

PLC *Professional Loss Control, Inc.*

STRUCTURAL STEEL ANALYSIS
for
PEACH BOTTOM GENERATING STATION

Calculation No. 92

Unit 2,3

Turbine Building El. 116'-0"

Conventional Chemistry Lab

Fire Area 78D

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PEACH BOTTOM GENERATING STATION

1. AREA DESCRIPTION

The area under consideration is the Conventional Chemistry Room on the 116'-0" elevation of the Turbine Building (Fire Area 78D). The bounding walls are constructed of reinforced concrete with an average thickness of 1 ft. The total surface area for heat transfer is 3,690 ft² (see Attachment A for a sketch of the area under consideration).

2. COMBUSTIBLE LOADING

There are no combustible liquids or cable trays located in this area.

3. VENTILATION PARAMETERS

There are two doors which enter this area.

| <u>Door</u> | <u>Size</u> | <u>Location</u> |
|-------------|--------------|-----------------|
| 116 | 3'-0"x 7'-0" | West Wall |
| 117 | 3'-0"x 7'-0" | South Wall |

4. CASES EXAMINED

Since there are no exposed fixed combustibles in this area, no cases were examined for a general room fire.

5. RESULTS

No general room fire was postulated because of the lack of exposed fixed combustibles in the area.

There are no cable trays in this area to present a localized heating exposure to the structural steel.

6. EFFECTS_OF_TRANSIENT_COMBUSTIBLES

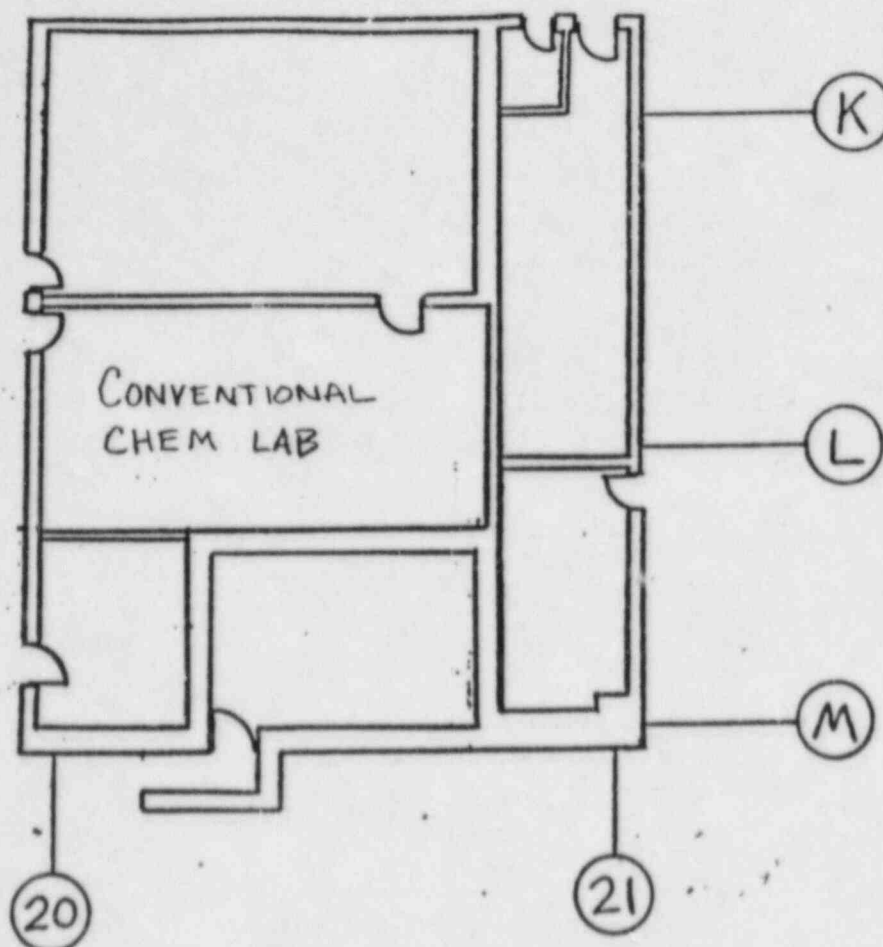
This area contains no exposed fixed combustibles. The table below lists the maximum heat release rate for transient combustibles for different fire durations which result in an area temperature less than 1100°F.

| <u>Fire_Duration</u> | <u>Q/A (kW/m²)</u> | <u>Q(kW)</u> |
|----------------------|-------------------------------|--------------|
| 1 hour | 10.5 | 3,599 |
| 2 hours | 8.0 | 2,743 |
| 3 hours | 6.5 | 2,228 |

The distance between the floor and the deepest beams supporting the ceiling is 16'-8 1/2". The heat release rates required of floor level transient combustible fires to produce plume temperatures of 1100°F, 1300°F and 1500°F at the bottom

flange of the beam have been determined and tabulated below. For the temperatures greater than 1100°F the time required to heat the sizes of the beams supporting the ceiling have also been determined.

| <u>T(°)</u> | <u>Q(kW)</u> | <u>Time to 1100°F(min)</u> |
|-------------|--------------|----------------------------|
| | | <u>W16 x 96</u> |
| 1100 | 7,257 | - |
| 1300 | 9,549 | 38 |
| 1500 | 12,042 | 26 |



Unit 2,3 Turbine Building Elevation 116'-0"
Conventional Chemistry Lab

Surface Area Calculation

| | | |
|--------------------------------------|-------------|-----------------------|
| <u>Walls</u> | | |
| North wall | (15' x 18') | 270 ft ² |
| East wall | (30' x 18') | 540 ft ² |
| South wall | (15' x 18') | 270 ft ² |
| West wall | (30' x 18') | 540 ft ² |
| | | <hr/> |
| | | 1,620 ft ² |
| <u>Ceiling</u> | (30' x 15') | 450 ft ² |
| | | <hr/> |
| | | 2,070 ft ² |
| Total Surface Area for Heat Transfer | | <hr/> |
| | | 3,690 ft ² |