Life Safety Summary

Introduction

The College of Urban and Public Affairs is an eight story academic building with retail on the ground floor
and basement (designated Basement, First Floor, Floor 1A, and Floors 2-7 plus penthouse). It is located on
the block bounded by Fifth and Sixth Avenues and Mill and Montgomery Streets. The College of Urban and
Public Affairs is classified as a Type B occupancy (Academic Offices and Educational Facilities over the 12th
grade) and is considered a high-rise structure, subject to the special provisions of Uniform Building Code
(UBC), Chapter 4, Section 303 - Special provisions for group B Office Building.

This document is intended to summarize the life safety systems of the building as they relate to the UBC
code requirements. It will follow the requirements of Section 403 in describing the building systems,
identify the “triggers” which will activate the system and finally describe the operation of the systems as it
related to triggers in particular locations within the building.

A. Life Safety Systems:

1. Automatic Sprinkler System (403.2):

This building is serviced by an Automatic Sprinkler system throughout.

This system includes, but is not limited to, a main pumping system with Jockey pump, main
dry stand pipes, engineered sprinkler runouts to all areas as described by code. The
controls for the pumping system are connected to the Emergency Electrical Generator
system. Since the emergency sprinkler pumping system is a diesel pump system the design
will operate under locked pump rotor as described in the Fire Code.

The site water supply is located in the basement Water Service Room (B08) adjacent Stair
S2. Sprinkler and Standpipe siamese connections for the building is located at the south
end of the Fifth Avenue elevation, adjacent stair S2. Standpipes are located in each of the
three stairs (S1, S2 & S3). Sprinkler shut-off valves for each floor are located in the
Mechanical Room in the core.

The Automatic Sprinkler System is monitored by the fire/life safety system in the building.
This system includes smoke detection, heat detection, hand pull stations, voice evacuation
system and enunciation panels. These items are covered in the following document.

The design and layout of the sprinkler system is predicated on achieving the code required
coverage throughout the building. In addition, water curtains provide additional sprinkler
protection as a mitigation to building conditions which were the subject of appeals. Theses
include the protection of the interior surface of exterior glazing when it is less than forty
feet form an opposite glazed surface of the building (See Appeal approved 6/18/97). In
addition, water curtains are provided in places where the interior glazing of corridor walls
exceeds 25% of the wall area (See Appeal approved 9/23/98).
2. **Smoke Detection (403.3):**

Smoke detectors are provided throughout the building exit pathways and are connected to the automatic fire alarm system. Actuation of any smoke detector operates the emergency voice alarm signal system and places into operation all equipment necessary to prevent the recirculating of smoke.

Smoke detectors are generally located in every mechanical equipment, electrical, transformer, telephone equipment, elevator machine room and the elevator lobbies. The smoke detectors in the elevator lobbies are connected to the fire alarm panel located in the Fire Control Room on the First Floor.

Smoke detectors are also located in the main return-air and exhaust-air plenum of each air-conditioning system and at return air connections on each floor.

3. **Smoke Control (403.4):**

The smoke control system is based on the smoke barrier system. Within each floor above the second floor smoke barriers segregate the two office areas from each other and from the public corridor (including adjacent conference rooms) and separate the Seminar room (on 3rd thru 6th Floors) from the public corridor and adjacent Conference Rooms. On the second floor, the occupied spaces are separated from the corridor by smoke barriers. The Lobby on the first floor is isolated by smoke barriers from the Retail, Loading/Receiving and service areas in the west core. The resulting smoke zones are neutral relative to each other. The Basement will also be divided into two passive smoke zones. Above the First Floor, the air-handling units will provide air only to the Lobby Space above and below the fire floor, or exhaust on the fire floor, while shutting down all other air distribution.

In addition as a part on an appeal for the stair vestibules an additional smoke control system based on the pressurization method was added within the floor lobby on the typical 2nd thru seventh floors. The design will create a pressure differential between the lobby on the fire floor, or floor of alarm origin, and the lobby of the floors above and below (except no air on the First Floor). To do this, the supply dampers on the floors above and below will be reconfigured to a full open position; and the main air handling units serving the lobby will reconfigure to a 100% outside air supply mode with no re-circulation; the supply damper on the fire floor lobby will configure to a closed position; and the return dampers will open to exhaust the fire floor. This would tend to create a pressure sandwich keeping the smoke and products of combustion confined to the floor of origin. The pressure differential between the fire floor and adjacent floors of at least 0.05 inches water column, will be maintained.

Finally a stairway pressurization system will be provided with injection points at three floor intervals. These pressurization inlets will be appropriately balanced so that the pressure along the height of the stairwell is relatively constant. The stairwell pressurization system design will provide for a pressure differential
between the stair and the fire floor of 0.15 inches of water column (with all doors closed.  See notes below regarding Elevator Shaft pressurization.

4. **Fire Alarm and Communication Systems (403.5):**

The building is equipped with complete fire alarm, emergency voice/alarm signaling system and fire department communication systems installed as per the Fire Code.

The system consists of speakers, speaker and strobes, manual pull stations, and a two-way fire department communication system connection the elevator lobbies, and elevators and stairways to the central control station.

The operation of any automatic fire detector, sprinkler or water-flow device shall automatically sound an alert tone followed by voice instructions giving appropriate information and direction on a general or selective basis to elevators, elevator lobbies and exit stairways. A manual override for emergency voice communications shall be provided for all paging zones. The following are the selected messages for the Urban Center Project:

**VROM-102:** When a trigger is activated on a floor the message for that specific floor is:

**Female Voice:** “May I have your attention please. May I have your attention please. There has been a fire reported on your floor. There has been a fire reported on your floor. “Please proceed to the stairways and exit the building. “Do not use the elevators!”

**VROM-113:** When the above mentioned message is activated, all other areas of the building hear the following:

**Female Voice:** “May I have your attention please. May I have your attention please. There has been a fire alarm reported in the building. “There has been a fire alarm reported in the building. “Please proceed to the stairways and exit the building. Do not use the elevators, but proceed to the stairways and exit the building.”

A two-way, approved fire department communication system shall be provided for fire department use. It shall operate between the Fire Control Station and the elevators, elevator lobbies, and at entries into enclosed stairways.

5. **Central Control Station (403.6):**

The Central Fire Control Station is provided at the first floor off the main lobby. The Control Station is separated from the adjacent parts of the building by one-hour construction. The Fire Control Room houses the following:

1. Voice alarm and public address system panels
2. The fire department communications panel
3. fire-detection and alarm system annunciator panels
4. annunciator visually indicating the location of the elevators and whether they are
6. **Elevators (403.7)**:

The building does not have elevator lobbies. Elevators E40 & E41 open into a one hour rated corridor on all floors. Upon any alarm in the building, this shaft will be pressurized to .05 in. water column with respect to the corridor of the 4th floor (mid-point) of the building (with the elevators recalled to the first floor landing). The entire shaft will be positively pressurized with greater pressure on the floors above the 4th floor and less on the floors below. The total air quantity will be based on City of Portland recommendations of 1000-1500 cfm per elevator door. The pressure differential will actually be greater on the fire floor, and less on the adjacent floors due to the smoke control system approach. However, this will only serve to enhance the pressurization effect.

The corridor ceiling, outside the elevators, has an approved listed smoke detector. When the detector is activated, elevator doors shall not open and all cars serving that corridor shall return to the main floor and be under manual control only. If the main floor detector or a transfer floor detector is activated, all cars serving the main floor shall return to a secondary floor approved by the Fire Marshal. (suggest the second floor). The same detector will serve to initiate the pressurization of the corridors above and below that floor, and exhaust the fire floor (see Smoke Control above).

7. **Standby Power, Light and Emergency Systems (403.8)**:

The entire Fire/Life Safety Control System is powered by normal building electric power and is also covered under the emergency electrical generator. The emergency generator also powers all emergency egress lighting, exit lights, pressurization fans and exhaust fans emergency exit sign lighting and all firefighter control systems. The Emergency generator is diesel powered and is located on the mezzanine above the loading dock (Floor 1A0). It is enclosed in two-hour construction. The generator has an integral tank with a capacity of 560 gallons, which will support the generator at full function twenty hours.

Separate lighting circuits and fixtures sufficient to provide light with an intensity of an average of 1.0 foot candle and not less than 0.1 foot candle, has been provided in all exit corridors, stairways, pressurized enclosures, elevator cars and lobbies, and other areas which are a part of the escape route. Standby lighting has also been provided for the Fire
Control Station and the Mechanical Rooms.

Exit signs and exit illumination shall operate within 10 seconds of failure of the normal power supply.

8. **Exits (403.9):**

All stairway doors can be locked and can be simultaneously unlocked from the Fire Control Station. Each stairway is equipped with an emergency telephone

9. **Seismic Considerations (403.10):**

Anchorage of mechanical and electrical equipment required for life-safety systems, including fire pumps, and elevator drive and suspension systems are designed as required for seismic zone 2.

B. **Activators:**

Activators are sensors, devices, and attachments that start processes associated with the Fire Life/Safety and Automatic Sprinkler System. These triggers are the first line of notification that activate all or part of Fire Life/Safety System. The triggers are as follows:

1. **Smoke Detectors**  
a. Area Ion Detectors  
b. Duct Smoke Detectors

2. **Thermal Detectors**  
Located in Electrical and Mechanical Service areas

3. **Pull Stations**  
Located @ all stairwells and exterior exits

4. **Flow Detectors**  
Installed into Sprinkler System, when system goes active alarm is sounded.

C. **Sequence of Response in Event of Fire Alarm Activator:**

1. Voice alert messages and/or tones via horn speakers give initial warning.  
2. Strobe Lights activate in all areas.  
3. Fire Department is notified.  
4. All door holders release and doors close.  
5. Elevators are recalled to first floor and are locked in place.  
6. Elevator and stairwell fan pressurization fans ramp to full operation.  
7. IFC-2020 (Fire Alarm Panel) displays specific location of alarm point.
8. Shutdown of HVAC fan systems, except for specific fan systems/fire smoke dampers to operate based upon which floor were the alarm was initiated (see references in this report for actual floor and compartmentalization plan).

9. Firefighter Control Panel assumes complete control of all fan system “Off/On” functions.

When the fire department is on site, they will have access to all stairways by way of the fire department key which is located as per fire department instructions. The fire department has access to the Fire Control Station with information and controls as described in Section B5 above.

D. Specific sequence of response to an activator dependent on location

1. Basement Activator:
   a. All responses described in Section C, above apply.
   b. The smoke wall in the basement is activated dividing the space into two fire zones. Fire/Smoke dampers that cross the smoke wall are closed and the supply fans are shut down, creating a neutral condition across the smoke barrier.
   c. The fans on the upper levels are shut down and fire/smoke dampers are closed.
   d. The elevator returns to the First Floor

2. First Floor Activator:
   a. All responses described in Section C, above apply.
   b. The smoke wall in the basement is activated dividing the space into two fire zones. Fire/Smoke dampers that cross the smoke wall are closed and the supply fans are shut down, creating a neutral condition across the smoke barrier.
   c. The smoke walls on the first floor are activated isolating the lobby from the loading dock and retail space. Fire/Smoke dampers are closed and the supply fans are shut down, creating a neutral condition across the smoke barrier.
   d. The fans on the upper levels are shut down and fire/smoke dampers are closed.
   e. The elevator returns to the alternate (second) floor.

3. Second Floor Activator:
   a. All responses described in Section C, above apply.
   b. The smoke walls on the First Floor are activated isolating the lobby from the loading dock and retail space. Fire/Smoke dampers that cross the smoke wall are closed and the supply fans are shut down, creating a neutral condition across the smoke barrier.
   c. The smoke walls on the second floor are activated isolating the corridor from the classrooms. Fire/Smoke dampers are closed and the supply fans to the classrooms are shut down. The exhaust fans to the public corridor are activated.
   d. The lobby supply on the third floor is activated pressurizing the third floor lobby, relative to the second floor corridor and fire/smoke dampers that cross the smoke walls are closed.
   e. The fans on the 4th-7th floors are shut down and fire smoke dampers are closed.
   f. The elevator returns to the first floor.

4. Third-Sixth Floor Activator:
a. All responses described in Section C, above apply.
b. The smoke walls on the floors below and above the fire floor are activated dividing those floors into four smoke compartments: the north office zone, the east office zone, the south Seminar Room, and the public corridor (including core and conference rooms). Fire/Smoke dampers that cross the smoke walls are closed. The supply fans to the public corridor are activated, pressurizing the public corridor relative to the corridor on the fire floor.
c. The smoke walls on the fire floor are activated dividing the floor into four smoke compartments as described above. Supply fans to all zones are shut down. The exhaust fan for the public corridor is activated creating a negative pressure on the fire floor relative to the public corridor on the floors above and below.
d. The fans on all other floors are shut down and fire/smoke dampers are closed.
e. The elevator returns to the first floor.

5. Seventh Floor Activator:
a. All responses described in Section C, above apply.
b. The smoke walls on sixth floor are activated dividing it into four smoke compartments as described above. Fire/Smoke dampers that cross the smoke walls are closed. The supply fans to the public corridor are activated, pressurizing the public corridor relative to the corridor on the fire floor.
c. The smoke walls on the Seventh Floor are activated dividing the floor into three smoke compartments: the north office zone, the east library/office zone and the public corridor, which includes the core and the large conference room. Supply fans to all zones are shut down. The exhaust fan for the public corridor is activated creating a negative pressure on the fire floor relative to the public corridor on the floors above and below.
d. The fans on all other floors are shut down.
e. The elevator returns to the first floor.