



NIOSH
Fire Fighter Fatality Investigation
and Prevention Program

Death in the line of duty...

A Summary of a NIOSH fire fighter fatality investigation

August 8, 2001

Volunteer Fire Fighter (Lieutenant) Killed and One Fire Fighter Injured During Mobile Home Fire— Pennsylvania

SUMMARY

On January 11, 2001, a 27-year-old male volunteer fire fighter (the victim) died after becoming separated, disoriented, and lost as he and another fire fighter were trying to escape from the interior of a fully involved mobile home fire. Fire apparatus were dispatched to the site at 1110 hours, and at 1113 hours, the Chief arrived on scene in his privately owned vehicle (POV) and assumed incident command (IC). At 1122 hours, the first apparatus arrived: Engine 19 with the First Assistant Chief, a driver/operator, and two fire fighters (including the injured fire fighter). The Chief told them to set up in the driveway of the mobile home (Side 2), and pull two attack lines. At 1123 hours the next apparatus arrived: Engine 14 (mutual aid) with a driver/operator. Engine 14 set up his apparatus behind Engine 19, and prepared to supply water. At 1125 the final two apparatus arrived: Engine 15 (Captain and two fire fighters) and Engine 16 (Captain, Lieutenant [the victim], driver/operator, and one fire fighter. Both engines set up their apparatus and awaited instructions.



Mobile Home Involved in Fire

The IC sent two crews to attack the fire—one crew entered the basement (Side 2), and the second entered the main floor from the porch (Side 1). The victim and the fire fighter from Engine 15 were in the first crew; they moved their attack from the basement to the porch, and then moved into the structure. A fire fighter from Engine 19, who was originally in the basement, joined them, and the three fire fighters moved down the hallway toward a back bedroom. The low-air alarm went off on the fire fighter from Engine 15, and he exited the mobile home to change his air bottle. The victim and remaining fire fighter hit the fire in the back bedroom until conditions deteriorated, and intense heat and smoke forced them to quit the interior attack and try to leave the structure. The deteriorating conditions also forced the second crew to quit the interior attack, and they were able to exit the home.

As the victim and fire fighter from the first crew were trying to exit, thick smoke banked down to the floor and the heat intensified further, forcing them to follow the handline on their hands and knees. However, the line had looped over itself

The **Fire Fighter Fatality Investigation and Prevention Program** is conducted by the National Institute for Occupational Safety and Health (NIOSH). The purpose of the program is to determine factors that cause or contribute to fire fighter deaths suffered in the line of duty. Identification of causal and contributing factors enable researchers and safety specialists to develop strategies for preventing future similar incidents. The program does not seek to determine fault or place blame on fire departments or individual fire fighters. To request additional copies of this report (specify the case number shown in the shield above), other fatality investigation reports, or further information, visit the Program Website at

www.cdc.gov/niosh/firehome.html
or call toll free 1-800-35-NIOSH



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several times, and the two fire fighters became disoriented, got off the line, and crawled into an addition (12 ft x 12 ft) to the mobile home. The fire fighter from Engine 19 found a window, broke through it, and fell outside the mobile home. Other fire fighters assisted him, and he was transported to the local hospital, at 1202 hours.

Between 30 and 40 minutes elapsed before it was determined that the victim was missing. At this time, several fire fighters began searching the grounds and the interior, and even called the local hospital to see if the victim had been transported there with the injured fire fighter. The victim was eventually located by a chief from one of the mutual aid departments, who crawled into the addition and saw the victim's boot. His body was removed to the outside and he was pronounced dead at the scene by the local coroner. NIOSH investigators concluded that, to minimize the risk of similar occurrences, fire departments should

- ***ensure that the Incident Command conducts a complete size-up of the incident before initiating fire fighting efforts, and continually evaluates the risk versus gain during operations at an incident***
- ***ensure that fire command always maintains close accountability for all personnel at the fire scene***
- ***ensure consistent use of personal alert safety system (PASS) devices at all incidents and consider providing fire fighters with a PASS integrated into their self-contained breathing apparatus***
- ***ensure that a rapid intervention team is established and in position immediately upon arrival***

- ***ensure that a separate incident safety officer, independent from the incident commander, is appointed***
- ***ensure fire fighting tactics and operations do not increase hazards on the interior—e.g., opposing hose streams***
- ***ensure that any hoseline taken into the structure remains inside until all crews have exited***
- ***use evacuation signals when command personnel decide that all fire fighters should be pulled from a burning building or other hazardous area***
- ***ensure that personnel equipped with a radio, position the radio to receive and respond to radio transmissions***
- ***ensure that team continuity is maintained***
- ***ensure that ventilation is closely coordinated with the fire attack.***

INTRODUCTION

On January 11, 2001, a volunteer fire fighter (the victim) died and one fire fighter was injured at an incident involving a mobile home fire. The victim became disoriented and lost as he and the injured fire fighter were trying to escape from the interior of a fully involved mobile home fire.

The National Institute for Occupational Safety and Health (NIOSH) was notified of this incident by the U.S. Fire Administration (USFA) on January 12, 2001. On January 24-25, 2001, the team leader and a safety and occupational health specialist from the NIOSH Fire Fighter Fatality Investigation and Prevention Program investigated this incident. Meetings and



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interviews were conducted with the Chief, First Assistant Chief, and the fire fighters from the first response companies. Also, the incident was discussed with two chiefs from the mutual aid fire departments, additional fire fighters from mutual aid departments, the local Police Chief, Coroner, State Police Arson Investigator, and the person who reported the fire. NIOSH investigators reviewed copies of photographs and a videotape of the incident scene, dispatch records, the police report, and the department's standard operating guidelines. The victim's SCBA was sent to the NIOSH Respirator Branch in Morgantown, West Virginia, for testing (see attachment). A site visit was conducted and the incident site photographed. The site was a single-family residence (1977 mobile home [trailer]). The home was typical in construction (e.g., wood frame with aluminum siding, flat roof with metal roofing, and was fully carpeted). It was 12 feet wide and 65 feet long with a 12-foot by 12-foot addition constructed on Side 1 (see Figure 1). Access into the basement from the first floor was provided by a stairway from the addition down into additional living quarters. The home had been placed on a 24-foot-wide by 65-foot-long concrete-block foundation which was 7 feet in height (basement). The basement was equally partitioned off and consisted of finished living quarters on the east side, and a workshop area which contained a garage on the west side (see Figures 1 and 2). Access into the garage area was through a garage door located on the west side (Side 2) and a doorway adjacent to the garage door. Additionally, an enclosed porch 12 feet wide by 43 feet long had been attached to the home (Side 1).

The fire department involved in this incident consists of two fire stations with a total of 39 uniformed fire fighters. The department serves a population of approximately 4500 in a geographic

area of 44 square miles. The following training is available at the State fire training center on an as-needed basis: personal safety, forcible entry, ventilation, fire apparatus, ladders, self-contained breathing apparatus, hose loads, streams, hazardous materials, structure fire, pumps, rappelling, search and rescue, terrorism, vehicle extraction, cardiopulmonary resuscitation, first aid, aerial operations, and electrical emergencies. The victim had received training in the following areas: Emergency medical technician, basic wildland fire suppression, arson detection and first responder, fire police, emergency vehicle driver training, fundamentals of fire fighting, bus vehicle fires and rescue emergencies, and hazardous materials for first responders. The victim had 14 years of fire fighting experience, 4 years through the junior fire fighter program. The origin of the fire, which was determined by the State Police Arson Investigator, was in the top of a closet in the workshop side of the basement. The cause was determined to be electrical in nature.

Although eight volunteer fire departments were involved in this incident, only those directly involved up to the time of the fatal incident are mentioned in this report.

INVESTIGATION

On January 11, 2001, a female at a mobile home noticed smoke and heat coming from the corner bedroom of her parents' residence at about 1110 hours, and immediately called 911 to report a fire. At 1113 hours, the Chief of the local volunteer fire department, who lived near the mobile home, arrived on scene in his POV, reported "smoke showing" and assumed Incident Command (IC). The IC conducted a size-up of Side 1 (see Figures 1 and 2), and was told by the female who reported the fire that everyone was out of the house and that she thought there was a problem with the wood burner in the basement. At 1122 hours,



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Engine 19 arrived on scene with the First Assistant Chief, a driver/operator and two other fire fighters (including the injured). They were instructed to enter the driveway of the mobile home (Side 2), set up, and pull two attack lines. Engine 14 (mutual aid) arrived next with a driver/operator and set up his apparatus behind Engine 19 to supply water. Engine 15 (Captain, two fire fighters) and Engine 16 (Captain, Lieutenant [the victim], driver/operator, and fire fighter) both arrived on scene at 1125 hours, set up their apparatus and awaited instructions.

In the interim, the First Assistant Chief and a fire fighter from Engine 19 pulled a 1 ¾-inch line to the front door (first floor, Side 1) entrance of the mobile home and entered (see Figure 1 and Photo 1). After entering, they moved left along a wall and discovered they were in an enclosed porch on the outside of the mobile home (see Photo 2), but could see fire through the windows in the interior of the home. The First Assistant Chief gave the nozzle to the fire fighter and an unidentified fire fighter, and he began breaking windows along the outside wall of the mobile home. The two fire fighters hit the fire through the windows, but had little effect on the fire. The two fire fighters then proceeded through another door off the porch area into the interior (addition) of the mobile home to attack the fire (see Photo 3). At that time, the First Assistant Chief's low-air alarm sounded on his self-contained breathing apparatus (SCBA), and he turned over interior command to the 2nd Assistant Chief, who had arrived earlier in his POV. The First Assistant Chief changed his air bottle, then pulled a 1 ¾-inch line off the front of Engine 19 to Side 3 and began hitting the fire through the doorway (Side 3, first floor) into the corner bedroom (see Photo 4).

Meanwhile, another 1 ¾-inch line had been pulled off Engine 19 to the garage door (basement level,

Side 2) by a fire fighter from Engine 19 and a fire fighter from Engine 15 (see Figure 2 and Photo 5). They entered the garage area and started hitting the fire in the basement area. A Lieutenant (the victim) from Engine 15 approached the two fire fighters in the basement and asked if they needed anything. A fire fighter replied that they needed a large hand light. The victim acknowledged the request, left the area, and returned a minute later with a hand light. Shortly thereafter, the SCBA low-air alarm for the fire fighter from Engine 19 sounded, and he left the basement area to change his air bottle. The remaining crew in the basement (fire fighter from Engine 15 and the victim) proceeded to the front door (first floor, Side 1) with their line and entered the porch area. After trying to knock down the fire through the windows on the outside wall of the mobile home, they moved inside the mobile home with their line. Shortly thereafter the fire fighter from Engine 19 who changed his air bottle followed one of the lines into the interior of the mobile home. Because of limited (zero) visibility, the fire fighter crawled on his hands and knees in order to follow the line. He followed the line until he met up with two other fire fighters, but never made identification of either fire fighter. About that time, the low-air alarm on the fire fighter from Engine 15 who was on the interior line began to sound, and he left the line and found his way out of the house. The remaining two fire fighters moved back through the hallway hitting fires in various rooms off to their left (see Photo 6). They reached a point in the hallway where they were hitting the fire in the corner bedroom and conditions worsened. The crew began backing out as the heat and smoke became more intense. The second hose crew, which was hitting the fire in another part of the house, backed out and exited as the heat and smoke intensified. As the crew that was in the hallway backed out



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(the victim and injured fire fighter), their line had looped over itself several times which slowed their retreat. Thick dark gray smoke had banked down to the floor and the heat was intensifying as the crew was trying to make their way out of the mobile home. They became disoriented because of the interior conditions, got off the line and started crawling around inside the 12-foot by 12-foot addition looking for a door or window to escape through. They apparently became separated as they continued to look for a way out. *Note: Although the victim had become lost and disoriented, no distress or mayday call was ever heard over the radios.* The injured fire fighter from Engine 19, after crawling around the inside of the addition for several minutes, found the doorway leading into the enclosed porch area. Once inside the porch area, the fire fighter saw light coming from a window on the outside wall of the porch, and ran toward the light. The fire fighter broke through the window and fell to the ground. He was assisted by two fire fighters on the exterior of the mobile home and was then transported by ambulance to the local hospital at 1202 hours.

At that time, a fire fighter from Engine 15 was ordered to take a 2-inch line to the basement. He arrived at the basement with the 2-inch line and from the doorway began spraying water into the interior until another fire fighter from Engine 19 joined him, and the two took the line into the basement and fought the fire until their low-air alarms sounded. During this time a fire fighter from a mutual aid department found a helmet in the mobile home addition and gave it to the First Assistant Chief, who initiated a search, and started calling the local hospitals trying to locate the victim. *Note: According to witness interviews and the ambulance run sheet, between 30 and 40 minutes had elapsed before the victim was discovered missing.*

The two fire fighters in the basement backed out and went to change their air bottles when they heard that the victim was missing. The two fire fighters were ordered by the First Assistant Chief to search for the victim. *Note: At this time, several other fire fighters were searching the grounds, the interior, and calling the local hospital to try and locate the victim.* The two fire fighters encircled the mobile home on the exterior, but did not locate him. Next, they began a search on the interior, but were hampered by zero visibility and soft floors. *Note: At one point during the search, a captain and two fire fighters from a mutual aid department, along with four other fire fighters, entered and searched the addition without finding the victim.* Finally, the basement area was searched and a red 1 ¾-inch line was found lying on the stairway that connected the basement to the addition (see Photo 7). The line was followed up the stairs into the addition and out the exterior door onto the enclosed porch. The fire fighters moved to the front yard to rest, and at that time heard someone yell that the victim had been found. The victim had been located by a chief from one of the mutual aid departments. The chief had crawled into the addition with a 1 ¾-inch line that he found on the enclosed porch. He opened the line with a fog spray and directed it at the open window which started clearing the room of smoke. He then saw a boot of the victim who was bent over backwards on a desk in the addition. The chief, along with several other fire fighters, dragged the victim out onto the lawn where he was subsequently pronounced dead by the local Coroner. The victim's facepiece was intact and still donned, but the air bottle was empty. He was wearing full turnouts and boots, but his helmet had been found earlier, and his structural fire fighting gloves were later found at the top of the stairway leading into the basement. His



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PASS device was attached to a strap for his SCBA, but had not been turned on, and his radio was found in his turnout pants pocket.

CAUSE OF DEATH

The cause of death as released by the Coroner's Office was asphyxiation.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Fire departments should ensure that Incident Command conducts a complete size-up of the incident before initiating fire fighting efforts, and continually evaluates the risk versus gain during operations at an incident.^{1,2}

The initial size-up conducted by the first-arriving officer allows the officer to make an assessment of the conditions, allowing his decisions to be proactive as opposed to reactive. The following general factors are important considerations: (1) occupancy type involved, (2) smoke conditions, (3) type of construction, (4) age of structure, (5) exposures, and (6) time considerations, such as time of incident, time fire was burning before arrival, time fire was burning after arrival, and type of attack. The IC's initial size-up involved all available information received from the home owner and what he saw upon his arrival on the scene (Side 1 of the mobile home). A view of all four sides may have revealed fire extension from the basement area up into the corner bedroom located above the workshop area of the basement. The additional information may have helped in the decision-making process and in the development of an effective attack plan, which may have included an exterior fire attack.

Recommendation #2: Fire departments should ensure that fire command always maintains close accountability for all personnel at the fire scene.¹⁻³

Accountability on the fire ground is paramount and may be accomplished by several methods. It is the responsibility of every officer to account for every fire fighter assigned to his or her company and relay this information to incident command. Accountability on the fire ground can be maintained by several methods: by a system using individual tags for every fire fighter and officer responding to an incident, or by a company officer's riding list stating the names, assigned tools, and duties of each member responding with every fire company. One copy of the list should be posted in the fire apparatus and one copy carried by the company officer. The list posted in the apparatus is used if the company officer or the entire company is reported missing. Additionally, fire fighters should not work beyond the sight or sound of the supervising officer unless equipped with a portable radio. This member should communicate with the supervising officer by portable radio to ensure accountability and indicate completion of assigned duties. Standard operating procedures (SOPs) should address accountability, including the location and the duties of the responding fire companies. Just as company officers should know the location of all fire fighters assigned to the company, the chief officer in command should know the operating locations of officers and companies assigned on the first-alarm assignment. One of the most important aides for accountability at a fire scene is an incident management system. It should be established by the officer in command of the incident.

Recommendation #3: Fire departments should ensure consistent use of personal alert safety system (PASS) devices at all incidents and consider providing fire fighters with a PASS integrated into their self-contained breathing apparatus.



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PASS devices, which are electronic devices worn by the fire fighter, emit a loud and distinctive alarm if the fire fighter becomes motionless for more than 30 seconds. Fire fighters entering hazardous areas should be equipped with a PASS device. There are several types of PASS devices available. One device that could be used is a PASS that is integrated into the SCBA. PASS devices integrated into the SCBA will be activated when the SCBA air cylinder is turned on. Manual PASS devices are also used throughout the fire service. These devices require the fire fighter to manually turn on the device each time they use it.

Recommendation #4: Fire departments should ensure that a rapid intervention team is established and in position immediately upon arrival.⁴

A rapid intervention team (RIT) should respond to every major fire. The team should report to the officer in command and remain at the command post until an intervention is required to rescue a fire fighter(s) or civilians. The RIT should have all tools necessary to complete the job—e.g., a search rope, first-aid kit, and a resuscitator—including tools for use if a fire fighter becomes injured. Many fire fighters who die from smoke inhalation, from a flashover, or from being caught or trapped by fire actually become disoriented first. They are lost in smoke and their SCBAs run out of air, or they cannot find their way out through the smoke, become trapped, and then fire or smoke kills them. The primary contributing factor, however, is disorientation. The RIT will be ordered by the IC to complete any emergency searches or rescues. They will provide the suppression companies an opportunity to regroup and take a roll call instead of performing rescue operations. When the RIT enters to perform a search-and-rescue, they should have full cylinders on their SCBAs and be physically prepared. When

a RIT team is used in an emergency situation, an additional RIT team should be put into place in case an additional emergency situation arises. This additional RIT team should be comprised of fresh, well-rested fire fighters. In this incident, a RIT had not been established.

Recommendation #5: Fire departments should ensure that a separate incident safety officer, independent from the incident commander, is appointed.²⁻⁴

According to NFPA 1561, paragraph 4-1.1, “The Incident Commander shall be responsible for the overall coordination and direction of all activities at an incident. This shall include overall responsibility for the safety and health of all personnel and for other persons operating within the incident management system. While the Incident Commander (IC) is in overall command at the scene, certain functions must be delegated to ensure adequate scene management is accomplished. According to NFPA 1500, paragraph 6-1.3, “As incidents escalate in size and complexity, the incident commander shall divide the incident into tactical-level management units and assign an incident safety officer to assess the incident scene for hazards or potential hazards.” The incident safety officer (ISO), by definition is “An individual appointed to respond to or assigned at an incident scene by the incident commander to perform the duties and responsibilities specified in this standard. This individual can be the health and safety officer or it can be a separate function.” According to NFPA 1521, paragraph 2-1.4.1, “An incident safety officer shall be appointed when activities, size, or need occurs.” Each of these guidelines complements each other and indicates that the incident commander is in overall command at the scene, but oversight of all operations is



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difficult. On-scene fire fighter health and safety is best preserved by delegating the function of safety and health oversight to the ISO.

Recommendation #6: Fire departments should ensure fire fighting tactics and operations do not increase hazards on the interior—e.g., opposing hose streams.⁵

Several times during the fire, the crews were attacking the fire from different perspectives simultaneously. Active fire fighting was taking place in the interior of the mobile home, while fire fighting activities were also being conducted in the basement and through a basement window from the exterior. Also, an attack line was directed through the doorway of the back bedroom from the exterior. Interior fire attack should be a coordinated event. Opposing hose streams may inadvertently push the fire in the direction of other hose crews.

Recommendation #7: Fire departments should ensure that any hoseline taken into the structure remains inside until all crews have exited.⁵

Fire fighters who enter smoke-filled enclosures for the purpose of fire attack, should be equipped with a safety line or hoseline in the event that a fire fighter becomes disoriented or trapped. Many fire fighters who die from smoke inhalation, a flashover, or are caught or trapped by fire, actually become disoriented first. They are lost in smoke, their SCBA runs out of air, or they cannot find their way to exit through the smoke. Although fire or smoke kills them, the primary contributing factor is disorientation. By using a hoseline, the fire fighter is able to determine the direction of exit by the couplings that connect two hose lines together. The male coupling signifies the exit direction. The line should remain inside as a guide for fire fighters to follow.

Recommendation #8: Fire departments should use evacuation signals when command personnel decide that all fire fighters should be pulled from a burning building or other hazardous area.⁵

Evacuation signals are used when command personnel decide that all fire fighters should be pulled from a burning building or other hazardous area because conditions have deteriorated beyond the point of reasonable safety. All fire fighters should be familiar with their department's method of sounding an evacuation signal. There are several ways this communication can be done. The two most common methods are to (1) broadcast a radio message ordering all fire fighters to evacuate, and (2) to sound an audible warning device on the apparatus at the fire scene for an extended period of time. The message should be broadcast several times to make sure everyone hears it.

Recommendation #9: Fire departments should ensure that personnel equipped with a radio, position the radio to receive and respond to radio transmissions.⁶

The fireground communications process combines electronic communication equipment, a set of standard operating procedures, and the fire personnel who will use the equipment. To be effective, the communications network must integrate the equipment and procedures with the dynamic situation at the incident site, especially in terms of the human factors affecting its use. The ease of use and operation may well determine how consistently fire fighters monitor and report over the radio while fighting fires. Fire departments should review both operating procedures and human factors issues to determine the ease of use of radio equipment on the fireground to ensure that fire fighters consistently monitor radio transmissions from the IC and



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respond to radio calls. In this incident, a portable radio was found on the victim in the off position and located in the pants pocket of his turnouts.

Recommendation #10: Fire departments should ensure that team continuity is maintained.^{5,7}

Each fire fighter should be assigned to a team of two or more and given specific assignments to help reduce the chance of injuries. Team continuity relies on knowing who is on your team, knowing the team leader, staying within visual contact at all times (if visibility is obscured then teams should remain within touch or voice distance of each other), communicating your needs and observations to the team leader, rotation to rehabilitation and staging as a team, and watching your team members (practice a strong “buddy-care” approach). These key factors help to reduce the risks involved in fire fighting operations by providing personnel with the added safety net of fellow team members.

Recommendation #11: Fire departments should ensure that ventilation is closely coordinated with the fire attack.^{5,8}

Chapter 10 of the *Essentials of Fire Fighting, 4th edition*, states that, “ventilation must be closely coordinated with fire attack. When a ventilation opening is made in the upper portion of a building, a chimney effect (drawing air currents from throughout the building in the direction of the opening) occurs.” Ventilation is necessary to improve a fire environment so that fire fighters can approach a fire with a hoseline for extinguishment. However, window and door ventilation should be coordinated with fire extinguishment. Only after a charged hoseline is in place and ready for extinguishment is ventilation of windows and doors most effective. Command should determine if ventilation is needed and where

ventilation is needed. The type of ventilation should be determined, based on evaluation of the structure and conditions on arrival.

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8. Dunn, V [1988]. *Collapse of Burning Buildings*, Saddle Brook, NJ: Publisher Penn Well.

INVESTIGATOR INFORMATION

This investigation was conducted by Richard W. Braddee, Team Leader/Project Officer, and Nancy T. Romano, Safety and Occupational Health Specialist, NIOSH, Division of Safety Research, Surveillance and Field Investigations Branch.

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Photo 1. Front Door Entrance to Mobile Home (Side 1)



Photo 2. Enclosed Porch Attached to Mobile Home

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Photo 3. Addition to Mobile Home (12 ft x 12 ft)



Photo 4. Doorway Into Corner Bedroom (Side 3)



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Photo 5. Entrance to Garage and Basement Area (Side 2)



Photo 6. Hallway to Corner Bedroom

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Photo 7. Stairway Connecting Addition to Basement

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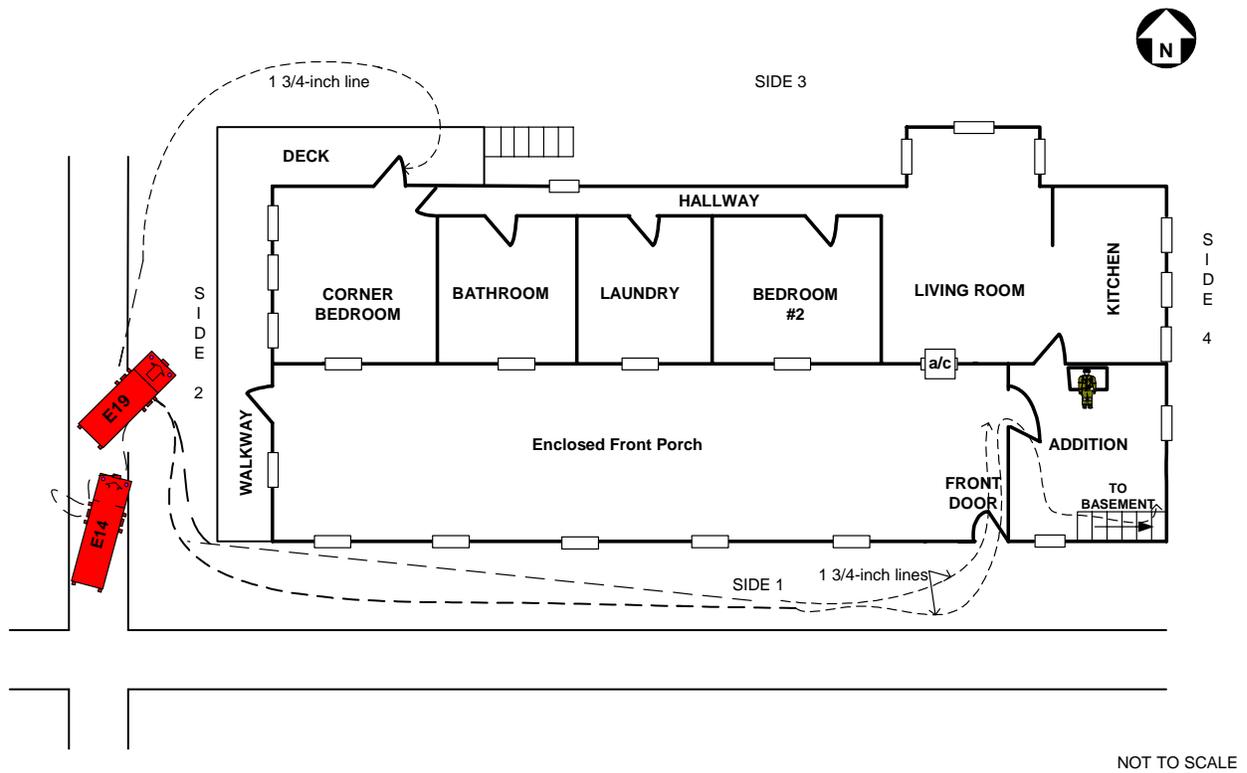


Figure 1. Mobile Home, First Floor Layout

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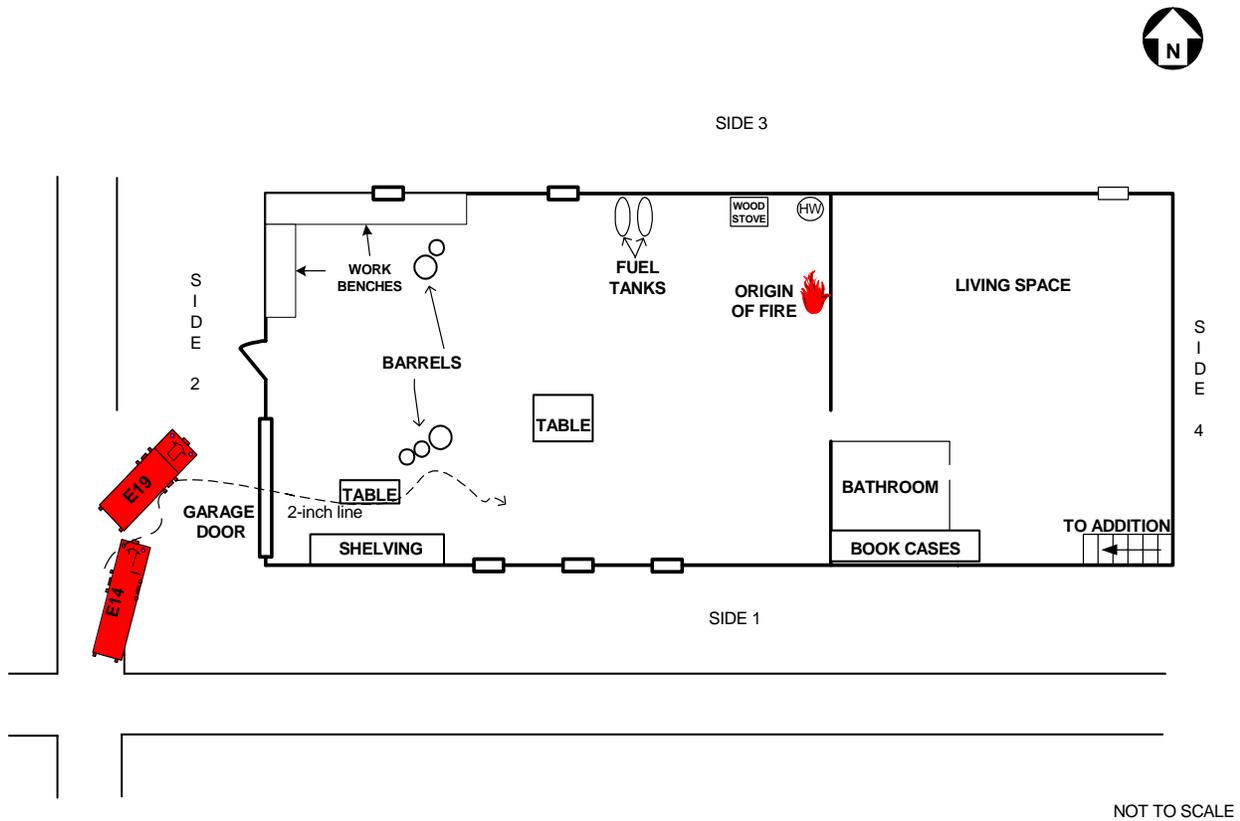


Figure 2. Mobile Home, Basement Floor Layout



Fatality Assessment and Control Evaluation
Investigative Report #F2001-04

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ATTACHMENT

The following is a summary of NIOSH Task No. TN-11837. For a full report, including photos, tables, and diagrams, contact NIOSH, Division of Respiratory Disease Studies, Respirator Branch at (304) 285-5907.

	DEPARTMENT OF HEALTH & HUMAN SERVICES	Public Health Service
	NIOSH Reference: TN-11837	Centers for Disease Control and Prevention (CDC) National Institute for Occupational Safety and Health - ALOSH 1095 Willowdale Road Morgantown, WV 26505-2888 Phone: (304) 285-5907 Fax: (304) 285-6030 May 7, 2001

Dear Investigator Whitman:

The National Institute for Occupational Safety and Health (NIOSH or the Institute) has concluded its investigation conducted under NIOSH Task Number TN-11837. This investigation consisted of the inspection and evaluation of one self-contained breathing apparatus (SCBA) received by NIOSH from your office on January 25, 2001. The primary purpose of this investigation was to determine the SCBA's conformance to the NIOSH certification requirements of **Title 42, Code of Federal Regulations, Part 84 (42 CFR 84)**. Our detailed Status Investigation Report is enclosed.

The box that was shipped to NIOSH by your office contained one complete Mine Safety Appliances (MSA) Model 401, 30-minute, 2216 psi, SCBA (NIOSH approval number TC-13F-30). The SCBA has the appearance of having seen considerable use as well as exposure to high heat and flames. Several components and sub-assemblies are severely damaged. The SCBA was examined component by component in the condition as received to determine its conformance to the NIOSH-approved configuration. The entire inspection process was videotaped. The SCBA inspection is summarized in Attachment Two of the enclosed report. The condition of each major component was also photographed with a digital camera. Images of the unit are contained in Attachment Three of the enclosed report.

Inspection of the SCBA revealed many severely damaged components:

- The exhalation valve diaphragm was melted to its seat.
- The high-pressure hose had a significant bulge near the Audi-Larm assembly.
- The belt-mounted regulator was found to contain debris and a substantial amount of liquid.
- The compressed air cylinder displayed signs of exposure to heat well beyond the manufacturer's recommendations.



Fatality Assessment and Control Evaluation
Investigative Report #F2001-04

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ATTACHMENT (continued)

In order to safely test this SCBA, these deficiencies would have to be rectified through part replacement and/or overhaul. Replacing or servicing these key components would render any performance test results as meaningless. Therefore, no performance testing was conducted on the SCBA.

No further action will be taken by NIOSH and the investigation of Task Number TN-11837 will be considered closed. The SCBA will be stored under lock in room 1520 of the NIOSH Appalachian Laboratory for Occupational Safety and Health (ALOSH) pending written instructions from your office.

I trust this information is satisfactory to meet your needs. If you require further assistance, please contact me at (304) 285-6337.

Sincerely yours,

Thomas W. McDowell,
General Engineer
Respirator Branch
National Personal Protective Technology Laboratory