

PLC *Professional Loss Control, Inc.*

STRUCTURAL STEEL ANALYSIS
for
LIMERICK GENERATING STATION

Unit 1 Diesel Generator Enclosure El. 217'
Diesel Generator Cell 1A
Fire Area 79

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LIMERICK GENERATING STATION

1. AREA DESCRIPTION

The area under consideration is the diesel generator cell 1A on the 217' elevation of the Unit 1 Diesel Generator Building (Fire Area 79). (See Attachment A for a sketch of the area.) The bounding walls in the area are of reinforced concrete with an average thickness of 2 feet. The total surface area for heat transfer is 5579 ft² (see Attachment A for calculation of areas).

2. COMBUSTIBLE LOADING

Combustible loading in the area consists of 198 ft² of cable tray, 250 gallons of lubricating oil, and 800 gallons of fuel oil which is assumed to have leaked into the diesel generator cell from a postulated break in the fuel oil supply line.

3. VENTILATION PARAMETERS

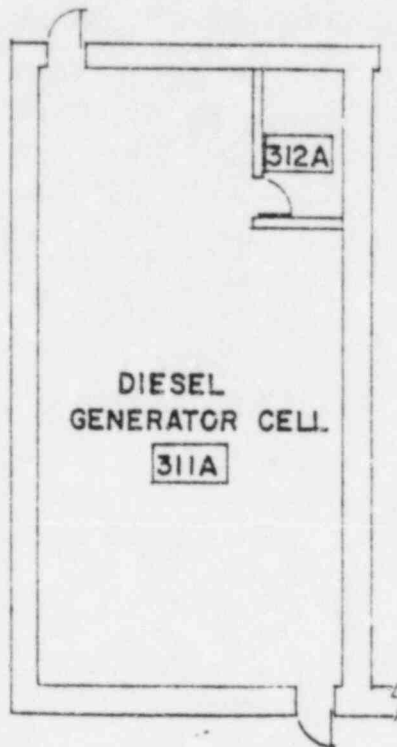
Two intake louvers for the diesel generator cell serve this area, each measuring 5.25' high x 6.5' wide. Both louvers are located in the south wall.

4. CASES EXAMINED

The case examined assumes a fuel oil fire with both louvers serving the area open which results in a ventilation controlled fire with a maximum heat release rate of 12,678 kW. This case assumes that the pre-action sprinkler system in the room does not operate and/or the fire brigade takes no action toward extinguishing the fire.

5. RESULTS

As can be seen from the results in Attachment B, the critical temperature of the structural steel will be exceeded within 20 minutes. This is due to the large ventilation openings in the area and the large quantity of fuel oil available for combustion.



Diesel Generator Room 311A

Surface Area Calculation

Walls

North wall	(25' x 29')	725 ft ²
East wall	(51' x 29')	1479 ft ²
South wall	(25' x 29')	725 ft ²
West wall	(51' x 29')	1479 ft ²

4408 ft²

Ceiling

(51' x 25') - (8' x 13')	1171 ft ²
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5579 ft²

CASE NUMBER: 1
 BUILDING: UNIT 1 DIESEL GENERATOR BUILDING
 ELEVATION AND AREA DESCRIPTION: 217' CELL 1A FIRE AREA 79
 CASE DESCRIPTION: TWO 5.25'x6.5' VENTS OPEN LUBE OIL FIRE

CEILING/WALL THICKNESS (ft)	CEILING/ WALL MATERIAL	Ao (ft2)	Ho (ft)	Aw (ft2)	Q (kW)
2.0	CONCRETE	68.3	5.3	5579	12678

FIRE IS VENTILATION CONTROLLED

FIRE DURATION
(min)

GAS TEMPERATURE
(deg.F)

10	876
20	1209
30	1464
40	1679
50	1869
60	2040
70	2198
80	2345
90	2483
100	2613
110	2737
120	2856
130	2970
140	3079
150	3184
160	3287
170	3386
180	3482