

# **National Personal Protection Technology Laboratory**

## **Concept for NIOSH Certification of Air-Fed Ensembles**

**Colleen Miller**

**Policy and Standards Development Branch**

**September 17, 2009**

**CDC**  
Workplace  
Safety and Health

**NIOSH**

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# JUROR SUMMONS

..... TIME SENSITIVE DOCUMENT.....

## SUMMONS TO APPEAR FOR JURY SERVICE

**COLLEEN S MILLER**

Court of Common Pleas of Allegheny County, Pennsylvania

**Juror Number: 2009057703**



**Fifth Judicial District of Pennsylvania**

By Order of the Honorable Donna Jo McDaniel, President Judge, you are hereby summoned as a juror in the Court of Common Pleas of Allegheny County. Please visit the website at [www.alleghencycourts.us/jury](http://www.alleghencycourts.us/jury) or telephone **412-350-6887** anytime after 4PM on **9/16/2009** to determine whether you are to appear on the date and time shown below. You will be informed by a recorded message if you are to report. You may serve as a juror in any division of the Court. Failure to comply with this summons is punishable by fine, imprisonment, or both. If you are instructed to appear, you must bring this summons with you.

**Building & Floor: 3RD FLOOR COURT HOUSE**  
**Room Number: 318**  
**Report Date: Thursday, September 17, 2009 at 8:30 a.m.**  
**Your Group Number is: R2**

## **Air-fed Ensemble Timeline**

- **December 2, 2008 - Development plan for air-fed ensembles was presented**
- **Benchmark testing, communication with stakeholders initiated**
- **September 17, 2009 - Draft Concept presented**
- **October 19, 2009 - NIOSH Docket 148A closes**

## **Air-Fed Ensemble subpart 42 CFR Part 84**

- **Should the NIOSH development plan require the air-fed ensemble to be certified according to the respirator type used, i.e. supplied air respirator or air purifying respirator**
- **Some air-fed ensembles are made using powered air purifying respirators which are not certified for use in environments immediately dangerous to life and health (IDLH)**
- **Others use the ensembles in work environments that have good engineering controls in place, but could potentially become IDLH environments if those controls fail (draft SAR module requires escape cylinders)**

## **Title 42 CFR Part 84**

- **Current subparts for air-purifying respirators (APR), supplied air respirators (SAR) and the ability to meet future technological advances and needs**
- **The NAS Report action planning process and response and its impact on the development plan for air-fed ensembles**

## OSHA

- **Air-fed ensembles are not currently considered respirators**
- **Classifications of protective clothing includes fully encapsulating suits and radiation-protective suits**
- **Levels of protection, A,B,C, and D do not include air-fed ensembles**



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## **Title 42 CFR Part 84**

- **Subpart A: General Provisions**
- **Subpart B: Application for Approval**
- **Subpart D: Approval and Disapproval**
- **Subpart E: Classification of Approved Respirators**
- **Subpart G: General Construction and Performance**

## **Title 42 CFR Part 84**

- **Classifications, subpart F, is not included**
- **Discuss classifications during the panel discussion, following the presentations**



# Requirements for Air-fed Ensembles

- **Benchmark testing**
  - Preconditioning
  - CO<sub>2</sub> machine (dead space) testing
  - Human subject breathing gas concentration
  - Total Inward Leakage
  - Exhaust vent operation, maintenance of positive pressure, breathing resistance

## CO<sub>2</sub> Machine Testing

- Modifications required to test ensembles
- Sheffield full torso ordered
- Position of the sampling tube in relation to the air inlet
- Breathing gas flow rate
- Inclusion of puncture and wear testing
- Allowing for CO<sub>2</sub> levels greater than 1%

# CO<sub>2</sub> Machine Testing



## **Manned CO<sub>2</sub> Testing**

- **Proper sampling near the subject's mouth**
- **Number of test subjects**
- **Exercises to be included**
- **Temperature conditioning and decontamination**
- **Fogging**

# Manned CO<sub>2</sub> Testing



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## **Inward Leakage**

- **NIOSH corn oil aerosol**
- **ISO 16900-1 selection of test agent and method, supplied air, nonporous material indicates corn oil aerosol method can be utilized**
- **Exhaust vent evaluation**

## **Radiological Workers**

- **Concerns about flammability testing and doffing requirements**
- **European v. American standard for flammability**
- **Fall arrest ensembles are used in some facilities**
- **Cross contamination test**

## **Biological Workers**

- **Use the ensembles daily, twice a day for extended work periods**
- **Concerned about decontamination, ease of changing gloves, and use of filter assemblies specific to the BSL**
- **Some simple repairs are made by the users**
- **Reusable suits are pressure tested**



## **Chemical Workers**

- **Permeation resistance of materials used and construction methods, hoses**
- **Service life indicators**
- **Cooling**
- **Paint industry concerned with vision clarity, practicality of the materials used in construction**

## **Input Sought from Stakeholders**

- **NIOSH welcomes your comments about the Draft Concept for Air-Fed Ensembles**
- **Information about ensembles currently produced, how they are used by workers now and in the future, and the methods used to evaluate their performance is needed**
- **Submit Comments Referencing NIOSH Docket 148A**

## Docket Information

Stakeholder input can be submitted

By Mail:

NIOSH Docket Office

Robert A. Taft Laboratories, M/S C 34

Reference: **Docket 148A** – Air-Fed Ensembles

4676 Columbia Parkway

Cincinnati, OH 45226

Email: [nioshdocket@cdc.gov](mailto:nioshdocket@cdc.gov)

Fax: (513) 533-8285

Phone: (513) 533-8611

## **Panel Discussion - Classifications**

- **Classification of NIOSH approved ensembles to indicate intrinsic safety?**
- **What works, is there a common language?**
- **Type I: A design such that the air supply to the suit and the respiratory inlet covering is interdependent**
- **Type II: A design such that air supply to the suit can be disrupted without affecting respiratory protection**

## **Panel Discussion - IDLH**

- **Feasibility of including escape cylinders, APER?**
- **Development and use of SAR/PAPR combination ensemble?**
- **Test methods to determine the “escape time” potentially offered by an ensemble?**

## **Panel Discussion – Use Concerns**

- **What classifies an ensemble as disposable or reusable?**
- **What methods are used to ensure proper functioning prior to reuse?**
- **Storage and use temperature concerns?**

## **Panel Discussion – Flammability**

- **Worker tasks that require the use of an ensemble and flame resistance?**
- **Ignition resistance?**
- **Identifying the test method to measure this property?**
- **Should it be specific to the classification or intended use environment?**

## **Panel Discussion – Flammability**

- **NFPA 701-1989, Flame Resistant Textiles and Films**
- **EN 1174 1997 Respiratory protective devices for self-rescue. Self-contained open-circuit compressed air breathing apparatus incorporating a hood (compressed air escape apparatus with hood). Requirements, testing, marking**



## **Panel Discussion – Visor/Harness**

- **Visors evaluated for impact and penetration resistance? For specific users or classification?**
- **External harnesses used with ensembles? How?**

## **Panel Discussion – Physical Properties**

- **Tensile and burst strength, tear and flex cracking resistance?**
- **Puncture resistance and abrasion resistance (combined with CO<sub>2</sub> dead space test)?**
- **Seam strength, penetration and permeation resistance**
- **Material permeation, liquid penetration, and particle penetration resistance**

## **Panel Discussion – Physical Properties**

- **Should these properties be classification or use specific?**
- **Data available to indicate the performance level of ensembles currently used?**