Institute for Tribal Environmental Professionals

Tribal Lands and Environment: A National Forum on Solid Waste, Emergency Response, Contaminated Sites and USTs
August 20-23, 2012 Coos Bay, Oregon

HAZWOPER 8-Hr Refresher
Aug. 20, 2012

Personal Protective Equipment (PPE)
Why Should Workers Wear PPE?

• 29 CFR 1910.120(i)

• The Occupational Safety and Health Administration (OSHA) requires that employers protect workers from workplace hazards that can cause injury or illness.

• Controlling a hazard at its source is the best way to protect workers. However, when administrative controls, engineering controls and work practice are not feasible or do not provide sufficient protection, employers must provide Personal Protective Equipment (PPE) to workers and ensure its use.
PPE – Required Or Optional

• PPE is the last line of defense against chemical contaminants (but important to use properly)

• Options to Reduce Exposure –
  - Reduce number of workers
  - Use tools or technology to reduce time
  - Prepare and plan prior to entry
  - Re-design tasks
# Employer Obligations

<table>
<thead>
<tr>
<th>Employer Obligations:</th>
<th>Workers Should:</th>
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<tbody>
<tr>
<td>Performing a &quot;hazard assessment&quot; of the workplace to identify and control physical</td>
<td>Properly wear PPE</td>
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<td>and health hazards.</td>
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<tr>
<td>Identifying and providing appropriate PPE for employees.</td>
<td>Attend training sessions on PPE</td>
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<td>Training employees in the use and care of the PPE.</td>
<td>Care for, clean and maintain PPE</td>
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<tr>
<td>Maintaining PPE, including replacing worn or damaged PPE.</td>
<td>Inform a supervisor of the need to repair or</td>
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<td></td>
<td>replace PPE.</td>
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<td>Periodically reviewing, updating and evaluating the effectiveness of the PPE program.</td>
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PPE Program

Hazard Assessment/Identification
Selection, Use, Decontamination Guidelines
Training
Record Keeping
PPE Program

- Employers must assess the workplace for hazards and determine if hazards are present that require PPE.
- Ensure workers receive training and know the following:
  - When PPE is necessary to be worn.
  - What PPE is necessary.
  - How to properly don, doff, adjust, and wear PPE.
  - The limitations of the PPE.
  - The proper care, maintenance, useful life and disposal of the PPE.
- Program addresses:
  - Some programs address eye, face, head, foot, and hand protection. Separate programs exist for respiratory and hearing protection since the need for participation in these programs is established through industrial hygiene monitoring.
PPE Selection

• Presence and identification of chemicals and hazards
• Physical characteristics of chemicals:
  - Physical state
  - Flammability/volatility
  - Reactivity
  - Corrosivity
  - Toxicity
• Work assignment and tasks
• Ease of decontamination and equipment compatibility
• Chemical resistance/breakthrough
• Disposable versus Reusable
• Which provides the best protection
• Cost
Types Of PPE

• Fully-encapsulating suits
• Non-encapsulating suits
• Respiratory protection
• Aprons, leggings, & sleeve protectors
• Gloves
• Boots
• Safety glasses, face shields
Levels of Protection

- **Level A**
  - Supplied Air Respirator (SAR), SCBA, In-line, pos. pressure
  - Totally encapsulated suit (vapor protective)

- **Level B**
  - SAR or SCBA pos. pressure
  - Chemical protection not specified

- **Level C**
  - Air Purifying Respirator (APR), neg. pressure
  - Chemical protection not specified

- **Level D**
  - Work clothes
  - No chemical protection
Head Protection

• Hard hat (A, B, C)

• ANSI Z89.1

• Inspect daily
  – Dents, cracks, penetration
  – Damage due to impact
  – Flex the hard hat - if it cracks or shatters, it has become embrittled by UV
  – Inspect the webbing for fraying or cuts
  – Inspect the anchor points
Eye Protection

• ANSI Z87.1

• Spectacles with side shields

• Goggles

• Face shield

• Side shields
Foot Protection

• Steel toe/steel shank (not required in all situations)
  - Electrically conductive shoes
  - Electrical hazard, safety-toe shoes

• Leather upper/oil resistant sole

• ANSI Z41.1

• Notched heel to prevent sliding thru ladder

• Disposable booties reduces decontamination needs
Gloves and Clothing

Gloves

• Latex
• Rubber
• Nitrile
• Butyl Rubber
• Leather
• Silvershields
Gloves and Clothing

Clothing

• Tyvek
  One-piece coverall that protects against dust, fibers, and contact with dry materials
  - Inexpensive
  - Not chemical resistant.
  - Mainly used for keeping clean
• Special Suits (Chemical, fully encapsulating)
Protective Clothing Breakthrough

• **Permeation** - the process by which a chemical dissolves in and/or moves through the material on a molecular level.

• **Degradation** - the loss of or change in a fabric’s chemical resistance or physical properties due to exposure to chemicals, use, or ambient conditions (i.e., sunlight).

• **Penetration** - the movement of chemicals through zippers, stitched seams or imperfections in the material.
Hearing Protection Controls

• Administrative & Engineering
• Ear plugs/ear muffs
• Noise Reduction Rating (NRR) - EPA hearing protection rating
RESPIRATORS
Types of Respirators

- Particulate Respirator
- Chemical Cartridge/Gas Mask
- Powered Air-Purifying Respirator (PAPR)
- Self-Contained Breathing Apparatus (SCBA)
- TESTED AND CERTIFIED BY NIOSH
- Certification is based on specific brands.
- Certified equipment will have a TC number
Particulate Respirator

Nine classes of particulate filters broken down into three series: **N, R, and P**.

- Each series (N, R, and P) is available at three efficiency levels: 95%, 99%, and 99.97%.
- The N series filter is used in environments free of oil mists.
- The R series filters can be exposed to oil mists, but should only be worn for one work shift.
- The P filter can be exposed to oil mists for longer than one work shift.
Chemical Cartridge/Gas Mask Respirator

- Basic Half Mask
- Full-face (eye protection)
PAPR

• Hood continuous flow hose (one example)
SCBA
Protection Factors

**Protection Factors (PF):** indicates the relative difference in concentrations that a respirator can maintain of a contaminant outside versus inside the face piece.

- **General PF** – determined experimentally by measuring the seal of the face piece and exhalation valve leakage.

- **Personal PF** – determined on an individual wearing a specific respirator using quantitative fit testing methods.

<table>
<thead>
<tr>
<th>Protection Factor</th>
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<tbody>
<tr>
<td>1/2 Mask</td>
<td>= 10</td>
</tr>
<tr>
<td>Full-face</td>
<td>= 50</td>
</tr>
<tr>
<td>PAPR</td>
<td>= 100</td>
</tr>
<tr>
<td>SCBA</td>
<td>&gt;10,000</td>
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# Cartridges

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Color Coding on Cartridge/Canister</th>
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<tbody>
<tr>
<td>Acid gases</td>
<td>White</td>
</tr>
<tr>
<td>Hydrocyanic acid gas</td>
<td>White with 1/2 inch green stripe completely around the canister near the bottom.</td>
</tr>
<tr>
<td>Chlorine gas</td>
<td>White with 1/2 inch yellow stripe completely around the canister near the bottom.</td>
</tr>
<tr>
<td>Organic vapors</td>
<td>Black</td>
</tr>
<tr>
<td>Ammonia gas</td>
<td>Green</td>
</tr>
<tr>
<td>Acid gases and ammonia gas</td>
<td>Green with 1/2 inch white stripe completely around the canister near the bottom.</td>
</tr>
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</table>
OSHA Respirator Program

- 29 CFR 1910.134
- Written Program
  - Selection
  - Training
  - Work Mission Duration
  - Personal Use Factors
  - Fit Testing
  - Donning
  - In-Use Monitoring
  - Doffing
  - Inspection
  - Storage
  - Maintenance
Respirator Fit Testing

POSITIVE AND NEGATIVE FIT TESTING EVERY TIME YOU PUT IT ON:

• QUALITATIVE FIT TESTING
• QUANTITATIVE FIT TESTING
Tasks That May Require Respirators

- Process where material is atomized or sprayed
- Process involving dust
- Process involving chemical reactions
- Process using carcinogens, sensitizers, or highly toxic materials.
- Other Situations – Confined spaces, firefighting, chemical spills, emergency back-up (chlorine system), asbestos abatement, etc.
Conditions That Exclude or May Exclude Use of Air Purifying Respirators

• Oxygen deficiency
• IDLH concentration of specific substance
• Entry into an unventilated or confined area where the exposure conditions have not been characterized
• Presence of unidentified contaminants
• Contaminant concentrations are unknown or exceed designated maximum use concentrations
• Identified gases or vapors have inadequate warning properties and the sorbent service life is not known and the unit has no end-of-service-life (ESLI) indicator
• High relative humidity
Safety Counts

- Buddy System
- Don’t ignore rules and regs; they are there to keep you safe
- Know your limits
Questions?