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TESTIMONY OF THE INTERNATIONAL ASSOCIATION
OF FIRE FIGHTERS, AFL-CIO, CLC

on

FIRE FIGHTERS SELF-CONTAINED RESPIRATORY PROTECTION

by

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Before

The National Institute of Occupational Safety and Health
and
The Mining Enforcement and Safety Administration

Public Hearings
on Respirator Testing and Approval

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I am Michael J. Smith, Assistant Director of Research for the International Association of Fire Fighters, and I am here this day to present to you some of our concerns, views, and problems associated with self-contained respiratory protective devices.

Prior to doing this, however, I believe it is important that you briefly understand what our organization is and who we represent at these hearings.

The International Association of Fire Fighters is an International Union affiliated with the AFL-CIO and the Canadian Labor Congress. We have been in existence since 1918 and our headquarter's office is located at 1750 New York Avenue, N.W., Washington, D.C.

At the present time we represent approximately 185,000 paid professional fire service employees in the United States and Canada. This total membership figure represents approximately 75% of the paid professional fire service in the United States and 95% in Canada. The membership of the IAFF is employed by various employers which include: the federal government, states, counties, municipalities, fire districts, airports, industrial manufacturers, amusement parks, etc.

The IAFF has been actively involved in fire fighters safety and health problems for the last twenty-five years. Each year we conduct an annual death and injury survey with the cooperation and participation of various fire department administrators. Over the last several years this survey has indicated that fire fighting is the most hazardous occupation in the United States. We have just concluded

tabulation of the Fire Fighter Death and Injury Data for 1976 and have released same and I believe it is appropriate to cite some of this information.

A total of 158 fire fighters lost their lives in on-the-job accidents or from occupational diseases in 1976.

There were 79 deaths of fire fighters in the line of duty last year. This averaged out to 70 on-the-job deaths per 100,000 fire fighters, constituting a 22 per cent decrease over 1975. Even with this decrease the fire fighters remain ahead of all other occupational death rates making fire fighting the most hazardous type of employment.

Over the last ten years fire fighters have suffered an average of 88 deaths per 100,000 compared to 58 deaths for every 100,000 policemen.

There was a decrease in deaths from occupational diseases with 88 men dying in 1975 and 79 in 1976. Of these 79, 66 percent died from heart disease, 24 percent from lung disease and the remaining from other ailments.

The vast majority of reported injuries--35,971--were sustained at the scene of a fire. The rest came while responding to or returning from alarms, during training, at the fire station, or from other work related causes. A total of 1,053 fire fighters suffered on-the-job injuries serious enough to force them to seek retirement.

Of those injuries suffered at the scene of a fire, 32.7 percent were sprains and strains; 17.6 percent, cuts; 11.5 percent, inhalation of toxic gases; 9.4 percent, burns; 3.6 percent over-exertion; 2.3 percent, heat exhaustion; 2.4 percent, broken bones; and 20.5 percent, other.

There was a slight increase in the injury ratio from 43 per 100 in 1975 to 44.2 per 100 in 1976. There was still almost one injury for every two fire fighters in 1976. Some other significant findings of the survey include:

- a. There were 7,146 injuries sustained at fire stations last year.
- b. 1,777 fire fighters sustained injuries while in training.
- c. Injuries sustained going to and returning from a fire totaled 2,862.
- d. False alarm related injuries totaled 212.
- e. 158 fire fighters were injured by acts of individual violence (harassment).
- f. The number of fire fighters forced to change occupations or retire because of occupational disease was 673.
- g. Of these, 431 had heart disease, 152 had lung disease, and the remainder suffered from other ailments.

I think it is important to highlight the fact that heart and lung disease is one of the largest problems with which todays fire fighter is confronted. We believe, as many others do, that these diseases are job connected. Some thirty-seven (37) states in the U.S. concur with our feelings and have legislation now in effect on this matter. The majority of this legislation "automatically presumes" that if a fire fighter contracts heart or lung disease that this has occurred due to his profession. Various scientific and medical experts have also come to this same conclusion. In a study conducted by the Harvard School of Public Health, Doctors Peters and Sidor noted in their report entitled "Prevalence Rates of Chronic Non-Specific Respiratory Disease in Fire Fighters" that;

"Although selection factors may result in a population of fire fighters who have less chronic non-specific respiratory

disease than the general population, excess respiratory disease is associated with the occupation of fire fighting."

For our purposes here today, we will not go into great detail on the research conducted in this area. However, if the sponsoring agencies would like further information, we would be most happy to provide this information at a later time.

When discussing the adequacy or effectiveness of self-contained respiratory protective devices for the fire service and accompanying rules and regulations, one must consider the appropriateness of the device in terms of the environment in which it is expected to function, as well as the protection needed to provide the user with a safe and healthy environment.

Because of the vastly changing fire load it is almost impossible to ascertain with any certainty exactly what a fire fighter will be exposed to from incident to incident. Consequently, fire service personnel are exposed to a host of toxic substances, mists, and fumes which can have immediate, short term, or long term health consequences. This can be best exemplified by one of the cases the IAFF investigated while conducting a detailed analysis of fire fighter mortalities on a research grant issued by the National Bureau of Standards and the National Fire Prevention and Control Administration. For your information I will read this case as listed in the final Research Report entitled "Fire Fighter Mortality Report".

"VICTIM(S) - A 30 year old fire fighter with five years total service, assigned to the ambulance/rescue squad.

- A 27 year old volunteer fire fighter with seven years total service, the last two served in this particular department, assigned to the ambulance/rescue squad.

SETTING - This fatal accident occurred in late June at approximately 3:00 p.m. The fire department that responded to this accident was part fulltime/part volunteer with one man of each responding to the accident in the rescue/ambulance unit. The accident scene was at a rendering plant and occurred in a basement below the scale area. Sludge (80% water, 20% hide, meat and fat) regularly drained into this basement and was then pumped by a float activated sump pump to a skimmer tank on the ground floor, and the fat and materials are skimmed from the water which is then pumped into the sewer.

SEQUENCE - Throughout the day the sludge built up, and in the afternoon an employee entered the basement and unplugged the sump pump so that the material could be pumped to the skimmer. When he left the basement the sludge level was approximately one foot. After 15 minutes, when it appeared that the skimmer was going to overflow, the employee again entered the basement and closed off the pump. As he was leaving, he climbed two stairs, collapsed and fell back into the sludge which was at this time around the three foot level. Three employees were sent to the basement to assist the man and when they got to the foot of the stairs they all collapsed also.

Meanwhile the Fire Department had been called reporting that a man had fallen down the stairs and they responded with

their rescue/ambulance unit. Prior to their arrival the plant supervisor descended to the middle of the basement stairway and observed one of the men at the bottom of the stairs in convulsions. He immediately left, shut off all electricity and reported to the two responding fire fighters that he thought the men had been electrocuted. They checked to be sure the electricity was off and then entered the basement. When the first fire fighter reached the bottom of the stairs he leaned over to grab the shoulder of one of the men, who was partially submerged in the sludge. As he did this he immediately collapsed and fell over the man. His partner thought that he had slipped so he leaned over to grab him and also collapsed. The plant supervisor immediately put another call in to the Fire Department and they responded with all available manpower.

In rescuing the six downed men (two fire fighters, four industrial workers) all of the fire fighters wore breathing apparatus. The rescue operations were hampered by the fact that the sludge made the men extremely slippery and ropes were needed to pull the men out. The two fire fighters were the first taken from the basement. One died en route to the hospital and the other died several days later, never regaining consciousness. The four industrial workers were all pronounced dead on the scene. The toxic fumes that the sludge created and which caused the fatalities, are believed to be methane and carbon monoxide.

It should be noted, before they pulled the last of the six men out a mutual aid call was made and the total manpower on the scene was over 70 men. The vast majority of these men were treated for dizziness, faintness, shortness of breath, chest heaviness, coughing, choking, nausea, vomiting and ocular irritation."

The points we would like to emphasize with this tragedy are:

First, the rescue personnel had no idea as to what kind of environment they were entering.

Second, these men were not provided with respiratory protective devices.

And third, the demand breathing apparatus used by the second alarm personnel was also not adequate for this environment.

Very little work has been done on the fire fighter's environment. However, the Harvard School of Public Health has just released data on maximum exposures which were found when monitoring a few Boston fire fighters from some seventy fire runs. It should be noted that the following contaminants exceeded the short term exposure limit.

<u>Contaminant</u>	<u>Concentration, PPM</u>	
	<u>Maximum Noted</u>	<u>STEL</u>
Hydrogen Chloride	371 PPM	5
Acrolein	98 PPM	0.3
Formaldehyde	2,130 PPM	2
Carbon Monoxide	4,800 PPM	400

Based upon this information and the reports we receive from the field, we recommend to NIOSH and MESA that all self-contained breathing apparatus be positive pressure.

Another area of concern to us is the extreme of temperatures in which fire fighters must function. Fire fighters are called upon to perform their functions in conditions which can fluctuate from -50°F to at least 500°F, which has been documented in the New York City Grumman Study. The current regulations do not require that this equipment be tested to these thermal loads. We believe NIOSH must develop testing procedures which will assure, as much as possible, that the SCBA will adequately function in these extremes.

Since fire fighting requires the use of large amounts of water and on various occasions specialized extinguishing agents, we believe NIOSH should be setting requirements on corrosion. Recent reports from our Miami, Florida affiliate have indicated that this Department has been experiencing corrosion problems in their regulators. We believe this warrants indepth research which would culminate with the development of specific corrosion criteria for this standard. Similarly, we have been informed by one of our affiliates that they have experienced regulator failure in two SCBA when functioning in high expansion Jet-Ax foam. This problem must be looked at and, if necessary, criteria should also be established within this standard.

We were very pleased to hear that NIOSH has addressed the problem of interchangeability of SCBA bottles. We wholeheartedly endorse interchangeability as long as we can be assured it will not compromise fire fighters safety. We look forward to hearing NIOSH's decision on this matter. Also, we encourage NIOSH to begin looking into the

interchangeability of SCBA component parts. We, in the fire service, could in my opinion experience a greater usage of SCBA and at the same time add some competition to a somewhat dominated industry. We would, however, first request that NIOSH conduct a research program on the subject of SCBA interchangeability which would lead to development of criteria for universal interchangeability.

In the last year we have heard a great deal of discussion concerning Buddy Breathing Systems. Since these systems are considered accessories to SCBA, it is our understanding that NIOSH will not approve these devices. The IAFF at this particular time cannot support nor reject the concept of these devices since it does not have the technical research to make an intelligent decision on this matter. We do feel, however, that these systems do warrant further investigation and encourage NIOSH to look into this matter.

We believe the time has come that a separate standard for fire fighters SCBA should be developed. Many changes in SCBA must be made if NIOSH is going to provide the fire service with an effective and meaningful standard. If the work we and others propose to be done is completed, this standard would have to be opened up several times. We feel there is no need to burden other employees with requirements unique only to the fire service, as well as their associated costs. The fire fighters are, without a doubt, in a very unique occupation whose safety and health problems boggle the mind at times. We do not think their problems will receive adequate attention by being grouped in with other employees with less severe requirements for SCBA.

In conclusion, I would like to make one final point. If NIOSH is going to have an effective certification and testing program, we feel more qualified personnel must be employed and an inhouse research capability must be developed. To date, due to hiring freezes, budget juggling, etc. we believe NIOSH hasnot given fire fighters safety and health issues adequate priority. We hope this will be alleviated in the future and the IAFF stands ready to assist in any way possible.

Thank you,