

# Research to Consensus Standards Development

NFPA 1984: Standard on Respirators for Wildland Fire Fighting Operations, 2011 Edition

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Courtesy C. Austin & SOPFEU

# Project Goal

Develop new certification criteria for the approval of respirators for wildland fire fighting operations



Courtesy L. Naeher

# Standards Scope

Dual NIOSH/NFPA Certification for APRs and PAPRs, for use in Wildland Fire Fighting Operations similar to certifications issued for SCBAs

# Research Background

- **The combustion products wildland firefighters are exposed to can vary greatly in characteristics due to the type and amount of material being burned, soil conditions, temperature and exposure time**
- **Smoke inhalation is one of the greatest concerns for firefighter health and it has been shown that the smoke consists of a large number of particles**
- **These smoke particles contain intermediates of hydrogen, carbon and oxygen free radicals which may pose a potential health risk**

# Research Background

- The work environment of firefighters is unlike that of other occupations, not only because of the physical hazards but also due to the respiratory and systemic health hazards of smoke inhalation resulting from combustion
- Research devoted to studying municipal firefighters may not be useful in wildland firefighter exposures because the two work environments are so different
- Thousands of Wildland Firefighters are exposed to different combustion products with different exposure profiles
- Gas and vapors, as well as high particulate concentrations are the major toxins encountered

# Research Background

## **Wildland Fire Fighters use:**

- **NIOSH respirators not suitable for the anticipated hazards;**
- **NIOSH approved filtering facepiece respirators – do not provide protection against fire gases that can be encountered; or**
- **No protection**

# Research Background

- **NFPA received a request from the California Department of Forestry to develop a performance standard for a wildland respirator**
- **In March 2004, a study was initiated by NIOSH to assess the feasibility of collecting medical and environmental exposure data preseason, in a wildfire setting, and post-season**
- **NIOSH health studies indicate that wildland firefighters experience acute respiratory effects, including respiratory symptoms and decrements in pulmonary function**

# Selected Background Material Used by the Task Group

- Austin, C. (September 2008). *Wildland Firefighter Health Risks*. Montreal (Quebec): IRSST.
- NIOSH, 2005a. Wildland firefighter symposium. National Institute for Occupational Safety and Health. Unpublished work, Morgantown, West Virginia.
- Reinhardt, T.E. and Ottmar, R.D. (July 2000). *Smoke Exposure at Western Wildfires*. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.
- Luke P. Naeher, e. (2007). Woodsmoke Health Effects: A Review. *Inhalation Toxicology* , 67 - 106.

# NFPA Process

- NFPA Technical Committee on Respiratory Protection Equipment established a Task Group to review Wildland Fire Fighting Operations in 2007
- Task Group was Chaired by David V. Haston, P.E. – Mechanical Engineer, U.S. Forest Service
- Draft NFPA 1984 “Standard on Respirators for Wildland Fire Fighting Operations” ROP – August 2009
- Technical Committee processed 1984 ROCs – March 2010
- NFPA 1984 Standard published in 2011

# NFPA Standard Scope

## NFPA 1984 Design/Performance Requirements:

- **Minimum protection factor of 10**
- **Heat Resistance**
- **Flame Resistance**
- **Respirator Storage Integrity**
- **Lens Abrasion Resistant**
- **Donning Performance**
- **Communication Performance**
- **Corrosion Resistant**
- **NIOSH Certified APR or PAPR**

# NIOSH Gas and Vapor tests: A multi-gas approval

- Carbon Monoxide
- Organic Vapors
- Sulfur Dioxide
- Nitrogen Dioxide
- Formaldehyde
- Acrolein



Courtesy C. Austin

# Partners

- **National Fire Protection Association (NFPA)**
- **US Forestry Service (Users)**
- **PPE Manufacturers**
- **Independent Test Labs**



# Researcher-Partner Relationship

- **Selection of Partners**
  - Responsible Standards Development Organization (SDO)
  - Motivated PPE users
- **Incentives of Partnership**
  - Memorandum of Understanding (MOU) with NFPA
  - Continued development of NIOSH NPPTL relationship with NFPA
  - Organizational strengths and networking ability with stakeholders
- **Resources**
  - NIOSH provided subject matter experts for project
  - User groups provided substantial feedback

# Researcher-Partner Relationship

- **Establishment of Rapport and Trust**
  - NFPA membership and representation on committee
- **Level of Interaction**
  - Intense level of communication required by strict timeline and scope of project
- **Division of Responsibilities**
  - Aligned with strengths including speed, technical expertise, and standards development process

# Dissemination

- **Presentations**
  - NFPA Technical Committee throughout the project
  - TSWG PPE Conference, December 2010
  - PPT Stakeholder Meeting, March 2011
- **Public Proposals and Public Comments within the NFPA revision process**

# Assessment of New Technologies

- **NIOSH developed test procedures to evaluate the performance of new or novel technologies intended to provide the multi-gas protections of NFPA 1984**
- **NIOSH conducted benchmark testing of products using new and novel technologies with intention of meeting the multi-gas protections of NFPA 1984**

# Standards Path Forward

- **NFPA issued NFPA 1984 Standard on Respirators for Wildland Fire Fighting Operations, 2011 Edition**
- **NIOSH can certify, under 42 CFR 84, for the NFPA identified performance requirements and protections**
- **NIOSH issued a Federal Register Notice <http://www.gpo.gov/fdsys/pkg/FR-2012-11-16/pdf/2012-27898.pdf> identifying test procedures for the NFPA performance requirements and protections**
- **NFPA process for updating the standard to a new edition**

# National Occupational Research Agenda (NORA)

- **Partnership program to stimulate innovative research and improved workplace practices**
- **Recent efforts to develop Research Agenda for Wildland Fire**
  - Working group comprised of a variety of agencies
    - 4 Topic areas for agenda development
      - Acute & Chronic Disease
      - Surveillance & Epidemiology
      - PPE and Equipment
      - Wildland Urban Interface
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