

PLC *Professional Loss Control, Inc.*

STRUCTURAL STEEL ANALYSIS

for

LIMERICK GENERATING STATION

Unit 1 Reactor Building El. 313'

Reactor Vent Supply Fan Room Room 607

Fire Area 49

December 20, 1983

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LIMERICK GENERATING STATION

1. AREA DESCRIPTION

The area under consideration is the Reactor Vent Supply Fan Room, Room 607, on the 313' elevation of the Unit 1 Reactor Building (Fire Area 49). The bounding walls of the area are of reinforced concrete construction with an average thickness of 2 ft. The majority of the south wall is louvers open to the outside. The total surface area for heat transfer is 7720 ft² (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 89 ft² with an average combustible loading of 3.5 lbs/ft² of cable tray surface area. There are no combustible liquids in the area.

3. VENTILATION PARAMETERS

The south wall of the area contains louvers which measure 16' high by 75' wide and are open to the outside.

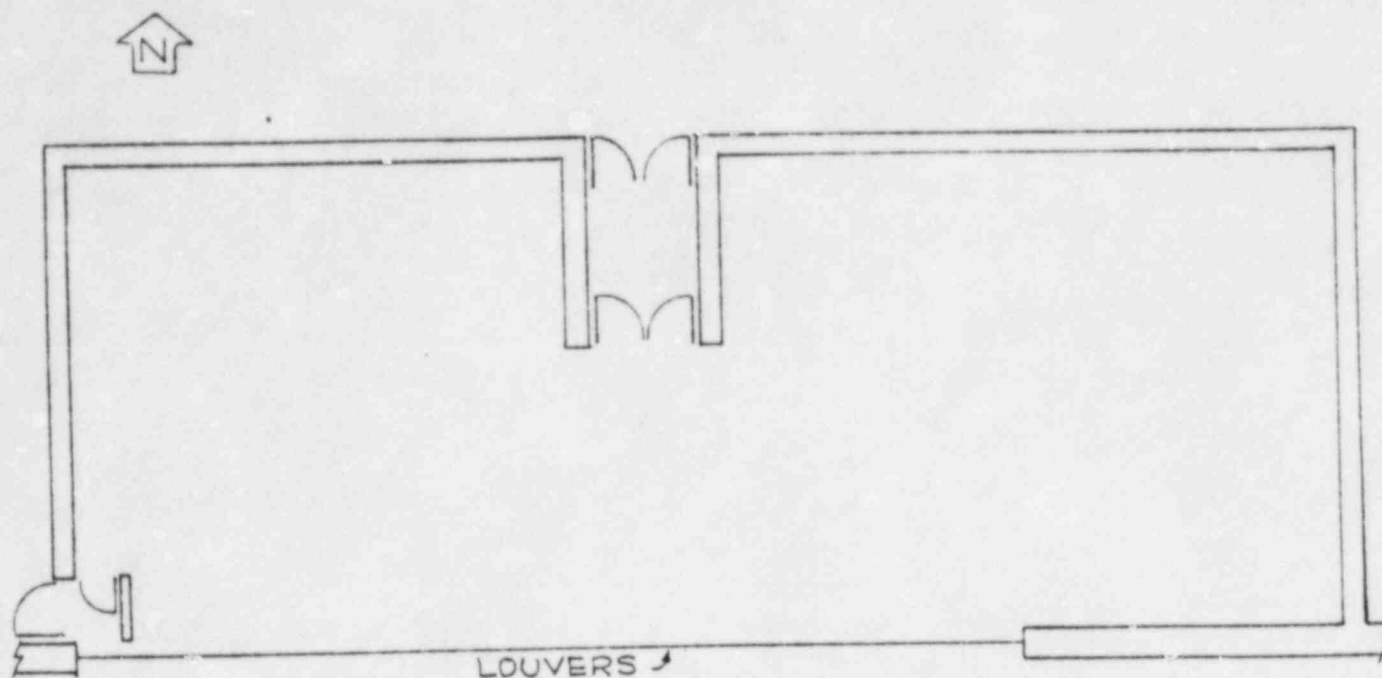
4. CASES EXAMINED

With the light combustible loading in the area, the assumption that all cable trays were burning simultaneously would present the worst case. With all cables burning, a cable tray surface area of 89 ft² would be involved. This corresponds to a heat output of 1575 kW. With all combustibles burning simultaneously the fire duration 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 large area of louvers, the resulting fire was fuel controlled. A gas temperature of 207°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 structural 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'
Reactor Vent Supply Fan Room Room 607

Surface Area Calculation

<u>Walls</u>		
North wall	(111' x 16')	1776 ft ²
South wall	(38' x 16')	608 ft ²
East wall	(40' x 16')	640 ft ²
West wall	(40' x 16')	640 ft ²
<u>Ceiling</u> (111' x 40') - (12' x 16') airlock		<u>4056 ft²</u>
Total Surface Area for Heat Transfer		7720 ft ²

CASE NUMBER: 1
BUILDING: UNIT 1 REACTOR BUILDING
ELEVATION AND AREA DESCRIPTION: 313' REACTOR VENT SUPPLY FAN ROOM
CASE DESCRIPTION: LOUVERS OPEN ALL CABLES BURNING

CEILING/WALL THICKNESS (ft)	CEILING/ WALL MATERIAL	Ao (ft2)	Ho (ft)	Aw (ft2)	Q (kW)
2.0	CONCRETE	1200	16.0	7720	1575

FIRE IS FUEL CONTROLLED

FIRE DURATION
(min)

GAS TEMPERATURE
(deg.F)

5	123
10	144
15	160
20	174
25	186
30	197
35	207