PLC *Professional Loss Control, Inc.*

STRUCTURAL STEEL ANALYSIS

for

LIMERICK GENERATING STATION

Unit 1 Reactor Building El. 313'

Laydown Area Room 601

Fire Area 48A

December 20, 1983

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

LIMERICK GENERATING STATION

1. AREA DESCRIPTION

The area under consideration is the Laydown Area, Room 601, on the 313' elevation of the Unit 1 Reactor Building (Fire Area 48A). The bounding walls of the area are of reinforced concrete construction with an average thickness of 3 ft. The total surface area for heat transfer is 5136 ft^2 (see Attachment A for sketch and calculation of surface areas).

2. COMBUSTIBLE LOADING

Combustible loading in the area consists of the cable insulation in a single cable tray which runs north/south through the area. The total surface area of the cable tray is 90 ft^2 with an average combustible loading of 4 lbs/ft^2 of cable tray surface area. There are no combustible liquids in the area.

3. VENTILATION PARAMETERS

This area is open to the remainder of the 313' elevation of the Reactor Building.

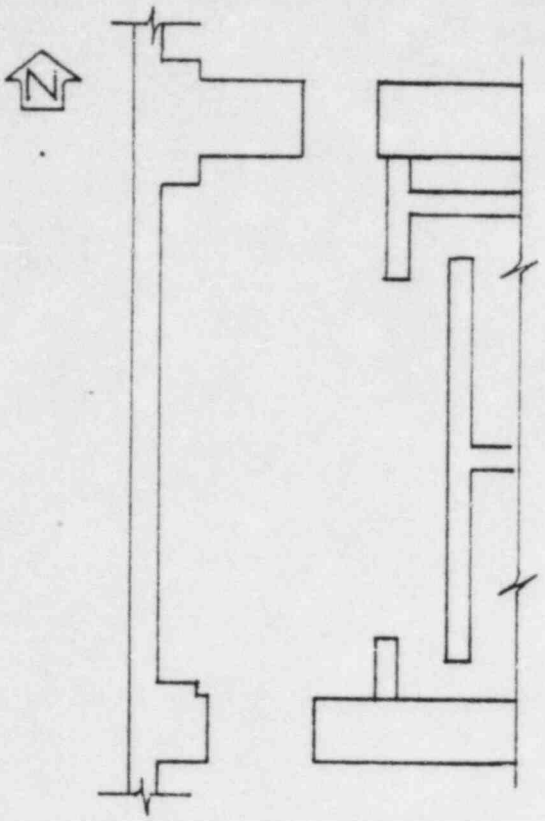
4. CASES EXAMINED

With the light combustible loading in the area, the assumption that all cable trays are burning simultaneously would present the worst case. With all cables burning, a surface area of 90 ft^2 would be involved. This corresponds to a heat output of approximately 1600kW. With all combustibles burning simultaneously, the fire duration would be 4 $lbs/ft^2 \div \frac{.1 \text{ lbs}}{\text{min } ft^2} = 40$ minutes.

5. RESULTS

With all cable trays in the area burning simultaneously and the large ventilation opening, the resulting fire was fuel controlled. A gas temperature of 292°F was achieved after 40 minutes, which is below the critical temperature for the structural steel (see Attachment B).

The position of the cable tray relative to structrual steel members was examined in the area. The cable tray was positioned so as not to 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 ft^2
Total Surface Area for Heat Transfer		5136 ft^2

ATTACHMENT A

CASE NUMBER: 1
BUILDING: UNIT 1 REACTOR BUILDING
ELEVATION AND AREA DESCRIPTION: 313' LAYDOWN AREA ROOM 601
CASE DESCRIPTION: ALL CABLES BURNING

CEILING/WALL THICKNESS (ft)	CEILING/ WALL MATERIAL	Ao (ft2)	Ho (ft)	Aw (ft2)	Q (kW)
3.0	CONCRETE	608	38.0	5136	1600

FIRE IS FUEL CONTROLLED

FIRE DURATION (min)	GAS TEMPERATURE (deg.F)
5	150
10	182
15	207
20	228
25	246
30	263
35	278
40	292