HAZARD ASSESSMENT AND SELECTION OF PERSONAL PROTECTIVE EQUIPMENT FOR OPERATIONS IN CLANDESTINE LABS

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The Problem

- National epidemic of clandestine methamphetamine “laboratories”
- Residences, motel rooms, condominiums, automobiles, dumpsters, etc.
- Fires, explosions, solvents, acid gases, Ph₃, NH₃, metals
- Product precursors, residuals and final product
- Occult hazards from surface contamination
- An occupational and public health problem
The Problem

- Not all clandestine laboratories are making methamphetamine:
  - Marijuana grow labs
    - Amphetamine – Speed, Crank
    - GHB – Date Rape, Scoop
    - LSD – Acid
    - MDMA – XTC, Ecstasy, Love Drug, Adam
  - Processing of other narcotics
The Risks

- Personal Harm
  - To self
  - To family, neighbors
  - Public safety/first responders
  - Remediators, public health personnel
- Damage to property
- Damage to environment
Data on methamphetamine labs collected from 16 states from Jan 2000, through June 2004 revealed:

- Nearly 1,800 meth events
- 10% of events involved fire or explosion
- 31 percent of the events involved injuries, with police officers most often injured
- 1,154 people underwent decontamination, 60 percent of which were emergency responders

Source: MMWR April 15, 2005 / 54(14);356-359
Methods of Manufacture

Red Phosphorus Method (Hot, Red P)
- Extract ephedrine-pseudoephedrine
- Add red phosphorus & iodine
- Let react for 8-72 hours
- Cool, filter red phosphorus
- Add sodium hydroxide
- Extract with solvent
- Salt out free base
- Purify as needed
Methods of Manufacture

Anhydrous Method (Birch, Cold, Nazi)

- Extract ephedrine-pseudoephedrine
- Add ammonia & lithium metal
- Let react for approx 3 hours
- Add sodium hydroxide
- Extract with solvent
- Salt out free base
- Purify as needed
Methods of Manufacture

One Pot or “Shake and Bake” Method

- Modification of the Birch or Anhydrous method
- Done in a single container, mix all the ingredients, agitate and vent cap
- Usually less than 1 gm produced
- In some localities, this is becoming THE way to make methamphetamine. May have a lot of separate batches
- Bring them all together to “salt out’
# Methods Summary

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Key Differences
What Status can Labs be Found

- Setup and Active
- Setup and Inactive
- Boxed or Stored
- Discarded
What Status can Labs be Found

Setup and Active

- Key indicators include:
  - Complete “Lab” setup
  - Active heat sources
  - Obvious chemical reactions

- Most dangerous situation!
  - Monitor for flammable/explosive atmosphere
  - Monitor for toxic gas and vapors
What Status can Labs be Found

Setup and Inactive

- Key indicators include:
  - Partial “Lab” setup
  - No active heat sources
  - No obvious chemical reactions
- Should be relatively stable
  - Monitor air quality
  - Splash hazard potential
What Status can Labs be Found

Boxed or Stored

- Key indicators include:
  - NO “Lab” setup
  - Materials stored or hidden
- Should be relatively stable
  - Should not need to take any actions
  - Chemical hazards may be present
What Status can Labs be Found

Discarded

- Key indicators include:
  - Can be found anywhere
  - All of the typical “precursors”
- Can be very unstable/dangerous!
  - Possible toxic or explosive reactions
  - Potential for splash hazards
Exposure Hazards

• Violent individuals
• Physical hazards-
  • Fire and/or explosions
  • Traps
  • Confined spaces
  • Slips, trips, falls

• Chemical hazards-
  • Volatile chemicals
  • Toxic chemicals
  • Corrosive chemicals
  • Reactive chemicals
Existing Guidance

- DEA “Red Book”: Guidelines for Law Enforcement for the Cleanup of Clandestine Drug Laboratories
Existing Guidance

- EPA “Green Book”: Voluntary Guidelines for Methamphetamine Laboratory Cleanup
Existing Guidance

- NIJ: CBRN Protective Ensemble Standard for Law Enforcement, NIJ Standard-0116.00
DEA “Red Book”

- Determination of PPE requirement is made during initial “size-up” and site assessment
  - Includes tactical PPE as well as OSHA levels of protection
    - Level A
    - Level B
    - Level C
    - Level D

- Best practice is to change to next lower level as soon as conditions warrant
• Level A- Selected when the greatest level of skin, respiratory, and eye protection is required

- Positive pressure, full face-piece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA, approved by the National Institute for Occupational Safety and Health (NIOSH)

- Totally-encapsulating chemical-protective suit-flash protection may be needed

- Gloves, outer, chemical-resistant

- Gloves, inner, chemical-resistant

- Boots, chemical-resistant, steel toe and shank

- 2-way communication
Level B - The highest level of respiratory protection is necessary but a lesser level of skin protection is needed

- Positive pressure, full-facepiece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved)
- Hooded chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls)
- Gloves, outer, chemical-resistant
- Gloves, inner, chemical-resistant
- Boots, outer, chemical-resistant steel toe and shank
- 2-way communication
Level C- The concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air purifying respirators are met

- Full-face or half-mask, air purifying respirators (NIOSH approved)
- Hooded chemical-resistant clothing (overalls; two-piece chemical-splash suit; disposable chemical-resistant overalls)
- Gloves, outer, chemical-resistant
- Gloves, inner, chemical-resistant
- Boots (outer), chemical-resistant steel toe and shank
- 2-way communication
• Level D- The atmosphere contains no known hazard and work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

  - Primarily a work uniform or coverall. It should not be worn on any site where respiratory or skin hazards exist. It provides no respiratory protection and minimal skin protection.
  - Always wear eye protection, gloves, boots with steel-toe and shank.
EPA “Green Book”

• Determination of PPE requirement is made during initial site assessment and included in the site safety plan
  • Includes OSHA levels of protection
    • Level A
    • Level B
    • Level C
    • Level D

• Best practice is to change to next lower level as soon as conditions warrant
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.
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)
- Fully encapsulating
- Requires Flame Resistance (FR) Protection
Law Enforcement Response Level–2 (LERL-2)

- Conditions unknown or known to be above IDLH
- Requires use of SCBA
- Dermal protection
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)
- Dermal protection
Law Enforcement Response Level–4 (LERL-4)

- Known to be below IDLH
- Requires use of APR or PAPR
- Dermal protection
Model Response

- Response for mobile laboratory at drugstore
Model Response
Model Response
Model Response
When possible, conduct a site assessment to determine possible hazards

- Type of laboratory: active, in-active, stored or dumped
- If possible, prior to tactical operations notify the fire department, HAZMAT, EMS, contractors
- Establish decontamination measures and RIT/back-up teams
Summary

- Assume the worst, hope for the best
  - Wear highest level of protection that is practical for the situation
  - Be observant and monitor for physical and chemical hazards
  - Secure the scene and begin stabilization/mitigation
Summary

- As conditions warrant, step down in level of PPE
  - Wearing of PPE is physically stressful
    - Increased heat stress
    - More physical exertion-heavy and bulky
  - Sensory impairment- poor vision/hearing
  - Increased risk of trips and falls
For further information

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