

Fire Behavior Case Study





Incident Timeline





The following timeline contains data from the Contra Costa County Fire Protection District *Investigation Report: Michele Drive Line of Duty Deaths*. While the timeline in the district report is detailed, many observations and events occurred concurrently and the time at which many events occurred could not be determined. The following timeline makes an effort describe the sequence of operations and provide reasonable time estimates based on integration of the timeline included in the district report and typical time required to complete the tactical operations involved.






The clock icon is used to identify events for which the investigation report identified a specific time (rounded to the closest full minute). Events which were estimated based on the narrative, photographic evidence, or other information are shown in italic text.




Note: As this case study focuses on fire behavior and the influence of tactical operations, this timeline does not include all radio transmissions or actions by the firefighters and officers involved. In addition, the timeline is intended to provide a general sequence and flow of operations and may differ slightly from the events as they occurred. Readers are encouraged to review the investigative report for additional information.


Figure 10. Incident Timeline



Fire Behavior Indicators & Conditions	Time	Response & Fireground Operations
	0134	 Automatic alarm for 149 Michele Drive received by a private alarm company. A female occupant confirmed a fire at that location via two-way intercom.
	0135	
	0136	
	0137	 Contra Costa Regional Fire Communications Center received a call from the alarm company reporting a fire alarm at 149 Michele Drive. The caller was placed on hold to take a higher priority 911 call.

Fire Behavior Indicators & Conditions	Time	Response & Fireground Operations
	0138	
	0139	
	0140	
	0141	
	0142	
	0143	 The dispatcher attempted to contact the residence at 149 Michele Drive but received a busy signal. On a second attempt the dispatcher received no answer.
	0144	 E70 was dispatched to investigate the residential fire alarm.
<p><i>The female occupant exited the house and called 911 on her cell phone to report the fire (observation by bystanders).</i></p>	0145	 Contra Costa Regional Fire Communications Center received a 911 call transferred from the California Highway Patrol. The caller was the female occupant of 149 Michele Drive who reported a residential fire and that her husband was still in the building
<p><i>The female occupant reentered the house in an attempt to rescue her husband, (observation by bystanders)</i></p> <p><i>Note: It is likely that the occupant left the door open when she reentered.</i></p>	0146	 The dispatcher upgraded the incident to a residential fire, adding two additional engines, a quint, and battalion chief.
	0147	






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	0148	<p> E69, Q76, and BC7 were dispatched and automatic aid response from E68 requested through the Richmond Communications Center.</p> <p>Engine 70 advised by dispatch that they had received multiple calls and upgraded the incident to a residential fire. <i>Note:</i> No mention of persons reported in the update.</p>
	0149	<p> E68 dispatched to the residential fire at 149 Michele Drive.</p> <p>E73 advises dispatch that they have cleared a medical incident 0.5 mile (0.8 km) from the residential fire and add themselves to the first alarm.</p>
E70 reports smoke showing from one block out.	0150	<p> Dispatch advises E70 that the resident was still trying to get her husband out, unknown if she was successful.</p>
Smoke and flame showing from the door and living room window on Side A.	0151	<p> E70 arrived, transmitted a size-up report “heavy smoke and fire from a single story residential structure, establishing Michele IC.</p> <p>E70 transmitted a supplemental report that two persons were reported inside and that they were making entry with a 1-3/4” line.</p>
Smoke and flame pushing from the door and window, the couch in the living room was on fire (firefighter E73).	0152	<p> E73 arrived (in reserve apparatus marked E74).</p> <p>E70 passed Command to E74 (not assigned to the incident).</p> <p><i>E70 deployed a 150’ 1-3/4” (45 M 45 mm) line to the doorway on Side A.</i></p>

Fire Behavior Indicators & Conditions	Time	Response & Fireground Operations
<p><i>Steam and light colored/white smoke showing from the building.</i></p>	<p>0153</p>	<p><i>E70 advanced 3'-5' (0.9-1.5 M) into the living room and knocked down visible fire.</i></p> <p><i>E73 hand stretched a 5" (127 mm) supply line 200' (61 M) to a hydrant.</i></p>
	<p>0154</p>	<p> E70 communicated to dispatch requesting the first due truck to perform vertical ventilation.</p>
	<p>0155</p>	<p> AMR Medic 228 dispatched (Code 2) to the residential fire.</p> <p><i>E70 exited the structure and retrieved a TIC from the apparatus and reentered, initiating a left hand search.</i></p>
<p><i>Heavy smoke showing from Side B (observed by E73 FF returning from the hydrant).</i></p> <p><i>Just inside the door, the smoke was thick (optically dense) and temperature was high (observed by E73).</i></p>	<p>0156</p>	<p><i>E73 officer directed E70 engineer to place a blower at the door on Side A. E73 entered the residence and started a right hand search (without a hoseline)</i></p> <p><i>E73 engineer shut off the natural gas service, but was unable to shut off the electrical service.</i></p>
<p>Thick black/gray smoke pushing from the window of Bedroom 1 on Side A and a large volume of fire from Side B (observed by E69).</p>	<p>0157</p>	<p> E69 arrived and prepared to perform vertical ventilation.</p> <p><i>E70 engineer asked the E69 officer about placing the blower at the door on Side A (previously ordered by E73 officer). He answered in the affirmative.</i></p> <p><i>E69 firefighter placed a 14' ladder to the roof at the A/D Corner.</i></p> <p><i>E70 and E73 engineers positioned the blower 3' (0.9 M) from the front door due to a short wall enclosing the porch.</i></p>






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<p><i>Temperature and visibility increase noticeably as E73 reaches the kitchen. Rollover extends from the hallway into the living room (observed by E73)</i></p> <p><i>Smoke conditions negligible in the living room (observed by E69).</i></p>	<p>0158</p>	<p><i>E73 locates an unresponsive female victim in the kitchen and remove her to the doorway on Side A.</i></p> <p><i>E73 officer briefly operated the nozzle of the initial hoseline (approximately 5' inside the doorway) to darken flames extending from the hallway into the living room.</i></p> <p><i>After retrieving his flashlight from the kitchen, the E73 officer moved the blower 90° to allow the victim to be removed from the porch. After the victim was removed the blower was repositioned.</i></p>
<p><i>Bedroom window on Side A had been cracked and venting smoke failed suddenly (glass blew out onto the lawn) with a large volume of fire pushing from the window for 10-15 seconds. (Observed by E73 firefighter who was performing patient assessment on Side A).</i></p>	<p>0159</p>	<p> Q76 arrived.</p> <p><i>E69 went to the roof to perform vertical ventilation.</i></p>
<p><i>Sudden increase in flaming combustion from the bedroom windows on Sides A and B (captured on video by Q76 FF).</i></p> <p><i>Firefighters reported that the rapid fire progress sounded like a tire exploding (possibly failure of the window on Side A).</i></p>	<p>0200</p>	<p><i>E73 officer reentered through the door on Side A to attack the fire in the hallway using the hoseline originally deployed by E70 and E70 engineer pulled a second 150' 1-3/4" (45 M 45 mm) line to the door on Side A.</i></p>




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	0201	<p><i>Vertical ventilation being performed by E69 (Observed by Q76).</i></p> <p><i>Q76 advanced the second 1-3/4" (45 mm) line into the building. E73 officer exited with his low air alarm sounding after handing the initial hoseline off to Q76. E73 officer expressed concern to his firefighter that E70 would be low on air as well.</i></p> <p><i>Q76 darkened the fire down in the hallway and Bedroom 2, and scanned this room with a TIC, but did not observe the crew of E70.</i></p>
<p><i>Light smoke exited from the vertical ventilation opening and a small volume of flame was visible from the area of the gable vent on Side B (E69)</i></p> <p><i>Poor visibility and high temperature with flames at the ceiling (rollover) in the hallway with a large volume of fire in Bedrooms 1 and 2 (Q76)</i></p>	0202	<p> BC7 arrived and made face-to-face contact with E70 engineer to determine the location of E70 officer and was advised that the crew was inside.</p>
	0203	<p> BC7 confirmed that a medic unit was responding and upgraded its response to Code 3.</p> <p><i>E69 completed a 6' x 6' (1.8 M x 1.8 M) ventilation opening in the roof but was unable to breach the original roof/ceiling to vent the interior of the building.¹</i></p> <p><i>Q76 knocked down the fire in Bedroom 2 and pushed the fire down the hallway, advancing into Bedroom 1.</i></p>

¹ This is the earliest time that the vertical vent could have been completed based on an estimated time of five minutes to access the roof, cut a 6' x 6' (1.8 M x 1.8M) hole, remove the roof covering and sheathing, and unsuccessfully attempt to push down the ceiling/original flat roof.

Fire Behavior Indicators & Conditions	Time	Response & Fireground Operations
	0204	 E73 officer reported to BC7 and asked about the status of E70, expressing concern that they would be out of air. BC7 again attempted to locate E70, asking other crews and via radio on the assigned tactical channel as well as unassigned channels.
	0205	 BC7 ordered a second alarm, followed shortly thereafter by a report of a missing firefighter, formally assumed command, and requested dispatch to add an additional engine to the second alarm assignment. <i>Q76 officer scanned Bedroom 2 with a TIC but did not locate the crew of E70.</i>
<p>Following a loud “pop”, a large volume of fire began to push from the vertical ventilation opening with a flame length of 8’-10’ (2.4-3.0 M) (E69)</p>	0206	 E74, E75, E72, BC71 were dispatched as part of the second alarm assignment. Medic 226 arrived.
	0207	 E68 requested as part of the second alarm assignment through the Richmond Communications Center. BC64 self-dispatched and advised the Contra Costa Regional Fire Communications Center.
	0208	 Command (BC7) repeatedly attempted to contact E70 officer and firefighter by radio. Command (BC7) requested an additional Code 3 Medic Unit and advised that the status of the missing firefighters was unknown.
<p><i>No significant release of smoke was observed from the windows on Side C (E69)</i></p>	0209	<p><i>E69 attempted horizontal ventilation on Side C, removing screens and breaking out several panes of glass.</i></p>

Fire Behavior Indicators & Conditions	Time	Response & Fireground Operations
<p>Flames visible from the window of Bedroom 2 and gable vent on Side B (E69).</p> <p>Flames observed in the attic through a small opening in the tongue and groove ceiling.</p>	<p>0210</p> <p>0211</p>	<p>Q76 applied water into the attic through a hole in the ceiling without significant effect.</p>
	<p>0212</p>	<p>Command (face-to-face) assigns E69 to continue primary search for the male occupant. Search is initiated by E69 firefighter and engineer (officer is changing air cylinders)</p>
<p>Minimal heat and smoke in the living room and kitchen (E69).</p>	<p>0213</p> <p>0214</p> <p>0215</p>	<p>E69 relieves Q76 on the second 1-3/4" (45 mm) hoseline and extend the line towards the kitchen.</p> <p>Command assigns Q76 to search for E70 around the exterior of the building after replacing their air cylinders.</p> <p>E69 locates the male occupant in the kitchen (deceased). Command advises E69 to defer removal of the body and to continue the search for E70.</p> <p>E69 walks through the interior in an effort to locate E70 and used first 1-3/4" (45 mm) hoseline (now in the hallway) to knock down flames in the closet of Bedroom 2.</p>
	<p>0216</p>	<p>E69 reports to Command that E70 is not inside the building. Command directs E69 to conduct another search.</p>

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<p><i>Large volume of fire in the attic with flames extending 10'-15' (3.0-4.6 M) out of the Side B gable vent (Q76)</i></p> <p><i>Smoke in the hallway and bedrooms has banked down to approximately 3' (.9 M) from the ceiling, with good visibility below that level (E69)</i></p>	0217	 Command requested that dispatch conduct a "head count" (personnel accountability report).
	0218	 BC64 arrived. E74 arrived.
	0219	 E75 arrived.
	0220	 E68 arrived.
	0221	 BC71 arrived.
<p><i>Visibility on the interior decreased as the volume of smoke increased and level of the upper layer dropped (E69).</i></p>	0222	<p><i>E69 located a firefighter casualty (Captain Burton) on the right side of the bed (facepiece on and low air alarm ringing slowly). E69 attempted to remove the casualty but was unable to do so due to low air and fatigue.</i></p> <p><i>Command assigned Q76 to assist in the search for E70.</i></p>
	0223	<p><i>Q76 advised by E69 that they had located a firefighter casualty in the bedroom.</i></p>
<p><i>Flames increased on the wall between Bedrooms 1 and 2.</i></p>	0224	<p><i>E76 began extrication of the firefighter casualty.</i></p>
	0225	<p><i>Additional personnel including E68 officer assisted in removal of the firefighter casualty to the living room and then to the yard on Side A.</i></p>
	0226	

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	0227	
	0228	 <i>Captain Burton removed from the building. Initial medical assessment indicated that the member was deceased.</i>
	0229	
	0230	<i>BC64 and Q76 officer initiated a search for the second member of E70.</i>
	0231	
	0232	<i>Second firefighter casualty (Engineer Desmond) located in Bedroom 2. BC64 and E72 operated the 1-3/4" (45 mm) hoseline that was in the hallway to control the remaining fire in Bedroom 2.</i>
	0233	
	0234	 <i>Engineer Desmond was removed from the building and determined to be deceased.</i>
	0235	 <i>Male civilian victim was removed from the building and defensive firefighting operations initiated to extinguish the remaining fire.</i>