ENGINEERED FIRE SYSTEMS, INC.
FIRE PROTECTION SPECIALISTS

March 10, 2016

Phred Stoner
Director of Operations and Maintenance
Truckee Tahoe Airport
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Re: Fire Safety Analysis
Industrial & Storage Building
12116 Chandelle Way
Truckee, CA

Mr. Stoner:

I have performed a fire safety and fire sprinkler feasibility evaluation of your existing unsprinklered building at 12116 Chandelle Way.

Please note that I have referenced the following codes and standards and listed the relevant code sections after many of the individual items that I cover.

2013 California Building Code (CBC)
2013 California Fire Code (CFC)
2013 Standard for the Installation of Sprinkler Systems (NFPA 13)

My evaluation reflects these current codes that are presently in effect in California. Please refer to the end of this report for definitions of various technical terms used.

Existing Conditions

The existing building is approximately 30,000 square feet in area. It is of steel beam and girder construction with roof heights of 19 feet at the peak and 16 feet at the eaves. The building has been divided by full-height walls into seven separate tenant spaces (Suites A through D, E-1 through E-3). B, F and S Occupancies are present in this building. The building is equipped with a fire alarm system employing heat and/or smoke detectors at the ceilings.

Mountain Home Center Suite A (A-1 to A-3) (5,800 sq.ft.): Commodities are stored in cardboard boxes on wooden pallets on racks with open shelves to 17 feet top of storage. Minimum aisle width is 4 feet. Examples of stored items are patio furniture, hot tub covers and fireplaces. Some

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of the packaging is encapsulated. Most of these items are considered Group A plastics / high-hazard commodities. Two small offices are in the space.

Clear Capital Suite B (4,000 sq.ft.): Parked automobiles are contained in this space. This space, as presently used, is considered an Ordinary Hazard Group 2 Occupancy.

Mountain Home Center Suite C (6,000 sq.ft): Commodities are stored in cardboard boxes or exposed on wooden pallets on racks with solid and open shelves to 17 feet top of storage. Most of the stored items are outdoor furniture made of teak wood, plastic or aluminum. Miscellaneous items are stored above and below a +/- 700 square-foot mezzanine. Also, an auto and a boat are stored on the floor in this space. As is the case in Suite A, many of the items are considered Group A plastics / high hazard commodities. An office is also included in the space.

WRA Suite D (8,000 sq. ft): Commodities are stored in cardboard boxes or exposed on wooden pallets on racks with solid shelves to 17 feet top of storage. Most aisle widths are 4 feet. Stored items include clothing in cardboard boxes and exposed encapsulated plastic tubs and other plastic items. The clothing is considered a Class IV commodity; the plastics are high hazard. An office is also included in the space. One aisle is blocked with piled empty cardboard boxes.

WRA Suite E-1 (1,100 sq.ft): Commodities are stored in cardboard boxes or exposed on wooden pallets on racks with solid shelves to 17 feet top of storage. Aisle widths are as narrow as 3 feet. Exposed plastic "swim rings" are stored encapsulated in the racks. Idle wooden pallets are stacked on the floor to approximately 6½ feet high. Again, contents are considered Group A plastics / high hazard.

Porter Simon Suite E-2 (1,200 sq.ft.): Paper records are stored in cardboard boxes on wooden shelves to 8 feet high. Aisles are approximately 2 feet wide. Paper records are considered Class III commodities. This area, as presently used, is considered an Ordinary Hazard Group 2 Occupancy.

Vacant Suite E-3 (3,500 sq. ft.): The proposed use of this space is a community workshop. A small kiln is already present in the space. The classification of this space is dependent upon the type of activities anticipated. Wood machining and product assembly are considered Ordinary Hazard Group 2 Occupancies. However, if combustible dust is present or combustibility of the contents are high, the space would qualify as an Extra Hazard Group 1 Occupancy. Flammable liquids spraying would dictate a Extra Hazard Group 2 Occupancy.

Water Supply

A 12" underground water line runs approximately 50 feet from the southwest end of the warehouse. The new underground lateral supply for the proposed fire sprinkler system would connect to this 12" line and run into the building at Suite A-2. The size of the lateral would be determined by the demand of the overhead fire sprinkler system (See Options 1 through 4 below).

Water flow data were not available. If recorded data cannot be obtained, a water flow test shall be performed on the nearest fire hydrant to determine the available water supply. The overhead fire sprinkler system shall be hydraulically designed to these results.

Fire Sprinkler Options

Below are four fire sprinkler options. All four options employ a dry-pipe fire sprinkler system. It is assumed that temperatures inside the building cannot reliably be maintained above 40°F at all times, year around.

Fire Sprinkler System Design Option 1

Ordinary Hazard Group 2: 0.20 gpm / sq.ft. / 1,950 sq. ft + 250 gpm hose allowance

This option, although the least costly, will severely limit the storage options in the warehouse. Storage of Class I to III commodities will be limited to 12 feet high; Class IV commodities to 10 feet high. Plastics would be limited to 5 feet (NFPA 13, Table13.2.1). Idle wood pallets are not allowed to be stored inside the building at any height under this design (NFPA 13, 12.12.1). The present storage configurations in Suites A, C, D and E-1 all exceed these limitations.

A 6" underground supply lateral is recommended to the base of the riser, 6" above the floor.

Fire Sprinkler System Design Option 2

Design Density: 0.20 gpm/ sq. ft. / 2,600 sq. ft. + 500 gpm hose allowance.

This option would increase solid pile storage of Class IV commodities to 12 feet high. Rack storage of Class IV commodities remain at 10 feet high (NFPA 13, Table 13.2.1). Plastic limited to 5 feet high. Idle wood pallets may be stored on the floor (not in racks) to a maximum 6 feet high (NFPA 13, Table 12.12.1.2(a)).

An 8" underground supply lateral is recommended to the base of the riser, 6" above the floor.

Fire Sprinkler System Design Option 3

Extra Hazard Group 2: 0.40 gpm/ sq. ft. / 2600 sq. ft. + 500 gpm hose allowance.

This option would increase rack storage Class IV commodities to 12 feet. Rack or solid-pile storage of plastics is allowed to 12 feet high (NFPA 13, Table 13.2.1). This option would also greatly increase the type of activities allowed in Suite E-3.

An 8" underground supply lateral is recommended to the base of the riser, 6" above the floor.

Fire Sprinkler System Design Option 4

Design Density: .60 gpm / sq. ft. / 2600 sq. ft. + 500 gpm hose allowance.

This option would allow the storage heights now present in the facility (NFPA 13, Figure 17.2.1.2.1(c)). However, the plastic stretch wrap or sheeting on top of the pallet loads (encapsulated) would have to be removed and all solid rack shelves must be converted to open shelving. Top of storage shall be a minimum 18" below the ceiling sprinklers.

An 8" underground supply lateral is recommended to the base of the riser, 6" above the floor.

Other Fire Sprinkler System Design Options

The use of Early Suppression Fast Response (ESFR) Sprinklers or Control Mode Special Application (CMSA) Sprinklers is not practical. Both these sprinklers require a minimum 36" clearance between the sprinkler and top of storage (NFPA 13, 8.11.6 & 8.12.6). With the ceiling heights at 16 feet to 19 feet, storage would be limited and the expense would not be justified. Also, ESFR sprinklers are not approved on dry pipe systems.

Offices and Suite C Mezzanine

Fire sprinklers shall be installed in all offices per Light Hazard Occupancy. Fire sprinklers shall be installed under the Suite C Mezzanine per Ordinary Group 2 Occupancy.

Fire Extinguishers

Portable fire extinguishers are installed throughout the tenant spaces. They shall be placed in accessible locations with the travel distance to an extinguisher being no greater than 75 feet (CBC Section 906)

Exits and Path of Egress

Spaces where the occupancy load is less than 30 in S Occupancies and less than 50 in F Occupancies require only one exit. However, the common path of egress shall be no more than 100 feet in a sprinklered building. That path of egress is reduced to 75 feet in an unsprinklered building of S occupancy and an occupancy load of greater than 30.

Conclusions and Recommendations

In my opinion, the warehouse facility as presently configured creates a significant fire hazard with potential loss of life and property. I would recommend installing a fire sprinkler system as outlined in Option 4. Current code would be met without altering the present storage use and activities in the building. However, solid shelving in storage racks would have to be replaced with open shelving. Also, encapsulation of pallet loads with plastic would be required to be removed. Plastic sheeting around the sides of the loads, but not on top, is acceptable.

Option 4 would be the most costly of the options. A fire booster pump may be needed if the existing water supply is not adequate. Note that installing one of the other options, but leaving the present storage as-is in the building would not be approved by the Truckee Fire Department.

In Suite E-3, high or extra-high temperature rated sprinklers should be installed in the area close to kiln. The exact temperature rating would be determined by the maximum ceiling temperature anticipated.

It is recommended that additional exits be incorporated to met current CBC and CFC code. Aisles should remain clear and unblocked.

Feel free to forward this analysis to your fire sprinkler contractor for bidding purposes or comments.

Definitions

The following definitions shall apply to the terms used in this report:

Occupancies per CBC and CFC:

Group B: Business
Group F: Assembly, Manufacturing
Group S1: Moderate hazard storage (clothing, furniture, paper products)
Group S2: Low hazard storage (metal, glass, food product, pottery)

Classification of Storage Commodities CFC and NFPA 13:

Class I Commodities: Noncombustible products placed directly on wooden pallets
Class III Commodities: Products fashioned from wood, paper, natural fibers containing 5% or less of Group A plastics by weight or volume
Class IV Commodities: Products and packaging that contain 5% to 15% by weight, or 5% to 25% by volume of Group A plastics; Level 2 Aerosols, synthetic clothing, beverages 20% to 80% alcohol
High-hazard Commodities: Products and packaging than contain more than 15% by weight or 25% by volume of Group A plastics; Level 3 Aerosols; beverages more than 80% alcohol; flammable solids

Fire Sprinkler System Design per NFPA 13:

Light Hazard Occupancy: Quantity and combustibility of contents are low; no stockpile of contents allowed (e.g. offices).
Ordinary Hazard Group 1 Occupancy: Combustibility is low, quantity of combustibles is moderate; stockpiles of contents do not exceed 8 feet.
Ordinary Hazard Group 2 Occupancy: Quantity and combustibility of contents are moderate to high; stockpiles of contents do not exceed 12 feet, plastics do not exceed 5 feet.
Extra Hazard Group 1 Occupancy: Quantity and combustibility of contents are very high and dust, lint or other materials are present
Extra Hazard Group 2 Occupancy: Moderate or substantial amounts of flammable or combustible liquids are present
High-piled storage: Solid-piled, palletized, rack, bin box and shelf storage over 12 feet high
Encapsulated: A method of packaging consisting of plastic sheeting enclosing the sides and top of a pallet load

gpm/ sq.ft.: water flow in gallons per minute per square foot that the fire sprinkler system is designed to deliver

psi: water pressure in pounds per square inch

Dry Pipe Fire Sprinkler System: A system employing sprinklers attached to piping containing air under pressure. Upon the opening of a sprinkler, the release of air pressure permits the water pressure to open a valve and water then flows in the piping system.

Wet Piping System: A system employing sprinklers attached to piping containing water.

If you have any questions or comments, please do not hesitate to call me at (530) 274-9400 x 206.

Sincerely,

Daniel Thacker

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