

PROFESSIONAL LOSS CONTROL, INC.

EVALUATION  
OF  
FIRE DOORS 3-20 AND 3-13  
AT  
FERMI 2  
DETROIT EDISON CO.

Date Submitted: January 31, 1985

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EVALUATION  
OF  
FIRE DOORS 3-20 AND 3-13

1.0 GENERAL

Previously, Detroit Edison Co. had Underwriter's Laboratory, Inc. (UL) investigate door/frame assemblies that are installed in fire barriers at the Fermi 2 Plant. The fire doors are unlabeled due to security constraints on the doors.

UL issued two reports:

1. Project 83NK23365, File NC698, Report NC699-2  
"Investigation of Edison's Steel Channel Frames and Security Doors".
2. Project 83NK23366, File NC699, Report NC6992  
"Fire and Hose Stream Test of Security Doors RB3-13 and RB 3-20".

These reports list modifications which have to be completed to make fire door/frame assemblies acceptable construction to UL designs. Detroit Edison has completed these modifications except for weather stripping on 4 doors (R1-10, R3-20, R3-13 and R3-4). The weather stripping will be installed by fuel load.

2.0 PROBLEM STATEMENT (Door 3-20)

UL - Test No. 1 was a 1 1/2 hour test for door R3-20 which has a 100 sq. in. of UL classified Bullet Resistant Glazing material. This door met the criteria of the subject tests with the exception of Sections 11.7 and 12.1 of UL10B. Light flaming developed at 21 minutes into the test on the unexposed side and the criteria is no flaming on the unexposed side within 30 minutes (12.1). A through opening developed at 80 minutes along the top latch corner of the glazing and the criterion is no opening for 90 minutes (11.7).

2.1 AREA DESCRIPTION (Door 3-20)

Door R3-20 separates the control room from the stairwell in the northeast corner of the control room. The stairwell construction has a two hour fire resistance. The control room is enclosed in a three hour fire resistive envelope except the north exterior wall. (Refer to Sketch No. 1).

2.2 FIRE HAZARDS ANALYSIS (Door 3-20)

The amount of combustible material in the stairwell consists of two (2) cable trays, each 8 ft. high. The type of combustible material in the control room consists of electrical cable insulation, paper, and plastics. The quantity of combustible loading is approximately 10 lb/ft<sup>2</sup>.

2.3 FIRE PROTECTION (Door 3-20)

The control room has ionization smoke detectors installed above the drop ceiling and in the control room panels. The control room is manned at all times. Halon and CO<sub>2</sub> portable extinguishers are located on the north and south walls of the control room. A hose station is located just outside the south wall of the control room.

2.4 SAFE SHUTDOWN EQUIPMENT (Door 3-20)

The control room contains safe shutdown panels and cabling.

2.5 CONCLUSION (Door 3-20)

Intermittent flaming on the unexposed surface of the door at 21 minutes into the test is not considered significant since the test criteria permit flame at 30 minutes. Although light flaming occurred 9 minutes before the specified time interval, the flaming experienced did not increase significantly for the duration of the test (1 1/2 hr). The opening that developed at 80 minutes into the test was not of sufficient magnitude to contribute to the flaming experienced, as indicated above.

Since the quantity of combustibile materials in the stairwell is negligible, this door assembly will prevent the passage of fire through the stairwell and into the control room.

### 3.0 PROBLEM STATEMENT (Door 3-13)

Test No. 2 was a 3 hour fire test for door R3-13 which has a transom, and is 3'8" wide which exceeds the width limits of listed doors by this manufacturer. This door met the conditions of acceptance of UL10B with the exception of section 11.2. At 90 minutes into the test, the door separated from the transom panel at its horizontal midpoint, by 2 in. The criterion specified is 1 3/4 in. (width of door). At 180 minutes, the separation was 2 15/16 in. and the criterion is 2 10/16 in.

### 3.1 AREA DESCRIPTION (Door 3-13)

Door R3-13 separates the control room from the Turbine Bldg. extension, floor elevation 643'-6". This security door is installed in a 3 hour fire resistance wall on the south side of the control room. This door is located approximately 25 ft from the main Turbine Building floor. (Refer to sketch No. 1).

### 3.2 FIRE HAZARDS ANALYSIS (Door 3-13)

The types of combustibile material in the control room consists of electrical cable insulation, paper, and plastic. The quantity of combustibile loading is approximately 10 lb/ft<sup>2</sup>.

The quantity of combustibile material in the Turbine Building extension is negligible (<1 lb/ft<sup>2</sup>).

### 3.3 FIRE PROTECTION (Door 3-13)

The control room has ionization smoke detectors installed above the drop ceiling and in the control room panels. The control room is manned at all times. Halon and CO<sub>2</sub> portable fire extinguishers are located on the north and south walls of the control room. The turbine building extension contains one hose station and two portable fire extinguishers (CO<sub>2</sub> and dry chemical).

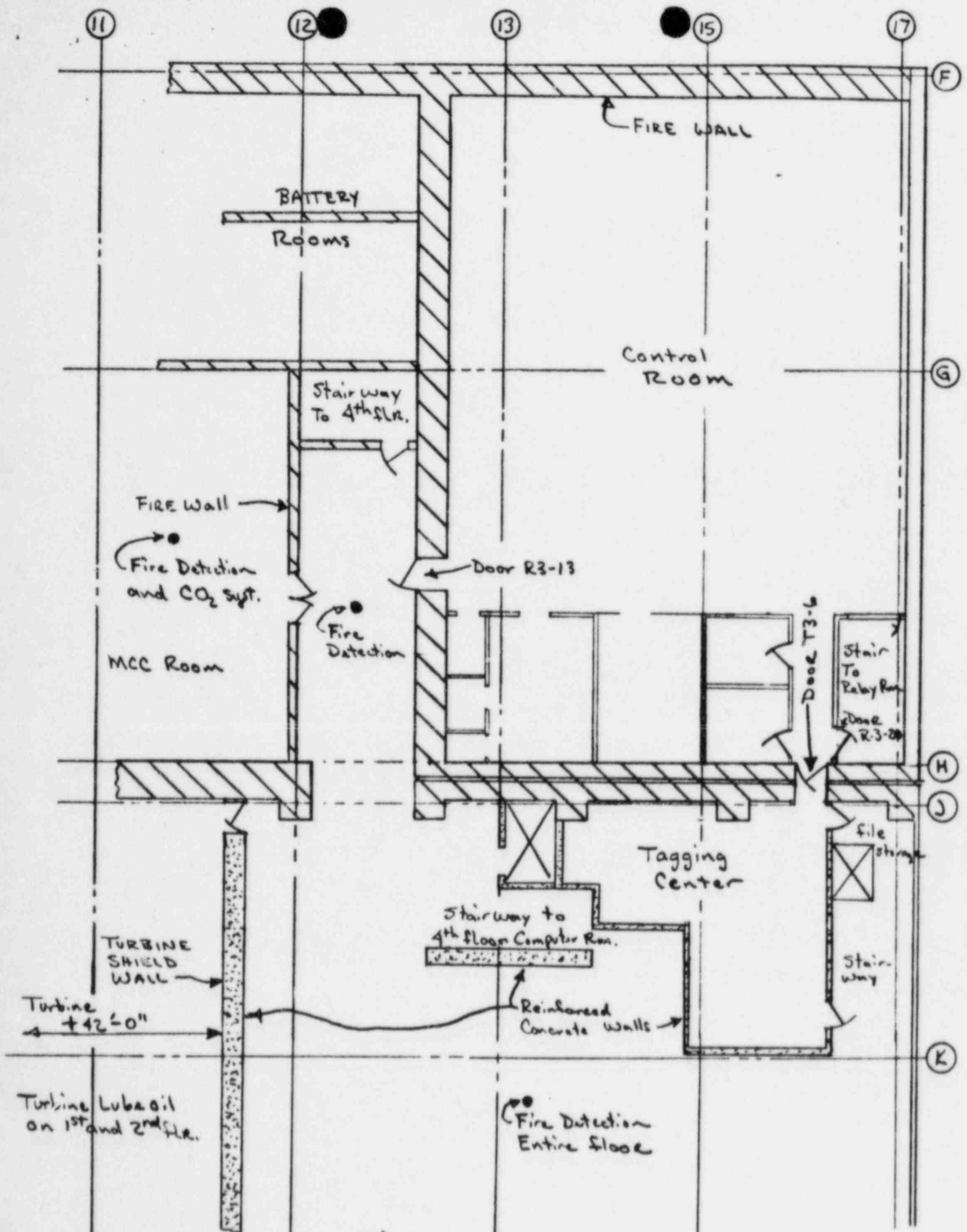
3.4 SAFE SHUTDOWN EQUIPMENT (Door 3-13)

The control room contains safe shutdown panels that have been protected to minimize fire exposure damage.

The turbine building extension contains no safe shutdown equipment.

3.5 CONCLUSION (Door 3-13)

Door 3-13 is considered adequate for its installation in the 3 hour rated fire wall even though an additional 5/16 inch gap occurred at the transom panel. This is considered a minor deviation from the acceptance criteria. In addition, the Turbine Building extension contains no fixed combustible material and therefore, does not present an exposure hazard to the door assembly. Transient combustibles are controlled procedurally.



3rd FLOOR CONTROL RM AREA

Scale  $\frac{1}{16}'' = 1'-0''$

FIGURE 1

GLW  
2-4-85







Results of Fire Detector Placement Review at Fermi 2

A study of Fermi's fire detection system was performed by Detroit Edison personnel to determine conformance to NFPA 72E, a standard for the installation of fire detectors. This review took into account spacing, location, ceiling types and construction, interferences from HVAC and normal air patterns (along with location of HVAC supply inlets and exhausts) and accessibility for testing and maintenance.

Based upon this study, additional smoke detectors will be installed according to Table 1.

TABLE 1

<u>AREA</u>	<u>DETECTION ZONE NUMBER</u>	<u>NUMBER OF EXISTING DETECTORS</u>	<u>NUMBER OF DETECTORS TO BE ADDED</u>
First Floor Reactor Building	7	10/8*	6
Second Floor Reactor Building	10	10	3
Third Floor Reactor Building	15	14	2 (Plus relocate one)
Auxiliary Building Basement	4	5	1
Auxiliary Building Mezzanine	6	12	2 (Plus relocate five)
Auxiliary Building Fourth Floor	16	5	1
Top of the Control Room			
Complex Stairwell (N/W Corner)	-	-	1

It should be noted that none of the above areas requiring additional detectors to comply with NFPA 72E rely on detectors to actuate gaseous suppression systems.

\*10/8 - 10 ionization smoke detectors  
8 thermal detectors

In addition, the study recommended relocating some detectors as summarized in Table 2:

TABLE 2

<u>AREA</u>	<u>DETECTION ZONE NUMBER</u>	<u>NUMBER OF EXISTING DETECTORS</u>	<u>DETECTORS TO BE RELOCATED</u>
<u>AUXILIARY BUILDING</u>			
Division I Switchgear Rooms	9	4	2*
Division II Switchgear Rooms	14	4	2*
Fifth Floor HVAC Areas	16	4	4
<u>RHR BUILDING</u>			
EDG #11 Switchgear Room	52	6	2*
EDG #12 Switchgear Room	53	6	2*
EDG #13 Switchgear Room	54	6	2*
EDG #14 Switchgear Room	55	6	2*

These detectors are currently planned to be installed and/or relocated by May 30, 1985.

With the existing fire detectors in their existing locations in service, sufficient detector coverage is provided during the interim period of time until the detectors are relocated and/or added as listed in Tables 1 and 2. Additional justification for this interim deviation to NFPA 72E is provided as follows:

- a) Auxiliary Building: Because of previous commitments, an hourly fire watch patrol will be making rounds in the Auxiliary Building. His routes will also include the Auxiliary Building areas listed except for the fifth floor. The fifth floor Auxiliary Building contains HVAC systems needed for safe shutdown and the combustible loading for this zone is light. The present detectors need to be relocated to meet NFPA 72E, but the present layout will detect a fire condition.

This additional fire watch coverage along with the existing fire detector coverage provides sufficient assurance to warrant granting the interim deviation for the Auxiliary Building.

\*The existing location of these detectors is in front of exhaust duct inlets. The detectors are equipped with air shields and should function acceptably. However, to meet code requirements, the detectors will be relocated.

- b) Reactor Building: The Reactor Building areas listed in Table 1 are large (approximately 30 ft. ceilings and 10,000 sq. ft floor areas). The existing detectors are located throughout the floor areas. Due to these detectors, the more than 20 ft. separation of shutdown equipment, and the light fire loading (see FSAR section 9B), a postulated small delay in fire detection due to not explicitly meeting NFPA 72E will not jeopardize safe shutdown capability.
- c) RHR Building: The RHR Building is arranged so Division I (EDG's 11 and 12) is separated from Division II (EDG's 13 and 14) by a three hour rated wall. Additionally, the Switchgear Rooms in each division have been separated by fire rated barriers because of Edison standards. The rooms have the proper number of detectors in them presently which will assure detection of a fire. Additionally, any postulated fire will be contained by the fire barriers.

The following sections of this Attachment provide permanent deviation requests from NFPA 72E for the following areas:

Control Room Complex	Performed by
Torus Room	Professional
Reactor Building Refueling Floor	Loss Control, Inc.
Reactor Building Basement Corner Rooms	Performed by
	Detroit Edison

DEVIATION REQUESTS FOR  
FIRE DETECTOR PLACEMENT

FOR

CONTROL ROOM COMPLEX  
TORUS ROOM  
REACTOR BUILDING REFUELING FLOOR

PERFORMED BY PROFESSIONAL LOSS CONTROL, INC.