

maintenance manual included a riser diagram that indicated the arrangement of valves on the systems (PANYNJ 1987). The use of system isolation valves was referenced as follows: “Emergency conditions unrelated to a system response to a fire, which may require actions based on this manual include: Isolation of a riser or sprinkler zone because of a rupture, also a mechanical failure which will activate the flow switch resulting in an alarm. Both conditions require isolation of the ruptured pipe or sprinkler head.”

4.4.5 Suppression Systems Performance on September 11, 2001

NIST learned from Investigation interviews that around 11:30 a.m., there was no water emerging from the hydrant system and no water in the standpipe system (Section 6.5 of this report). It was reported that hose lines connected to the standpipe system in WTC 7 were used to fight fires in other buildings of the WTC complex prior to the collapse of any of the buildings. Thus, it is likely that the primary water supply to the mid and upper levels of WTC 7 was diminished by the time the towers collapsed, and that the city water supply, which was the primary source of water for the lower level of the building, was severely compromised even before the fires began in WTC 7.

As will be seen in Section 5.6, fires were seen on the 22nd, 29th, and 30th floors as early as 12:10 p.m. The flames were no longer seen on the 22nd floor after 12:27 p.m. and the fires on the 29th and 30th floors were no longer evident after 12:47 p.m. These three floors were in the mid-level zone, where the primary water supply to the automatic sprinkler system was from the tanks on the 47th floor. As seen in Section 4.4.3, the sprinkler system had the capacity to control fires on multiple floors, each involving a few cubicles. Note, however, that since there were no people on those floors around this time, none of the Investigation interviews contained observations of functioning automatic sprinklers.

The water supply to the automatic sprinklers from the ground floor to the 20th floor was directly from the city water supply, which had been interrupted following the collapses of the WTC towers. Thus, the fires on the 7th through 13th floors went unchecked by the automatic sprinklers. The only evidence of fire on the 19th floor is a single photograph showing smoke marks above two windows on the far south of the west face (Chapter 5). NIST was unable to obtain evidence to indicate why this fire did not spread.

4.5 ACTIVE FIRE PROTECTION SYSTEMS: SUMMARY OF INVESTIGATION FINDINGS

4.5.1 Function on September 11, 2001

The active fire protection systems installed in WTC 7 were designed to alert building occupants to the smoke and heat produced early in a fire, to activate sprinklers in the fire zone when a threshold temperature was reached, and to manage the smoke in a way that aided evacuation and fire fighting operations. None of these systems played a role in preventing the loss of life (no lives were lost in WTC 7), increasing the effectiveness of fire fighting operations (the FDNY did not attempt to extinguish fires in WTC 7), or in keeping the building standing (WTC 7 collapsed about seven hours after WTC 1) on September 11, 2001. Nonetheless, a number of significant findings resulted from NIST's investigation of the active fire protection systems. These are listed below.