

*PLC* *Professional Loss Control, Inc.*

STRUCTURAL STEEL ANALYSIS  
for  
LIMERICK GENERATING STATION  
  
Control Structure El. 180'  
Backwash Receiving Tank Room 163  
Fire Area 1G

December 20, 1983

8401090657 840104  
PDR ADOCK 05000352  
E PDR

P. O. Box 446 • Oak Ridge, Tennessee 37830 • (615) 482-3541

## LIMERICK GENERATING STATION

### 1. AREA DESCRIPTION

The area under consideration is the Backwash Receiving Tank Room 163 on the 180' elevation of the Control Structure (Fire Area 1G) (see Attachment A for sketch of area). The bounding walls in the area are of reinforced concrete construction with an average thickness of 3 ft. The total surface area for heat transfer is approximately 2772 ft<sup>2</sup> (257 m<sup>2</sup>) (see Attachment A for calculation of areas).

### 2. COMBUSTIBLE LOADING

Combustible loading in the area consists of two cable trays which run east-west across the room. The total surface area of the trays is 164 ft<sup>2</sup>. The average combustible loading of the trays is 3.5 lbs/ft<sup>2</sup> of tray surface area. There are no combustible liquids in this area.

### 3. VENTILATION PARAMETERS

There is one door leading into this area. The door measures 3' wide by 7' high and is located in the northwest corner of the room.

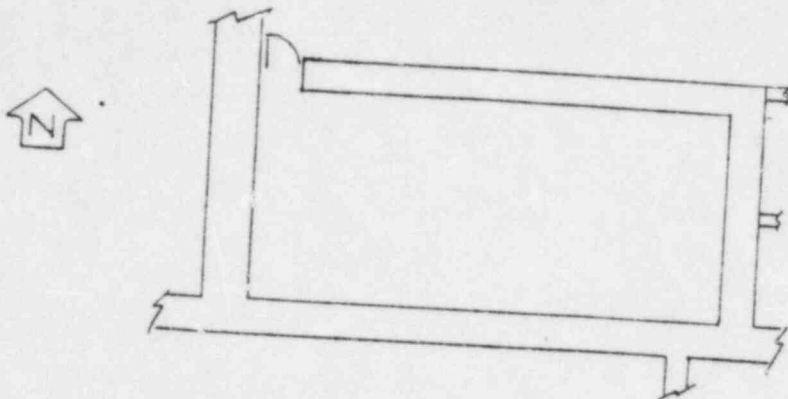
### 4. CASES EXAMINED

With the light combustible loading in the area, the assumption that all cables are burning simultaneously would present the worst case. With all cable trays burning, a surface area of 164 ft<sup>2</sup> would be involved. This corresponds to a heat output of approximately 2900 kW. With all cables assumed to be burning simultaneously the duration of the fire would be

$$3.5 \text{ lbs/ft}^2 \div \frac{.1 \text{ lbs}}{\text{min/ft}^2} = 35 \text{ minutes}$$

### 5. RESULTS

With all cable trays in the area burning simultaneously and the door entering the area open, a fire temperature of 764°F was achieved after 35 minutes, which is below the critical temperature for the structural steel (see Attachment B). None of the cable trays in the area was positioned so as to present a localized heating exposure to the structural steel.



Control Structure El. 180'  
Backwash Receiving Tank Room 163

Surface Area Calculation

<u>Walls</u>		
North wall	(40' x 18')	
South wall	(40' x 18')	720 ft <sup>2</sup>
East wall	(17' x 18')	720 ft <sup>2</sup>
West wall	(17' x 18')	306 ft <sup>2</sup>
		306 ft <sup>2</sup>
<u>Ceiling</u>	40' x 18'	
		720 ft <sup>2</sup>
Total Surface Area for Heat Transfer		2772 ft <sup>2</sup>

CASE NUMBER: 1  
BUILDING: CONTROL STRUCTURE  
ELEVATION AND AREA DESCRIPTION: 180' BACKWASH RECEIVING TANK AREA 163  
CASE DESCRIPTION: ONE DOOR OPEN ALL CABLES BURNING

\*\*\*\*\*

CEILING/WALL THICKNESS (ft)	CEILING/ WALL MATERIAL	Ao (ft2)	Ho (ft)	Aw (ft2)	Q (kW)
3.0	CONCRETE	21	7	2772	2900

FIRE IS FUEL CONTROLLED

FIRE DURATION  
(min)

5  
10  
15  
20  
25  
30  
35

GAS TEMPERATURE  
(deg.F)

334  
442  
525  
595  
657  
713  
764

ATTACHMENT B