Why Develop a CBRN Ensemble Standard for Law Enforcement?

- Existing standards address CBRN protection for many emergency responders (HAZMAT, fire service, technical rescue, and emergency medical service)

- No existing standard fully addresses law enforcement needs

- DHS grant programs limit procurement of CBRN ensembles to those compliant with standards adopted by DHS

Result = procurement of ensembles that are neither designed for nor tested to meet requirements of the law enforcement community
Law Enforcement Requirements

Examples include:

- Durability
- Different threats (i.e., human threat)
- Dexterity (operating firearm)
- Stealth operations
- Compatibility with other mission-essential equipment (communications, ballistic-resistant armor, helmets, etc.)
NIJ CBRN Protective Ensemble
Standard Effort

Special Technical Committee (STC)

Advisory Working Group (AWG)

Steering Committee (SC)
Special Technical Committee

• Began work in August 2007 and completed work in May 2009

• Responsible for developing the performance standard and related documents for CBRN ensembles for law enforcement

• Membership:
  – Law enforcement practitioners with relevant experience & expertise
  – Stakeholder organizations represented include: NFPA, DHS, DEA, FLETC, FOP, IACP, NSA, NTOA
  – Technical experts from NIST/OLES, DOD, NIOSH, UL, and SEI (engineers, scientists, test labs, conformity assessment bodies, standards development organizations)
  – Standard was released in November 2010
## Special Technical Committee

### Law Enforcement Practitioners

<table>
<thead>
<tr>
<th>Member</th>
<th>Organization</th>
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<tr>
<td>Capt. Ed Allen</td>
<td>NTOA (Seminole County SD)</td>
</tr>
<tr>
<td><strong>Ed Bailor</strong></td>
<td>US Capitol Police (Retired), STC Chairman</td>
</tr>
<tr>
<td>Mike Brown</td>
<td>National Sheriff’s Association</td>
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<tr>
<td>Hugh Breslin</td>
<td>Federal Law Enforcement Training Center</td>
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<tr>
<td><strong>Lt. Kevin Sommers</strong></td>
<td>Fraternal Order of Police (Warren PD)</td>
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<tr>
<td>Jerry Craig</td>
<td>Drug Enforcement Administration</td>
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<tr>
<td>Martin Hutchings</td>
<td>National Bomb Squad Advisory Board (Sacramento County SD)</td>
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<tr>
<td>Dave McBath</td>
<td>International Association of Chiefs of Police (NYSPD)</td>
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<tr>
<td><strong>Lt. Tom Nolan</strong></td>
<td>NTOA (Upper Merion Township PD)</td>
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<tr>
<td>Charles Onesko</td>
<td>FBI Hazardous Materials Response Unit</td>
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### Technical Experts

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<tr>
<td>Heather McArthur</td>
<td>Phoenix Police Department</td>
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<tr>
<td>Patricia Gleason</td>
<td>Safety Equipment Institute</td>
</tr>
<tr>
<td>Gordon Gillerman</td>
<td>National Institute of Standards and Technology</td>
</tr>
<tr>
<td><strong>Bill Haskell</strong></td>
<td><strong>National Institute for Occupational Safety and Health</strong></td>
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<tr>
<td>Tom Neal</td>
<td>ASTM International</td>
</tr>
<tr>
<td>Gene Stark</td>
<td>Department of Defense</td>
</tr>
<tr>
<td>Stephanie Elder</td>
<td>US Army Soldier Research, Development and Engineering Center – Natick</td>
</tr>
<tr>
<td>Elaine Stewart-Craig</td>
<td>Edgewood Chemical and Biological Center</td>
</tr>
<tr>
<td>Steve Corrado</td>
<td>Underwriters Laboratory</td>
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Advisory Working Group (AWG)

- Provides oversight and guidance to the STC during standard development effort

- Comprised of senior-level personnel from the following organizations

  NIST/OLES: Phil Mattson
  DHS: Jim Hagy
  NFPA: Bob Vondrasek
  FOP: Tim Richardson
  NTOA: John Gnagey
  IACP: Joel Leson/Dave McBath
  IAB: Bob Ingram
  NSA: John Thompson
Steering Committee

• Purpose is to provide overall direction of the effort and to review the completed standard and related documents

• Consists of the following senior advisors:

  NIJ Deputy Director for Science and Technology: Dr. John Morgan

  DHS Science & Technology Standards Executive: Dr. Bert Coursey

  NIST/OLES Director: Mark Stolorow
Standard and Supporting Documents

1. **Equipment Standard**: Defines minimum performance requirements and test methods to assess performance.

2. **Conformity Assessment Requirements**: Details the requirements for ensuring that a product or process conforms to the standard.

3. **Selection and Application Guide**: Provides information to assist law enforcement agency decision-makers, procurement officials, and end users.
CBRN Ensemble Standard

- Built on related work by Natick (funded by DHS), NFPA, and other organizations to minimize time needed to create a new standard for law enforcement

- Modeled the new standard after existing NFPA CBRN/Hazmat Standards

- Law enforcement requirements incorporated in ensemble classification levels, ergonomic testing, noise generation criteria, durability requirements, etc.
Standard

Defines minimum design and performance requirements and test methods to verify performance

1. Purpose, Scope, and Application
2. References
3. Definitions
4. Form and Fit Requirements
5. Performance Requirements
6. Test Methods
7. Labeling and Information
Major Features of the Standard

• Scope: Standard establishes the minimum requirements for ensembles and ensemble elements designed to protect law enforcement personnel from CBRN hazards:
  – Chemical warfare agents (CWAs)
  – Toxic industrial chemicals (TICs)
  – Biologically derived toxins or pathogens
  – Radiological particulate hazards
  – Clandestine drug laboratory exposure hazards

• Ensemble elements: Garment, hand protection, foot protection
  – Garment: protects upper and lower torso, arms, legs, and head
Major Features of the Standard (Cont’d)

- 4 Law Enforcement Response Levels (LERLs) based on mission requirements, expected mission duration, durability requirements of different operations and activities, and hazards in the CBRN threat environments

- Design Requirements, such as interoperability and integration with law enforcement mission-specific equipment

- Performance requirements and test methods to assess whether or not requirements are met
Law Enforcement Response Levels

- Law Enforcement Response Level-1 (LERL-1)
  - Conditions unknown or known to be above Immediately Dangerous to Life and Health (IDLH)
  - Requires use of Self Contained Breathing Apparatus (SCBA)
  - Requires Flame Resistance (FR) Protection

Example Mission Scenario: High-risk tactical entry into a building containing chemical warfare agents of toxic industrial chemicals or into a suspected clandestine drug lab
Law Enforcement Response Levels

- Law Enforcement Response Level–2 (LERL-2)
  - Conditions unknown or known to be above IDLH
  - Requires use of SCBA

**Example Mission Scenario**: Hostage-taking incident where there is a potential dynamic entry into an environment where chemical warfare agent of toxic industrial chemicals are being used or implied as a weapon
Law Enforcement Response Levels (Cont’d)

- **Law Enforcement Response Level–3 (LERL–3)**
  - Known to be below IDLH
  - Requires use of Air Purifying Respirator (APR) or Powered Air Purifying Respirator (PAPR)

**Example Mission Scenario:** Tactical building search in an environment where chemical warfare agents or toxic industrial chemicals are present and monitoring has determined that level to be below IDLH
Law Enforcement Response Levels (Cont’d)

- Law Enforcement Response Level–4 (LERL-4)
  - Known to be below IDLH
  - Requires use of APR or PAPR

**Example Mission Scenario:** Securing a perimeter in an environment where chemical warfare agents or toxic industrial chemicals are present and monitoring has determined the level to be below IDLH
Form and Fit Requirements

- Ensembles shall protect the wearer’s entire body including the upper and lower torso, legs, arms, head, hands, and feet.

- Ensemble elements include protective garments, hand protection, and foot protection.

- Garments and footwear shall be provided in at least 8 distinct sizes each.

- Hand protection shall protect from the fingertip to at least 1 inch beyond the wrist crease.
Important Law Enforcement Test Methods

- Ergonomics Tests:
  - Donning and Doffing Tests
  - Gross Body Mobility Tests
  - Dexterity Tests: Glove Fine and Gross Dexterity Tests
  - Field of View Test
  - Tactical and Perimeter Scenario Tests (developed by STC)

- Audible Signature Test (developed by STC)

- Color/Visibility Test (developed by STC)
Certification Program

- Purpose is to demonstrate that products available to law enforcement are tested and evaluated to meet or exceed the requirements of the standard

- Third-party certification of CBRN protective ensembles to the requirements of the NIJ standard

- Initial and periodic evaluation of products and facilities

- Accreditation requirements for certification bodies (ISO/IEC Guide 65) and for test laboratories (ISO 17025)
Selection and Application Guide

- Provides information to assist law enforcement agency decision-makers, procurement officials, and end users

- Description of the applicable NIJ standard and conformity assessment program in non-technical terms

- Importance of wearing CBRN protective ensembles

- Guidance for selecting most appropriate technology

- Maintenance and care of equipment

- Applicable Codes and Regulations

- Recommended Training

Provides information to assist law enforcement agency decision-makers, procurement officials, and end users.

Description of the applicable NIJ standard and conformity assessment program in non-technical terms.

Importance of wearing CBRN protective ensembles.

Guidance for selecting most appropriate technology.

Maintenance and care of equipment.

Applicable Codes and Regulations.

Recommended Training.
Opportunities for Stakeholder Input

- 3 AWG briefings
- Steering Committee briefing
- Presentations at numerous conferences, meetings, and workshops
- Public comment period
Review by the AWG

• March 26, 2008 – Briefing of the overall effort including status to date

• July 18, 2008 – Discussion prior to release of draft standard and certification program requirements for public comment

• March 20, 2009 – Discussion of final documents
  – AWG verbally concurred with documents
Public Review and Comment

- Public comment period for standard and certification program requirements
  - Announced via Federal Register Notice.
  - Comments given via internet.
  - Open from August 11, 2008 – September 24, 2008
  - ~ 600 Comments received (many repetitive due to structure of standard)
  - Each comment was reviewed and discussed by the STC
  - Changes were made by the STC based on public comments
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Public Comments (Continued)

• Topics
  – Independent certification of ensemble elements
  – Clarification of definitions
  – Coordination with changes in respiratory protection configuration
  – Clarification of “subdued, non-reflective”
  – Clarification of “visible breach of integrity”
  – Adopt 1994 requirements where possible
  – Ergonomic test - acceptance criteria; clarification of movements
  – Sample sizes (numbers, gender, etc.)
  – FR thread for levels other than LERL-1
  – Donning/doffing times
  – Liquid Integrity Test (vs. Rain Cabinet Test vs. Expulsion Test)
Public Comments (Continued)

• Topics (Continued)
  – Audible signature test – acceptance criteria; methodology
  – Chemical permeation test – dermal vs. respiratory threat; gas concentrations
  – Total Heat Loss (THL) requirement
  – Flash Fire Test – requirement; applicability
  – Clarification – inner vs. outer layers providing protection; test separate layers vs. composites
  – Man-in-Simulant Test (MIST) requirement
  – Tactical/Perimeter Tests (temperature conditions; clarification of test method)
  – Sample conditioning
  – Decontamination (single use vs. single exposure)
  – Miscellaneous clarifications
Major Changes Made to the Standard

- Adjusted TIC gas concentrations for chemical permeation test
- Added test method and requirements for color/visibility testing
- Adjusted total heat loss (THL) values
- Reduced number of samples required
- Added Annex A - “Acoustic Measurements and Calculations”
- Increased number of ergonomic test repetitions
- Adjusted acceptance criteria for flash fire test
- Added definitions and/or clarifying text
Changes to Certification Program

• Addition/revision of definitions: attestation, certification, certification organization.

• Miscellaneous clarifications.
Further Information

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