

**Facility Readiness for Safe Operations and Occupancy**

**Report on**

**Technology and Engineering Development Facility (TEDF)**

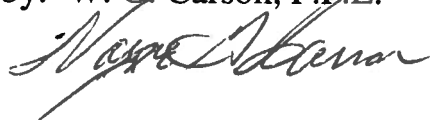
**Technology and Engineering Development Building (TED) Building 58**

**Test Lab Addition (TLA) Building 55**

**Fire / Life Safety Code Features and Functions**

January 10, 2012

Prepared by: W. G. Carson, F.P.E.

A handwritten signature in black ink, appearing to read "W. G. Carson", is written over the printed name.

## 1. Introduction:

This readiness overview report is provided to summarize and document the survey of the Technology and Engineering Development Building (TED) and the Test Lab Addition (TLA) on Monday January 9, 2011. This review is based on the 2009 *Life Safety Code*, NFPA 101.

## 2. General Building Description

**A. TED Building:** The new TED building is a two-story building of approximately 39,000 square feet per floor. The second floor is primarily offices. The first floor is light industrial with some offices. It is mixed use Group B and F-1 under the State Building Code. The uses are considered non-separated under both the Virginia Uniform Statewide Building Code (IBC 2006 with amendments) and the *Life Safety Code*, NFPA 101.

**B. TLA Building:** The new Test Lab Addition is a one-story building with a mechanical mezzanine. The building includes clean rooms and assembly areas (Group F-1) and a space for hazardous material that is Group H-4 under the State Building Code.

The building construction for both buildings is Type IIB under the Building Code. That is, the structural frame is of non-combustible construction, but has no fire resistance. The Building Code and the *Life Safety Code* both permit this type of construction for these structures.

## 3. Means of Egress

**A. TED Building:** The means of egress appears to be in compliance with the approved plans. There are two enclosed exit stairs from the second floor in accordance with Code. A third stair is open and not counted as an exit, but is available for use by occupants. Egress from the First floor is via doors directly to

grade. Travel distances, deadends, and common path of travel distances appear well within Code requirements. Egress capacity is also well within Code requirements.

The exit stairs are enclosed in one-hour fire protection rated walls and the doors are one-hour fire protection rated as shown on the approved drawings. Stair 7 has two plastic drainage pipes penetrating the stair at the second floor. No penetrations of utilities are permitted to penetrate the exit stair enclosure that do not provide necessary services to the exit stair. *Life Safety Code* section 7.1.3.2.1(9) prohibits penetration of stair enclosures by drainage piping.

**B. TLA Building:** The means of egress appears to be in compliance with the approved plans. Egress from the First floor is via doors directly to grade. Egress from the mechanical mezzanine is via an outside stair on the Southeast corner and a stair not yet constructed into the existing building at the Northeast corner. Travel distances, deadends, and common path of travel distances appear well within Code requirements. Egress capacity is also well within Code requirements.

The “T” shaped area containing the hazardous material has two remote exits as required by code. However, the Southwest corner of the “T” has a common path of travel of approximately 16 feet. No common path of travel is permitted in High Hazard per the *Life Safety Code* section 40.2.5. Two options are being considered for correcting this situation at the time of this report. One is administration controls and the other being the installation of a door in the Southwest corner of that space.

#### **4. Fire Detection and Alarm System and Associated Interfaces**

A manual fire alarm system with voice evacuation is being installed throughout the buildings. The system will be an addressable multiplex system with mass notification capability throughout the TED Building, the TLA Building, and existing Building 58 Test Lab structure. Manual fire alarm boxes are provided at exits and some interior spaces. The distribution appears to comply with the Code. Audible/visible alarm notification appliances are being installed throughout the

building. Smoke detection is provided in the HVAC system as required by Code. VESDA smoke detection is being installed in the HVAC units for the clean rooms.

A complete acceptance test of the system will be needed upon completion of the system installation.

## **5. Fire Suppression System(s)**

The building is to be protected throughout with wet pipe automatic sprinklers. The sprinkler piping is installed and reportedly has been hydrostatically tested. As of this survey, sprinklers have been installed in many areas. The suspended ceilings are presently being installed so the sprinklers in those areas will be installed shortly.

Most of the building sprinkler design is based on Ordinary Hazard Group I with a design density of 0.15 GPM/ft<sup>2</sup> over 1,500 ft<sup>2</sup>. The High Bay areas will be protected with sprinklers designed for Ordinary Hazard Group II with a density of 0.2 GPM/ft<sup>2</sup> over 1,500 ft<sup>2</sup>.

Multiple fire hydrants are located around the facility. Distribution appears adequate and in accordance with NFPA standards and DOE standard 1066.

The sprinkler system appears to be in compliance with the applicable codes except for the following items:

- a. The Storage Room 1536 and the adjacent Janitor Closet 1540 have two large ducts that create an obstruction greater than 48" wide. Sprinklers are needed under these ducts. [NFPA 13-2007, 8.5.5.3.1]
- b. Janitor closet 2514 appears to not have a sprinkler. A sprinkler needs to be added.

A final inspection will be needed after all sprinklers are installed.

## 6. Emergency Lighting

Emergency lighting is to be provided by having some lighting units powered from an emergency circuit via an emergency generator for the entire building complex. When this system is completed, the emergency generator will need to be tested in accordance with NFPA 110 and a walk through will be needed to assure adequate lighting is provided in the stairs, corridors, designated aisles, and on the exterior at each discharge door.

## 7. Exit Signage

The conduit for the exit signs and the back boxes are installed. The placement of exit signs appears adequate. When finalized, an inspection will be needed to assure the signs are visible at the exits as one approaches the exit and any areas where the way to reach the exit is not readily apparent.

## 8. Fire/Smoke Barriers

**A. TED Building:** The open stair and hole in the floor is separated on the First Floor by a one-hour wall. This opening between floors was designed in accordance with the *Life Safety Code* section 8.6.8.1. Since this is a wall around the space on the First Floor that is open to the hole between floors, it is a wall around a vertical opening and is required to be a one-hour wall [8.6.5(2)] with one-hour fire protection rated doors [8.3.4.2]. The doors designed in this one-hour wall are shown as ¾ hour doors. These doors should be one-hour fire protection rated doors.

There is no occupancy separation in this building and none is required.

**B. TLA Building:** The area to containing hazardous materials is being separated by two-hour fire rated construction with 1-1/2 hr. fire protection rated doors. This separation complies with both the State Building Code and the *Life Safety Code*. Two remote means of egress are provided from this space. See item # 3 for a discussion of a common path of travel issue.

**General:** The electrical rooms, elevator machine room, and mechanical pump rooms are enclosed in one-hour walls with 45 minute rated fire protection rated doors. All of these enclosures appear in compliance with Code. Final inspection will require all penetrations be sealed with approved through-penetration fire stop protection.

## **9. Portable Fire Extinguishers**

Fire extinguishers cabinets, partially recessed type, are provided throughout. Based on the design documents and field observations, the placement of fire extinguishers appears adequate.

## **10. Pre-Fire Planning by Jefferson Lab**

Emergency services are provided to Jefferson Lab by the City of Newport News. A Baseline Needs Assessment (BNA) conducted in 2009 concluded the NNFD is capable of providing a broad spectrum of emergency services in a timely and effective manner. Members of the NNFD will be given a tour of the buildings as they are prepared for occupancy.

## **11. Conclusion**

This survey documents that the TED Building and the TLA Building appear on track for occupancy in accordance with the *Life Safety Code*. Final inspection and testing of the fire alarm, sprinkler systems, fire barriers and fire doors, exit signs, and emergency lighting will be necessary.