, the lack of credible leakage paths within the room during normal operation and the periodic tours of the room to monitor ventilation operation, no air flow alarms are deemed necessary to prevent possible buildup of a combustible mixture of hydrogen during normal operation.

NFPA 72D- Request:
Standard section 1232 of NFPA 72D addressed the frequency of testing the Fire Water Storage Tank level and temperature instrumentation. The frequency of testing is not in compliance with the monthly testing of the standard and a request was made to provide the actual testing interval.

Response:
Both the level and temperature instrumentation are periodically monitored and calibrated on a 36 month interval. This calibration interval is based upon similar devices used throughout the plant and the interval has been established as acceptable based upon past history.

NFPA 80 - Request:
For several sections of the NFPA 80 review, references to fire door tests were made to justify larger gaps than specified around the doors. A request was made to identify the specifics of this testing.

Response:
Each door that deviates from the standard was evaluated and that evaluation is summarized in various safety evaluations. A typical example is the safety evaluation provided for various doors with excessive gaps (SE89-0067) and a copy of that safety evaluation is provided as Attachment 2. The bases for such safety evaluations are proprietary tests performed by other utilities. Copies of these test results are available for review at the Davis-Besse site.

NFPA 90A- Request:
Standard section 4-4 of the NFPA 90A review addresses the turbine building ventilation system duct detectors non-compliance due to jumpers on the detection panels which eliminate spurious alarms that have occurred. A request was made to describe the proposed modification's compliance to the standard.

Response:
The modification which is currently under development will meet the intent of the standard. Due to the high temperatures normally experienced at the top of the turbine building the detector alarm setpoint will be approximately 175°F versus 135°F specified in of the standard. This difference is acceptable for this situation since it will not exceed the limit of 50° above the maximum ambient (at the ceiling) specified by the standard for heated air (i.e., discharge of heating coils). Other design parameters will be set to meet the standard.

NFPA 204- Request:
Standard section 411 of the NFPA 204 review and various other sections address the frequency and testing of the turbine building roof vents. Currently, no testing is performed and a commitment to develop a test procedure prior to restart from the sixth refueling outage was made. A request was made to describe the type and frequency of testing proposed.

Response:
As of this date, the procedure for testing of the turbine building roof vents has not been written. The intent of the procedure is to meet the standard requirements for adequate frequency and type of testing. The frequency of the testing will be determined as the details of procedure is defined. Any deviations that arise will be to account for uniqueness of the specific installation or to match existing standards on similar testing already established at Davis-Besse.

Request:
A request was made to explain the acceptability of an intentional loss of off-site power in a fire related shutdown to mitigate the consequences of numerous spurious operations that may be caused by the fire. Also confirmation was requested that station blackout was not created by the procedural steps.

Response:
The procedural steps taken at Davis-Besse, in case of a significant fire, to isolate off-site power will not cause station blackout as at least one diesel generator will automatically start on low voltage and load essential power as designed for a loss of off-site power event.

The determination of Davis-Besse safe shutdown systems for a fire in any area was performed to identify the minimum set of systems needed based upon a loss of off-site power. Initially, spurious operations of non-safe shutdown systems were assumed based upon the availability of off-site power and the failures caused by a fire. The large number of manual operator actions and modifications to isolate the unnecessary equipment to prevent repeated spurious operations with continued availability of off-site power led to the decision to minimize operator actions/modifications by manually tripping off-site power sources. This would ensure that operator actions could be concentrated on the minimum set of equipment needed for safe shutdown. Additionally, a loss of off-site power is an analyzed event for which the operators have received training on plant response and actions required for plant shutdown and cooldown.

SAFETY EVALUATION FOR USE-AS-IS DISPOSITION FOR EXCESSIVE DOOR GAPS

DESCRIPTION

During performance of the NFPA-80 "Fire Door" code compliance walkdown, it was identified that the top, side and bottom gap clearances exceeded the NFPA-80 requirements of a 1/8" gap for top and sides, and a 3/4" gap for floors (no floor covering or sills) for a large number of doors. The majority of these doors have gaps of less than 1/4" for sides and top and less than 7/8" for bottom gaps. Actual fire tests demonstrate that gaps of up to 1/4" for top and sides, and up to 7/8" for the bottom, do not degrade the ability of a fire door to meet the standard fire test requirements.

This safety evaluation is in response to PCAQR 89-0012 and demonstrates that limited increases in door gaps above the NFPA-80 requirements will not reduce the adequacy of a fire door to act as an effective fire barrier. Based upon fire tests, the acceptance criteria for door gaps can be raised to 1/4" for side and top gaps and 7/8" for bottom gaps for floors with no floor covering, sills or curbs. Latch engagement on the latch side must remain within code requirements either by increased latch throw or shims behind the strike plate.

SYSTEMS AND COMPONENTS AFFECTED

System 013.14 "Fire Doors". The Fire Doors are located throughout the plant and provide passive fire resistance to prevent the spread of a fire. Many of these doors are in Technical Specification fire barriers (making up a part of the fire barrier) which are designed to separate redundant safe shutdown equipment.

DOCUMENTS AFFECTED

1. USAR Section 9.5.1
2. Technical Specification 3.4.7.10
3. FHAR Table 4-1
4. DB-FP-03028 "18 Month Fire Door Inspection"

SAFETY FUNCTIONS OF AFFECTED SYSTEM AND COMPONENTS

The function of a fire door is to prevent a fire from passing from one area to another, thereby confining a fire to one area or at least retarding the spread of a fire beyond the area. This design feature minimizes the possibility of a single fire involving several fire fire areas of the facility.

SAFETY EVALUATION FOR
USE-AS-IS DISPOSITION FOR EXCESSIVE DOOR GAPS

No system, component or equipment other than the doors will be directly or indirectly affected by allowing an increase of 1/8" to the NFPA-80 code requirements for door gaps as long as the latch engagement is maintained at 3/8" for single doors and 5/8" for double doors. This will increase the allowable top and side gaps to 1/4" and the allowable bottom gap to 7/8".

EFFECTS ON SAFETY

The effect of having allowable fire door gaps of up to 1/4" for top and side gaps and 7/8" for bottom gaps is insignificant to the safety of the plant and its operation as justified below:

1. The most important factor in evaluating the performance of a fire door is that it remain closed in a fire. To ensure this, the door must remain properly latched closed. In fire tests conducted on doors with latch side gaps (only one which affects engagement) of 1/4", preserving latch engagement in accordance with NFPA-80 limits, the doors did not open during either the fire test or hose stream test. Strike plate shims were used to attain proper latch throw engagement. Therefore, it has been demonstrated that the increased gaps will not affect the ability of the door to remain closed as long as latch engagement is maintained at 3/8" for single doors and 5/8" for double doors (by use of shims or longer latch throw).

2. An increase in door gaps could allow a larger supply of air into a space and thereby increase the fire intensity. The top and side gaps are not line of sight openings between the two sides of a door. There is a stop (part of the frame) behind the door which blocks the side and top edges of the door and the 1/8" difference in gap clearances would not significantly increase the air flow into a room. NFPA-80 allows a bottom gap of 3/4" (this is necessary for ease of operation) and the 1/8" increase in bottom clearances is only a 17% increase in gap width. This increase would not significantly increase the air flow into a room and as a result the increased intensity of a fire would be insignificant.

3. There is no limit for cold side temperatures on a fire door because combustible materials are assumed not to be stored up against fire doors. This is a valid assumption since doors are normally used for the passage of personnel and equipment. In fact, if doors are no longer used, NFPA-80 requires that the opening be sealed with a material comparable to the rating of a barrier. This removal of combustible materials away from a fire door ensures that any increase in the cold side temperature of the door due to the increase in gaps will have no significance on the capability of the fire door it perform its function.

SAFETY EVALUATION FOR
USE-AS-IS DISPOSITION FOR EXCESSIVE DOOR GAPS

4. Other nuclear power stations have performed fire tests on similar hollow metal fire doors with increased gaps (clearances) to study the effect of the larger gaps. These tests show that for the 1/4" side/top and 7/8" bottom gaps the door passes the three hour fire endurance and the hose stream test as specified by ASTM E-152. Therefore, the increase of 1/8" in door gaps will not reduce the ability of a fire door to meet the fire door test requirements as long as the latch engagement is maintained at 3/8" for single doors and 5/8" for double doors.

UNREVIEWED SAFETY QUESTION CONCLUSIONS

The use-as-is condition would not increase the probability or consequences of an accident previously evaluated in the USAR (9.5.1) as the doors are equivalent to the required design.

The use-as-is condition would not increase the probability of a malfunction of equipment important to safety because the doors are equivalent to the required design.

The use-as-is condition would not increase the consequences of a malfunction of equipment important to safety because the doors are equivalent to the required design.

The use-as-is condition would not create a possibility for an accident of a different type than any evaluated previously in the USAR because the doors are capable of providing their intended function in their in their present configuration.

The use-as-is condition will not create a possibility for a malfunction of equipment of a different type than any evaluated previously in the USAR because the doors are equivalent to the required design.

This condition will not reduce the margin of safety as defined in the Tech Specs (3/4.7.10) because the increase in door gaps will not prevent the fire doors from performing adequately to meet the fire door testing requirements.

In summary, based on the facts above, the results of fire tests and engineering judgment, the increase of 1/8" in door gap clearances will not threaten plant operations or the health and safety of the public and does not constitute an unreviewed safety question as long as latch engagement is maintained within code requirements.