PLC *Professional Loss Control, Inc.*

STRUCTURAL STEEL ANALYSIS

for

LIMERICK GENERATING STATION

Unit 1 Reactor Building El. 313'

Corridor Room 605

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 Corridor, Room 605, 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 2.5 ft. The total surface area for heat transfer is 12,460 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 located in cable trays. The total cable tray surface area is 508 ft^2 with an average combustible loadng of 3.5 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.

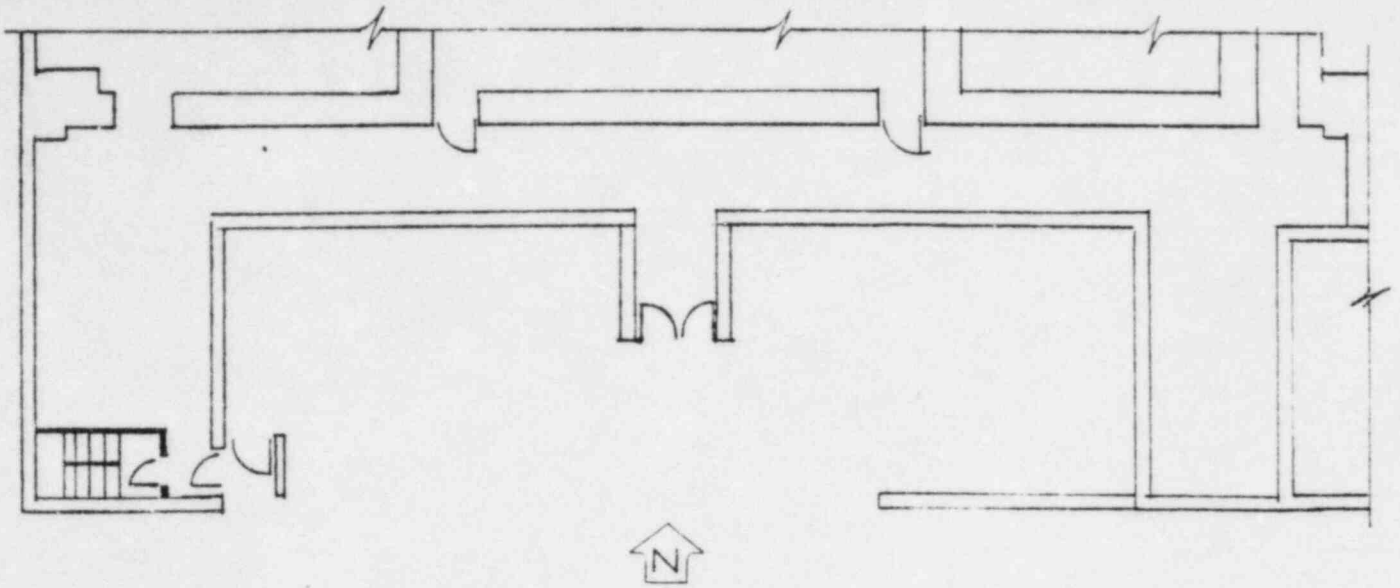
4. CASES EXAMINED

All cables in the area were assumed to be burning simultaneously. With all cable trays burning a surface area of 508 ft^2 would be involved. This corresponds to a heat output of approximately 8970 kW. With all combustibles burning simultaneously, the fire duration would be 3.5 $lbs/ft^2 \div \frac{.1 \text{ lbs}}{\text{min ft}^2}$ = 35 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 548°F would be achieved after 35 minutes, which is below the critical temperature for the structural steel (see Attachment B).

The position of the cable trays relative to structrual steel members were examined in the area. No cable trays were positioned so as to present a localized heating exposure to the structural steel.



Unit 1 Reactor Building El. 313'
Corridor Room 605

Surface Area Calculation

Walls		
North wall	(160' x 38')	6080 ft^2
South wall	(112' x 38')	4256 ft^2
East wall	(9' x 38')	342 ft^2
West wall	(9' x 38')	342 ft^2
Ceiling	(160' x 9')	1440 ft^2
Total Surface Area for Heat Transfer		12,460 ft^2

ATTACHMENT A

CASE NUMBER: 1
BUILDING: UNIT 1 REACTOR BUILDING
ELEVATION AND AREA DESCRIPTION: 313' CORRIDOR ROOM 605
CASE DESCRIPTION: ALL CABLES BURNING

CEILING/WALL THICKNESS (ft)	CEILING/ WALL MATERIAL	Ac (ft2)	Ho (ft)	Aw (ft2)	Q (kW)
2.5	CONCRETE	304	38.0	12460	8970

FIRE IS FUEL CONTROLLED

FIRE DURATION (min)	GAS TEMPERATURE (deg.F)
5	253
10	327
15	384
20	432
25	475
30	513
35	548