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NOV 28 2011

# Memorandum

OCCUPATIONAL SAFETY AND HEALTH  
STANDARDS BOARD

To : Marley Hart, Executive Officer  
Occupational Safety and Health Standards Board  
2520 Venture Oaks Way, Suite 350  
Sacramento, CA 95833

Date: October 10, 2011

From : Ellen Widess, Chief *Ellen Widess*  
Division of Occupational Safety and Health

Subject: Division Evaluation of Petition 524, Bill Taylor, Public Agency Safety Management Association (PASMA)

This memorandum is written in response to your request for a Division review of Petition 524 dated June 28, 2011 submitted by Bill Taylor of the Public Agency Safety Management Association (PASMA). The petitioner is proposing to modify 8 CCR 5199, subsection (g)(3)(B), Exception 2.

Labor Code Section 142.2 permits interested persons to propose new or revised standards concerning occupational safety and health, and requires the Board to consider such proposals, and render a decision no later than six months following receipt. Further, as required by Labor Code Section 147, any proposed occupational safety or health standard received by the Board from a source other than the Division must be referred to the Division for evaluation, and the Division has 60 days after receipt to submit a report on the proposal.

The Division has prepared this memorandum as an evaluation of the petition.

## Actions Requested by the Petitioner

Section 5199 (g)(3)(B) requires the use of higher levels of respiratory protection such as powered air purifying respirators (PAPRs) for employees who perform high hazard procedures on people who are cases or suspected cases of airborne infectious diseases (AirID). Exception 2 permits emergency medical personnel to use P100 particulate respirators in lieu of PAPRs. The petitioner has requested that Exception 2 be modified to permit the use of N100 particulate respirators in non-oil environments.

## Existing Title 8 Regulations: Section 5144 (d) states:

*(d) Selection of respirators. This subsection requires the employer to evaluate respiratory hazard(s) in the workplace, identify relevant workplace and user factors, and base respirator selection on these factors. The subsection also specifies appropriately protective respirators for use in IDLH atmospheres, and limits the selection and use of air-purifying respirators.*

*(1) General requirements.*

*(A) The employer shall select and provide an appropriate respirator based on the respiratory hazard(s) to which the worker is exposed and workplace and user factors that affect respirator performance and reliability.*

*(B) The employer shall select a NIOSH-certified respirator. The respirator shall be used in compliance with the conditions of its certification.*

*(C) The employer shall identify and evaluate the respiratory hazard(s) in the workplace; this evaluation shall include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. Where the employer cannot identify or reasonably estimate the employee exposure, the employer shall consider the atmosphere to be IDLH.*

*(D) The employer shall select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.*

Section 5199(g)(3)(B) states:

*(B) Effective September 1, 2010, the employer shall provide a powered air purifying respirator (PAPR) with a High Efficiency Particulate Air (HEPA) filter(s), or a respirator providing equivalent or greater protection, to employees who perform high hazard procedures on AirID cases or suspected cases and to employees who perform high hazard procedures on cadavers potentially infected with ATPs, unless the employer determines that this use would interfere with the successful performance of the required task or tasks. This determination shall be documented in accordance with the ATD Plan and shall be reviewed by the employer and employees at least annually in accordance with subsection (d)(3).*

*EXCEPTION 1 to subsection (g)(3)(B): Where a high hazard procedure is performed by placing the patient in a booth, hood or other ventilated enclosure that effectively contains and removes the aerosols resulting from the procedure, and the employee remains outside of the enclosure, the employee may use a respirator meeting the requirements of subsection (g)(3)(A).*

*EXCEPTION 2 to subsection (g)(3)(B): Paramedics and other emergency medical personnel in field operations may use a P100 respirator in lieu of a PAPR.*

*High hazard procedures are defined in subsection 5199(b):*

**High hazard procedures.** *Procedures performed on a person who is a case or suspected case of an aerosol transmissible disease or on a specimen suspected of containing an ATP-L, in which the potential for being exposed to aerosol transmissible pathogens is increased due to the reasonably anticipated generation of aerosolized pathogens. Such procedures include, but are not limited to, sputum induction, bronchoscopy, aerosolized administration of pentamidine or other medications, and pulmonary function testing. High Hazard Procedures also include, but are not limited to, autopsy, clinical, surgical and laboratory procedures that may aerosolize pathogens.*

Although examples are provided in the definition of high hazard procedures, subsection 5199(d)(2)(C) requires employers to determine which high hazard procedures are performed in the facility, service or operation, and to list those procedures, and the employees who perform them, in the employer's ATD exposure control plan,

*5199(d)(2) "The Plan shall contain all of the following elements:...*

*(C) A list of all high hazard procedures performed in the facility, service or operation, and the job classifications and operations in which employees are exposed to those procedures."*

Section 5199(b) also includes definitions for *suspected cases*, *cases*, and *health care provider* that are consistent with Title 17, California Code of Regulations, Section 2500. They are:

**Suspected case.** *Either of the following:*

- (1) A person whom a health care provider believes, after weighing signs, symptoms, and/or laboratory evidence, to probably have a particular disease or condition listed in Appendix A.
- (2) A person who is considered a probable case, or an epidemiologically-linked case, or who has supportive laboratory findings under the most recent communicable disease surveillance case definition established by CDC and published in the *Morbidity and Mortality Weekly Report (MMWR)* or its supplements as applied to a particular disease or condition listed in Appendix A.

**Case.** *Either of the following:*

- (1) A person who has been diagnosed by a health care provider who is lawfully authorized to diagnose, using clinical judgment or laboratory evidence, to have a particular disease or condition.
- (2) A person who is considered a case of a disease or condition that satisfies the most recent communicable disease surveillance case definitions established by the CDC and published in the *Morbidity and Mortality Weekly Report (MMWR)* or its supplements.

**Health care provider.** *A physician and surgeon, a veterinarian, a podiatrist, a nurse practitioner, a physician assistant, a registered nurse, a nurse midwife, a school nurse, an infection control practitioner, a medical examiner, a coroner, or a dentist*

Federal Regulations and Other Standards

There is no Federal (OSHA) regulation that is equivalent to subsection 5199(g)(3)(B). 29CFR 1910.134 is the OSHA Respiratory Protection Standard that corresponds to 8CCR 5144. Subsection 1910.134(d) contains equivalent language to 8 CCR 5144(d), quoted above. 42 CFR Part 84.181 establishes the NIOSH testing criteria for particulate respirator filtration materials.

Background

As stated in the rulemaking record for Section 5199<sup>1</sup> high hazard procedures, such as sputum induction and bronchoscopy can generate very high levels of aerosols. When those procedures are performed on patients who have airborne infectious diseases (AirID) such as tuberculosis and SARS, there is an increased risk that employees performing the procedures will become infected<sup>2 3</sup>. As a result of the advisory process, the Division recommended, and the Board adopted a requirement that PAPRs be used for high hazard procedures on AirID cases and suspected cases. However, powered air purifying respirators require maintaining a charged battery, and consist of multiple components that may be difficult to maintain and deploy under field conditions. Therefore, Exception 2 permits the use of a P100 particulate respirator in lieu of a PAPR for emergency medical service personnel who perform high hazard procedures on AirID cases or suspected cases.

This recommendation is consistent with the recommendations of the International Association of Fire Fighters bulletin, "Swine-Origin Influenza A (H1N1) Virus (Swine Flu) Pandemic."<sup>4</sup> The Final Statement of Reasons for Section 5199 contains a response to the California Professional Firefighters who commented that the regulation should specify the P100 respirator as minimum protection for emergency medical service:

<sup>1</sup> California Occupational Safety and Health Standards Board, Aerosol Transmissible Disease Initial Statement of Reasons and Final Statement of Reasons

<sup>2</sup> Loeb M et al. SARS among Critical Care Nurses, Toronto. *Emerging Infectious Diseases*, Vol. 10, No. 2, February 2004

<sup>3</sup> Fennelly, KP. The role of masks in preventing nosocomial transmission of tuberculosis. *The International Journal of Tuberculosis and Lung Disease*, Volume 2, Supplement 1, September 1998, pp. S103-S109(1).

<sup>4</sup> International Association of Fire Fighters, Swine-Origin Influenza A (H1N1) Virus (Swine Flu) Pandemic Informational Bulletin for Emergency Responders: [http://www.iaff.org/hs/pdf/iaff\\_pandemic\\_flu\\_guide.pdf](http://www.iaff.org/hs/pdf/iaff_pandemic_flu_guide.pdf)

*Response: Emergency medical services (EMS), such as paramedics, may be exposed to high concentrations of aerosols, particularly when performing high hazard procedures, or being exposed to aerosols generated by intubated patients. It is also possible that emergency medical procedures provided in the context of injuries and accidents may involve wet or oily environments that would compromise the integrity of N95 filter materials, or of the sealing surfaces of the respirator.*

*The standard as originally proposed required the use of PAPRs for high hazard procedures, unless it would interfere with the performance of the task, in which case a respirator at least as effective as an N95 would be required. However, in these emergency operations, it may not be feasible to provide a PAPR. Therefore, in order to address the potential for higher exposures in the EMS setting, the modified proposal contains a new exception to subsection (g)(3)(B) permitting the use of P100 respirators by paramedics performing high hazard procedures when PAPRs are not used.*

#### “N” and “P” Materials

In 1995 the National Institute for Occupational Safety and Health established new requirements for the testing and certification of particulate respirators<sup>5</sup>. Section 84.170(b) states:

*Non-powered air-purifying particulate respirators are classified into three series, N-, R-, and P-series. The N-series filters are restricted to use in those workplaces free of oil aerosols. The R- and P-series filters are intended for removal of any particulate that includes oil-based liquid particulates.*

N series materials are not permitted to be used in those workplaces in which oil aerosols are present, because they degrade the filter materials, and reduce filter efficiency. A filter that has lost efficiency will lose efficiency both for oily and non-oily aerosols (such as respiratory secretions). Since EMS personnel may respond to a medical call in any environment, they must be able to use materials whose integrity and filtration capability are not compromised by oils, and therefore P materials are required. Accidents requiring emergency medical response, especially involving vehicles or in industrial environments, can release these materials into the emergency rescue environment. Fires create a wide variety of particles, including oily particles. As the IAFF stated, the “IAFF bases its recommendation for “P” rated disposable due to the fact that emergency response is usually to “unknown condition” environments.” Unless the employer can ensure that a given environment will not degrade the N-type filter materials, the employer must provide oil-resistant or oil proof filtering materials. The difference between N and P materials is recognized in NIOSH’s test procedures for the two types of materials<sup>6</sup>.

An additional concern is whether N materials may be less effective in filtering viruses, and virus-size particles than P100 respirators. Studies have found that N95 respirators are less effective than

<sup>5</sup> 42 CFR Ch. I (10–1–04 Edition) Subpart K–Non-Powered Air-Purifying Particulate Respirators § 84.170 Non-powered air-purifying particulate respirators; description

<sup>6</sup> NIOSH NPPTL Respirator Testing: TEB-APR-STP-0057 Determination of Particulate Filter Efficiency Level for N100 Series Filters Against Solid Particulates for Non-Powered, Air-Purifying Respirators Subpart K, Section 84.181(a)(1), (c), (d), (e), (f)(1), (g), (h), (i); and TEB-APR-STP-0051 Determination of Particulate Filter Efficiency Level for P100 Series Filters Against Liquid Particulates for Non-Powered, Air-Purifying Respirators Subpart K, Section 84.181(a)(2), (b), (d), (e), (f)(2)(3), (g), (h), (i)

P100 respirators for these particles.<sup>7 8</sup> There are no published studies comparing the effectiveness of N100 and P100 respirators. There are also no published studies regarding whether the materials and construction of N95, N100, and P100 filtering facepiece respirators may affect the ability of the respirator to maintain its seal with the face under different conditions of use.

### Discussion

The petitioner has cited the Board's decision in regards to variance application Number 10-V-040, that had been made by the California Department of Forestry and Fire Protection (CalFire), which granted permission to that employer to use N100 respirators instead of P100 respirators with a number of important conditions. Some of those conditions included that the employer not permit the use of N100 respirators in environments with oil aerosols, and that the employer provide P type respirators or other NIOSH approved respirators for those environments.

A decision by a hearing panel of the Board to grant a variance to a specific employer with specific conditions is not a substitute for a full discussion by affected parties as occurs during the course of rulemaking. The issue of respiratory protection for high hazard procedures was discussed during the five- year advisory process that led to the adoption of Section 5199. However there was little discussion of N100 respirators, because at the time there were few such models on the market. In the past two years, partly as a result of the 2009 H1N1 epidemic, the respirator market has changed. There have also been additional studies regarding the efficacy of respiratory protection in regards to infectious aerosols.

There are also significant issues regarding how EMS employers will be able to assess each environment to ensure that appropriate respiratory protection is available to employees who perform high hazard procedures on persons who are suspected or confirmed as having an airborne infectious disease. The Division therefore supports convening an advisory meeting to permit full discussion of this issue, and to consider any proposed changes in the regulation.

### Conclusion

Based on the above rationale, the Division recommends that the Board grant the petition to the extent that an advisory committee be convened by the Division so that these issues, and any proposed regulatory changes can be fully discussed.

cc: Robert Nakamura  
Steve Smith  
Deborah Gold  
Suzanne Marria

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<sup>7</sup> Lee S, Grinshpun SA and Reponen T. Respiratory Performance Offered by N95 Respirators and Surgical Masks: Human Subject Evaluation with NaCl Aerosol Representing Bacterial and Viral Particle Size Range. *Ann Occup Hyg* 52:177-185, 2008.

<sup>8</sup> Lee, Shu-Ann et al. Respiratory Protection Provided by N95 Filtering Facepiece Respirators Against Airborne Dust and Microorganisms in Agricultural Farms. *Journal of Occupational and Environmental Hygiene*, 2: 577-585, 2005