



Career Officer Injured During a Live Fire Evolution at a Training Academy Dies Two Days Later – Pennsylvania

Revised September 19, 2007

SUMMARY

On October 23, 2005, a 47-year-old male career Captain (the victim) was severely burned during a live fire training evolution in the burn building at the State Fire Academy. The victim was an adjunct instructor at the Academy in addition to being a career fire officer. The Academy was teaching a Suppression Instructor Development (train the trainer) course when the incident occurred. The victim was in the basement of the burn building adding pallets to the fire prior to the last evolution of a 5-day training course. Three students in the course found the victim on the floor in the burn room as they were advancing a hose line during their evolution. The students immediately carried the victim outside where emergency medical care was administered. The victim was transported via ambulance to a community hospital where he was stabilized prior to transport via helicopter to a regional trauma/burn center. The victim died from his injuries on October 25, 2005.

The NIOSH investigator concluded that, to minimize the risk of similar occurrences, fire departments and training academies should:

- *ensure that two training officers are present with a charged hoseline during the ignition or refueling of a training fire in accordance with NFPA 1403.*
- *determine the minimum amount of flame, heat and/or smoke required during live fire evolutions to perform the training while ensuring fire fighter safety.*
- *use the minimum fuel load necessary to conduct live fire training.*
- *have a written respiratory protection program and ensure that self-contained breathing apparatus (SCBAs) facepieces are properly inspected, used, and maintained.*
- *have burn rooms with at least two exits.*
- *avoid having basement burn rooms.*

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/fire/ or call toll free 1-800-CDC-INFO (1-800-232-4636).



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Additionally training academies should consider:

- *installing instrumentation within live fire training structures to record information such as heat, the effects of suppression and the byproducts of combustion.*
- *installing a ventilation system within the burn structure.*
- *having a qualified engineer evaluate fuel loads, heat retention, and the instrumentation and ventilation systems of live fire training facilities.*

INTRODUCTION

On October 23, 2005, a 47-year-old male career Captain (the victim) was severely burned during a live fire evolution at the State Fire Academy. On October 23, 2005, the State Fire Commissioner notified the National Institute for Occupational Safety and Health (NIOSH) Fire Fighter Fatality Investigation and Prevention Program of the injured instructor and requested an investigation. The victim later died from his injuries on October 25, 2005. On October 25-27, 2005, an occupational safety and health specialist from NIOSH began an investigation into the incident. The NIOSH investigator met with the State Fire Commissioner, the Administrator of the Training Academy, and Resident and Adjunct Academy instructors. The NIOSH investigator examined photographs and video of the burn building, and reviewed witness statements, training records and course documents. The incident site was evaluated and photographed by the NIOSH investigator. The victim's SCBA and bunker gear were examined and shipped to the NIOSH National Personnel Protective Technology Laboratory in Pittsburgh, PA for further analysis (see Appendix). On November 18, 2005, the NIOSH investigator met with officials of the Academy and conducted interviews with the adjunct instructors present during the incident.

Fire Academy

The State Fire Academy was established in 1955 and is the primary resource for fire fighting and emergency response training within the State. There are seven buildings situated on an 11 acre campus. The Academy has 13 full time employees including a facility administrator, 2 resident instructors, 3 field education supervisors, a curriculum specialist, a certification program manager, and 5 support personnel. The Academy has over 80 adjunct instructors that also teach at the facility. The Academy teaches about 40 classes each year with outside 'hands-on' training from April to November. In addition to training programs conducted on site, the State Fire Academy is also responsible for delivering special curriculum locally to emergency service organizations. The three field education supervisors manage a statewide local level training program. Each year, this program delivers over 3,000 programs across the State; and, the majority of the programs are conducted at local fire departments. The Academy also administers the State Fire Service Certification program which has certified over 6,000 emergency responders.



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The Academy was teaching a Suppression Instructor Development course when the incident occurred. This 40-hour class is designed to develop and evaluate the instruction skills of the students called “Instructor Candidates.” The course graduates will become State-certified as fire suppression instructors. The course has 16 evolutions and the fatal event occurred during the last evolution of the 5-day course. The course had 1 resident instructor, 9 adjunct instructors, 1 field supervisor, 1 curriculum specialist and 16 students. The student makeup included a mix of career and volunteer fire fighters from throughout the State.

Burn Building

The 2½ story residential non-gas-fired burn building used in structural fire fighting training at the Academy was built in 1993 (see Photo 1) and completely renovated in 2000-2001. The building foundation is approximately 36 x 26 feet and approximately 30 feet to the roof line. The burn building has 4 training levels: the basement, the first floor, the second floor, and the attic. The building has one internal stairwell with an additional stairwell from the basement to the exterior. The D-side of the structure includes a simulated attached garage that is also used as a storage area. The building has a slightly pitched flat concrete roof. The building is constructed of concrete cinder block with high temperature lining (HTL) fire brick in the basement burn room. The doors are steel and the window openings include steel shutters that can be opened or closed to vary interior conditions during live burns. Burn rooms are located in the basement and on the second floor. The incident occurred in the basement burn room (see Diagram). The basement can be accessed from an interior stairway and another stairway that leads to the exterior. The basement burn room has only one means of entry or exit. Fires are only set with wooden pallets and excelsior (a wooden packing material similar to straw).

Training and Experience

The victim had over 30 years of fire fighting experience beginning in 1974 as a junior fire fighter with a volunteer department. The victim had been a career fire fighter for nine years and held the rank of Captain. He had extensive training and was State certified as Fire Fighter I and II, Fire Officer I and II, Fire Service Instructor I and II, HAZMAT Technician, and Rescue Technician – vehicle and machinery. The victim was also an Emergency Medical Technician (EMT). The victim had been an adjunct instructor at the Fire Academy since 1998.

Equipment

At the time of the incident, the victim was wearing the full array of personal protective clothing and equipment, consisting of bunker gear (coat and pants), helmet, Nomex® hood, gloves, boots, and a self-contained breathing apparatus (SCBA) with an integrated personal alert safety system (PASS). The victim was also equipped with a portable radio. The SCBA and radio were provided by the training academy.



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INVESTIGATION

At approximately 0805 hours on October 23, 2005, the instructors (including the victim) had a staff meeting to discuss the 6 evolutions that would take place in the residential burn building (see Photo 1). The evolutions involved not only extinguishing the fire but also a series of pre-scripted simulated emergencies. The students were unaware of which simulated event would occur during which evolution. The purpose of these simulated events was to evaluate the students' ability to respond and effectively manage emergency situations. The fatal event occurred during the last evolution and the scenario was to simulate that the fire in the basement burn room had not been knocked down enough from the previous evolution. *(Note: The students' ability to evaluate the fire conditions within the building was an important part of the course since they would be training live fire suppression techniques to new fire fighters).* The lead instructor had two teams of 4 adjunct instructors in addition to 2 academy staff. The adjunct instructor teams worked every other evolution; they participated in an evolution then wrote student evaluations during the next.

Prior to the instructor staff meeting, the students were given assignments to prepare for the upcoming evolutions. The evolutions began at approximately 0845 hours. The first 5 class evolutions of the day (11-15) were completed from about 0900 hours until 1200 hours without incident. The incident command structure during the training consisted of the students serving as the Incident Commander (IC), Incident Safety Officer and Rapid Intervention Team (RIT) members, all monitored by the course instructors. The victim completed evolution 12 evaluating students in the basement, on evolution 14 he was outside evaluating the student IC, and on evolution 16 (when the fatal event occurred) he served as the basement instructor and as "the arsonist" or ignition officer for the basement burn room.

The final evolution of the course began at approximately 1238-1240 hours. The victim went to the basement and another instructor went to the 2nd floor. They were "arsonists" who would tend the burn rooms by placing more pallets on the fire and then evaluate the students as they began suppression. *(Note: The students are prohibited from entering the basement burn room and the instructor "arsonists" only remain in the burn room long enough to add additional fuel to the fires).*

A third instructor (the curriculum specialist) went into the burn building in preparation to monitor the basement attack crew. Instructor #3 went in the front entrance and awaited the crew's entry. There was still good visibility with some smoke. The instructor had waited about 2 minutes, then heard the basement door open. The instructor saw another fire instructor come over and lay flat on the floor, while pulling and lifting on his bunker gear. *(Note: The fire instructor was the victim, but instructor #3 could not immediately identify him).* The instructor asked the victim twice, "Are you OK?" The victim responded that "It's hot as hell down there!" The instructor asked if the victim wanted to go outside and again asked if he was OK. The victim responded "No, I'm OK." As the victim was beginning to sit up, the instructor said "I really think you need to go outside." The victim responded "No, I'm all right", got up and said "Yeah, I'm fine I will see you down there." The victim went back down the basement steps. *(Note: It is estimated that 1½ minutes elapsed from the time the victim came up the stairwell until he went back down to the basement).*



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At approximately 1245 hours, the victim was in the basement of the structure putting additional pallets on the fire. A few minutes later, three students in the course were advancing a hose line to the basement during their evolution. They encountered low visibility and moderate heat at the base of the basement stairwell. As they approached the burn room they heard a person moaning. They found the victim struggling on the floor in the right corner of the burn room. *(Note: According to interviews and witness statements, fire fighters did not report hearing the victim's PASS device. The PASS device may not have activated because the victim was still moving. Immediately after the incident, the PASS device began sounding but could not be deactivated due to heat damage. The PASS device was still sounding weakly two days later during the NIOSH investigation).*

They were surprised to find the victim in this location. *(Note: Initially there was confusion about whether this was a training scenario or a real event. Some students thought that the final scenario would be a grand finale.)* One of the students radioed "Mayday! Mayday! Mayday! Firefighter Down!" The IC immediately deployed the RIT team and the students in the basement immediately carried the victim up the D-side stairwell (see Photo 2) and outside where emergency medical care was administered. *(Note: An ambulance staffed by two EMTs was already on scene for the training. Additionally, an adjunct instructor and a student in the class were paramedics.)*

After the last evolution started, the lead instructor and 4 of the adjunct instructors went to the instructor's room in an adjacent building to discuss the final student evaluations. They heard the radio transmissions that were not part of the training scenario and immediately went to investigate. They saw the victim being carried up the basement stairs at 1253 hours.

The victim was transported via the ambulance to a community hospital where he was stabilized prior to transport via helicopter to a regional trauma/burn center. The victim died from his injuries on October 25, 2005.

NPPTL and NIST Investigations

Based on the National Personal Protective Technology Laboratory (NPPTL) respirator investigation report and fire experiments conducted by the National Institute of Standards and Technology (NIST) Fire Research Division, it is hypothesized that excessive heat in the burn room caused a catastrophic failure of the victim's SCBA facepiece lens. This failure was a result of the heat conditions within the burn room and not a problem with the facepiece's manufacture. *(Note: Any SCBA facepiece exposed to these conditions probably would have failed).* The failure occurred as the victim was carrying pallets in the burn room to add to the existing fire. The victim dropped the pallets and fell forward (see Diagram and Photo 3). The victim then struggled on the ground and crawled towards the exit.

The NPPTL report indicated that many components of the victim's SCBA had suffered severe damage from heat exposure.¹ The lens is molded from polycarbonate plastic, which has a transition temperature in the range of 145-150°C (293-302°F).² *(Note: The transition temperature is the point*



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the material changes from a rigid state to a soft, rubbery state.) At even higher temperatures, the plastic begins to melt. The lens material of the victim's facepiece appears to have reached temperatures possibly higher than 300°F. This is supported by the charring of the voicemitter tubes which are made of Neoprene rubber, which begin to decompose around 342°C (647°F).² The polycarbonate buttons on the two upper head-harness attachment points were covered by the protective hood, as were portions of the lens. These components appear to have been heated well in excess of the glass transition temperature but did not reach melting temperature.

CAUSE OF DEATH

The county coroner's office reported the cause of death as thermal trauma listed as accidental. The coroner's office found no medical reason for the victim to have collapsed within the burn building.

RECOMMENDATIONS

Recommendation #1: Fire departments and training academies should ensure that two training officers are present with a charged hoseline during the ignition or refueling of a training fire in accordance with NFPA 1403.

Discussion: Live fire training evolutions should be conducted in accordance with NFPA 1403, Standard on Live Fire Training Evolutions.³ NFPA 1403, Chapter 6 Non-Gas-Fired Live Fire Training Center Structures, Section 4 Safety, states that an instructor shall be designated as the "ignition officer" to control the materials being burned and a charged hose line shall accompany the ignition officer when he or she is igniting any fire. The decision to ignite the training fire shall be made by the instructor-in-charge in coordination with the safety officer and the fire shall be ignited by the ignition officer in the presence of and under the direct supervision of the safety officer.

Recommendation #2: Fire departments and training academies should determine the minimum amount of flame, heat and/or smoke required during live fire evolutions to perform the training while ensuring fire fighter safety.

Discussion: The fire fighters in this course were already highly trained, skilled fire fighters and their training was focused on the ability to instruct new fire fighters, not fire fighting skills. In this incident, high heat conditions were probably not necessary for this training.

Recommendation #3: Fire departments and training academies should use the minimum fuel load necessary to conduct live fire training.

Discussion: The basement burn room was lined with material that retained heat within the room. There was only one doorway to enter the room and there was no way to release heat that built up during the live fire evolutions. The basement burn room was also not given sufficient cool down time between evolutions. The minimum fuel load necessary to conduct the training should be used to



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minimize heat retention within the burn room. During fires in training facilities, consideration should be given to monitoring and controlling both the air temperature (convective heat) and the radiant heat experienced by firefighters to limit the risk to their safety. Fire academies should ensure that temperature sensing instruments are available and working throughout the structure, and monitored during training evolutions.

Recommendation #4: Fire departments and training academies should have a written respiratory protection program and ensure that self-contained breathing apparatus (SCBAs) facepieces are properly inspected, used, and maintained.

Discussion: Based on a witness statement, the SCBA facepiece the victim had worn during this training had a heat damaged lens similar to the one shown in Photo 4. Facepieces on two additional SCBAs submitted by the Training Academy to NPPTL for testing also showed heat damage. Facepieces in this condition should be removed from service. The Fire Academy did not have a written respiratory protection program at the time of the incident. Anecdotal evidence based on inquiries directed to NIOSH over time tends to support the notion that heat damage to SCBAs occurs more frequently during training and flashover simulation situations than during fires in ordinary structures.¹ NFPA 1404, NFPA 1852 and OSHA 29 CFR 1910.134 all outline the requirements for a respiratory protection program.⁵⁻⁷ NFPA 1404 contains the minimum requirements for the training component of a respiratory protection program covered in NFPA 1500. NFPA 1852 contains general guidelines that all fire departments and training academies should follow to ensure that all in-service SCBAs are in good working order and will function properly when needed. OSHA 29 CFR 1910.134 contains requirements for respiratory protection programs including the selection, fit testing, use, maintenance, and medical screening.

Recommendation #5: Fire departments and training academies should have burn rooms with at least two exits.

Discussion: The purpose of the live fire training structure is to provide a location for safely training fire fighters in the methods of interior fire suppression. NFPA Standard 1402, Guide to Building Fire Service Training Centers states in Chapter 10.1.4 on Live Fire Training Structures that every burn room or compartment should have a minimum of two means of escape.⁴

Recommendation #6: Fire departments and training academies should avoid having basement burn rooms.

Discussion: NFPA Standard 1402, Guide to Building Fire Service Training Centers states in Chapter 10.1.5 that burn areas that are fully below grade are hazardous and should be avoided.⁴ For live fire training structures where a walk-out basement configuration is impractical, basement or cellar fires could be simulated at the ground floor. An exterior stair to a second-floor landing at an exterior second-floor door could be constructed; fire fighters could then enter at the second floor and simulate attacking below-grade fires by working down the interior stairs to the ground floor.



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Recommendation #7: Training academies should consider installing instrumentation within live fire training structures to record information such as heat, the effects of suppression and the byproducts of combustion.

Discussion: NFPA Standard 1402, Guide to Building Fire Service Training Centers, Chapter 10.3 suggests that instrumentation be installed within the burn structure to monitor temperatures in order to provide information to help keep the fire within safe parameters, to observe the effect of suppression and to record the byproducts of combustion.⁴ Thermocouples or other analyzing equipment could be used to measure heat within the training compartments. The thermocouples could be installed between protective linings and structural elements of the live fire training structure to monitor temperatures radiating through the lining system that could affect the structure. The system should be designed and installed by qualified personnel.

Recommendation #8: Training academies should consider installing a ventilation system within the burn structure.

Discussion: NFPA 1402 Guide to Building Fire Service Training Centers, Chapter 10.4.1 recommends a ventilation system capable of removing heat and smoke as a safeguard.⁴ If a ventilation system is installed, it should be sized to provide a minimum of one air change per minute in the training space and designed to withstand the high temperatures related to repetitive live fire training.

Recommendation #9: Training academies should consider having a qualified engineer evaluate fuel loads, heat retention, and the instrumentation and ventilation systems of live fire training facilities.

Discussion: NFPA 1403, Standard on Live Fire Training Evolutions, Chapter 6 Non-Gas-Fired Live Fire Training Center Structures, Section 6 Structures and Facilities states that training structures shall be inspected visually for damage prior to live fire training evolutions and that the structural integrity of the burn structure be evaluated and documented periodically by a licensed professional engineer with live fire training structure experience and expertise.³ During the structural integrity inspection the engineer should also evaluate fuel loads, heat retention, and the instrumentation and ventilation systems within burn structures.

REFERENCES

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3. NFPA [2007]. NFPA 1403, Standard on live fire training evolutions. Chapter 6 non-gas-fired live fire training center structures. Quincy, MA: National Fire Protection Association.
4. NFPA [2007]. NFPA 1402, Guide to building fire service training centers. Quincy, MA: National Fire Protection Association.
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7. OSHA [1998]. 29 CFR Part 1910.134, respiratory protection; Final Rule. US Department of Labor. Federal Register, Vol. 63, No. 5.

INVESTIGATOR INFORMATION

This incident was investigated by Steve Berardinelli, Occupational Safety and Health Specialist with the Fire Fighter Fatality Investigation and Prevention Team, Surveillance and Field Investigations Branch, Division of Safety Research, NIOSH located in Morgantown, WV. Technical reviews were provided by Dan Madrzykowski, National Institute of Standards and Technology and Deputy Chief William Goldfeder, Loveland-Symmes Fire Department and editor of <http://www.FireFighterCloseCalls.com>.

The results of the NIST fire experiments conducted within the Fire Academy basement burn room will be available in the future at www.fire.nist.gov.



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Photo 1. Residential Burn Building at Fire Academy Showing Incident Scene.



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**Photo 2. Burn Building D-Side Conditions during the Incident
(Photo Courtesy of Fire Academy)**



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Photo 3. Basement Burn Room after Incident.



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Photo 4. Another SCBA Facepiece Exhibiting Conditions Similar to the One Worn by the Victim



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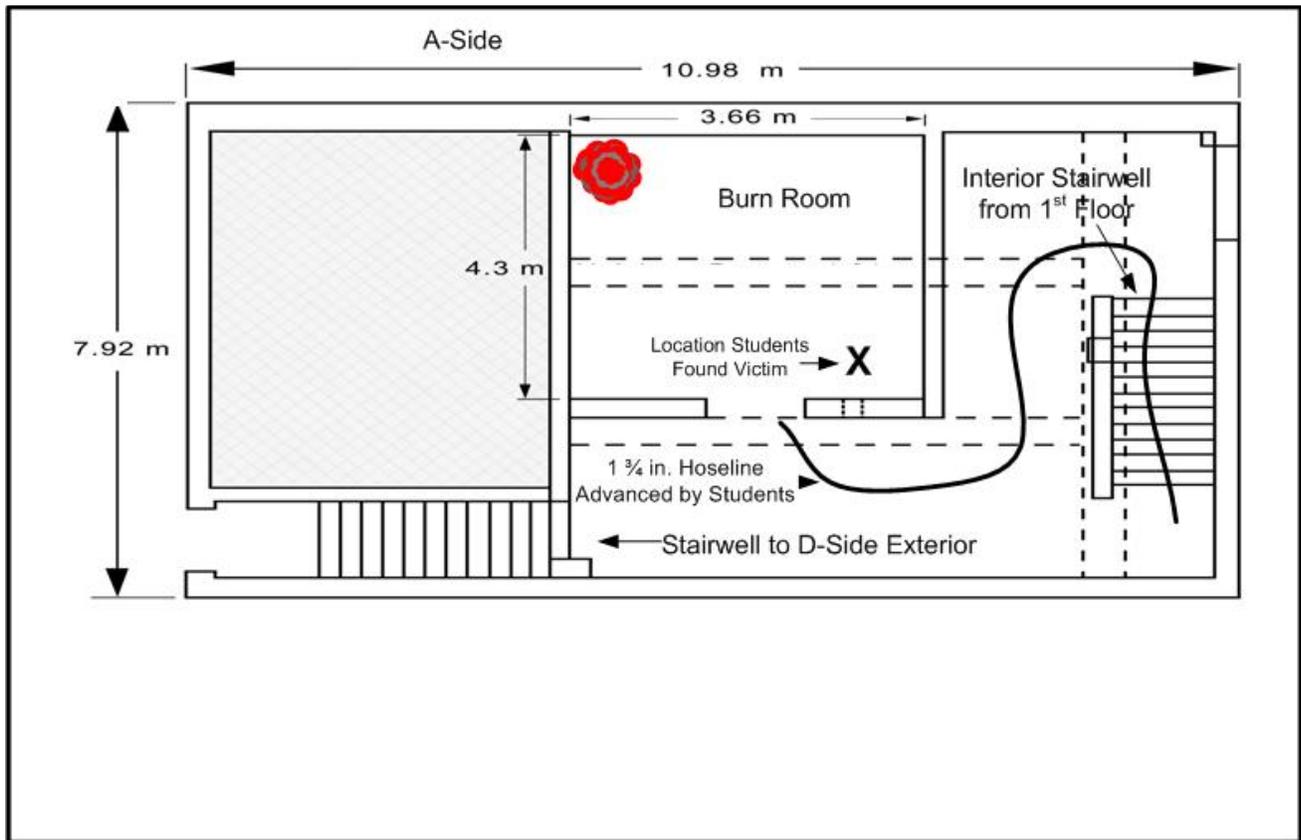


Diagram of Basement in Burn Building



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APPENDIX

Summary of Status Investigation Report NIOSH Task No. 14292

Background

As part of the *National Institute for Occupational Safety and Health (NIOSH) Fire Fighter Fatality Investigation and Prevention Program*, the Technology Evaluation Branch agreed to examine and evaluate three Scott 4500 psi, 30-minute, self-contained breathing apparatus (SCBA). The branch also agreed to photograph a set of protective clothing to document its condition, but any further analysis or evaluation of the clothing should be done by an entity with the appropriate experience and capability.

This SCBA status investigation was assigned NIOSH task number 14292. The submitter was advised that NIOSH would provide a written report of the inspections and any applicable test results.

Three complete respirators were provided. The SCBA designated as Unit #1 was the unit being worn by the victim of a fatal incident. It and the protective clothing worn by the victim were delivered to the NIOSH site in Bruceton, Pennsylvania on October 28, 2005. Two additional facepieces were received on November 10, 2005; these were reportedly from the stock of equipment in use at the same facility. On December 7, 2005, two sets of backframes, pneumatics, and cylinders were received. These were matched with the two facepieces and designated as Units #2 and #3. All of the equipment was taken to the Firefighter SCBA Evaluation Lab in building 108 and stored under lock until the time of the evaluation.

SCBA Inspection

The inspection of Unit #1 was performed on June 27, 2006. The SCBA was inspected by Vance Kochenderfer, Quality Assurance Specialist, of the Technology Evaluation Branch, National Personal Protective Technology Laboratory (NPPTL), NIOSH. The SCBA was examined, component by component, in the condition as received to determine its conformance to the NIOSH-approved configuration. Although a full inspection of Units #2 and #3 was not conducted, their facepieces were evaluated for the sake of comparison. The entire inspection process was videotaped. The SCBA were identified as the Scott Air-Pak Fifty 4.5 model.

The complete SCBA inspection is summarized in **Appendix I** of the full Status Investigation Report. The condition of each major component of Unit #1 and the facepieces of Units #2 and #3 was also photographed with a digital camera. Images of the SCBA are contained in **Appendix III** of the report.



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Unit #1 has been exposed to extreme levels of heat. The most prominent evidence of this is the facepiece lens, the center portion of which has melted and completely separated from the facepiece. Many other plastic, fabric, and elastomeric components of this unit show similarly extreme levels of heat damage. No performance testing of Unit #1 was possible. The facepieces of Units #2 and #3 also showed signs of exposure to high heat levels, although not to the same degree as Unit #1. Both facepieces were damaged to the point where they should be repaired or replaced, but it was determined that Units #2 and #3 could be safely tested.

Personal Alert Safety System (PASS) Device

A Personal Alert Safety System (PASS) device was incorporated into the pneumatics of Unit #1. Like other components of the SCBA, it has suffered severe thermal damage and is not functional.

SCBA Testing

The purpose of the testing was to determine the conformance of Units #2 and #3 to the approval performance requirements of Title 42, *Code of Federal Regulations*, Part 84 (42 CFR 84). Further testing was conducted to provide an indication of the SCBA's conformance to the National Fire Protection Association (NFPA) Air Flow Performance requirements of NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for the Fire Service*, 1997 Edition.

NIOSH SCBA Certification Tests (in accordance with the performance requirements of 42 CFR 84):

1. Positive Pressure Test [§ 84.70(a)(2)(ii)]
2. Rated Service Time Test (duration) [§ 84.95]
3. Static Pressure Test [§ 84.91(d)]
4. Gas Flow Test [§ 84.93]
5. Exhalation Resistance Test [§ 84.91(c)]
6. Remaining Service Life Indicator Test (low-air alarm) [§ 84.83(f)]

National Fire Protection Association (NFPA) Tests (in accordance with NFPA 1981, 1997 Edition):

7. Air Flow Performance Test [Chapter 5, 5-1.1]

Testing was conducted on July 21 and 25, 2006. All testing was videotaped with the exception of the Exhalation Resistance Test and Static Pressure Test. Both SCBA met the requirements of all tests, except that the bell alarm of Unit #2 activated at a higher pressure than that allowed during the



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Remaining Service Life Indicator Test. This would result in the user receiving an earlier-than-normal warning of cylinder exhaustion.

Appendix II of the full Status Investigation Report contains the complete NIOSH and NFPA test reports for the SCBA. **Tables One through Four** summarize the NIOSH and NFPA test results.

Protective Clothing

The condition of the victim's turnout coat, bunker pants, and protective hood were documented through a series of digital photographs. These appear in **Appendix III** of the full Status Investigation Report. An additional shirt which was worn underneath the turnout coat was included and appears in some of the photographs.

Summary and Conclusions

Three SCBA and a set of protective clothing were submitted to NIOSH for evaluation. The SCBA were identified as Scott Air-Pak 4.5 30-minute, 4500 psi, SCBA (NIOSH approval number TC-13F-76). Unit #1 was heavily damaged by heat and is unserviceable. The facepieces of Units #2 and #3 were less severely damaged and it was determined that these SCBA were in a condition safe for testing.

The two SCBA were subjected to a series of seven performance tests on July 21 and 26, 2006. The bell alarm of Unit #2 failed to meet the requirements of the Remaining Service Life Indicator Test; it activated at a higher pressure than that allowed during the test. This would result in the user receiving an earlier-than-normal warning of cylinder exhaustion. The SCBA met the requirements of all other tests.

As detailed in the analysis of **Appendix I**, these SCBA appear to have been exposed to levels of heat in excess of those encountered during normal firefighting operations. During fires in training facilities, consideration should be given to monitoring and controlling both the air temperature and the radiant heat experienced by firefighters to limit the risk to their safety.

In light of the information obtained during this investigation, NPPTL has proposed no further action regarding the approval status of this SCBA model at this time. Following inspection and testing, the SCBA were returned to the packages in which they were received. They were returned to the submitter on December 13, 2006.

If Units #2 and #3 are to be placed back in service, they should be repaired, inspected, and tested by a qualified service technician. The facepieces of both units should be repaired or replaced, and the bell alarm of Unit #2 adjusted to within the proper activation range.