

NEW JERSEY DIVISION OF FIRE SAFETY

Firefighter Fatality and Serious Injury Report Series

Deputy Fire Chief Dies While Attempting to Rescue Residents During a Structure Fire

**New Brunswick, New Jersey
September 3, 2004**

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**STATE OF NEW JERSEY
Jon S. Corzine, Governor**



**DEPARTMENT OF COMMUNITY AFFAIRS
Susan Bass Levin, Commissioner**



**DIVISION OF FIRE SAFETY
Lawrence Petrillo, Director**

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INTRODUCTION

The investigation of this incident was conducted by the New Jersey Division of Fire Safety / Office of the State Fire Marshal in conjunction with the New Jersey Department of Labor. This report was prepared in accordance with N.J.S.A. 52:27D – 25d, Duties of the Division. The purpose of these firefighter casualty investigations is to report the causes of serious firefighter injuries or deaths and identify those measures which may be required to prevent the future occurrence of deaths and serious injuries under similar circumstances. In some cases new information may be developed, or old lessons reinforced, in an effort to prevent similar events in the future.

Comments and/or inquiries concerning this report may be addressed to the address listed below:

New Jersey Department of
Community Affairs
Division of Fire Safety
101 South Broad Street
P.O. Box 809
Trenton, NJ 08625-0809

EXECUTIVE SUMMARY

On September 3, 2004 at 0304 hours, the New Brunswick Fire Department (Nbfd) responded to a reported house fire at 50 Lee Avenue. Deputy Chief (DC) James D'Heron was the first to arrive on scene, finding a small fire in the first floor hallway of the structure, with a propane tank in front of the fire. DC D'Heron immediately entered the structure to begin evacuating residents. Thereafter, as additional Nbfd units were arriving on scene, an explosion was heard and the hallway became heavily involved in fire. With the fire threatening the neighboring home which was only inches away, firefighters immediately deployed hoselines to attack the fire and protect the exposure structure. Personnel then realized that DC D'Heron was missing, as multiple attempts to contact him on the radio were to no avail.

After knocking down the fire in the hallway and stairway areas, firefighters ascended the interior stairway for additional fire suppression and search operations. Upon reaching the second floor landing, they located a body which was removed from the structure and soon realized to be that of DC D'Heron. At about this time, all initial Nbfd personnel were relieved of their duties and returned to Fire Headquarters. Additional operations were performed by the mutual aid companies, and the fire was completely extinguished without further incident.

The origin and cause investigation for this incident was conducted by the New Brunswick Division of Fire Safety. The fire was determined to be accidental in nature, caused by careless smoking which ignited combustible materials in the first floor hallway. This small fire quickly spread to a gasoline container and propane tanks which were located in the immediate vicinity, causing the sudden explosion that engulfed the hallway and stairway in flames.

In order to minimize the risk of similar incidents, the New Jersey Division of Fire Safety identified key issues that must be addressed and remedies that should be implemented within all departments.

1. **FACTOR:** Improper storage of gasoline inside the two family dwelling ignited by careless smoking caused the death of Deputy Chief D'Heron.

REMEDY: *The NJ State Fire Code does not regulate the storage of hazardous materials in one and two family dwellings. Fire departments should educate the citizens of their municipality through public education programs and print materials that gasoline, propane gas and other similar materials should never be stored inside of structures used for human occupancy. Additionally,*

firefighters need to be constantly vigilant when responding to fires and always expect the unexpected, especially in one and two family dwellings due to the lack of fire safety regulation of these types of occupancies.

2. **FACTOR:** DC D'Heron made a decision to enter the residence prior to the arrival of fire crews and without the benefit of personal protective equipment because he felt the risk to the occupants was so great as to not delay.

***REMEDY:** In only the most dire circumstances should actions of this type be undertaken. Under normal conditions, firefighters must wait for adequate personnel to arrive on scene and they must don their personal protective equipment prior to beginning fire scene operations.*

3. **FACTOR:** It is not known if DC D'Heron conducted a risk / benefit analysis prior to entering the structure. However, he most likely believed there was a significant risk to occupants if they were not evacuated immediately. Had he not acted it is likely that the occupants in the building would have been seriously injured or killed.

***REMEDY:** A risk / benefit analysis must be conducted by all firefighters on the fireground prior to conducting all operations; the risk of an action needs to be weighed against the probable benefit that may be reasonably and realistically expected. Further, the concept of risk / benefit analysis, although covered in Firefighter 1 courses, should be stressed to a greater degree in order to make a lasting impression on firefighter recruits.*

INVESTIGATION

Pursuant to New Jersey Incident Management System regulations, to provide for uniform identification of locations and operational forces within an incident scene, the scene is divided geographically into smaller parts which are designated as divisions. Specific areas of the incident scene are to be designated as follows:

- *Sides of incident scenes shall be identified as letters of the alphabet beginning with the letter "A."*
- *The side of the incident scene that bears the postal address of the location shall be designated as Division "A" by the Incident Commander. Where the incident scene has no postal address, the Incident Commander shall select any side to designate Division "A"*
- *Continuing in a clockwise rotation, the side adjacent to the Division "A" side shall be designated as Division "B."*
- *Continuing in a clockwise rotation, the side adjacent to the Division "B" side shall be designated as Division "C."*
- *Continuing in a clockwise rotation, the side adjacent to the Division "C" side shall be designated as Division "D."*
- *Floor levels shall be designated as Division "Basement" or "0"; "1"(ground level – not necessarily street level); "2", "3", and so on.*

The Incident

On September 3, 2004 at 0304 hours, the New Brunswick Fire Department (NBFD) responded to a reported house fire at 50 Lee Avenue. Initial response for the NBFD consisted of DC D'Heron (Car 21), Engine E-1, and Ladder L-1 from Fire Headquarters, as well as E-5 and E-2 from NBFD Substations. While still responding, the dispatcher advised DC D'Heron about the possibility of propane tanks being involved in the fire, and he acknowledged this information.

Deputy Chief (DC) James D'Heron was the first to arrive on scene, finding a small fire in the first floor hallway of the structure, with a propane tank next to the fire. He immediately entered the structure through the front door and went past the fire to begin evacuating residents on the first and second floors. Thereafter, as E-1 and L-1 were arriving on scene, an explosion was heard, with the hallway and stairway suddenly becoming heavily involved in fire. The fire was now venting from a second floor window at the stairway landing, threatening the neighboring home which was only inches away. Firefighters immediately deployed two 1-3/4" hoselines to directly attack the fire and protect the exposure structure.

At this time, personnel realized that DC D'Heron was missing, and multiple attempts to contact him on the radio were to no avail. Upon making entry into the structure, the hose crew knocked down the fire in the hallway and stairway areas and continued up the interior stairway for additional fire suppression and search operations. While this was occurring, the crew of L-1 observed a resident in a window on the second floor; they placed a ground ladder to this window to try to rescue him; however the resident then exited via the rear stairway. Other

firefighters went to the rear of the structure, where they assisted other residents down this stairway. It was soon found that all residents had successfully exited via this rear stairway during the initial stages of this incident, and it was found that they were alerted about the fire by the initial 9-1-1 caller and DC D'Heron upon his arrival.

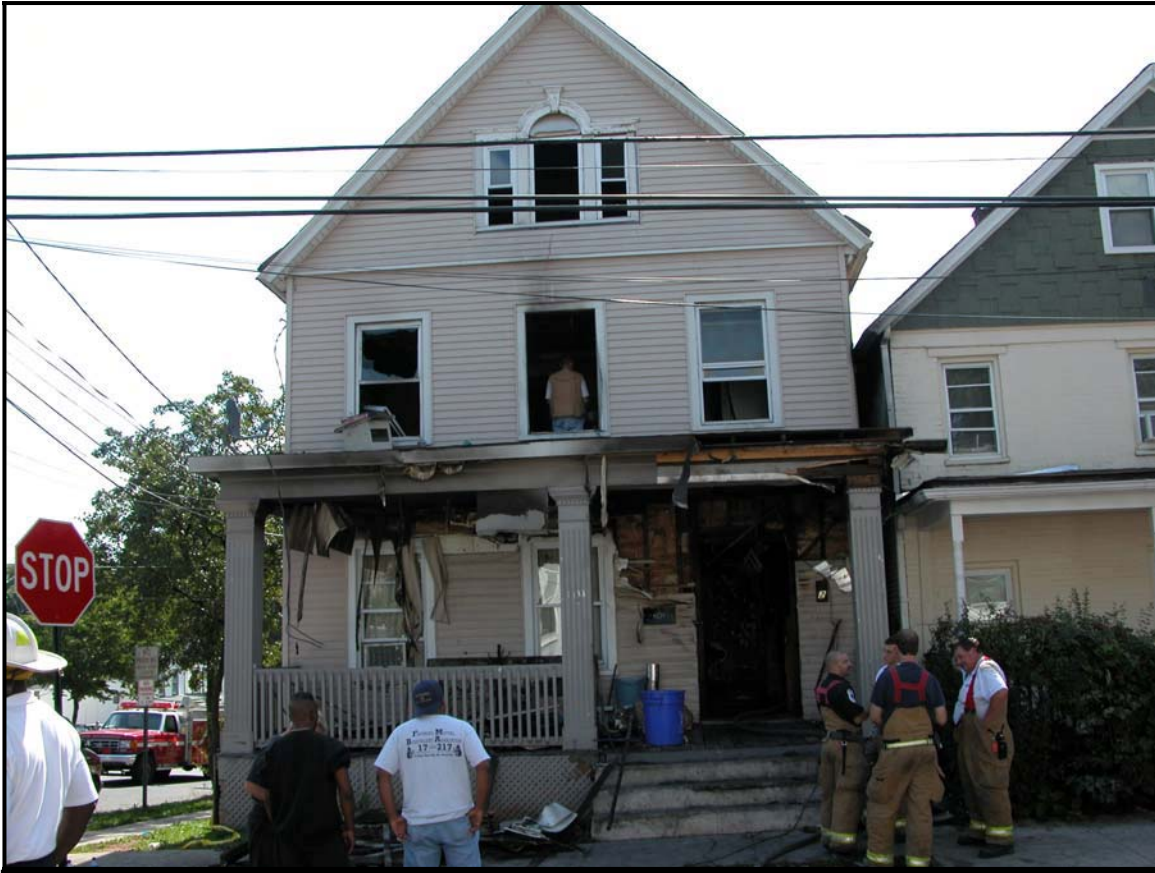


Figure 1 - 50 Lee Avenue

Upon reaching the second floor landing, firefighters began knocking down fire that had extended into the second floor apartment. Soon after, they located a body on this landing, which was immediately removed from the structure. It was realized that this body was that of DC D'Heron. Understanding that the discovery of DC DeHeron was very distressing for Nbfd personnel, the incident commander relieved the firefighters of their duties and had them return to Fire Headquarters. Additional operations were performed by the mutual aid companies, and the fire was fully suppressed without further incident.

The Casualty Scenario

Deputy Chief James D'Heron was a 52 year old member of the New Brunswick Fire Department with 24 years of firefighting experience. As a result of this incident, D'Heron suffered burns over a large percentage of his body and respiratory tract that caused his death after being enveloped in fire.

ANALYSIS

Initial Incident Information

It should be noted that the 9-1-1 caller stated that there was a fire at the corner of Suydam St. and Lee Ave. She reported that the fire was in the hallway of the structure, and there appeared to be a propane tank next to the fire. She further reported that she was yelling to alert the residents, but nobody was coming to the door. Following the initial dispatch, this information was relayed to DC D'Heron, who acknowledged the location of the fire and the propane storage. Soon after, the responding police officer reported that although he was in the area, he did not see any smoke; after crossing paths with DC D'Heron in Car 21, the officer continued down the street trying to locate the structure.

DC D'Heron arrived on scene and reported, "I've got a working fire in a hallway; a propane can stored right in front of this fire, number 50." Soonafter, he called to E-1 which was still responding, "Listen, I'm going up above this; we've got to get some people out of here." In his mirror, the police officer saw DC D'Heron stop and run into the structure at 50 Lee Ave. By the time he turned his patrol car around and stopped at the structure, he reported hearing an explosion with heavy fire conditions, and that there was a woman yelling that there were propane tanks in the structure. He also reported that as the fire apparatus arrived on scene, he noticed a group of people at the rear of the structure; upon reaching them, a woman stated to him that everyone was out of the structure.

What was not initially reported or known was that the small fire was a burning tablecloth or similar object, which covered a gasoline container and additional propane tanks, hiding them from the view of DC D'Heron. However, once the fire intensified upon reaching the gasoline container, it quickly compromised the propane tanks, causing the sudden explosion which engulfed the hallway and stairway in flames.

Personal Protective Equipment (PPE)

PPE is considered to be the full protective ensemble that a firefighter dons prior to commencing firefighting operations. It is designed to cover all exposed skin surfaces so as to protect them from the products of combustion, including smoke, heat, and direct flame. Included in this would also be a Self Contained Breathing Apparatus (SCBA) with face mask, protecting the lungs and face.

During this incident, it was found that although he was dressed in approved station-wear, DC D'Heron failed to don any of his PPE prior to entering the structure. Case studies and tests conducted by the National Institute of Science

and Technology (NIST) have shown that full PPE can offer up to 15 seconds of limited protection to a firefighter in a flashover situation prior to degrading, as it is not designed to resist such extreme temperatures. However, station-wear offers no such direct protection, and the above timeframe of protection has loose interpretations. Even by wearing full PPE, firefighters exposed to such extreme temperatures are likely to suffer severe and/or fatal burns due to the sheer amount of heat that gets transferred through the PPE onto the firefighter's body.

2-In / 2-Out Regulations

Regulations under 29CFR1910.134 place certain staffing requirements on firefighting operations, specifically as follows:

- *At least two employees enter the immediately dangerous to life or health (IDLH) atmosphere and remain in visual or voice contact with one another at all times;*
- *At least two employees are located outside the IDLH atmosphere; and*
- *Visual, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;*
- *The employees located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue;*
- *One of the two individuals located outside the IDLH atmosphere may be assigned to an additional role, such as incident commander in charge of the emergency or safety officer, so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any firefighter working at the incident.*

These regulations, known to firefighters as the “2-In / 2-Out Rule” are further referenced in NFPA Standard 1500, and Incident Management System (IMS) regulations under N.J.A.C. 5:75, which adopts NFPA Standard 1561.

As previously mentioned, DC D’Heron entered the structure alone prior to the arrival of additional NBFDF units. He was subsequently killed while in the process of conducting rescue operations by alerting residents about the fire and attempting to assist their safe egress.

Building Considerations

Building and occupancy characteristics can play a significant role in both fire spread and personnel safety during incidents. Given this incident, some characteristics specific to this structure that played a role in this incident are as follows:

- *Vagrancy* - It was determined that a “homeless” ex-resident of the structure had been using the interior hallway for shelter at night. It was this man who admitted to carelessly smoking which caused the fire; he left the structure prior to the fire being reported.
- *Improper storage* - There was a grill, propane tanks, and a gasoline container kept in the interior hallway of the structure. However, only one propane tank

was readily visible by DC D'Heron; the other items were covered by the burning "tablecloth".

- *Stairways* - This structure had an open interior stairway which allowed for the unimpeded upward movement of heat, smoke, and fire. However, it also had a rear stairway which allowed for the safe egress of the residents; this was never noted by DC D'Heron as no 360° size-up was performed.
- *High occupancy* – Although this structure was given a "Certificate of Occupancy" as a two family dwelling, it was found that up to 21 people were residing in the structure at the time of the fire.

Critical Incident Stress Debriefing (CISD) Team Use

The purpose of a CISD Team is to provide individual counseling, group sessions and, if necessary, referrals to members of an emergency response organization involved in traumatic events. These events include death or serious injury of a co-worker, multiple deaths, or the death of a child. The teams are made up of specially trained fire, police and EMS personnel, along with mental health professionals who provide training and guidance to the team members and assist at the debriefing sessions. The assistance provided by the CISD Team helps to sensitize the firefighters to the possibility of stress reactions, hopefully avoiding future stress related problems. It allows the members to understand the range of normal reactions and provides a method to deal with the incident and its after-effects. CISD Teams are regionalized in New Jersey and are part of a statewide network.

Public Employees Occupational Safety & Health (PEOSH) Inspections

Following this incident, an investigation was performed by the NJ Department of Labor and Workforce Development (NJ DOLWD) PEOSHA Unit. No violations were cited with respect to this incident.

LESSONS LEARNED

Utilizing Scene Size-Up to Perform Risk / Benefit Analysis for Determining Operations

The basic principle for firefighting is that human life must take precedence over all other concerns. A risk / benefit analysis must be conducted by all firefighters on the fireground prior to conducting all operations; the risk of an action needs to be weighed against the probable benefit that may be reasonably and realistically expected. In this case it cannot be known conclusively if DC D'Heron conducted a risk / benefit analysis prior to entering the structure. However, it can reasonably be assumed that he believed there was a significant risk to occupants if they were not evacuated immediately. DC D'Heron's belief in this respect was most likely based upon the dispatch information he received and scene conditions when he arrived. This assumption, if it was made by D'Heron, turned out to be correct as events confirmed.

Notwithstanding DC D'Heron's actions in saving several occupants' lives, firefighters should under normal circumstances conduct operations in such a way as to protect their safety as much as possible and as conditions permit by taking into consideration the information they obtain from dispatch, occupants and visual observations upon arrival at the scene.

The concept of risk / benefit analysis which is covered in Firefighter 1 courses, should be stressed to a greater degree in order to make a lasting impression on firefighter recruits. Further, advanced training for firefighters should stress the importance of conducting risk / benefit analysis during firefighting operations.

Personal Protective Equipment

Regulations under N.J.A.C. 12-100-10 mandate that interior structural firefighters wear a full ensemble of protective clothing compliant with all applicable NFPA standards. For career firefighters, this protective ensemble must be worn in conjunction with a station / work uniform constructed of approved, non-meltable materials. Additionally, NFPA Standard 1975 states that these *station / work uniforms are not protective garments or primary protective garments and cannot be relied upon to provide protection from specific hazards, such as those encountered during structural or wildland firefighting.* Furthermore, NFPA standard 1500 requires that *members who engage in or are exposed to the hazards of structural firefighting shall be provided with and use a protective ensemble."*

Firefighters should always don their protective equipment prior to commencing fireground operations. It has to be noted that if DC D'Heron had taken the time to don his equipment, the building conditions most likely would have deteriorated prior to his entry which may have altered his decision to enter, thus saving his life. However, had this been the case, there is a good possibility that some or all of the occupants may have perished.

2-In / 2-Out Regulations

Despite entering the structure prior to the arrival of additional NBFD units, it should be noted that the initial actions of DC D'Heron did not violate the provisions of these aforementioned regulations, as there is a specific exemption to the "2-In / 2-Out Rule". This exemption states that if *initial attack personnel find an imminent life-threatening situation where immediate action could prevent the loss of life or serious injury, such action (rescue) shall be permitted with less than 4 personnel*. However, this exemption pertains to rescue situations only, and is in no way meant to be endorsed as accepted practice for firefighting. Under all but the most dire situations, firefighters must wait until adequate staffing is in place before commencing operations.

Building Considerations

Fires that occur in one and two family residences can be some of the most hazardous for firefighters to battle, as these structures do not possess the same life safety or construction design features as commercial structures, nor are they subject to any regular fire safety inspections after initial occupancy. It is for this reason that firefighters must anticipate a wide range of dangerous conditions in private residences including hazardous materials storage, shoddy construction/alterations and high numbers of occupants. It is critical that firefighters avoid complacency when responding to fires in such occupancies.

Characteristics of Propane

Propane, otherwise known as liquefied petroleum gas (LPG) is commonly found in or around both residential and commercial structures. However, firefighters must not become complacent when dealing with emergency situations involving propane, as it can become an extremely dangerous substance due to its physical characteristics.

Propane is in liquid form when inside of a container such as the common 20-lb. barbeque grill tank (it turns into a gas once it is released into the atmosphere). As the temperature of the tank increases, the LPG at the bottom of the tank will expand, raising the vapor pressure above it. Typically, a relief valve will allow

this excess pressure to vent; however, this also expels the flammable propane gas which can pose an ignition hazard. If this does not occur, the pressure can continue to build until the tank itself fails.

A Boiling Liquid Expanding Vapor Explosion (BLEVE) describes the failure of a container holding a liquefied gas at temperatures well above its boiling point. Typically, the liquid inside the container will absorb the increased heat until it reaches its boiling point. The boiling liquid increases pressure inside the container; all heat applied above the liquid level will eventually weaken the metal walls of the container. This weakening, combined with the increased pressure will cause a crack in the container, instantly releasing the gas which typically flashes as an intense fireball combined with fragmentation of the metal container.

Additional characteristics of LPG which make it dangerous for firefighters include:

- A boiling point of -44°F
- Flash point of -156°F
- Specific gravity of 1.5 (heavier than air) at 60°F
- Expansion ratio from liquid to gas in air of 1:270
- Flammability limits in air by volume: 2.15% (lower) & 9.6% (upper)
- Auto ignition temperature of 842°F
- A leak with no fire poses an asphyxiation hazard in confined areas

When sizing-up risks at incidents involving LPG, keeping track of times and key events is critical. It is important that the incident commander acquire the following information during the size-up process:

- Time the incident started. Remember, this may not necessarily be the same time the incident was reported.
- The time between when the leak or fire started and the time the emergency responders arrive on scene. This will give an idea as to how much gas has been released or how much pressure has built up in a non-leaking container.
- Layout of the incident scene. Factors such as exposures, terrain, potential sources of ignition need to be evaluated.
- Water supply requirements and resources.
- The size of the area affected by a potential vapor release and the probability that the problem will be confined to its present size.
- Factors involving evacuation issues such as population centers, schools, hospitals etc.
- Estimated time of arrival of personnel and equipment from the LPG provider.

Regulations in Chapter 36 of the NJ State Fire Code govern the storage, use, and handling of LPG. However, these regulations can not be enforced upon one and two family dwellings.

Critical Incident Stress Debriefing (CISD)

It must be remembered that the use of a CISD Team in situations such as this is not a sign of weakness on the part of emergency personnel. Failure to deal completely with the emotional stress of such a traumatic occurrence can negatively affect both the professional and personal lives of those involved.

The notification and use of CISD teams is recommended whenever CISD “trigger events” are found to be present. Such significant events may include:

- *line of duty death of a co-worker*
- *mass casualty incidents*
- *death of a child*
- *death occurring after prolonged rescue efforts*
- *when a victim reminds an emergency worker of a loved one*
- *during highly dangerous or highly visible events*
- *when the emergency worker influences death or injury*
- *co-worker suicides*
- *any other unspecified highly traumatic event*

Currently, there are many CISD teams throughout the state, most of which are made up of other public safety individuals. These teams will respond on a 24-hour basis whenever requested. Emergency contact numbers for activation of a CISD team are as follows:

The Statewide CISD Network – (609) 394-3600

The NJ Fire & EMS Lifeline – (866) 653-3367

CONCLUSION

This incident resulted in the death of a veteran Deputy Chief who by all accounts was the type of person who typically went above and beyond the call of duty. DC D'Heron made a decision to put himself in harm's way in order to protect the lives of the occupants of 50 Lee Avenue in New Brunswick. He entered the building without benefit of other firefighters and his personal protective equipment. As a result of his actions he played a significant role in saving the lives of 21 occupants.

The fire that was started by careless smoking was fueled by the improper storage of gasoline and propane inside the dwelling. This lethal combination of events and circumstances posed an extreme risk to the dwelling's occupants. DC D'Heron recognized this fact and took immediate action.

While normal circumstances would not dictate actions on the fireground to be conducted in this manner, DC D'Heron felt that the risk to the occupants outweighed his personal risk. In the end, his intuition was correct. Had he not acted in such an expedient manner, it is quite likely that some or possibly all of the occupants in the building would have been seriously injured or killed.

It has been (appropriately) said that courage comes from a reserve of mind more powerful than outside circumstances. Deputy Chief James D'Heron lived and died by that axiom. Nothing said or done from this point forward can ever detract from his noble service and ultimate sacrifice rendered in the line of duty. Having said that, it is nonetheless incumbent upon this investigative body to take from this tragic loss of life, the lesson or lessons which might serve to protect those who continue the work of brave souls like D'Heron in the fire protection service.

Among those lessons we must include:

- **Incident Assessment:** It is difficult, if not impossible to control certain factors found at the scene of an incident. Recognition and awareness of limiting/controlling factors are critical.
- **Proper Risk/Benefit Management:** The concept of *high risk* to save life when the objective is deemed obtainable, *moderate risk* to save property, minimal or *no risk* where there is nothing of value to save.
- **Use of Full Protective Gear:** There can be no doubt that the proper use of personal protective gear will greatly reduce the risk of serious injury or death to a firefighter exposed to the untenable conditions encountered during interior operations at a structure fire. Firefighters are encouraged to utilize full protective gear to *every extent possible* during interior operations or in the presence of other hazardous environments.

REFERENCES

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29CFR1910.134 – “PEOSHA Respiratory Protection Standard”, as enforced by the NJ Department of Health.

The following NFPA Standards:

- NFPA Standard 58 – “Liquified Petroleum Gas (LPG) Code”: 2001 edition.
- NFPA Standard 1500 – “Fire Department Occupational Safety and Health Program”: 1997 edition.
- NFPA Standard 1971 – “Protective Ensemble for Structural Firefighting”: 2000 edition.
- NFPA Standard 1975 – “Station / Work Uniforms for Fire and Emergency Services”: 1999 edition.

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