SUBMISSION TO THE SENATE EDUCATION, EMPLOYMENT AND WORKPLACE RELATIONS COMMITTEE

ON THE SAFETY, REHABILITATION AND COMPENSATION AMENDMENT (FAIR PROTECTION FOR FIREFIGHTERS) BILL 2011

PHILIP TAYLOR

Introduction

1. My name is Philip John Taylor and I have been employed by the MFB since 1979 and currently hold the classification of Commander of Operations.

2. I also have extensive involvement in the development and evolution of firefighters personal protective fire-fighting equipment.

3. In facilitating the above I hold the following qualifications:

   Diploma of Occupational Health and Safety
   Diploma of Project Management
   Advanced Diploma of Public Safety (Fire-fighting Management)
   Associate Diploma of Applied Science (Fire Technology)

4. As part of my duties as UFU OHS Coordinator (UFU Branch) I was a member of Australian Standards Committee SF-049 that oversees the development of fire-fighters protective clothing and equipment from 1999 until 2010.

5. I attach for your information my curriculum vitae.

Firefighting

6. Fire-fighting is an extremely hostile environment where unlike other workplaces, the working environment is uncontrolled and the hazards cannot be eliminated.

7. For example, a normal structure fire involving a single premises, firefighters can be exposed to temperatures up to 1000 degrees Celsius in performing their duties of rescue and suppression.

8. The toxic environments created during structural fires due to generation of by products of combustion are well documented. Research has consistently proven that a normal structure fire generates large volumes of smoke and other by products including a multitude of toxic chemicals such as benzene, formaldehyde, and PAH's.

9. Many of these chemicals are known or suspected carcinogens as classified by the International Agency on Cancer (IARC).

Background

10. I have been asked to comment on whether the provision of contemporary personal protective clothing ("PPC") and equipment to fire-fighters delivers a level of protection that means that the potential risk of developing work related cancer from fire-ground exposures would be avoidable.

11. Although contemporary fire-fighter's PPC provides much improved protection for fire-fighters, personal protective clothing and equipment is the least preferred risk control method. In addition, all of the Standards referenced for fire-fighter's PPC specify that the level of protection provided by clothing and equipment is limited. In other words there is a limit to the level of protection that can be provided to firefighters by PPC due to the inherent nature of the work they perform.

12. Firefighter protective clothing essentially involves 5 levels which are as follows:

    A Station wear
    B Structural fire-fighting ensemble
    C Wildland fire-fighting ensemble
    D Splash suits
    E Fully encapsulated protective suits

13. The majority of operational activities that an urban fire service firefighter undertakes during his or her career are structural and non-structural fire-fighting. Car fires are referred to as non-structure fires, however, the toxic chemicals that a car fire produces are as dangerous if not more toxic than structure fires as the majority of the components are fabricated from plastic.

14. Occupational Health and Safety legislation across Australia imposes a duty of care upon employers to provide employees with a working environment that is safe and without risks to health. Generally, employers are required to undertake risk assessments of all the hazards in the employees workplace/s and implement controls, where reasonably practicable, that are designed to mitigate the risks arising from those hazards.

15. Workplace hazards should be mitigated in a prescribed order utilizing a process known in the occupational health and safety industry as the "Hierarchy of Controls".

    Hierarchy of Controls

    - Eliminate
    - Substitute
    - Isolate
    - Engineering Controls
    - Administrative
    - Personal Protective Clothing

14. The key principle of the hierarchy of controls is that the best solution is to try and eliminate the hazard at the source. However, elimination of the hazard may not always be possible or reasonably practicable. In fact the elimination of hazards at the source for fire-fighters during structural fire-fighting is impossible.

15. As you go down the list of options, the controls become less reliable, more costly and require more work to ensure they are maintained. In many situations, the method for controlling the risk is often a combination of control methods within the hierarchy.

16. Fire-fighters are required to respond to emergency situations in the community that they and their employers know have a range of hazards that are not controlled. In fact, it is a major role of the emergency services to establish control of emergency incidents whilst protecting life, property and the environment. Accordingly, fire services utilise a range of risk control combinations to make the fire-fighters workplace as safe as is reasonably practicable given the intrinsically dangerous tasks that they are required to undertake. However with structure fires this does not eliminate the risk involved due to toxic exposure.

17. Fire-fighters are routinely exposed to multiple exposures to chemical, biological and other health hazards in their workplace including the products of combustion. Australian fire services generally try to eliminate hazards and where this is not possible they utilise multiple control strategies designed to reduce the risks. Control methods might include modern, well maintained fire-fighting equipment (engineering controls), safe operating procedures and training (administrative controls) and personal protective clothing and equipment.

Fire-fighter Personal Protective Clothing

18. The uncontrolled and dangerous nature of incidents where fire-fighters operate place a much higher reliance upon the lowest level of risk treatment within the control hierarchy; personal protective clothing and equipment. Australian fire services issue personal protective clothing and equipment to fire-fighters depending upon the risks within their area of operations; including protective garments, footwear, gloves, flash hoods and helmets.

19. Respiratory protection or breathing apparatus, chemical splash suits and fully encapsulated chemical resistant suits are also generally available for use by fire-fighters. Fire-fighters are exposed to chemicals at structure fires such as buildings, petro-chemical facilities, non-structure fires such as cars, trains, vessels, buses & trucks, grass & bush fires and hazardous material incidents such as chemical leaks and spills. Fire-fighter protective clothing is designed to provide limited protection against the particular hazards encountered at fires and hazardous material incidents.

Structural fire-fighting protective clothing

20. AS/NZS 4967:2009 specifies the minimum design and performance requirements for clothing designed to provide fire-fighting personnel with limited protection from thermal, physical and environment hazards encountered during structural fire-fighting operations. Most Australian fire services issue multi-layer structural clothing that is either certified to or may be compliant with AS/NZS 4967 or the European standard EN 469:2006.

21. Even if fire services provide structural fire-fighting protective clothing above the minimum standard it still would not eliminate the risk of exposure during structural fire-fighting and other operations. In short, it is not a sealed garment that would isolate the fire-fighter from the environment where they are performing fire-fighting operations.

22. Certification provides an assurance to fire-fighters that the garments they are wearing fully conform to the requirements specified in the Standard. To maintain this assurance over time, the certification process also includes annual auditing of manufacturing processes, quality control systems, test reports, batch testing requirements and technical/specification document control.

23. Some Australian fire services also specify the inclusion of a moisture barrier in the design of their structural fire-fighting garments. The main purpose of the moisture barrier is to keep

the thermal protective properties of the system intact by preventing water and common fire-ground chemicals from penetrating into the garment. Some barriers are also designed to provide a level of protection from blood and body fluids. The most effective moisture barriers are breathable and allow the release of excess metabolic heat and moisture generated by fire-fighters, which if not managed correctly can lead to heat stress.

25. Whilst structural fire-fighting garments, even those incorporating moisture barriers, may provide some level of exposure reduction, no structural fire-fighting clothing standards in Australia, Europe or North America result in garments that provide full protection against toxic liquid or vaporous fire-ground chemicals. The design of structural fire-fighting clothing allows for the circulation and exchange of air through the garment to assist in the management of the high metabolic heat that is generated when working in the gear, therefore the risk of some skin exposure to fire-ground contaminants at structure fires is almost certain.

Wildland protective clothing

26. AS/NZS 4824:2006 specifies the minimum design and performance requirements for protective clothing designed for use for extended periods during wildland fire fighting and associated activities. Wildland fire-fighting involves work primarily in summer temperatures, for many hours in which the fire-fighter may develop high levels of metabolic heat.

27. Consequently, the protective clothing should be light, flexible and commensurate with the risks to which the fire-fighter may be exposed in order to be effective without introducing heat stress to the wearer. Wildland clothing construction is normally single layer fire resistant fabric and does not provide protection against chemical, biological, electrical or radiation hazards.

Self contained breathing apparatus

28. AS/NZS 1716:2003 specifies the requirements for respiratory protective devices (respirators) intended to provide, according to type, varying degrees of protection against atmospheres containing substances which may be harmful if breathed; also, with certain types, to provide protection against atmospheres which may be deficient in oxygen. Self contained breathing apparatus (SCBA) is designed to prevent entry of products of combustion and chemicals into the lungs and eyes.

Disposable Face Masks

29. FFP2 NR disposable particulate respirators are approved for use against solid and liquid aerosols according to EN 149:2001+A1:2009. They are suitable to protect against low-to-average toxicity harmful materials.

30. FFP2 NR respirators can provide protection against solid and liquid aerosols and smoke containing materials such as: calcium carbonate, china clay, cement, cellulose, sulphur, cotton, flour, carbon, ferrous metals, hardwood, silicon, plastic, vegetable oils and mineral oils, copper, aluminium, bacteria, fungi and mycobacterium tuberculosis (T.B.).

31. EN 149 defines the following classes of "filtering half masks" (also called "filtering face pieces"), that is respirators that are entirely or substantially constructed of filtering material:

Class	Filter penetration limit (at 95 L/min air flow)	Inward leakage
FFP1	Filters at least 80% of airborne particles	<22%
FFP2	Filters at least 94% of airborne particles	<8%
FFP3	Filters at least 99% of airborne particles	<2%

32. FFP2 disposable particulate respirators are commonly used for respiratory protection at grass and bushfires and are used in overhaul of structure fires by some fire services. Research conducted by the Bushfire Cooperative Research Centre indicates that these respiratory devices are ineffective in filtering out all of the particulate matter and toxic chemicals that are found in grass and bushfire smoke.

Chemical splash suits

33. AS/NZS 6530:2006 specifies a test method for measuring indices of penetration, absorption and repellence for protective clothing materials against low-volume, low-pressure splashes of liquid chemicals, usually chemicals of low volatility. Chemical splash suits are designed to be used in conjunction with chemical footwear, gloves and SCBA to prevent skin exposure with liquid chemicals.

34. ISO 13994 may be used for determining the penetration resistance of protective clothing materials against chemicals in larger volume and higher pressure splashes. Clothing made of these materials should not be used as the sole means of protection where resistance to permeation by chemicals at the molecular level (see ISO 6529) is essential and where a complete barrier to liquid (or gaseous) chemicals is required (e.g. risk of exposure to massive and forceful discharges of concentrated liquid chemicals). The level of protection provided by these suits is therefore limited by the chemical type, concentration and force that the chemical may be projected.

Chemical gas suits

35. AS/NZS ISO 6529:2006 specifies the requirements for suits that provide limited protection against permeation by chemical liquids and gases. Workers involved in the production, use, transportation, and emergency response with liquid and gaseous chemicals can be exposed to numerous compounds capable of causing harm upon contact with the human body.

36. The deleterious effects of these chemicals can range from acute trauma such as skin irritation and burn to chronic degenerative disease, such as cancer. Since engineering controls may not eliminate all possible exposures, attention is often placed on reducing the potential for direct skin contact through the use of protective clothing that resists permeation, penetration and degradation.

37. The test methods in this standard are normally used to evaluate the barrier effectiveness of materials used for protective clothing and specimens from finished items (see Note 1) of protective clothing against permeation of either liquid or gaseous chemicals. Once again, the level of protection provided by these suits is therefore limited by the chemical type, concentration and force that the chemical may be projected.

Footwear

38 AS/NZS 4821:2006 specifies test methods and minimum performance requirements for three (3) types of footwear for fire-fighters; Wildland, Structural and Chemical resistant.

Type 1 Suitable for general purpose rescue, fire-fighting suppression action involving a fire in vegetative fuels such as forest, crops, plantations, grass or farmland.

Type 2 Suitable for fire rescue, fire suppression, and property conservation in buildings, enclosed structures, vehicles, vessels, or like properties that are involved in a fire or emergency situation.
Type 3 Hazardous materials emergencies, involving the release or potential release of hazardous chemicals into the environment that can cause loss of life, personnel injury, or damage to property and the environment. Suitable also for fire rescue, fire suppression, and property conservation in aircraft, buildings, enclosed structures, vehicles, vessels, or like properties that are involved in a fire or emergency situation.

Type 2 footwear has a requirement for a barrier that provides limited protection to the feet from some common fire-ground contaminants and chemicals. Type 3 footwear is generally constructed from nitrile rubber and provides limited protection against some chemicals, depending upon the concentration, for a specific period of time.

Gloves

39. AS 2161.6:2003 specifies the minimum requirements for three types of gloves with different performance requirements. The main purpose of these gloves is to provide protection against mechanical and thermal hazards encountered on the fire-ground.

Type 1 gloves provide the lowest level of performance. Criteria for these gloves were partly based on requirements considered suitable for wildland fire fighting with certain requirements consistent with the same level of protection provided by wildland clothing as specified in ISO 15384.

Type 2 gloves provide an intermediate level of performance. The performance requirements for Type 2 gloves are based partly on EN 659 but uses some of the criteria from EN 469 for thermal protection.

Type 3 gloves provide the highest level of performance. The performance requirements for Type 3 gloves have been adapted from NFPA 1971 including the requirement for a moisture barrier that also provides blood-borne pathogen protection. Only Type 3 fire-fighting gloves provide some limited protection against some common fire-ground contaminants and chemicals.

Summary

40. All of the Standards cited above clearly indicate that the level of protection provided by fire-fighter's personal protective clothing and equipment is limited to the performance requirements within them. The skin, eyes and lungs are the routes of chemical exposure that are exposed to some degree to the chemical hazards that fire-fighters routinely encounter on the fire-ground. Although fire-fighter's PPC can be effective in reducing the exposure to these hazards, it can never completely eliminate the exposure.

41. Accordingly, the only conclusion that can be drawn from this is that the risk of exposures to fire-ground contaminants, including chemicals that can initiate occupational cancers, is unavoidable.

Philip Taylor
Commander Training & Development
MFESB

Personal Details

Name: - Philip John TAYLOR

Address: -

Contacts: - Hom.
- Bus.
Mob.

Employment History

I have been employed as a Fire-fighter and officer with the Metropolitan Fire & Emergency Services Board for the past 32 years.

Current Position

Commander Training & Development – Central Zone, 2010 – present

Previous Positions

Project Manager – Acting Commander - PPC & Station Wear Project, 2007 - 2010
Key Roles:

Led the PPC & Station Wear Project, including:-

- Chairing the Implementation Committee and Working Group
- Manage issues and conflict between internal and external stakeholders
- Identifying and managing stakeholder expectations
- Monitoring project performance against critical paths
- Reporting and presenting progress of the project to EMT and Board

OH&S Coordinator - United Fire-fighters Union (Victoria) 1999 – 2009
Key Roles:

Took a leading role in identifying and addressing OH&S issues

- Represent UFU on MFB and CFA OHS Policy Committees
- Represent UFU on Standards Australia Committee
- Collaboratively develop and implement MFB OHS cultural change
- Developed and implemented strategy to audit MFB PPC by HSR's
- Collaborate in the development of new policies and procedures
- Collaborate in the development and delivery of Health and Safety Seminars

Committee Membership

Current

- PPE/Uniform Committee
- Operational OHS Committee
- Fire-ground Rehabilitation Working Group

Previous

- Chair - PPC & Station Wear Implementation Committee
- Chair - PPC & Station Wear Working Group
- OH&S Policy Committee

- PPC & Station Wear Project Steering Committee
- Operational Risks Working Party
- Breathing Apparatus Tender Evaluation Committee
- Total Garment Management System Tender Evaluation Committee
- Breathing Apparatus Implementation Committee

External

Standards Australia – SF 049 – Standards for Fire-fighters Protective Clothing & Equipment

Professional Development

Tertiary Education

2011	**Advanced Diploma of public Safety (Fire-fighting Management)** Metropolitan Fire & Emergency Services Board
2009	**Diploma of Project Management** Holmesglen TAFE
1999	**Diploma of Health – Occupational Health & Safety** Royal Melbourne Institute of Technology
1996	**Associate Diploma of Applied Science – Fire Technology** Swinburne University of Technology

Conferences

2007	MFB Representative International Association of Fire-fighters Redmond Symposium Fire-fighter Health, Safety and Welfare - Chicago Illinois

MFB Awards - ***February 20, 2007 - Chief Officer's Commendation***

The commendation was awarded for performing cardio-pulmonary resuscitation and coordination of bystanders in the resuscitation attempt until the arrival of MFB and paramedics. The early commencement of CPR resulted in a successful resuscitation of the victim with negligible heart damage and a positive long term outcome.