

**Adams and Jefferson County Hazardous Response Authority  
FIELD OPERATING GUIDELINES**

**SAFETY**

**F.O.G. #: 500**

**DATE:** October 25, 2018

**CATEGORY: PPE**

**PAGES: 8**

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**I. Purpose:**

- A. To define the Personal Protective Equipment (PPE) used by the AJCHRA.

**II. Guideline:**

- A. Personal Protective Equipment (PPE) shall be utilized in accordance with the hazards present at the incident scene. If a specific type of PPE cannot be determined in the initial stages then the highest level of PPE shall be selected.

1. Levels of PPE:

- a) Level "A" Protective equipment includes the following:

- 1) Vapor Tight Encapsulated Suits: Vapor suits will be worn whenever the possibility of chemical contamination from toxic vapors exists. This suit provides the highest level of skin and respiratory protection. The suit will consist of:
  - i) Vapor tight encapsulated suit - Whenever any type suit is used, chemical compatibility shall be checked
  - ii) Chemical protective boots with outer security boot cover
  - iii) Nomex type coveralls for thermal protection.
  - iv) Positive pressure Self Contained Breathing Apparatus
    - (1) Open Circuit
    - (2) Closed Circuit
  - v) Radio Equipment
  - vi) A system of gloves will be used in the following order:
    - (1) Inner nitrile exam glove
    - (2) Attached suit glove(s)
      - Butyl
      - Viton

- Nitrile
- Neoprene
- Silver Shield or One-Glove® System

(3) Appropriate outer protective gloves.

- Cut resistant aramid fiber
- Thermal protection (Cryogenic)
- Leather work gloves

b) Level "B" Protective equipment includes the following:

1) Splash Suits: Protective splash suits shall be worn whenever the possibility of chemical contamination exists, excluding vapor contamination. This suit provides the same level of respiratory protection as the Level A but less skin protection. The suit will consist of:

i) CPF, Saranex/Tyvek or PVC. Whenever any of the suits are used, all seams and area that may provide an opening for chemical contamination may be sealed with duct tape or chem. tape. If there is a large splash hazard or overhead work to be done, fully encapsulated, non-vapor tight suits should be considered.

ii) Protective boots

iii) Gloves (PVC, nitrile, or butyl rubber)

iv) Breathing apparatus (positive pressure) shall be used

c) Level "C" Protective equipment includes the following:

1) Provides the same level of skin protection as Level B, but a lower level of respiratory protection. Chemical resistive protective clothing that may include one- or two-piece chemical splash suit or disposable protective suits: The disposable suit may be worn whenever the possibility of chemical contamination is minor, as additional protection under splash or vapor suits, and during decontamination of other personnel. The disposable suit shall consist of:

i) Coat with hood, or combination suit (CPF, tyvek)

ii) Protective Boots and if warranted outer security boot cover system.

iii) Appropriate gloves.

iv) Full face air purifying respirator (APR) or powered air purifying respirator (PAPR) approved by the safety officer based on air monitoring and known chemical hazard.

2. Self-Contained Breathing Apparatus shall meet NFPA Standards and all personnel shall be adequately trained and have the competencies to wear the SCBA in a contaminated environment.
  - a) The AJCHRA uses air packs with ratings of no less than 60 minutes. SCBA's rated at 60 minutes provide the necessary time to provide personnel time to perform typical work functions at Hazmat events.
  - b) Typically, a 30-minute window will be allowed for personnel to work within a hot zone before being required to leave the hot zone and begin the decon sequence.
  - c) A team member must report to rehab for 30 minutes after working in an encapsulated suit within the hot zone and after decon is performed. During this time, it is critical the member is rehydrated and has post medical evaluation conducted. The Medical Officer must then determine what the member's status should be for the remainder of the event.
- B. Chemical Suit Procedures: When using encapsulating and non-encapsulating chemical suits the following procedures shall be followed:
  1. All jewelry should be removed prior to donning chemical suit.
  2. Uniforms should be removed, and a pair of cotton, nomex, or disposable coveralls should be worn under the chemical resistant suits. Using a coverall undergarment will provide additional protection for the wearer, will act as a thermal barrier, an absorbent for perspiration, and will prevent the uncomfortable feeling when the suit comes in contact with the skin. With incidents involving flammable chemicals, Nomex®, Pyrolon® or PBI® coveralls should be used.
  3. Before donning a chemical resistant suit, two inspections should be made. If an inspection record for the suit is available, use the records to insure the suit is suitable to use. Other than Level A suit testing records, disposable suits need not have records as they will be used only once per exposure. Check for holes or tears in the suit and look for wear or abrasions that may damage the suits ability to keep the chemical out. Check that attachments (gloves, boots, faced, etc.) are properly attached and in good condition.
  4. When chemical suits have booties attached, a pair of heavy socks should be worn. After donning the suit, a pair of turn-out or chemical protective overboot should be worn to protect the booties. If included, the splashguards of the suits should be pulled over the boot to prevent any chemicals from entering the boot. Do not attempt to wear your regular shoes over the booties of the chemical suit. They do not offer any protection from the chemicals, will be too tight, and will become contaminated and require decontamination or disposal.
  5. If the chemical resistant suits do not have attached booties, a chemical resistant boot must be worn with the suit. Regular fire fighter turn-out boots are made of neoprene rubber and have good chemical resistance properties, but turnout boots that are used for fire suppression service are not recommended because of the integrity of the boot may have been damaged

due to (cuts or holes) thus a possibility of contamination. Either turnout boots reserved specifically for chemical incidents or a chemical resistant boot should be worn at a chemical incident. Leather shoes or boots should not be worn as chemical protection.

6. For encapsulating suits with gloves permanently attached, a second pair of gloves shall always be worn over the permanently attached gloves. This procedure will protect the permanently attached gloves from mechanical damage and also from excessive chemical exposure. Double gloving is always recommended and should be mandatory when working with compressed gasses, as the product being released is cold. Additionally, the use of nitrile exam gloves under the other gloves is appropriate, as they prevent the contact with any contamination during the doffing of the chemical resistant clothing. Before making any decisions on reducing protection for the hands, the hazard of the products compatibility and the job function should be considered.
7. Standard issue fire fighter gloves should never be used for protection from chemicals at a chemical incident. These gloves have seams that will allow the entry of chemicals, and are made of materials that will allow chemicals to be absorbed into the gloves. Fire fighter gloves may be worn over chemical resistant glove to protect the chemical resistant glove from mechanical damage. The fire fighter glove, if exposed, should be disposed of.
8. Positive pressure self contained breathing apparatus (SCBA) in Level A or Level B will be utilized at chemical related incidents. APR or PAPR may only be used when competent Health Department or Hazmat Team personnel deem otherwise and only after the appropriate air monitoring is conducted to determine the safety of the environment, chemical hazard and the appropriate canister/cartridge selection.
9. Except for lifesaving operations, prior to any personnel entering the hot zone, back-up personnel shall stand by in the appropriate chemical protective clothing (“two in-two out”) ready to provide the necessary assistance or rescue to those personnel operating in the hot zone, and decontamination procedures shall be developed, deployed and ready to use.
10. The number of emergency response personnel at the emergency site will be limited to only those who are actively engaged in performing operations or essential support. All other personnel shall be relocated to a remote area. All operations in the hot zone shall be performed using the buddy system in groups of two or more.
11. **During operation in the hot zone, personnel qualified and equipped to provide advanced life support procedures shall be standing by with the ability to transport injured personnel to a medical facility.** If ALS is not available a decision must be made by the Incident Commander and the Team Leader as to the acceptability of EMT-B or EMT-I service.
12. All personnel, clothing, suits, boots, gloves, and equipment leaving the contaminated area shall be properly decontaminated. In some instances, it may be appropriate to properly dispose of the clothing and or equipment if decontamination is not possible or practical.

13. Decontamination shall be performed in an area that will minimize the exposure of uncontaminated personnel or equipment. Personnel performing decontamination shall wear protective clothing and respiratory protection appropriate for the contaminants expected. Chemical suits or disposable coveralls, chemical resistant gloves, and chemical resistant boots should be worn by personnel performing decontamination. The need for respiratory protection should be evaluated after considering the hazards of the materials involved and the likelihood of the exposure of personnel performing decontamination actions.
14. Personnel exiting the hot zone should be dry decontaminated or washed off with a hose line or a safety shower. When appropriate, personnel should be gently scrubbed with a mild detergent and warm water solution and rinsed prior to doffing the chemical resistant clothing. When chemical resistant clothing has been grossly contaminated, at least four washing and rinses with a mild detergent and warm water solution shall be performed prior to doffing the clothing.
15. There are some chemical exposures that may require the use of special decontamination solutions for clothing and equipment. When working around chemicals requiring special decontamination procedures, the health department or HazMat Team Leader will advise personnel of any special solutions or procedures necessary. All equipment and solvents used during decontamination shall be contained, evaluated, and properly disposed of. Special decon solutions can be found in [Appendix? under Decon](#).
16. After use, chemical resistant suits that are to be returned to service, should be rinsed with lukewarm water inside and out and hung up to dry in an area out of direct sunlight with good ventilation. Do not hang the suits in a boiler room or area with heat lamps or hot air blower. The temperature of the drying area should not exceed 120 degrees F.
17. Prior to returning the chemical suits to service, they must be checked for damage, etc. that may have occurred during use. All suits should be given a visual check for discoloration, stiffness, softness, holes, seams separating, etc. Chemical suit testing procedures shall be followed. Any suit that **has not** been contaminated yet fails suit inspection or testing, may be relegated to training suit status. Suits removed from service relegated to training will be permanently and conspicuously marked, both front and rear as "TRAINING USE ONLY".
18. When placing in service, the suits should be stored in a clean, dry location away from items that may damage the suits. The suits should be protected from direct sunlight and kept at a temperature not to exceed 120 degrees f.
19. Suits marked for training will be used for training only. Training suits should be stored in a location as to prevent them from being used during an actual emergency.
20. No hazardous materials operations will be done in P.B.I. bunker gear, as the material will not tolerate some chemicals and decontamination will be a problem with the leather knee pads.

C. General Rules for use with encapsulated suits:

1. Obtain information on chemicals involved in the incident.
2. Compare the suit manufacturer's compatibility chart to the chemicals and advise team members of the proper suit to wear.
3. Before the Entry Team is ready to go into the incident, the Team Leader shall assign a Decontamination Officer.
4. Fit each entry team member with an air mask: check and record their name, suit number he/she will use and air tank, in a log.
5. Entry team members working in encapsulated suits may suffer heatstroke or heat exhaustion. Provide preloading of potable water prior to and after encapsulation to replenish liquid levels. Cooling vests if available can be donned and activated prior to encapsulation.
6. The Team Leader will rotate entry team members out of the suit based upon the conditions present while considering the safety of the responders. The Team Leader if at all possible shall limit the time a team member is in the Hot Zone to the 30-minute time frame referenced in Section A.2. (SCBA) on page 1 of this FOG.
7. Radio communication should be tested as the entry team goes out of sight of the Safety Officer. The Safety Officer should maintain radio communication frequently with encapsulated suit personnel. Back up hand signals as shown in Appendix C shall be used in case routine communications are not available or inadequate.
8. Each responder donning and doffing PPE shall have assigned to them a "VALET" who is to assist the responder in suit, boot and glove size selection, donning and doffing the suit, and to ensure that the suit is properly sealed and meets acceptable standards for entry.
  - a) The "VALET" may be assigned to monitor the entry times, air supply and visual contact. If there are not adequate technicians on scene to perform this function the safety officer shall ensure that these tasks are completed and may use operation level personnel.

D. Suit Selection: There are several types of suits carried which give technicians compatibility with 97% of all common chemicals one may come in contact with. Compatibility does not necessarily mean entry. It may mean vapor or splash protection. Suit compatibilities MUST be consulted before entry can be made. There are compatibility charts located with each group of suits. In addition, the CAMEO. Program should be consulted as well as other references available on Hazmat 1 and Hazmat 4.

E. Entry Suit Journal

1. A suit status board shall be used to record air, time, suit number, and Entry Team member. This information allows the Team Leader to rotate members in and out of the Hot Zone safely.

F. Anytime encapsulated suits are worn, four members will be suited up; two working the incident, two as backup, the balance of assigned team members will be in acceptable level of protective clothing; all Entry Team members must be in full protective gear.

#### G. Protective Clothing Maintenance

##### 1. Protective Clothing Identification Marking System (encapsulated)

###### a) Objectives of marking system:

- 1) To quickly identify suits for the purpose of logging and tracking suit failure and repair.
- 2) To identify a particular suit with a particular user should suit failure occur.
- 3) To identify a particular suit with a particular incident should suit failure occur.

###### b) Explanation of four section marking system.

- 1) The first section will identify the highest level of protection the suit will provide:
  - i) A = Level A
  - ii) B = Level B
  - iii) F = Fire protection clothing
- 2) The second section will identify the year the suit was placed in service
- 3) The third section will provide an individual identification number for each suit.
- 4) The fourth will be the initials of the hazardous materials response team to indicate the property of the team.
- 5) Example: "A - 15 - 12 - AJCHRA" Level A, placed in service in 2015, individual-I.D.-no. 12, and belonging to the AJCHRA response team.

###### c) Marking of suits: The complete identification number will be marked on each suit in the following manner:

- 1) On an inside tag.
  - i) On an interior part of the suit not providing the primary protection to the wearer.
  - ii) Due to the possibility of suit deterioration **UNDER NO CIRCUMSTANCES WILL SUIT IDENTIFICATION BE MARKED ON THE PRIMARY PROTECTIVE FABRIC ITSELF.**

H.



## Testing of fully encapsulating vapor tight suits

### 1. Frequency

- a) Annually, on a date to be determined by the AJCHRA member responsible for suit maintenance or after each use. After any repairs or servicing. Test results shall be recorded on the appropriate suit history record form. Inflation tests should be performed according to manufacturer's manual guidelines.

### I. Inspection of non- vapor tight suits:

#### 1. Frequency

- a) Suits are to be checked at the time of use prior to donning. Suit should not be used if there are signs of damage or substantial wear.