

MINUTES OF THE ADVISORY COMMITTEE FOR  
GENERAL INDUSTRY SAFETY ORDERS  
SECTIONS 3402.1 and 3402.3  
PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT FOR FIRE FIGHTERS  
Revisions in NFPA 1851, 2020 edition

June 9, 2022  
Videoconference Via Webex

**1. Call to Order.**

The video conference meeting was called to order by the Committee Chair, Maryrose Chan, Senior Safety Engineer, Occupational Safety and Health Standards Board (Board), at 9:00 am on Thursday, June 9, 2022, in Sacramento, CA. The Committee Chair was assisted by Bernie Osburn, Associate Governmental Program Analyst, Board and Jennifer White, Associate Governmental Program Analyst, Board.

**2. Welcoming Remarks.**

The Committee Chair welcomed the attendees. Members of the advisory committee meeting introduced themselves. The Committee Chair stated that this meeting is the first of a series of meetings to review the updates of the National Fire Protection Association (NFPA) standards since our last advisory committee meetings held in 2015 and 2016. The Division of Occupational Safety and Health (Cal/OSHA) is also conducting a separate advisory committee that will be working on developing vertical standards for respiratory protection for wildland, structural and proximity fire fighters.

**Fire Fighters' Personal Protective Clothing and Equipment – AB 2146 (2014) Rulemaking**

The Committee Chair displayed the the Rulemaking Flowchart and explained the origin of the Fire Fighters' Personal Protective Clothing and Equipment proposal adopted by the Board in April of 2022. The legislature passed AB 2146 (2014), which directed the Department of Industrial Relations and the Board to engage in a comprehensive review and necessary rulemaking activities every 5 years. AB 2146 (2014) was codified under Labor Code section 147.4. The Board convened the first of these advisory committee meetings in 2015 and 2016. Subsequently, an initial rulemaking was noticed on January 29, 2021 and the Board held a public hearing on March 18, 2021.

The advisory committee process is part of what is called “preliminary activities” used for developing regulatory text and determining the economic and fiscal impact of the proposal. After the regulatory text is developed, the economic and fiscal impact are estimated. The Board staff (Committee Chair) then proceeds to draft the rulemaking documents, called the Notice of Proposed Rulemaking (Notice), Initial Statement of Reasons (ISOR), and Text of Regulations. These documents are sent to the Office of Administrative Law (OAL) for publication and

issuance of Notice, which opens the rulemaking record. Typically, the Board has one year to complete the rulemaking process, but because of COVID-19, the Governor's executive orders extended the rulemaking deadlines.

Once a proposed rulemaking is published, there is a minimum 45-Day public comment period where the Board receives, considers, and responds to comments. If there are major changes to the proposal a new 45-Day Notice is required. This step was not necessary for the initial rulemaking. The initial Fire Fighter Personal Protective Equipment and Clothing rulemaking proposal underwent minor modifications in response to public comments, resulting in three 15-Day Notices. After the three 15-Day Notices, the Board staff (Committee Chair) drafted the Updated Informative Digest, Final Statement of Reasons (FSOR), and Final Text of Regulations, which was adopted by the Board on April 21, 2022.

[Executive Order N-08-21](#) provided an additional 90 day extension to the standard 30 days for OAL to review the rulemaking. The Fire Fighters' Personal Protective Clothing and Equipment-AB 2146 (2014) rulemaking, if approved by OAL, will most likely become effective on January 1, 2023.

#### Role of the Advisory Committee Process

The Committee Chair explained the Board's policy regarding the use of advisory committees, explaining that the Board has found advisory committees to be an effective way to develop a proposal because of the expertise of the attendees.

#### Purpose of the Meeting

The rulemaking was developed with the assistance of the advisory committee in 2015 and 2016, and addressed Labor Code section 147.4, subdivisions (a) and (b). The 2022 advisory committee meetings are to fulfill the requirements of Labor Code section 147.4, subdivision (c). Subdivision (c) requires the agency to review the NFPA standards every five years to determine if the updates to the NFPA standards provide a greater degree of personal protection and determine if the Board needs to change the safety orders.

#### Office of Administrative Law (OAL) and Federal OSHA Standards of Review

The Committee Chair explained that the regulatory text developed has to meet the following criteria:

- Authority
- Necessity
- Clarity
- Enforceable
- Consistency

- Non-Duplication
- Explore Alternatives
- As Effective as the Federal OSHA Standards

### Documents Incorporated Reference

Title 1, California Code of Regulations (CCR), section 20, does not permit consensus standards to be incorporated by reference without an edition year. The Board has to review the consensus standards and go through the rulemaking process to update the edition of the consensus standard.

### **3. Review of Selected Documents Relied Upon.**

The ISOR has a heading called “Documents Relied Upon”. These are documents the drafters of the regulation have used to develop and support the proposal. The Committee Chair stated that the documents relied upon includes the minutes of the advisory committee meeting.

The Committee Chair also reviewed the following research studies with the committee. This is not an inclusive list of all the documents relied upon for the rulemaking.

#### Firefighter hood contamination: Efficiency of laundering to remove PAHs and FRs

Alexander C. Mayer, Kenneth W. Fent, Stephen Bertke, Gavin P. Horn, Denise L. Smith, Steve Kerber and Mark J. La Guardia. Published online February 7, 2019, Journal of Occupational and Environmental Hygiene, DOI: 10.1080/15459624.2018.1540877

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8647047/>

The Committee Chair prefaced that this study will not be relied upon, but was a good introductory study to illustrate the different issues related to the cleaning of garments.

The Single Wash (Comparison of hoods washed after every use vs unlaundered hoods) portion of the study came to the conclusion that:

- Laundering greatly reduced the levels of polycyclic-aromatic hydrocarbons (PAHs)
- Majority of the non-polybrominated diphenyl (PBDE)ethers flame retardants (NPBFRs) and organophosphate flame retardants (OPFRs) were removed by routine washing, but not as well as PAHs

The Hood Contamination portion of the study showed evidence of:

- Cross-contamination
- Some evidence that laundering of hood made the made the fabric more adsorptive of NPBFRs (need further study)
- Laundering did not effectively remove polybrominated diphenyl ethers (PBDEs)

The reasons for not relying on the study were: (1) the sample size was too small; and (2) although the study claims that the hoods were washed in accordance to manufacturer's recommendations, the hoods were not washed in accordance with the procedures listed in NFPA 1851 Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2020 edition. The detergent used was not in compliance with NFPA 1851, 2020 edition. The number of hoods in the washing machine did not amount to a full load. Adequate friction between garments is necessary for effective cleaning of garments.

NFPA Project 1 and Project 2 reports:

<https://www.nfpa.org/News-and-Research/Resources/Fire-Protection-Research-Foundation/Current-projects/Investigation-of-Turnout-Clothing-Contamination-and-Validation-of-Cleaning-Procedures>

The proposal will be relying on Project 1 (PPE Cleaning Validation) and Project 2 (Fire Service Gear Cleaning Validation) reports that support the cleaning validation of NFPA 1851, 2020 edition. NFPA committee members in collaboration with National Institute of Occupational Safety and Health (NIOSH) developed cleaning validation procedures to determine the effectiveness of the cleaning process. They developed methods of creating swatches with known concentrations of contaminants (Semi-Volatile Organic Chemical Contamination, heavy metals, and biologicals) that can be analyzed to determine how much was removed by the laundering process.

Project 1 reports include:

Supplement A - Annotated bibliography

Supplement B - Preliminary Work for Assessing PPE Cleaning Procedures

Supplement C - Investigation of Simulated Fire Ground Exposures

Supplement D - Evaluation of Outer Shell Liquid Retention Properties

Supplement E - Report of Semi-Volatile Organic Chemical Contamination, Extraction, and Analysis Procedures

Supplement F - Report of Heavy Metal Contamination, Extraction, and Analysis Procedures

Supplement G - Report of Biological Contamination, Extraction, and Analysis Procedures

Supplement H - Evaluation of Microbial Cleanliness of Selected ISP Advanced Cleaning Procedures

Project 2 reports are still in progress and aimed at developing validation for cleaning methods for other fire fighter gear such as helmets, boots, Self-Contained Breathing Apparatus (SCBAs), etc.

Contamination of fire fighter personal protective equipment and skin and the effectiveness of decontamination procedures

Kenneth W. Fent, Barbara Alexander, Jennifer Roberts, Shirley Robertson,

Christine Toennis, Deborah Sammons, Stephen Bertke, Steve Kerber, Denise Smith and Gavin Horn. Published online September 22, 2017, Journal of Occupational and Environmental Hygiene, 14:10, 801-814, OI: 10.1080/15459624.2017.1334904  
<https://pubmed.ncbi.nlm.nih.gov/28636458/>

The study supported the necessity of preliminary exposure reduction NFPA 7.2. The Committee Chair reviewed the different figures in the study.

#### **4. Presentation by Jim Evans (Solution Safety Products and Services), An Overview and Some Revisions/Additions to NFPA 1851, 2020 Edition.**

The Committee Chair introduced Jim Evans, an expert in NFPA 1851. He presented an overview of the NFPA 1851, 2020 edition, which included a summary of the major revisions made to the prior 2014 edition as it pertains to fire department operations.

The NFPA 1851, 2020 edition denotes (N) for new requirement, (\*) refers to the Annex.

The major changes to NFPA 1851 are in:

- Chapter 4. Program
  - N Table 4.2.4 Responsibilities for Garment Element Inspection, Cleaning, and Repair list what a Manufacturer Verified in Cleaning, Verified Independent Service Provider (ISP) or Verified Organization, Verified Cleaner, Manufacturer Trained Organization, User, Ensemble or Ensemble Element Manufacturer is permitted to do.
- Chapter 7. Cleaning and Decontamination
  - 7.1 General
    - Two Decision trees
      - N Figure 7.1.1.2(a) Approach for Deciding, Cleaning, and Disposition of Ensemble Elements (page 22).
      - N Figure 7.1.1.2(b) Approach for Addressing Specific Types of Contamination (page 23).
  - 7.2 Preliminary Exposure Reduction  
There are many new paragraphs about performing preliminary on-site decontamination, and not waiting until arrival at the fire station.
  - 7.3 Advance Cleaning  
There are many new paragraphs relating to cleaning procedures and training.

#### **Chapter 1. Administration and Chapter 2: Referenced Publication**

The scope specifies the minimum selection, care and maintenance for structural fire fighting protective ensembles-- the entire gear, not just the garments. The standard is related to NFPA 1971, Standard on Protective Ensembles for Structural and Proximity Fire Fighting. The purpose

of the standard is to establish a program for the selection, care, and maintenance of the PPE to health and safety purposes.

### Chapter 2. Reference Publications

There are other referenced documents, which are interrelated to NFPA 1851. The most pertinent ones from the list below are NFPA 1500, Standard on Fire Department Occupational Safety and Health and Wellness, 2018 edition and NFPA 1971, 2018 edition.

### Chapter 3. Definitions

Jim Evans reviewed some key definitions.

- 3.3.12\* Cleaning
- 3.3.12.1\* Advanced Cleaning
- 3.3.12.2\* Specialized Cleaning
- 3.3.15\* Contamination
- *N* 3.3.66\* Preliminary Exposure Reduction
- *N* 3.3.67\* Products of Combustion
- *N* 3.3.83\* Sanitizer
- 3.3.90\* Soiling
- 3.3.91 Specialized Cleaning
- 3.3.64.1 Manufacturer-Trained Organization
- 3.3.64.2 Verified Organization
- *N* 3.3.114 Verified Cleaner
- 3.3.115 Verified Independent Service Provide

### Chapter 4. Program

#### 4.2.4.5\* Training for Advance Cleaning and Inspection

In order to do cleaning in-house, the employees of the department doing the cleaning have to be trained by: the manufacturer of the same type PPE; a verified ISP; a verified organization; a verified cleaner; or a combination thereof.

#### 4.3 Records

The list of records that must be kept in 4.3.3 and *N* 4.3.5\*. Records can be updated during the annual inspection.

### Chapter 5. Selection

*N* 5.1.1.1 and *N* 5.1.1.2 require that departments develop a process for selecting their gear and that process must include a risk assessment. The department must now complete a new risk assessment at least every two years or if new circumstances happen as listed.

A risk assessment is needed to identify the hazards, the type of gear to purchase, what type of emergency responses, what needs to change, and what is applicable to the department's needs.

5.1.2 requires the department to evaluate the distinguishing response activities for different potential incidents and determine if there is a need for two sets of ensemble or spare ensemble elements. Based on past experience, the requirement for preliminary exposure reduction and advance cleaning, two sets is a major help for having PPE available for use.

## Chapter 6. Inspection

### 6.2. Routine Inspection

6.2.1 Routine inspection of protective ensembles must now be performed at the beginning of each duty period. There is a chart in NFPA 1851 that will help departments with what to look for during the inspection. There are departments that have developed good Standard Operation Procedures (SOPs) for routine inspection.

### 6.4 Complete Liner Inspection

6.4.3 Advanced inspections require a complete liner inspection, which involves turning the liner inside out. There are inspection ports for pulling out the different layers. The moisture barrier and thermal liner are inspected. This includes the hydro testing and a visual inspection. A complete liner inspection is now required to be done annually. Originally, it would be three years before the first complete liner inspection.

## Chapter 7. Cleaning Decontamination

### 7.1. General

- N 7.1.1.2 (a) New flow chart, Approach for deciding handlings, cleaning and disposition of ensemble elements.
- N 7.1.1.2 (b) New flow chart, Approach for addressing specific types of contamination.

### 7.2 Preliminary Exposure Reduction (Organization)

Certain departments and Cal Fire have created some good training videos on how to do preliminary exposure reduction. It used to be called routine cleaning and others call it gross decon.

#### N 7.1.3.5 Products of Combustion Cleaning Actions

N 7.1.3.5.1. The department has to create a process to mitigate products of combustion at the scene. The previous slides by the Committee Chair showed how effective preliminary exposure reduction can be. The PPE is isolated, tagged, and bagged at the incident scene.

N 7.1.3.5.2. The PPE will then be subject to advanced cleaning per subchapter 7.3, which are procedures learned from the ISP or manufacturer. There will be times where the PPE cannot be cleaned right away. The SOPs need to be developed so that a department can mitigate as soon as possible and get the gear to advance cleaning. It is known that there are carcinogenic materials on the gear and it off-gasses.

N 7.1.1.1 Cleaning capabilities shall be permitted to be conducted in-house by a manufacturer-trained organization, a verified organization, a verified cleaner, a manufacturer verified in cleaning, a verified ISP, or any combination thereof. It is important to have records as to who did what.

4.2.4.5.1 Training can be done by a verified ISP based on how they clean. This is different from becoming a verified cleaner.

N 7.1.1.2 Figures 7.1.1.2 (a) and 7.1.1.2(b) assist in deciding the appropriate cleaning procedures to follow.

#### 7.2.2\*. Preliminary Exposure Reduction Procedures

7.2.2.1 After the incident, the end user conducting the exposure reduction on-site decides whether to use the dry or wet method.

N 7.2.2.4\* advises performance of the mitigation techniques before the removal of ensemble elements. Fire fighters are to stay on air per 7.2.2.2\*.

N 7.2.2.4.1\* Dry mitigation involves using a soft brush to brush debris off. Do not use a stiff brush.

#### 7.3 Advanced Cleaning

7.3.1.3\* Training shall meet the requirements specified in 4.2.4.5 and 4.2.4.5.1. Jim Evans has been in departments in California to set up the program for their extractors, materials for cleaning, training on how to close up the outer shells, and how to prepare the liners to be washed. He advised members to take the time to get the training from an ISP, verified organization, or verified cleaner and get a certificate.

7.3.4. Advance cleaning was required every 12 months or when soiled. Now, advance cleaning is required at least every six months or when soiled or after preliminary exposure reduction.

#### Reviewed Flow Charts:

- Handling, Cleaning Disposition (Chart)
- Specific Types of Contamination



#### 7.3.11 to 7.3.15. Other Ensemble Elements

Please review the standard. There are other procedures for helmets, gloves, boots, and hoods. Gloves should be hand washed. Everything outside ends up inside and gloves cannot be rinsed very well. Gloves should be placed in the extractors without flushing them out really well.

#### N 7.4 Disinfection or Sanitization of Biological Decontamination

The ISP or organization per 4.2.4.5.1 should train departments on how to perform cleaning to address this type of contamination. There is a process. There should be minimum touching of contaminated items.

7.4.2\* Provides a cross reference to the Federal Blood Borne Pathogen program 29 CFR 1910.1030. *The California counterpart is title 8, section 5193.*

### Chapter 8. Repair

8.1.1 All repairs shall be performed by the original manufacturer, a verified ISP, or a member of the organization who has received training. Only basic repairs can be done by the organization unless verified. 8.3 lists what is considered as basic repair.

8.1.1.1. Training shall be provided by an element manufacturer of the same element type or by a verified ISP in the repair of ensembles or ensemble elements.

#### 8.3 Additional Requirements for Basic Garment Element Repair.

After the training on basic repairs, the fire department can do the repairs.

The repairs specified in this section shall be performed by the element manufacturer, the organization, manufacturer-trained organizations, verified organizations, or verified ISPs.

Basic repairs shall be limited to the following:

- (1) Patching of minor tears, char marks, and ember burns to a separable outer shell.
- (2) Repairing of skipped, broken, and missing stitches to a separable outer shell. These are small areas, not a stitching up of the entire arm.
- (3) Replacement of missing hardware, excluding positive closure systems to a separable outer shell. The closure system can only be repaired by a verified ISP or the manufacturer.
- (4) Reclosing of the liner of a garment after inspection. If the garment had to be opened (open the hem) to do a complete liner inspection, departments can be trained to put it back together. If it was opened, make sure to put in an inspection port so it doesn't have to be opened back up and sewn again.

### Chapter 9. Storage

Keep gear away from living areas, right storage area, right type of case or bags, and do not cross-contaminate. Keep personal items away from gear.

## Chapter 10. Retirement, Disposition, and Special Incident Procedure

### 10.1 Retirement.

10.1.1. The department must develop a program for retirement.

10.1.1 and 10.1.2 Retire structural and proximity fire fighting ensembles and ensemble elements no more than 10 years from the ensemble's date of manufacture.

10.1.3.1. Proximity gear needs an outer shell. The radiant reflective outer shell shall be retired after five years. The liner can be retired in 10 years.

10.3. Special incident procedures. This is a bad day that departments do not want to think about, but departments should be prepared for that bad day.

10.3.1 The organization shall have procedures for the handling and maintenance of custody of structural and proximity fire fighting ensembles and ensemble elements that were worn by fire fighters who were seriously injured or died on the job.

Ensemble elements need to be boxed in a certain way and handled according to a certain procedures. Departments have to develop these procedures and include them in their SOPs.

10.3.2 lists the minimum procedures for handling evidence (i.e. PPE). Emphasis was given on rule no. 3 to not use plastic or air tight containers because of the possible presence of body fluids. This is to prevent mold from forming. Use paper or cardboard containers.

## Chapter 11. Verification

11.1.1.1 In order to verified, the manufacturer, organization, or ISP must meet all the requirements in Chapter 11.

11.1.1.1\* Verification of the organization or ISP shall include advanced inspection, advanced cleaning, sanitization, and advanced repairs of garment elements only as specified in Table 11.1.1.1.

N 11.1.1.2.2 A cleaner shall only be verified for advanced cleaning and sanitization of garment elements. A verified cleaner can only do cleaning, not advanced inspections or repairs.

11.3.7. Evaluate the effectiveness of the cleaner's processes. The How Clean is Clean project through the NFPA foundation has set up some guidelines in determining the acceptable level of effectiveness of the cleaning procedures.

All of the ISPs have to pass the minimum cleaning efficiency. The ISP may not pass the first time, but they can change their process in order to pass. Sometimes it is not the cleaning materials, but the water itself might have some metal and need to go through a softener. It is up to the department to ask for the certificates to make sure that the ISP is verified.

The results of the testing must show:

*N* 11.3.7.2 When tested for removal of selected products of combustion as specified in section 12.4, the cleaning process shall provide for a **50 percent or greater cleaning efficiency for the average of all surrogate heavy metal contaminants.**

*N* 11.3.7.3 When tested for removal of selected products of combustion as specified in section 12.4, the cleaning process shall provide for a **50 percent or greater average cleaning efficiency for the average of all surrogate semi-volatile organic compounds.**

*N* 11.3.7.4 When tested for the neutralization and sanitization of biological contaminants as specified in section 12.5, the sanitization process shall provide for at least **log<sub>10</sub>3 reduction of challenge microorganisms.**

## Chapter 12. Test Procedures

*N* 12.1 Light Evaluation of Hood Particulate-Blocking Layers.

*N* 12.1.1\* Application. This evaluation method shall apply to particulate-blocking protective hood interface components that are in service. The ISP is the one doing this. This is not tested in the verification, but it should be in the procedures. If something is being built in-house, then consult this section more closely.

12.3 Water Penetration Barrier Evaluation, which is hydro testing for moisture barriers. This method has been used for quite some time. The test is used to identify problems with the moisture barrier. The moisture barrier testing areas are in areas with high abrasion such as the:

- (1) Broadest part of the shoulders
- (2) Back waist area of the coat
- (3) Knees
- (4) Crotch area
- (5) Seat area

## **5. Discussion on Board Staff Proposal.**

### **Discussion of Section 3402.1 (a) to (f)**

Subsections (a) through (f) were proposed for deletion because the subsections are no longer necessary after subsection 3402.3, which incorporates by reference NFPA 1851, 2014 edition, is fully implemented and after the effective dates in section 3402.3(c) have run its course.

Selection and purchase of protective ensembles will be covered under subchapter 5.1, Selection and Purchase of NFPA 1851, 2020 edition. The retirement of fire fighting protective ensembles is covered under subchapter 10.1.2 of NFPA 1851, 2020 edition, which requires fire fighting ensembles to be retired 10 years after the date of manufacture.

An alternative to simply deleting subsections (a) through (f) is to replace subsections (a) through (f) with proposed subsection (a) for clarity, to avoid confusion, and to not give the impression that the purchase quality standards simply disappeared, wherein in fact, they are governed under NFPA 1851, 2020 edition.

There were no comments from advisory committee members.

#### **Proposed Amendments to Section 3402.1 (g) and (h)**

Subsections (g) and (h) were re-numbered as subsections (b) and (c). Subsections (b) and (c) relate to respiratory protection, and such amendments to those subsections will be handled by Cal/OSHA at a later date.

#### **Discussion**

There was one proposed change that is different from the proposal that is posted online, which is to incorporate by reference NFPA 1851, 2020 edition without the Annex. The Annex provides explanatory information, not strict requirements. OAL restricts title 8 to regulatory text. Other minor changes are to add “cared for” and “stored” for clarity and to be consistent with NFPA 1851, 2020 edition.

An unidentified AC member asked if the Board can reference the Annex in title 8. The Committee Chair replied that a note can be added, but the purchase of NFPA 1851 includes the Annex as part of the standard. The Annex is included in the Table of Contents of NFPA 1851. The Committee Chair has decided that it was not necessary to add a note.

**Jeremy Lawson (Cal Fire)** asked what PPE elements are included when text refers to “ensemble”. The Committee Chair replied that it is PPE from head to toe. Mr. Lawson sought clarification by asking if it includes gloves, helmets, boots, etc. The Committee Chair replied “yes”.

*3.3.96\* Structural Fire Fighting Protective Ensemble. Multiple elements of compliant protective clothing and equipment that when worn together provide protection from some risks, but not all risks, of emergency incident operations.*

Earlier in the meeting, Jim Evans summarized the revisions to NFPA 1851, 2014 edition that make up the NFPA 1851, 2020 edition. The Committee Chair asked if there was any objection to updating section 3402.3 to the NFPA 1851, 2020 edition. The members of the committee did not object to the proposed update.

**Discussion of Section 3402.1 (b) and (c)**

**Jeremy Lawson** asked why subsections (b) and (c) regarding effective dates are proposed to be deleted and was concerned the proposal we are currently working on might interfere with those dates.

The Committee Chair replied that the amendments being discussed are to amend the proposal that has been adopted (i.e. version 1). The committee is working on version 2, which will not be noticed for at least three years from now and will not be in effect prior to 2026. By the time version 2 is noticed, subsections (b) and (c) will no longer be relevant.

**Additional Questions to Stakeholders sent to AC Members on May 27, 2022**

The Committee Chair sent a document to the AC members listing sections of the NFPA 1851, 2020 edition that are proposed to be modified to comply with the Administrative Procedure Act (APA) standards.

The Committee Chair consulted with the committee on the following proposed modifications to the NFPA 1851, 2020 standard for discussion. The resulting modifications from the discussion will be incorporated into proposed section 3402.3 and is listed below as Post AC Proposed Text.

**Proposed Amendment to NFPA 1851, 2020 edition. Subchapter 4.2.2**

The written SOPs shall include training requirements for users of protective ensembles, program administrators and selected personnel who are involved in the implementation of NFPA 1851.

**Discussion**

The Committee Chair proposed that the written SOPs should enumerate the type of training that is required for the fire fighter using the PPE, the administrator and selected personnel involved in the implementation of NFPA 1851. For example, the users of the PPE should be trained on routine inspection and preliminary exposure reduction. There were no comments from committee members.

**Post AC Proposed Text**

§3402.3. Selection, Inspection, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting.

**(c) Training.**

**(1) The written standard operating procedures (SOPs) as required in chapter 4 Program, subchapter 4.2.2 shall include training requirements for users of protective ensembles, program administrators and selected personnel who are involved in the implementation of NFPA 1851.**

**Proposed Section Amendment to NFPA 1851, 2020 edition, Subchapter 4.2.4.5**

Program administrators and selected employees of manufacturer-trained organizations shall meet the training requirements in this section and shall be permitted to perform the activities identified in Table 4.2.4 for manufacturer-trained organizations.

**Discussion**

The Committee Chair stated that the amendment is to tie the training requirements to persons. The committee members did not have any comments.

**Post AC Proposed Text**

§3402.3. Selection, Inspection, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting.

**(c) Training.**

(2) Program administrators and selected employees of manufacturer-trained organizations shall be trained according to the training requirements in chapter 4 Program, subchapter 4.2.4.5 and shall be permitted to perform the activities identified in Table 4.2.4 for manufacturer-trained organizations.

**Proposed Amendment to NFPA 1851, 2020 edition, Subchapter 4.4.3**

4.4.3 The organization shall retain and make accessible to fire department personnel a copy of manufacturers' instructions regarding the care, use, and maintenance of the protective ensembles for reference purposes. The organization shall provide the user of the protective ensemble a copy of the manufacturer's instruction within **10 business days** upon request.

**Discussion**

The Committee Chair asked for input from the committee to determine a reasonable time period to provide manufacturer's instructions to the employee requesting the information.

**Jeff Knobbe (Alameda County Fire Department)** stated that when members are provided a new set of gear, they are always provided manufacturer's instructions.

The Committee Chair asked, what happens when the person loses the instructions and wants another a copy.

**Jeff Knobbe** replied that the department would have to look at their files or contact the vendor and request another copy of the instructions and the information can be e-mailed to the member in a day.

The Committee Chair then asked if the employee should be provided a copy of manufacturer's instruction within three to seven business days upon request.

**Jeff Knobbe** suggested that the departments can set up a link to the manufacturer so that the employee can obtain the information by themselves.

The Committee Chair stated that the regulation has to tell the employers what to do.

**Robert Sestito (Sacramento Metropolitan Fire District)** suggested seven business days.

**Jim Evans (Solution Safety Products & Services)** agreed that seven days is a good time. Departments are moving toward QR codes, making it easier to access information.

The Committee Chair asked if it should be calendar days or business days.

**James Gaboury (City of San Diego Fire-Rescue Department)** suggested 10 working (business) days, because their personnel gets four days off and six days on duty. If the request for a copy comes in on the administrator's day off, there may not be enough time to gather and provide the information to the requestor.

#### Post AC Text

§3402.3. Selection, Inspection, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting.

#### (d) Manufacturer's Instruction.

(1) In addition to the requirements of subchapter 4.4.3, the employer shall provide the user of the protective ensemble a copy of the manufacturer's instruction within 10 business days, upon written request.

#### **Proposed Amendment to NFPA 1851, 2020 edition, Subchapter 4.6.2**

4.6.1\* The organization shall report all personal protective equipment (PPE) health and safety concerns, if caused by a known or suspected element failure, to the element manufacture and certification organization.

4.6.2 The organization shall notify the manufacturer and the certification organization in writing within 15 days upon discovery of the PPE health and safety concern.

#### **Discussion**

The Committee Chair explained that although NFPA 1851 requires the organization to notify the manufacturer of known or suspected element failure, section 4.6.2 does not provide a timeline.

**Robert Sestito** suggested that 15 days is a little short. For those utilizing an ISP, the department may not be aware until they are notified by the ISP or when they get their gear back.

The Committee Chair replied that the time starts upon discovery.

**Jim Evans** suggested 21 to 30 calendar days.

**James Gaboury** stated that the time requirements should be in business days. He suggested 20 business days, which would be four weeks. Fire fighters do not have a typical work schedule and the legal department does not work on weekends.

#### Post AC Text

§3402.3. Selection, Inspection, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting.

#### (d) Reporting Personal Protective Equipment Health and Safety Concerns.

(1) To implement subchapter 4.6.1, the organization shall notify the manufacturer and the certification organization in writing within 20 business days upon discovery of the PPE health and safety concern caused by a known or suspected element failure.

#### **Proposed Amendment to NFPA 1851, 2020 edition, Subchapter 5.1.5**

Based on the risk assessment, the organization shall compile and evaluate information on the comparative strengths and weaknesses of the elements under consideration. The selection criteria for comparing elements shall include the following:

#### (1) Protective garment elements

(a) Thermal protective performance of the material composite

(b) Total heat loss of the material composite

(c) Conductive and compressive heat resistance of reinforcements

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#### (5) Protective hood interface elements

(a) Thermal protective performance of hood material

(b) Flame resistance of hood material

(c) Thermal shrinkage of hood material

(d) Burst strength of hood material

(e) Cleaning shrinkage of hood material

(f) Particulate contamination blocking layer

#### **Discussion**



The Committee Chair moved all the selection criteria from the Annex to regulatory text. There were no objections.

Post AC Text

§3402.3. Selection, Inspection, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting.

(f) Risk Assessment.

(1) The selection criteria for comparing elements as required in subchapter 5.1.5 shall include the following:

(A) Protective garment elements:

1. Thermal protective performance of the material composite;
2. Total heat loss of the material composite;
3. Conductive and compressive heat resistance of reinforcements;
4. Thermal shrinkage of the material layers (outershell, moisture barrier, thermal barrier);
5. Flame resistance of material layers and other components (outer shell, moisture barrier, thermal barrier, other material layers and components);
6. Tear resistance of the material layers (outer shell, moisture barrier, thermal barrier);
7. Cleaning shrinkage of the material layers (outer shell, moisture barrier, thermal barrier);
8. Water absorption resistance of the outer shell;
9. Tensile strength of the outer shell;
10. Seam strength of outer shell, moisture barrier, and thermal barrier layers;
11. Visibility properties of the trim;
12. Radiant reflectance of the outer shell (for proximity fire fighting protective clothing).

(B) Protective helmet elements:

1. Impact resistance (top and acceleration) after selected preconditions;
2. Flame resistance;
3. Heat resistance (level of sagging).

(C) Protective glove elements:

1. Thermal protective performance of glove body and, if present, wristlet;
2. Conductive heat resistance of glove body;
3. Thermal shrinkage of glove and innermost material;
4. Cut resistance of glove body;
5. Puncture resistance of glove body;
6. Burst strength of wristlet material;
7. Dexterity of whole gloves;
8. Grip of whole gloves.

(D) Protective footwear elements:

1. Flame resistance;
2. Radiant heat resistance of upper;

3. Conductive heat resistance of sole and upper;
4. Puncture resistance of sole and upper;
5. Cut resistance of upper;
6. Abrasion resistance of sole.

(E) Protective hood interface elements:

1. Thermal protective performance of hood material;
2. Flame resistance of hood material;
3. Thermal shrinkage of hood material;
4. Burst strength of hood material;
5. Cleaning shrinkage of hood material;
6. Particulate contamination blocking layer.

**Proposed Amendments to NFPA 1851, 2020 edition, Subchapter 6.1**

6.1.3\* The organization shall establish guidelines for its members to follow in determining if an element is soiled to an extent that cleaning is necessary.

**Discussion**

The Committee Chair asked what guidelines departments use to train their employees in determining when an element is soiled to the extent that cleaning is necessary. During the discussion, the Committee Chair conflated the terms soiling and contamination, which is incorrect. This was later clarified towards the end of the discussion.

**Robert Sestito** stated that this is the most complex portion, because the majority of the people wear protective garments during structural fires, but people wear them on medical aids and on extrication, so defining what is soiled is not so cut and dry. Exposure to products of combustion mean the protective elements must be washed. The problem is that there are a myriad of exposures to be dealt with. It is difficult to define.

The Committee Chair stated that the organization (employer) is tasked with establishing guidelines. This information has to be communicated to the employees. Employees need to know when their gear is soiled and needs advanced cleaning. It is important to take time to create a set of criteria. For example, response to a live event could be one. If Cal/OSHA asks for guidelines as to what is soiled, what will be written in that document as part of the SOP. The set of guidelines does not have to be decided today.

**Jim Evans** stated that the NFPA committee have argued what “soiled” is for almost 20 years. The department has to establish guidelines to identify what soiled means. The decision tree helps out a lot, but what is difficult is the soiling portion from sweating. The way other departments have done it is by establishing guidelines based on use. For example, what

particular type of use can create soiling? Mr. Evans doesn't believe that the committee can get a consensus on is the definition of soiled.

The Committee Chair stated that the way NFPA 6.1.3 currently written is acceptable for a consensus standard, but probably not acceptable as a regulation. The regulatory text has to be enforceable.

**Jim Evans** stated that soiled is pretty subjective. The decision tree addresses products of combustion, hazmat, and blood borne pathogen, but the word soiled becomes very subjective.

The Committee Chair suggested to amend the text to: "The organization shall establish guidelines for its members to follow in determining if an element is ~~soiled~~ contaminated to an extent that cleaning is necessary".

**Jim Evans** pointed out the contamination is pretty much laid out already. He suggested that the members can meet amongst themselves and try to develop guidelines for soiling.

The Committee Chair responded that that is an option.

**Jeremy Lawson** stated there should not be any modifications. If we specify what soiled means, which is different for everyone, it will increase the cost. Two sets of turnouts will not be enough. He believes that the guidelines are best left with each individual agency. Otherwise the fiscal cost would be too high and may even require more than two sets. It has been determined at local agency up to this point. He believes that it is still enforceable and that Cal/OSHA can look at what the agency did to come up with those determinations. He asked what soiled means. For example, if you put your knee down and you have mud on it, is that soiled?

The Committee Chair asked Jeremy Lawson if his suggestion is to leave 6.1.3 unmodified. Mr. Lawson agreed.

The Committee Chair asked Mr. Lawson for a copy of the document Cal Fire uses to train their employees on how to determine when the garment is soiled and needs advanced cleaning.

**Kyle O'Neil (City of San Diego Fire-Rescue Department)** asked what soiled means. He asked if we are referring to contamination from fire or contamination from bacteria.

The Committee Chair responded by reading the definition of soiling from the NFPA 1851, 2020 edition. "Soiling. The accumulation of sweat, dust, dirt, debris, and other nonhazardous

materials on or in an ensemble or ensemble element that could degrade its performance or cause hygiene issues.”

The Committee Chair stated that if the committee does not need to establish guidance for soiling then subchapter 6.1.3 can be modified and deleted. If there is a need to establish guidelines for soiling, then the committee needs to know what those guidelines are. There should be enough clarity on what employers are instructing employees to do.

**Thomas Cope (Fresno City Fire).** Fresno received grants and will have extractors in every station. All of their members have two sets of turnouts. Mr. Cope believes it is unrealistic to have a hard and fast rule that states after one exposure, the garments must go to advance cleaning. Fresno City Fire’s written program defaults to, if exposed to products of combustion, then the garments must go through advance cleaning. Mr. Cope has received some push back from seasoned engineers who rarely do interior fire attack, they don’t do vertical vents, but they have crusty old blackened helmets that they are proud of. Mr. Cope used white paper and rubbed it on the helmet and the particulate matter came off. It is low tech and unscientific, but it is one tool that can be used.

#### **Proposed Amendments to NFPA 1851, 2020 edition, Subchapter 7.2.2.1**

End users shall carry out preliminary exposure reduction immediately after exiting the emergency scene at any incident where their protective ensemble or ensemble elements could have become soiled or contaminated.

#### **Exception:**

**Where it is infeasible to perform preliminary exposure reductions immediately, preliminary exposure reduction shall be performed as soon as practically possible.**

#### **Discussion**

**Jeff Knobbe** asked if the Annex will not be included in the regulatory text.

The Committee Chair confirmed that the Annex is not included.

**Jeff Knobbe** stated that the NFPA 1851, 2020 did not list all the exceptions and that is why it is in the Annex, whether it be rain or snow. In some cases it is not practical to immediately conduct preliminary exposure reduction at the scene. However, he was concerned that practically possible would be interpreted as “just do it at the station”.

The Committee Chair responded that it will be the department’s burden to prove that it is infeasible. Infeasible doesn’t mean not buying soft brushes or other equipment for wet soap method.

Post AC Text

§3402.3. Selection, Inspection, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting.

(h) Cleaning and Decontamination.

(1) Preliminary exposure reductions shall be carried out by the end user of the PPE as required by subchapter 7.2.2.1.

EXCEPTION to (g)(1):

Where it is infeasible to perform preliminary exposure reductions immediately, preliminary exposure reduction shall be performed as soon as practically possible.

**Proposed Amendments to NFPA 1851, 2020 edition, Subchapter 7.3.3**

Ensembles and ensemble elements that are soiled or contaminated shall receive advanced cleaning as soon as practicable.

**Discussion**

The Committee Chair did not place a deadline as to when soiled or contaminated PPE shall receive advanced cleaning.

Post AC Text

§3402.3. Selection, Inspection, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting.

(h) Cleaning and Decontamination.

(2) Ensembles and ensemble elements that are soiled or contaminated shall receive advanced cleaning as required in subchapter 7.3.3 as soon as practically possible.

**6. Cost.**

The Committee Chair reviewed the form created to capture the estimated number of fire departments that would need to update their NFPA 1851 to the 2020 edition. The Committee Chair asked members for suggestions to improve the form, which was sent to committee members on May 27, 2022.

**7. Closing Remarks.**

The Committee Chair sought feedback from the committee members regarding their experience in implementing NFPA 1851, 2014 edition.

The next meeting will be scheduled in November 2022.

**Jeff Knobbe** stated NFPA 1851 would be widely implemented after NFPA 1851 becomes a regulation. Regulation and enforcement is needed for widespread implementation. After 2023, Mr. Knobbe predicts that departments will purchase more extractors, turnouts, cleaning materials and other equipment to implement the program. The departments have known this regulation is coming for the past seven years.

**Robert Sestito.** Sac Metro has 552 full time fire fighters, 1,500 coats, 1,500 pants, 750 helmets, 3,000 hoods, 750 boots, and 1,400 gloves. Mr. Sestito believes that their department is better than average when it comes to washing garments. They wash 1,300 pieces of approximately 700 garments. Even at that rate with the amount of fire fighters and washing gear from contamination, to comply with NFPA 1851, their organization will be at about 80 percent compliance. They are going to roll out the glove program next month, but that does not include boots and helmets.

Other departments may not realize that it is a large program to implement and it is costly. Currently, there is a supply shortage. When the 10 year retirement of turnouts becomes effective, it is going to affect departments that allow leather helmets. Mr. Sestito knows of departments who contacted vendors to buy turn outs and are looking at 50 weeks of lead time. The rolling out of the information and three year phase is important. Smaller departments may have a difficult time. It has taken five to seven years to be to be where they are, but Sac Metro is still struggling to be 100 percent compliant.

The Committee Chair thanked the committee members for their attendance and participation and adjourned the meeting at approximately 2:30 PM.