

The modified riser diagrams were conceptual in nature and provided the installation contractor with the number of devices to be installed on each floor, type of fire alarm equipment on each floor, and the number and type of wire interconnecting the devices and equipment. The modified riser diagram had areas crossed-off, which indicated that the area had undergone renovation. Additional renovation drawings provided a section of the riser with its modifications. The final drawings consisted of the partially modified riser diagrams with areas crossed-out, separate drawings containing a revised section of the riser, and floor plans with the locations of the devices on each designated floor.

From the available drawings, it appears that the contractor was responsible for determining the final circuit configurations for the devices and equipment. Limited information was found on the specific location of the fire alarm control equipment, initiating devices, and communication equipment.

The 3rd floor lobby was designated as the FCS. On a typical floor, manual pull stations were located at each stair entrance, and smoke detectors were provided in electrical/telephone closets and in elevator lobbies. Sprinkler water flow switches and valve supervisory switches in each stairwell were monitored by fire alarm interface devices. Duct smoke detector locations were not identified, but the criteria required detectors to be installed in heating, ventilation and air-conditioning (HVAC) systems over 3,400 m³/h (2,000 ft³/min). Fire warden stations were typically installed on the north wall outside the elevator lobby.

The Investigation Team did not locate drawings that provided guidance on the installation of the fire alarm devices to meet tolerances required by code and the manufacturer. The riser diagrams indicated that the smoke detector, manual pull station, speaker and strobe circuits were configured to be a Class B type. The use of a Class B circuit was consistent with the minimum requirements for performance, but a Class B circuit does not have the higher level of survivability associated with a Class A circuit.

The Investigation Team also did not locate drawings showing the number of wires required to run between each device, and between the device and equipment, nor were fire alarm power calculations located to document the capability of the fire alarm equipment to power the number and type of devices connected to the equipment. No quality control documentation was found for the installation, and no testing and commissioning procedures were located.

Inspection, testing, and maintenance were mandated by the applicable building codes after a fire alarm system was installed and in operation. The building owner was responsible for inspection, testing, and maintenance of the systems. The inspection, testing and inspection were permitted to be done by qualified and experienced personnel employed by the owner, or the work could be performed under contract. These duties were conducted by a contractor; and, based upon the information reviewed for 2000 and 2001, were adequately documented.

4.2.3 Fire Alarm System Performance on September 11, 2001

Information on the performance of the WTC 7 fire alarm system on September 11, 2001 was limited to the record of the offsite system monitoring company. The printout shown in Figure 4–1 indicates the system registered an alarm at 10:00:52 a.m., just after the collapse of WTC 2. Even though a fire alarm is indicated, alternatively the record might have been the result of dust entering smoke detectors. Although the entire alarm history record was obtained from AFA Protective Services (AFA), the system monitoring company, the amount of information it shows is typical of system monitoring operations and is meager.