August 25, 2004
Key Bridge Marriott, Arlington, VA
NIOSH/NPPTL Public Meeting

Development Efforts
Total Inward Leakage Standards
Welcome

William Newcomb
Project Manager
Total Inward Leakage Program
National Personal Protective Technology Laboratory
Schedule 21
- 1934
- Thirty-minute test in coal dust

Schedule 21A
- 1959
- Coal dust but no exercises

Schedule 21B
- 1965
- Isoamyl acetate test
- Organic vapor cartridges
- Schedule 21C
- 1972 Coal dust test abolished
- Isoamyl acetate test
- Configuration issues
- 42 CFR Part 84
- 1995 Isoamyl acetate test eliminated
- OSHA individual fit testing
- Undefined NIOSH effectiveness studies for isoamyl acetate
- ANSI/OSHA accepted fit testing
- Best practices used in a quality respirator program
Lack of Fit Testing

- **Respirator Usage in Private Sector Firms, 2001**
  - Only 53% of respondents conduct fit tests

- OSHA public hearing on the proposed revision to 29 CFR Part 134
  - Table for assigned protection factors
  - Maximum use concentrations

- NPPTL to add a quantifying fit method to respirator certification requirements

**CDC Workplace Safety and Health**

**NPPTL**

**NIOSH**

25 August 2004
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- NPPTL TIL assessment
  - Respirators with face-fit as a major contributor
  - TIL of other PPE such as total encapsulation suits
- ANSI Z88.2 *American National Standard for Respiratory Protection* and OSHA proposed APF schedule
  - Two areas of the most debate by the experts as to the actual protection and associated assigned protection factors
  - Half-mask respirators in particular, filtering facepieces
  - Hood/helmet devises both air supplied and powered air purifying
    - Notable Lawrence Livermore National Laboratory PAPR study
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- NIOSH's unique modular approach to Standards Development
- Develop requirements for half-mask respirators first
- PAPR and supplied-air respirators to follow
Total Inward Leakage Program

- Phase 1: Investigative/concept draft
  - Gather and review existing TIL respirator information,
  - Review existing TIL test equipment capabilities and technical specifications,
  - Identify a peer review team composed of manufacturers, users, academia and government,
  - Develop initial TIL concept addressing performance requirements and test protocol,
  - Establish technical specification for TIL test facility
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- Phase 2: Test facility/benchmark testing
  - Establish NPPTL TIL test facility
  - Perform benchmark testing to establish state of the art respirator performance
  - Continue development of TIL concept requirements and protocols
  - Identify draft implementation plan
- Finalize TLL concept requirements and protocols
- Finalize implementation plan
- Conduct validation testing for TLL facility

Phase 3: Consistency testing and implementation plan

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Criteria

TI: Certification Performance

- No respirator can be certified to fit
  - Only method of assuring individual fit is a fit test
  - Not a substitute for OSHA mandated individual fit testing
TIL Certification Performance Criteria

- Establish certification performance criteria
- Not based on OSHA's APF
- Based on actual fit factor results
- Inappropriate to use previously obtained fit-test data
- Conduct benchmark testing on state-of-the-art respirators within class
- Rely on the manufacturer's User Instructions
- Use entire panel for TIL evaluation in lieu of specific guidance
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For the half-mask project the following test method characteristics were compared:

<table>
<thead>
<tr>
<th>Ability to be used to measure TIL on all styles of halfmasks, quartermasks and filtering facepieces regardless of air purifying element</th>
<th>Ability to give accurate, repeatable results</th>
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</thead>
<tbody>
<tr>
<td>Required sensitivity for the desired results</td>
<td>Ability to do required test exercises without disturbing the fit due to test equipment, probes, etc</td>
</tr>
<tr>
<td>Ease of duplication (i.e., intra-lab reproducibility)</td>
<td>Ease of preparation, use, clean up, etc</td>
</tr>
<tr>
<td>Cost of equipment</td>
<td>Need for a test chamber</td>
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- Best choice for measuring half-mask respirator TIL is PortaCount® Plus, in a direct reading mode

- Most reproducible exercise methods were thought to be the OSHA fit test protocol

- A standard workplace with standardized movements does not exist.
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- Project will be peer reviewed
  - Programmatically
  - Scientifically
  - Input from all stakeholders is welcome

- Two planned public meetings on the half-mask project

- Benchmark testing has begun
  - Plans to have the testing complete this year

- Final concept by late next spring
  - Recommendations are sought
## Total Inward Leakage Program

<table>
<thead>
<tr>
<th>Phase</th>
<th>Objectives</th>
<th>Dates</th>
<th>Milestones</th>
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<tbody>
<tr>
<td>Phase 1: Investigative concept draft</td>
<td>Gather information, Review test equipment, Identify peer review</td>
<td>Mar 04 through Aug 04</td>
<td>TIL concept, Facility specification, Peer review, Public meeting</td>
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<tr>
<td>Phase 2: Test facility/ benchmark testing</td>
<td>Establish test facility, Benchmark tests, Continued concept development</td>
<td>May 04 through Feb 05</td>
<td>Draft implementation plan, Peer reviews, Public meeting, Test facility complete</td>
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<tr>
<td>Phase 3: Validation testing/ implementation plan</td>
<td>Validation testing, Implementation plan</td>
<td>Sept 04 through April 05</td>
<td>Peer review, Implementation plan, Final TIL concept</td>
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</tbody>
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Quality Partnerships
Enhance Worker
Safety & Health

Thank you

Visit NPPTL at: http://www.cdc.gov/niOSH/npptl/default.html