

PLC *Professional Loss Control, Inc.*

STRUCTURAL STEEL ANALYSIS

for

LIMERICK GENERATING STATION

Unit 1 Reactor Building El. 313'

Laydown Area Room 602

Fire Area 48A

December 20, 1983

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LIMERICK GENERATING STATION

1. AREA DESCRIPTION

The area under consideration is the Laydown Area, Room 602, on the 313' elevation of the Unit 1 Reactor Building (Fire Area 48A). 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 16,764 ft² (see Attachment A for sketch and surface area calculations).

2. COMBUSTIBLE LOADING

Combustible loading in the area consists of a single cable tray located along the north wall of the area. The total surface area of the cable tray is 164 ft² with an average combustible loading of 3.5 lbs/ft² of cable tray surface area. There are no combustible liquids in this area.

3. VENTILATION PARAMETERS

This area is open to the remainder of the 313' elevation by two large walkways in the south wall.

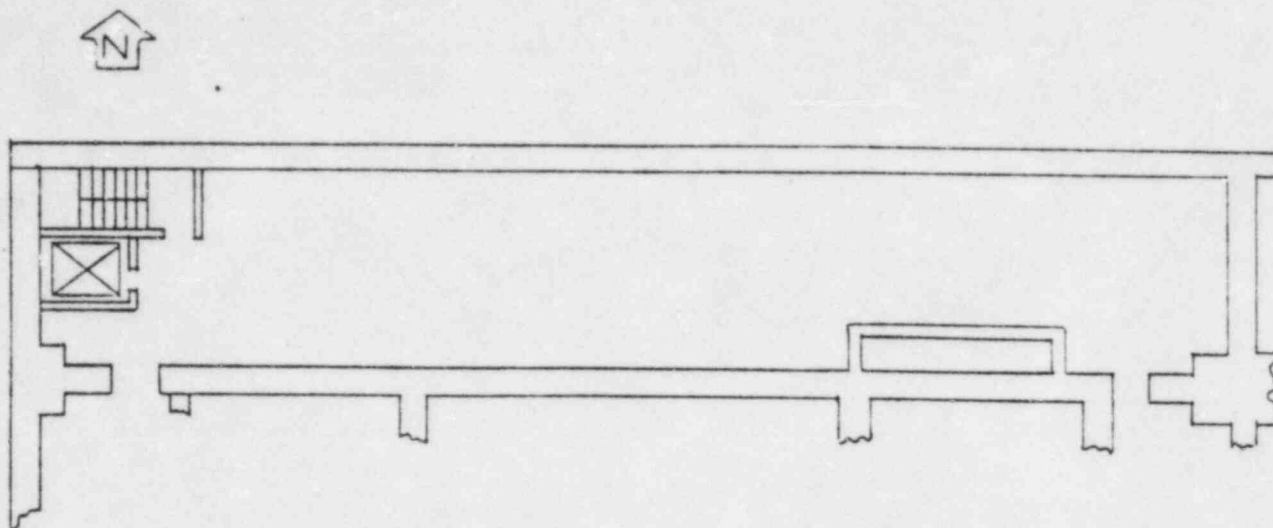
4. CASES EXAMINED

With the light combustible loading in this area, the assumption that all cables are burning simultaneously would present the worst case. With all cable trays burning a surface area of 164 ft² 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, a gas temperature of 186°F was achieved after 35 minutes, which is below the critical temperature for the structural steel (see Attachment B). The cable tray in the area was positioned so as to not present a localized heating exposure to the structural steel.



Unit 1 Reactor Building El. 313'
Laydown Area Room 601

Surface Area Calculation

Walls

North wall	(12' x 38')	456 ft ²
South wall	(12' x 38')	456 ft ²
East wall	(48' x 38')	1824 ft ²
West wall	(48' x 38')	1824 ft ²

Ceiling

576 ft²

Total Surface Area for Heat Transfer

5136 ft²

CASE NUMBER: 1
 BUILDING: UNIT 1 REACTOR BUILDING
 ELEVATION AND AREA DESCRIPTION: 313' LAYDOWN AREA ROOM 602
 CASE DESCRIPTION: ALL CABLES BURNING

CEILING/WALL THICKNESS (ft)	CEILING/ WALL MATERIAL	Ao (ft ²)	Ho (ft)	Aw (ft ²)	Q (kW)
3.0	CONCRETE	222.0	37.0	16764	2900

FIRE IS FUEL CONTROLLED

FIRE DURATION (min)	GAS TEMPERATURE (deg.F)
1	92
2	100
3	106
4	111
5	115
6	119
7	123
8	127
9	130
10	133
11	136
12	139
13	142
14	144
15	147
16	149
17	152
18	154
19	156
20	159
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22	163
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34	185
35	186