



## Arbor Heights Fire

8/27/2011, Incident # 11-79392

## **Incident Overview**

### **1726 hrs.**

On Saturday, August 27, 2011, at 1726 hours, the Fire Alarm Center received the first of multiple calls reporting a house fire at 10221 41 Ave. SW. A full response was dispatched; L13, E32, E26, E36, E29, L11, B7, B5, DEP1, SAFT2, M32, A14, Staff 10 and Air 9. En route, the FAC notified responding units that the fire was reported to be across the street from the address, with flames from the house. While responding, B7 notified the FAC that there was a significant column of smoke. The actual address of the fire building was 10242 41 Ave. SW, although this address was not corrected by the first arriving unit.

The normal first due engines for this area, E37 and E11, were on a MED 7 at the time of dispatch. This placed L13 as the first due unit.

### **1734 hrs.**

L13 was the first unit on scene and the acting officer reported flames from the Charlie side of the fire building with 20' of flames from the roof and exposures on the Bravo and Charlie sides.<sup>1</sup> (See Observation 1, page 9) The fire building was a wood framed 1970's split level entry 40'X30' with a landing at the front door and stairs dropping down to floor 1 and stairs leading up to floor 2. Mature fir trees lined much of the property. L13 observed that the front door was closed, but the entry window next to the front door was broken. A window in the Alpha/Delta corner was cracked and smoke stained as well as the window above the front door. The floor 2 windows on the Alpha side were clear with a cat sitting in an open window in the Alpha/Bravo corner. While completing a 360, L13 #3 had a report from the Bravo exposure home owner that all occupants were out of the exposure house, and that the occupants of the fire building were unlikely to be in the home since they were on vacation. This information was relayed to dispatch by the IC (L13). The 360 also confirmed there was a fire on floor 1 in the Bravo/Charlie corner that had extended to the roof. The location and degree of extension of the fire was not transmitted over the radio.<sup>2</sup> (See Observation 2, page 9)

### **1735 hrs.**

Nine minutes after the initial dispatch and one minute after L13's arrival, E32 and E26 arrived from the north. E32 stopped just north of the house on a hydrant and deployed a pre-connect to the front door and a 2 ½" blitz line as an exposure line to the "bravo" side, where the home owner was wetting the side of his house with a jiffy hose.<sup>3</sup> (See Observation 3, page 10) E32 notified E26 they would need a supply. E26 assisted E32 in connecting to the hydrant adjacent to E32. L13 Team B was completing the assigned tasks of PPV,<sup>4</sup> (See Observation 4, page 10) securing the gas line and laddering the

building. A 24' ladder was placed on the Alpha side of the building to the roof.<sup>5</sup> (See Observation 5, page 10)

### 1738 hrs.

As B7 was completing the face-to-face transfer of command, Dispatch gave the notification that they had received a call that a second house was involved. At this point, B7 requested three more engines and one more truck. E10, E13, E27 and L7 were added to the response. E11 had been released from their prior incident and had also been added to the response just prior to the IC's request for three additional units. E11 arrived on scene shortly after E36 and just prior to E29 and was assigned RIT.

E32 split their crew with the officer and #4 operating a 2 ½" exposure line on the Bravo side. E32 #3 simultaneously stretched a 1 ¾" pre-connect to the front door. While the E32 Officer and #4 were controlling the exposure fire, E32 #3 entered the fire building with L13 Team A who had initiated a search of the survivable spaces in the building as they had been unable to definitively confirm the occupant status. E32 #3 knocked the fire down in the hall, kitchen, and living room on floor 2 as L13 Team A searched the rest of the floor.<sup>6</sup> (See Observation 6, page 10) E32 #3 was joined shortly after entry by the E32 Officer. Effective PPV operations allowed the E32 Officer to maintain a visual on #3 from the front door.

After completing their search and returning back towards the split level entry stairwell, L13 noted reduced visibility and a "soft and spongy" feeling of the floor outside the second floor bathroom door. This led L13 Team A to descend to floor 1 to further investigate the extent of fire involvement below them. Visibility on floor 1 was good; L13 Team A was able to stand. They found floor 1 approximately 50% involved, with fire contained to one large room on the Charlie side. The door to the room was shut and had just begun to burn through at the top. L13 was able to complete a quick search. They notified Command of the compromised structural members on floor 2. *"We have fire on floor 1. This is a ground floor going down the stairs. We have flames in a room below the firefighters on floor 2. We need a hose line to*



the basement.”<sup>7</sup> (See Observation 7, page 11) B7 then re-assigned E11 to take a line to floor 1 which never got deployed due to the quickly changing events (as noted in the preceding paragraph). L13 Team A then radioed out, “Command from L13, also advise our firefighters on floor 2 to not go down the hallway on the bedroom side. The floor is starting to give way.” With the movement of L13 Team A on floor 1, E32 #3 had backed the line down from the top of the stairs to near the front door to protect L13’s egress.

E32 reported to Command a “dead” hydrant in front of the address with insufficient volume to fill their soft suction, and water flowing from the drain valve with the hydrant fully open. E26, hearing of the dead hydrant in front of the fire address, made a reverse lay south to the next hydrant to supply E32. E29 backed out and took the hydrant to the north. Both the 2 ½” exposure line and 1 ¾” attack line were running off E32’s tank water. E32’s attack line lost water at approximately the same time as L13 Team A radioed out the fire conditions and structural instability of floor 2.

Hearing of the water supply issues, E11 completed a face-to-face with the IC and went to assist with a supply. With the report of structural compromise and an insufficient water supply, B7 ordered a withdrawal from the fire building and a transition to a



defensive fire attack. B7 accounted for all members who had been operating inside the fire building.

E26 reported a frozen hydrant to the south and E29 found insufficient water in the village hydrant (only two ports, each 2 ½”) to the north. E29 dumped their tank to E32. In an attempt to find a viable water source, E29 directed E11 to drop

their tri-gate and lay to 42 Ave SW and SW 102 St. This too was a village hydrant with insufficient volume to establish a supply.

The E26 driver, knowing of E32’s water problem and knowing that E26 still had tank water, returned to the fire location with the apparatus. E26 Team B quickly connected their wye load to E26 to control an exposure fire that had begun to extend to the exterior of the Delta exposure. With the addition of E26’s line there were three exposure lines in place, one on each side of the building. E36 had deployed a 1 ¾” to the Charlie side,

E26 an 1 ¾” to the Delta side, and E32 was on the Bravo side with a 2 ½” exposure line. As the additional truck companies, L11, L3 and L7, began to arrive on scene, they were primarily tasked with checking the exposure houses and assisting in laying LDH. Safety 2 noticed that power wires overhead of L13 were about to burn through and fall onto the apparatus. He directed L13 to relocate, but the wires burned through and dropped across the truck before the driver was able to relocate. L13 driver then set a perimeter and guarded the hazard zone until City Light was able to confirm that the line was de-energized.<sup>8</sup> (See Observation 8, page 11)

#### **1746 hrs.**

A sufficient water source had still not been located 12 minutes after the first unit arrived on scene. E32, E26, E29 and E11 had all found hydrants that were inoperable or of insufficient volume. At this point, the Incident Commander focused suppression efforts on exterior exposure protection, “...we are running low on water on multiple hydrants so let’s make sure we keep the exposures protected. Keep the exposures protected and do what we can on the fire building”.<sup>9</sup> (See Observation 9, page 11) E13 (who had been moved up to Station 32) was listening to the response understood that E29 and E11 had gone northwest and the other assigned units would be coming from the northeast. The E13 Officer instructed the driver to come in from the south approaching 41 Ave. SW from SW 104 St. It was at the intersection that they saw E26’s uncharged LDH supply hose dropped near the mid-block hydrant. E13 Team B exited with the manifold to make the connection as E13 drove to the next available hydrant which was mid-block on SW 106 St. between 41 and 42 Ave. SW. This too was a village hydrant which did not provide sufficient volume to fill the two 2 ½” lines connecting from the hydrant. E13 radioed, “Command from E13, the hydrant on 106<sup>th</sup> is a low pressure hydrant too.”

E10 was directed to meet L11 who was overhauling hose eastbound through the neighboring yards to 40 Ave. SW. The IC had hoped to find better water volume to the east since the volume was poor both north and south. E10 met L11 mid-block and discovered another village hydrant with insufficient volume. E10 radioed out, “We have zero residual pressure and zero discharge pressure. We need water department to increase the pressure on 40 Ave. SW.”

E27’s approach to the incident was from the east on SW 102 St. As they approached the intersection at 40 Ave. SW they met E10. E27 dropped their manifold for E10 and headed north to the next hydrant. After hooking up to the second hydrant they reported, “.....we have no pressure on the second hydrant.”

**1758 hrs.**

32 minutes into the response, despite efforts to supply them from three different directions, E32 still didn't have a viable water supply. Exposures were being intermittently protected with tank water that was being pumped into the supply line from E11 and E29. There was not enough water volume for E11 or E29 to pump directly to E32. E11 would fill their tank, pump to E29 who would then pump to E32. Command requested that dispatch contact the Water Department<sup>10</sup> (See Observation 10, page 11) to increase the volume on the grid and upgrade the response to a 2-11. The 2-11 response included E5, E28, E34, as well as L3 and L4. Dispatch also added the Hose Wagon to the response due to the ongoing water supply issues. However, it was quickly discovered that the Hose Wagon was out-of-service at the Fire Garage.

Meanwhile E39 was listening to the response in their watch office and recalled that they had a set of Water Department Hydrant Main maps. The maps indicated that there were 8" mains on SW 100 St. They relayed this information to Dispatch who announced on channel 1 that there were 8" mains on SW 100 St. A14 was also searching the B5 apparatus looking for the Water Department Hydrant Main Map Book, not knowing it



was no longer carried on the Chiefs' apparatus.<sup>11</sup> (See Observation 11, page 12)

E11 and E27 both heard the location of the 8" main and disconnected from their hydrants and laid to SW 100 St. E11, now three blocks from E29, attempted to get out on the radio to ensure E29 was ready for water. The E11 Officer, recognizing the saturation of Channel 1, directed the driver to

switch to Zone 2 Channel 1 (a simplex non-repeated channel). The officer then walked to E29 and directed the E29 driver to Zone 2 Channel 1. Both drivers were able to easily communicate as no other units were using Zone 2 Channel 1. Once the supply was connected, E11 was able to pump with limited volume to E29. Given the lack of volume, E29 was only able pump intermittently to E32 by partially filling their tank, dumping the tank into the supply, and repeating for an extended period of time.

With only an intermittent water supply and a tremendous amount of heat being radiated from the house on fire, the large fir trees surrounding the house began to auto-ignite. As each tree ignited, it would radiate an intense amount of heat before being knocked back by a quick stream of water from the exposure lines. It was during these exposure problems that E32 #4, staffing an exposure line in full PPE, including a hood and ear flaps down, received a second degree burn on his face.<sup>12</sup> (See Observation 12, page

12) The firefighter was transported to HMC for evaluation.

E5 and E28 came in on SW 100 St. and were met by the E34 Officer (who had previously been assigned to E11 for many years and was familiar with the water supply issues in this area). They were directed to assist E34 with laying a supply from 40 Ave. SW to 35 Ave. SW where there was a known 8" main. It took nearly 2000' of hose to get to 35 Ave. SW. E37, being the last engine to arrive on scene, took the hydrant at 35 Ave. S, and E28 and E5 relay pumped from E37 to E27 at the corner of 40 Ave. SW/SW 100 St. E27

pumped to E10 mid-block on 41 Ave. SW between SW 102 St. and SW 104 St. E10 pumped through the neighboring yards to E32 sitting just north of the fire building on 41 Ave. SW. Lastly, since E26 was supplying exposures lines, E32 pumped to E26.

### 1809 hrs.

35 minutes after the first rig arrived on scene, a positive water supply was established. E37 was the connected to the 8" main located at 35 Ave. SW and SW 100 St. E27, who was in the five rig relay, reported a jump from 10 psi to 60 psi when hooked into the 8" main E37 was sitting on. On the other side of the incident, the E11 driver noted that their discharge pressure jumped from 110 psi to 210 psi without any change in the throttle setting. E10 also noted that they had begun receiving back pressures above 200 psi from E32, presumably from the E11/ E29 supply operation. This pressure increase was also noted by E29 driver who notified E11 to reduce pressure.

### 1811 hrs.

Though it took just under 45 minutes to establish a water supply, the Seattle Fire Department was able to effectively protect multiple exposures and limit the major



damage to the house of origin. The responding crews showed great initiative and were able to trouble shoot the water supply problem by directing engines in all directions, and protect exposures with diligence attention to and coordination of the limited water.



## **Synopsis**

- Smoke and fire through the roof on the Charlie side of a split level with a daylight lower level, single family residence. Fire exposures on the Bravo and Charlie sides.
- 14 Engine Companies, 5 Ladder Companies and 4 Chief Officers comprised the firefighting force.
- Ladder 13 was the first-in unit at 1734 hours with Engine 32's arrival one minute later.
- 105 Firefighters/ Responders
- 8 minutes from dispatch to first unit on scene (1734 hours).
- At 1740 hours a "dead hydrant" is identified and reported over the radio.
- All interior crews are pulled out (1742 hours) and a defensive fire posture assumed (1744 hours).
- "Fire Under Control" reported at 1840 hours.
- One firefighter suffered a burn on his ear and was transported to HMC via Medic Unit.
- \$281,000 loss to building and contents, \$35,000 to the exposure building
- King County 2010 building value \$186,000.
- Cause of fire – accidental- spontaneous combustion or organic materials



## Effective Actions

- First in companies quickly reacted to the water supply problem by deploying in multiple directions for a supply, and using tank water from multiple apparatus.
- Face-to-face communication between engines and use of Zone 2 Channel 1 for apparatus driver communication to coordinate hose lays reduced radio traffic on Channel 1.
- Companies not on the alarm, but listening attempted to help solve the water supply problem by locating a Water Department Main Map.
- Recognition of changing conditions inside structure.
- A quick withdrawal from the building when water supply issues became apparent ensured firefighter safety.
- Immediate PAR of all units in the building when the attack transitioned to defensive.
- Clear communication of the transition from offensive to defensive, defensive to exposure protection, and collapse zones. Protection of the exposure buildings with interior and exterior surveys.
- Coordinated use of limited water with the assignment of Division Charlie and clear communication with the IC.
- Use of full PPE while operating outside provided protection that limited injuries to the firefighter who was burned at the scene.

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**1 Observation:** The initial size-up did not include corrected address or building description.

**References:** OG 4003-33, OG 5012-6, NFPA Structural Firefighting, Chapter 2

**Analysis:** A size-up “paints a picture” of the fire building, fire conditions, and potential hazards or life safety risks associated with an occupancy. By having this information, a safer and more effective incident action plan can be developed and incoming units are better prepared to accomplish their assignments.

**Recommendations:** Develop initial incident management/command training for officers and acting officers, incorporate into OSET.

**2 Observation:** The extent and location of fire involvement was not communicated over the radio after the initial 360.

**References:** OG 5012

**Analysis:** While performing the 360 degree view of the fire building, the initial Incident Commander observed a basement fire extending up the Charlie side to the roof of the structure. This is critical information that should be provided to incoming units so that all units know the location of the fire and the extent of involvement that might not be apparent from their location.

**Recommendations:** (1) Reinforce the initial Incident Commanders responsibility during MCOs and OSET. (2) Provide critical information examples in CDM Communications Best Practice document.

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- 3** **Observation:** Initial strategy and assignments were not communicated over the radio.  
**References:** OG 5011, 5012; NFPA Structural Firefighting, Chapter 2; CDM Single Family Dwellings  
**Analysis:** The only initial task described over the radio was the first unit, “doing a 360, establishing 41 Ave Command.” The first arriving officer as the initial IC should specifically direct incoming units, when possible, to include the attack operation, hand-line size, ventilation plan, and/or search and rescue. Without a clearly communicated plan from the initial Incident Commander, crews must try to find the IC for face to face directives or may self deploy.  
**Recommendations:** Reinforce CDM training and incorporate into OSET.
- 4** **Observation:** Positive pressure ventilation was utilized without a verbalized Ventilation Plan to members on scene.  
**References:** SFD Single Family Residence-Ventilation  
**Analysis:** The ventilation plan, including entry and exit points when using PPV, is critical information that must be communicated to everyone on scene. This helps interior crews adjust their risk benefit analysis, especially when conditions don’t improve as expected.  
**Recommendations:** Company officers to conduct ventilation drills with an emphasis on verbalizing the ventilation plan. Continue to include verbalizing ventilation plans in the OSET scenarios.
- 5** **Observation:** No ladder was placed to floor 2.  
**References:** IFSTA Fire-ground Support Operations, 1<sup>st</sup> Edition, Ch. 5, p77, NFPA Structural Firefighting, Chapter 1  
**Analysis:** Laddering a building should include providing a secondary means of egress for firefighters working on upper floors, in addition to setting up for roof operations.  
**Recommendations:** (1) Develop CDM Best Practice for Ladder Company support operations in addition to ventilation and search and rescue documents. (2) Review Ladder Company operations in MCO drills.
- 6** **Observation:** Companies were split into different teams. Those teams were split into single members that operated on the fire-ground and hazardous environments without an accountability system to track their whereabouts.  
**References:** WAC 296-305-05001(6)(8)  
**Analysis:** Although E32 was accounted for in the passport accountability system as Team A and Team B, this is not the way that the company was “split” during operations at the fire scene. E32 #3 entered the fire building with L13 Team A creating an unknown accountability system when compared to passport records of E32.  
**Recommendations:** Reinforce and train on the importance of accountability on the fire-ground. Companies and teams that are set up as Team A and Team B on the passport MUST remain in those team combinations, or as a full company on the fire-ground.

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- 7** **Observation:** Different terms were used to describe the floor levels within the fire structure.  
**References:** OG 4003, prior PIAs  
**Analysis:** This was a split level home, where the bottom floor was variously referred to as floor 1, the ground floor, or the basement. The difficulty in describing the different levels in the home are highlighted in the following radio transmission, “*We have fire on floor 1. This is a ground-floor going down the stairs. We have flames in a room below the firefighters on floor 2. We need a hose line in the basement.*” The IC and units on scene must understand where the fire is and where units are operating in relation to the fire. The topography and building history in Seattle create many situations where describing the fire location can be a challenge.  
**Recommendations:** Reinforce the floor numbering system during MCOs and OSET. Determine best practice for split level homes, or other less obvious situations such as homes on grade with entrances at different levels.
- 8** **Observation:** Burned through power lines fell on ladder truck.  
**References:** OG 5012-7, NFPA Structural Firefighting, Chapter 1, Apparatus Positioning  
**Analysis:** Ladder Companies are trained to avoid power lines with their aerials. All companies, however, should consider avoiding parking under power lines that could become involved in fire.  
**Recommendations:** Review apparatus positioning considerations at MCO’s.
- 9** **Observation:** Multiple units involved in overhauling hose to hydrants reporting directly to “Operations”.  
**References:** OG 5011; NFPA Structural Firefighting, Chapter 1  
**Analysis:** As the incident escalated and the lack of a continuous water supply became evident, a designated “Water” Group could have eased responsibility and communication burdens for Operations. It would also allow for a manageable span of control (being 3 to 7 units).  
**Recommendations:** Reinforce the span of control principle to all members, review in BC meetings.
- 10** **Observation:** SPU representatives were not requested until 32 minutes into the incident.  
**References:** OG 5011, 5012  
**Analysis:** Incident Commanders should consider requesting SPU early in any incident where the water supply is in question. In addition, SPU representatives indicated that hydrant mains can be impacted whenever SFD is flowing over 300GPM. If SPU workers are on scene, they can quickly address any failure, or reroute units to the best location for additional water. SPU is available 24/7 to respond and could be automatically requested when water flow exceeds an agreed upon level.  
**Recommendations:** (1) Automatically dispatch SPU whenever multiple lines or a 2 ½ line is flowing. (2) Work with SPU for an MOU on fire responses.

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- 11** **Observation:** Firefighters on scene did not have access to SPU water supply maps, units had to connect to each hydrant to determine pressure and volume available.  
**References:** IFSTA Fireground Support Operations, Chapter 9  
**Analysis:** Seattle is known for its strong water supply. Areas with poor supply may be known by local companies, however, actual minimum GPM ratings for specific hydrants are not known.  
**Recommendations:** (1) Provide water main map overlay for the MDC GIS function that already shows hydrant locations. (2) Work with SPU to mark hydrants in low flow areas, and provide a mechanism to identify hydrants that cannot supply the SFD's smallest diameter attack line. (3) Provide CAD message for problem flow areas.
- 12** **Observation:** Firefighter was burned operating under a tree that flashed.  
**References:** OG 5019  
**Analysis:** Trees that flash give off enormous BTUs. This hazard may not be apparent in urban situations where the hazard zone is normally the interior of a structure.  
**Recommendations:** (1) Update OG 5019 to include additional wildland hazard information. (2) Develop wildland/urban interface awareness training module or CDM Best Practice document.

### ***Additional Observations:***

- Observation:** Channel 11 was not monitored on scene; units responding on Channel 11 were unable to communicate on that channel with anyone on scene while responding.  
**References:** OG 4003, prior PIAs  
**Analysis:** Channel 11 can be used by command for support functions or to direct incoming units, especially when Operations has been established and is operating on the tactical channel.  
**Recommendations:** (1) Update the operating guideline to include better defined protocols for use of Channel 11. (2) Develop CDM Best Practice communication module