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SITE ENTRY

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FIELD STANDARD OPERATING PROCEDURES

FOR

SITE ENTRY

F.S.O.P. 4

U S. ENVIRONMENTAL PROTECTION AGENCY

OFFICE OF EMERGENCY AND REMEDIAL RESPONSE

HAZARDOUS RESPONSE SUPPORT DIVISION

WASHINGTON, D.C. 20460

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Contents of this manual do not necessarily reflect the views and policies of the Environmental Protection Agency.

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SECTION I

INTRODUCTION

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PROCESS SITE ENTRY

I. Objectives

This document provides site entry procedures that field response personnel can use to minimize the risk of exposure to hazardous substances.

II. Background

These procedures have been derived by reorganizing the U.S. Environmental Protection Agency, Office of Emergency and Remedial Responses (US EPA, OERR), Washington, DC. "Standard Operating Safety Guides", November 1984, into a format more appropriate for use in the field at hazardous materials responses.

III Brief Description of Site Entry Procedures

1 Personnel Entry

Personnel entering sites of hazardous substance incidents must use adequate safety precautions to minimize exposure to a host of contaminants which may have long term or immediate health affects. These precautions include selecting and properly using and decontaminating personal protective equipment. Each site is separate and distinct as is each site entry. The EPA (OERR) has designated levels of protection, based on site characteristics, for their own use. In situations where the type(s) of chemical(s), concentration(s), and possibilities of contact are not well characterized, experienced professionals must select the appropriate level of protection based on potential exposure, until the hazards can be better characterized.

2. Protective Equipment Level

The EPA (OERR) has classified the equipment to protect the body against contact with known or potential chemical hazards into four categories according to the degree of protection afforded.

- a. Level A. Affords the highest available level of respiratory, skin, and eye protection.
- b. Level B: Affords the highest level of respiratory protection, but a lesser level of skin protection. Level B protection is the minimum level recommended on initial site entries until the hazards have been further defined by on-site studies.

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- c. Level C. Affords appropriate protection when the type(s) of airborne substance(s) is known, the concentration(s) is measured, and experienced professionals judge that the criteria for using air-purifying respirators are met.
- d. Level D. Affords minimal protection. Level D is primarily a work uniform and should not be worn on any site with respiratory or skin hazards.

3. Selection of Level of Protection

The Level of Protection selected should be based primarily on the following.

- Type(s) and measured concentration(s) of the chemical substance(s) in the ambient atmosphere and its toxicity.
- Potential exposure to substances in air, splashes of liquids, or other direct contact with material due to work being performed.

4. Selection of Sampling Equipment

Sampling equipment used on site should be selected to meet the following criteria

- Provides information useful for protecting personnel.
- Is convenient to use and maintain.
- Is disposable if possible.
- Can be bagged with plastic to avoid the need for decontamination.
- Will not initiate an explosion if used in an explosive atmosphere.
- Can be easily decontaminated.

SECTION II

PERSONAL PROTECTIVE
EQUIPMENT

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PROCESS SITE ENTRY

III. Levels of Protection

A. Level A Protection

1. Personal protective equipment

- Supplied-air respirator approved by the Mine Safety and Health Administration (MSHA) and National Institute of Occupational Safety and Health (NIOSH).
Respirators may be

- pressure-demand, self-contained breathing apparatus (SCBA)

or

- pressure-demand, airline respirator (with escape bottle for Immediately Dangerous to Life and Health (IDLH) or potential for ILDH atmosphere)

- Fully encapsulating chemical-resistant suit
- Coveralls*
- Long cotton underwear*
- Gloves (inner), chemical-resistant
- Boots, chemical-resistant, steel toe and snank (Depending on suit construction, worn over or under suit boot)
- Hard hat* (under suit)
- Disposable gloves and boot covers* (Worn over fully encapsulating suit)
- Cooling unit*
- 2-Way radio communications (inherently safe)

2. Criteria for selection

Meeting any of the following criteria warrants use of Level A Protection.

- The chemical substance(s) has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on
 - measured (or potential for) high concentrations of atmospheric vapors, gases, or particulates

or

- site operations and work functions involves high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials highly toxic to the skin.
- Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible.
- Operations must be conducted in confined, poorly ventilated areas until the absence of hazards requiring Level A protection is determined.
- Direct readings on field Flame Ionization Detectors (FID) or Photoionization Detectors (PID) and similar instruments indicate high levels of unidentified vapors and gases in the air.

B. Level B Protection

1. Personal protective equipment

- Supplied-air respirator (MSHA/NIOSH approved). Respirators may be:
 - pressure-demand, self-contained breathing apparatus
- or
- pressure-demand, airline respirator (with escape bottle for IDLH or potential for IDLH atmosphere)
- Chemical-resistant clothing (overalls and long-sleeved jacket, hooded, one or two-piece chemical-splash suit, disposable chemical-resistant, one-piece suits)
- Long cotton underwear*
- Coveralls*
- Gloves (outer), chemical-resistant
- Gloves (inner), chemical-resistant
- Boots (outer), chemical-resistant, steel toe and shank
- Boots (outer), chemical-resistant (disposable)*
- Hard hat (face shield)*
- 2-Way radio communications (intrinsically safe)

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2. Criteria for selection.

Meeting any one of these criteria warrants use of Level B protection:

- The type and atmospheric concentration of toxic substances have been identified and requires a high level of respiratory protection, but less skin protection than Level A. These would be atmospheres.
- with concentrations Immediately Dangerous to Life and Health, but substance or concentration in the air does not represent a severe skin hazard

or

- that do not meet the selection criteria permitting the use of air-purifying respirators.
- The atmosphere contains less than 19.5% oxygen.
- It is highly unlikely that the work being done will generate high concentrations of vapors, gases or particulates, or splashes of material that will affect the skin of personnel wearing Level B protection.
- Atmospheric concentrations of unidentified vapors or gases are indicated by direct readings on instruments such as the FID or PID or similar instruments, but vapors and gases are not suspected of containing high levels of chemicals toxic to skin.

C. Level C Protection

1. Personal protective equipment

- Air-purifying respirator, full-face, canister-equipped (MSHA/NIOSH approved)
- Chemical-resistant clothing (coveralls, hooded, one-piece or two piece chemical splash suit, chemical-resistant hood and apron; disposable chemical-resistant coveralls)
- Coveralls*
- Long cotton underwear*
- Gloves (outer), chemical-resistant
- Gloves (inner), chemical-resistant
- Boots (outer), chemical-resistant, steel toe and shank*

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- Boots (outer), chemical-resistant, (disposable)*
- Boot covers (outer), chemical-resistant (disposable)*
- Hard hat (face shield)*
- Escape mask*
- 2-Way radio communications* (inherently safe)

2. Criteria for selection

Meeting any of the following criteria permits use of Level C protection

- Oxygen concentrations are not less than 19.5% by volume.
- Measured air concentrations of identified substances will be reduced by the respirator below the substance's threshold limit value (TLV) and the concentration is within the service limit of the canister.
- Atmospheric contaminant concentrations do not exceed IDLH levels.
- Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect the small area left unprotected by chemical-resistant clothing.
- Job functions do not require self-contained breathing apparatus.
- Direct readings are a few ppms above background on instruments such as the FID or PID. (See Appendices I and II.)

D. Level D Protection

1. Personal protective equipment

- Coveralls
- Gloves*
- Boots/shoes, leather or chemical-resistant, steel toe and snank
- Safety glasses or chemical splash goggles*
- Hard hat (face shield)*

*Optional

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2. Criteria for selection

Meeting any of the following criteria allows use of Level D protection.

- No contaminants are present.
- Work functions preclude splashes, immersion, or potential for unexpected inhalation of any chemicals.

Level D protection is primarily a work uniform. It can be worn only in areas where there is no possibility of contact with contamination.

SECTION III

INITIAL SURVEYS

F.S.O.P. #4
PROCESS. SITE ENTRY

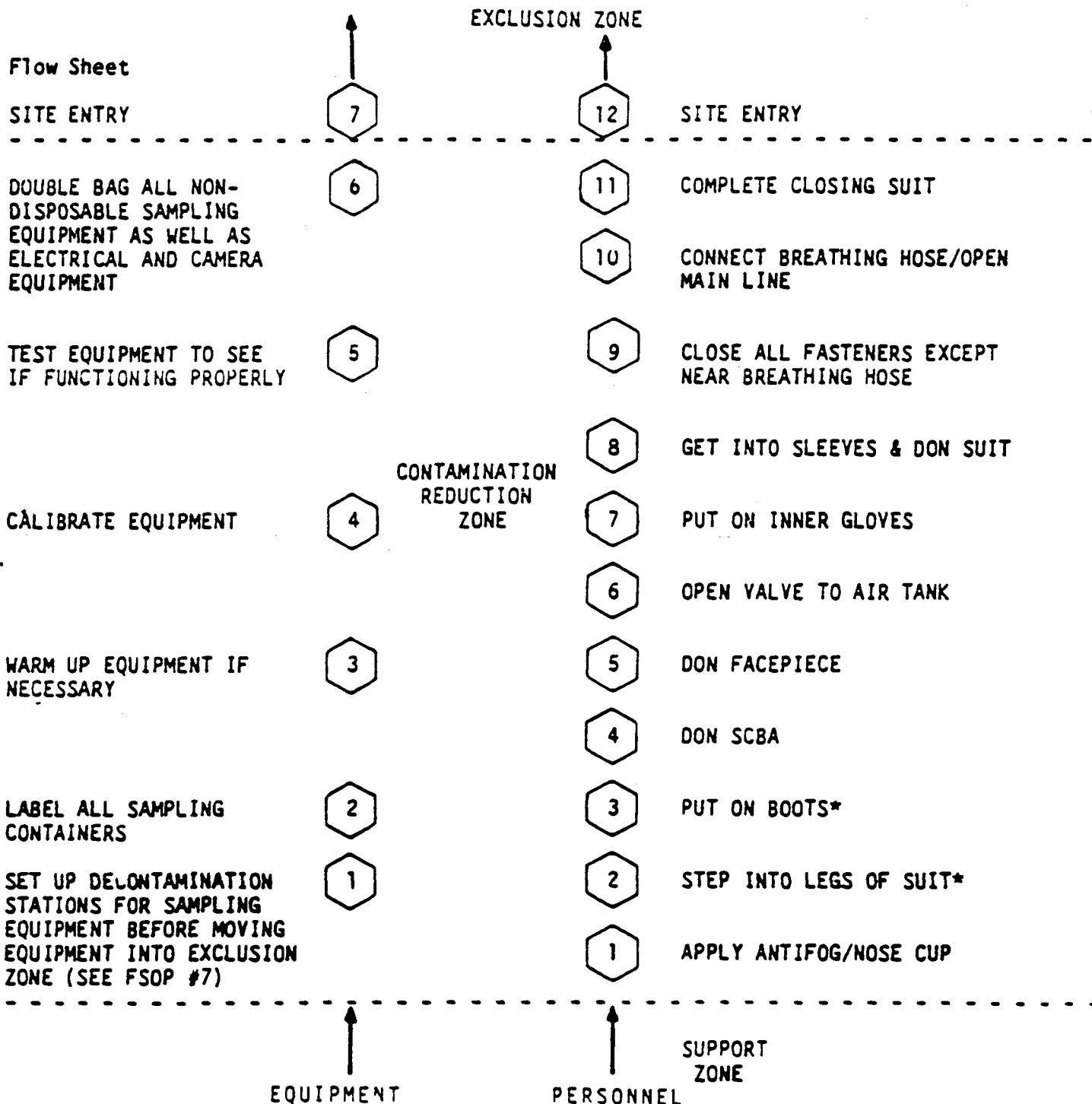
III. INITIAL SURVEYS

In general, the initial entry is considered a relatively rapid screening process for collecting preliminary data on site hazards.

Of immediate concern to initial entry personnel are atmospheric conditions which could affect their immediate safety. These conditions are. airborne toxic substances, combustible gases or vapors, lack of oxygen, and to a lesser extent, ionizing radiation. Priorities for monitoring these potential hazards should be established after a careful evaluation of conditions.

PROCESS SITE ENTRY

SITE ENTRY - LEVEL A PROTECTION



*Order may be reversed depending on suit type. Steps #1-11 may be done outside but adjacent to the contamination reduction zone.

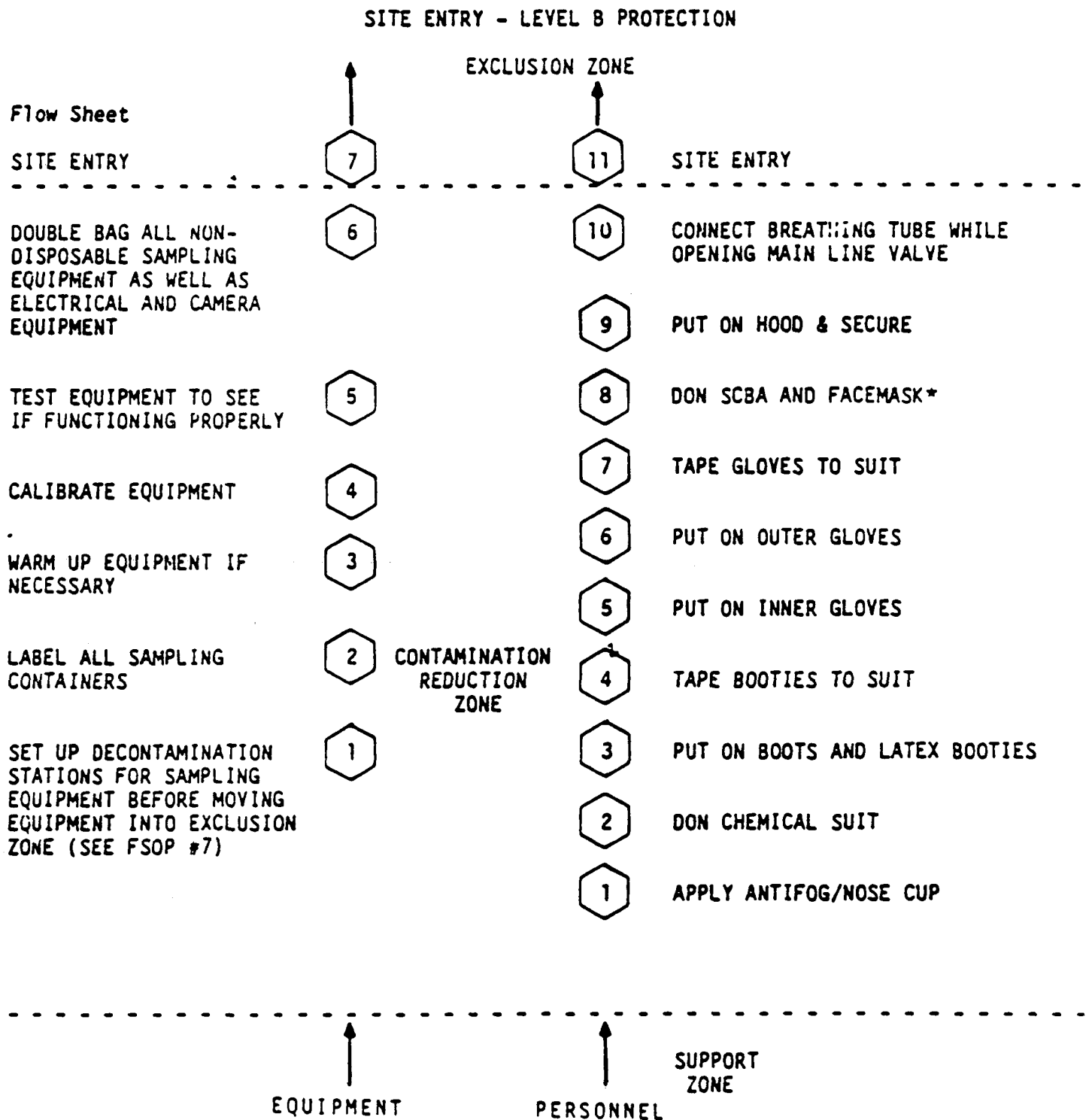
SECTION IV

FLOW CHARTS

FOR

SITE ENTRY

PROCESS SITE ENTRY

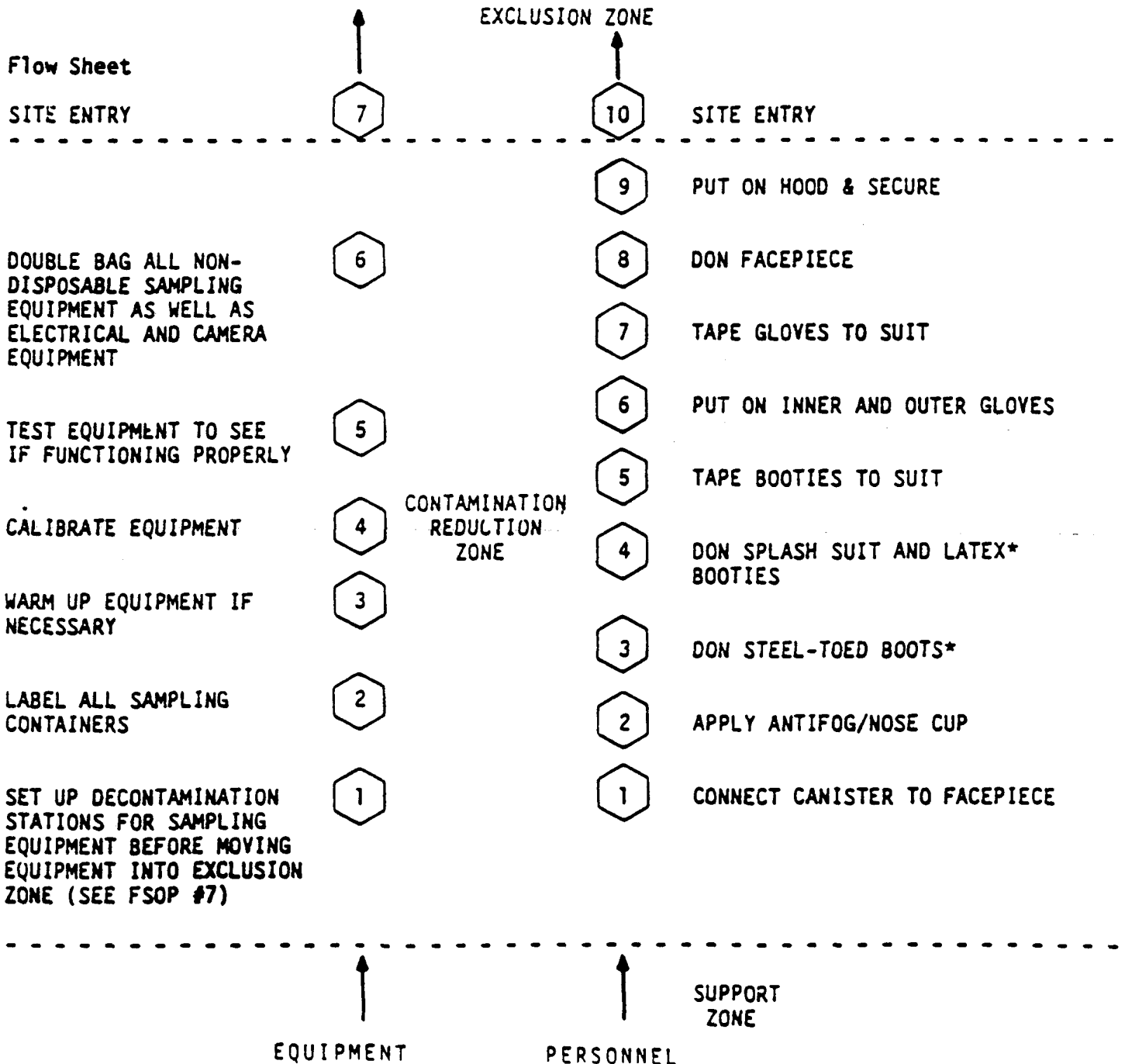


Steps #1-11 may be done outside but adjacent to the contamination reduction zone.

*May be donned before outer gloves.

PROCESS SITE ENTRY

SITE ENTRY - LEVEL C PROTECTION



*Boots donned first only when using dispensable coveralls with attached booties.

Steps #1-11 may be done outside but adjacent to the contamination reduction zone.

SECTION VII
SUMMARY
OF
FIELD EQUIPMENT

FIELD STANDARD OPERATING PROCEDURES

FSOP NO: 4

Prepared by: _____

Date: _____

PROCESS: SITE ENTRY

Approved by: _____

OPERATING PROCEDURES

STEP SEQUENCE

INFORMATION/OPERATING GOALS/SPECIFICATIONS

TRAINING
GUIDE/NOTES

A. Level A Donning

Measures Taken	Station 1: Apply Antifog	Use antifog on suit and mask facepieces (nose cups may be applicable).
	Station 2: Step Into Legs of Suit	While sitting, step into legs, place feet properly, and gather suit around waist.
	Station 3: Put On Boots	While sitting, cover feet of suit, put on steel toe and shank boots.
	Station 4: Don SCBA	Put on SCBA and harness assembly.
	Station 5: Don Facepiece	Put on facepiece and adjust to be secure - do not connect breathing hose.
	Station 6: Open Valve	Open valve to air tank.
	Station 7: Don Inner Gloves	Put on inner gloves.
	Station 8: Get Into Sleeves	Helper pulls suit up and over SCBA, adjusting suit around SCBA backpack and user's shoulders.
	Station 9: Close Fasteners	Close all fasteners until there is only room to connect breathing hose. Secure belts and adjustments.
	Station 10: Connect Breathing Hose	Connect breathing hose while opening main valve.
	Station 11: Don Suit and Close	When properly breathing in SCBA, complete closing suit.
	Station 12: Check Equipment	Check equipment (e.g. communication, etc.)
		Enter site with necessary monitoring equipment

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OPERATING PROCEDURES	STEP SEQUENCE	INFORMATION/OPERATING GOALS/SPECIFICATIONS	TRAINING GUIDE/NOTES
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A. Level B Donning

Measures Taken	Station 1: Apply Antifog	Use antifog on facepiece (nose cups may be applicable).
	Station 2: Don Suit	Put on chemical resistant splash suit, tape around waist if necessary.
	Station 3: Don Boots	Put on steel-toed and shanked boots and latex booties. Make sure booties are outside of suit.
	Station 4: Taping	Tape booties to suit. Also tape around the arch of the boot to keep booties in place.
	Station 5: Don Inner Gloves	Put on inner gloves.
	Station 6: Don Outer Gloves	Put on outer gloves. Make sure gloves are outside of sleeves.
	Station 7: Taping	Tape gloves to suit.
	Station 8: Don SCBA	Put on SCBA and facemask. Open tank valve.
	Station 9: Connect Breathing Tube	Connect breathing tube while opening main line valve.
	Station 10: Site Entry	Enter site with necessary monitoring equipment.

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PROCESS: SITE ENTRY

Approved by: _____

OPERATING PROCEDURES	STEP SEQUENCE	INFORMATION/OPERATING GOALS/SPECIFICATIONS	TRAINING GUIDE/NOTES
A. Level C Donning			
Measures Taken	Station 1: Canister Application	Screw appropriate canister to facepiece.	
	Station 2: Apply Antifog	Use antifog on facepiece (nose cup may be applicable).	
	Station 3: Don Boots	Put on steel-toed and shanked boots.	
	Station 4: Don Splash Suit	Put on splash suit and latex booties. Be sure booties are outside of suit.	
	Station 5: Taping	Tape booties to suit.	
	Station 6: Glove Donning	Put on inner and outer gloves. Be sure outer gloves are outside of sleeves.	
	Station 7: Taping	Tape gloves to suit.	
	Station 8: Don Facepiece	Put on and secure facepiece.	
	Station 9: Site Entry	Enter site with necessary monitoring equipment.	

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OPERATING PROCEDURES

STEP SEQUENCE

INFORMATION/OPERATING GOALS/SPECIFICATIONS

TRAINING
GUIDE/NOTES

A. Level A Doffing

1. Maximum Measures Taken for Decontamination	Station 1:	Segregated Equipment Drop	1. Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. During hot weather operations, a cooldown station may be set up within this area.
	Station 2:	Boot Cover and Glove Wash	2. Scrub outer boot covers and gloves with decon solution or detergent/water.
	Station 3:	Boot Cover and Glove Rinse	3. Rinse off decon solution from Station 2 using copious amounts of water.
	Station 4:	Tape Removal	4. Remove tape around boots and gloves and deposit in container with plastic liner.
	Station 5:	Boot Cover Removal	5. Remove boot covers and deposit in container with plastic liner.
	Station 6:	Outer Glove Removal	6. Remove outer gloves and deposit in container with plastic liner.
	Station 7:	Suit and Boot Wash	7. Wash encapsulating suit and boots using scrub brush and decon solution or detergent/water. Repeat as many times as necessary.
	Station 8:	Suit and Boot Rinse	8. Rinse off decon solution using water. Repeat as many times as necessary.

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OPERATING PROCEDURES	STEP SEQUENCE	INFORMATION/OPERATING GOALS/SPECIFICATIONS	TRAINING GUIDE/NOTES
A. Level A Doffing			
T. Maximum Measures Taken for Decontamination	Station 9: Tank Change	9. If an air tank change is desired, this is the last step in the decontamination procedure. Air tank is exchanged, new outer gloves and boot covers donned, and joints taped. Worker returns to duty.	
	Station 10: Safety Boot Removal	10. Remove safety boots and deposit in container with plastic liner.	
	Station 11: Fully-Encapsulating Suit and Hard Hat Removal	11. Fully-encapsulated suit is removed with assistance of a helper and laid out on a drop cloth or hung up. Hard hat is removed. Hot weather rest station may be set up within this area for personnel returning to site.	
	Station 12: SCBA Backpack Removal	12. While still wearing facepiece, remove backpack and place on table. Disconnect hose from regulator valve and proceed to next station.	
	Station 13: Inner Glove Wash	13. Wash with decon solution that will not harm the skin. Repeat as often as necessary.	
	Station 14: Inner Glove Rinse	14. Rinse with water. Repeat as many times as necessary.	
	Station 15: Face Piece Removal	15. Remove face piece. Deposit in container with plastic liner. Avoid touching face with fingers.	

FIELD STANDARD OPERATING PROCEDURES

FSOP NO: 4

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PROCESS: SITE ENTRY

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OPERATING PROCEDURES	STEP SEQUENCE	INFORMATION/OPERATING GOALS/SPECIFICATIONS	TRAINING GUIDE/NOTES
A. Level A Doffing			
T. Maximum Measures Taken for Decontamination	Station 16: Inner Glove Removal	16. Remove inner gloves and deposit in container with liner.	
	Station 17: Inner Clothing Removal	17. Remove clothing soaked with perspiration and place in lined container. Do not wear inner clothing off-site since there is a possibility that small amounts of contaminants might have been transferred in removing the fully-encapsulated suit.	
	Station 18: Field Wash	18. Shower if highly toxic, skin-corrosive or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.	
	Station 19: Redress	19. Put on clean clothes.	

FIELD STANDARD OPERATING PROCEDURES

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OPERATING PROCEDURES	STEP SEQUENCE	INFORMATION/OPERATING GOALS/SPECIFICATIONS	TRAINING GUIDE/NOTES
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A. Level B Doffing

1. Maximum Measures Taken for Decontamination	Station 1: Segregated Equipment Drop	1. Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, cooldown stations may be set up within this area.
	Station 2: Boot Cover and Glove Wash	2. Scrub outer boot covers and gloves with decon solution or detergent and water.
	Station 3: Boot Cover and Glove Rinse	3. Rinse off decon solution from Station 2 using copious amounts of water.
	Station 4: Tape Removal	4. Remove tape around boots and gloves and deposit in container with plastic liner.
	Station 5: Boot Cover Removal	5. Remove boot covers and deposit in container with plastic liner.
	Station 6: Outer Glove Removal	6. Remove outer gloves and deposit in container with plastic liner.
	Station 7: Suit and Safety Boot Wash	7. Wash chemical-resistant splash suit, SCBA, gloves, and safety boots. Scrub with long-handle scrub brush and decon solution. Wrap SCBA regulator (if belt mounted type) with plastic to keep out of water. Wash backpack assembly with sponges or cloths.

FIELD STANDARD OPERATING PROCEDURES

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OPERATING PROCEDURES	STEP SEQUENCE	INFORMATION/OPERATING GOALS/SPECIFICATIONS	TRAINING GUIDE/NOTES
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A. Level B Doffing

- | | | | |
|---|-------------|-----------------------------------|---|
| 1. Maximum Measures Taken for Decontamination | Station 8: | Suit, SCBA, Boot, and Glove Rinse | 8. Rinse off decon solution using copious amounts of water. |
| | Station 9: | Tank Change | 9. If worker leaves exclusion zone to change air tank, this is the last step in the decontamination procedure. Worker's air tank is exchanged, new outer gloves and boot covers donned, and joints taped. Worker returns to duty. |
| | Station 10: | Safety Boot Removal | 10. Remove safety boots and deposit in container with plastic liner. |
| | Station 11: | SCBA Backpack Removal | 11. While still wearing facepiece, remove backpack and place on table. Disconnect hose from regulator valve. |
| | Station 12: | Splash Suit Removal | 12. With assistance of helper, remove splash suit. Deposit in container with plastic liner. |
| | Station 13: | Inner Glove Wash | 13. Wash inner gloves with decon solution. |
| | Station 14: | Inner Glove Rinse | 14. Rinse inner gloves with water. |
| | Station 15: | Face Piece Removal | 15. Remove face piece. Deposit in container with plastic liner. Avoid touching face with fingers. |

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OPERATING PROCEDURES	STEP SEQUENCE	INFORMATION/OPERATING GOALS/SPECIFICATIONS	TRAINING GUIDE/NOTES
A. Level B Doffing			
T. Maximum Measures Taken for Decontamination	Station 16: Inner Glove Removal	16. Remove inner gloves and deposit in container with liner.	
	Station 17: Inner Clothing Removal	17. Remove clothing soaked with perspiration. Place in container with liner. Do not wear inner clothing off-site since there is a possibility that small amounts of contaminants might have been transferred in removing the fully-encapsulated suit.	
	Station 18: Field Wash	18. Shower if highly toxic, skin-corrosive or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.	
	Station 19: Redress	19. Put on clean clothes.	

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OPERATING PROCEDURES	STEP SEQUENCE	INFORMATION/OPERATING GOALS/SPECIFICATIONS	TRAINING GUIDE/NOTES
A. Level C Doffing			
1. Maximum Measures Taken for Decontamination	Station 1:	Segregated Equipment Drop	1. Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool down station may be set up within this area.
	Station 2:	Boot Cover and Glove Wash	2. Scrub outer boot covers and gloves with decon solution or detergent and water.
	Station 3:	Boot Cover and Glove Rinse	3. Rinse off decon solution from station 2 using copious amounts of water.
	Station 4:	Tape Removal	4. Remove tape around boots and gloves and deposit in container with plastic liner.
	Station 5:	Boot Cover Removal	5. Remove boot covers and deposit in container with plastic liner.
	Station 6:	Outer Glove Removal	6. Remove outer gloves and deposit in container with plastic liner.
	Station 7:	Suit and Boot Wash	7. Wash splash unit, gloves, and safety boots. Scrub with long-handle scrub brush and decon solution.
	Station 8:	Suit and Boot, and Glove Rinse	8. Rinse off decon solution using water. Repeat as many times as necessary.

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OPERATING PROCEDURES	STEP SEQUENCE	INFORMATION/OPERATING GOALS/SPECIFICATIONS	TRAINING GUIDE/NOTES
A. Level C Doffing			
T. Maximum Measures Take for Decontamination	Station 9: Canister or Mask Change	9. If worker leaves exclusion zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, and joints taped worker returns to duty.	
	Station 10: Safety Boot Removal	10. Remove safety boots and deposit in container with plastic liner.	
	Station 11: Splash Suit Removal	11. With assistance of helper, remove splash suit. Deposit in container with plastic liner.	
	Station 12: Inner Glove Wash	12. Wash inner gloves with decon solution.	
	Station 13: Inner Glove Rinse	13. Rinse inner gloves with water.	
	Station 14: Face Piece Removal	14. Remove face piece. Deposit in container with plastic liner. Avoid touching face with fingers.	
	Station 15: Inner Glove Removal	15. Remove inner gloves and deposit in lined container.	

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OPERATING PROCEDURES	STEP SEQUENCE	INFORMATION/OPERATING GOALS/SPECIFICATIONS	TRAINING GUIDE/NOTES
A. Level C Doffing			
1. Maximum Measures Taken for Decontamination	Station 16: Inner Clothing Removal	16. Remove clothing soaked with perspiration and place in lined container. Do not wear inner clothing off-site since there is a possibility that small amounts of contaminants might have been transferred in removing the fully-encapsulated suit.	
	Station 17: Field Wash	17. Shower if highly toxic, skin-corrosive or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.	
	Station 18: Redress	18. Put on clean clothes.	

IV. SUMMARY OF FIELD EQUIPMENT

A. Initial Site Entry

The initial on-site entry is to determine, on a preliminary basis, hazardous or potentially hazardous conditions. The main effort is to rapidly identify the immediate hazards that may affect the public, response personnel, and the environment. Of major concern are the real or potential dangers - for example, fire, explosion, oxygen-deficient atmospheres, radiation, airborne contaminants, containerized or pooled hazardous substances that could affect workers during subsequent operations.

1. Organic Vapors and Gases

If the type(s) of organic substance(s) involved in an incident is known and the material is volatile or can become airborne, air measurements for organics should be made with one or more appropriate, properly calibrated survey instruments.

When the presence or types of organic vapors/gases are unknown, field analyzers using photoionization and/or flame ionization detectors (PID/FID), operated in the total readout mode, should be used to detect organic vapors. Until specific constituents can be identified, the readout indicates total airborne substances to which the instrument is responding. Identification of the individual vapor/gas constituents permits the instruments to be calibrated and used for more specific analysis when used with chromatograph columns.

Sufficient data should be obtained during the initial entry to map or screen the site for various levels of organic vapors. These gross measurements can be used on a preliminary basis to: 1) determine levels of personnel protection, 2) establish site work zones, and 3) select candidate areas for more thorough qualitative and quantitative studies.

2. Inorganic Vapors and Gases

The ability to detect and quantify nonspecific inorganic vapors and gases is extremely limited. Presently, the photoionization detector has limited detection capability while the flame ionization detector has none. (See Appendix I for characteristics). If specific inorganics are known or suspected to be present, measurements should be made with appropriate instruments, if available. Colorimetric tubes can be used if substances present are known (or can be narrowed to a few) and appropriate tubes are available.

C. Radiation

Although radiation monitoring is not necessary for all responses, it should be incorporated in the initial survey where radioactive materials may be present - for example, fires at warehouses or hazardous material storage facilities, transportation incidents involving unknown materials, or abandoned waste sites.

Normal gamma radiation background is approximately 0.01 to 0.02 milliroentgen per hour (mR/hr) on a gamma survey instrument. Work can continue with elevated radiation exposure rates, however, if the exposure rate increases two times above gamma background, a qualified health physicist should be consulted. At no time should work continue with an exposure rate of 10 mR/hr or above without the advice of a health physicist. EPA's Office of Air, Noise, and Radiation has radiation specialists in each Region, as well as at facilities in Montgomery, Alabama, and Las Vegas, Nevada, to assist.

The absence of gamma readings above background should not be interpreted as the complete absence of radioactivity. Radioactive materials emitting alpha, or beta radiation may be present, but virtually all alpha and beta emitters that you can reasonably expect to be found at incident sites will also be gamma emitters and therefore be measured with the gamma survey.

D. Oxygen Deficiency

At sea level, ambient air contains at least 19.5% oxygen by volume. At lower percentages, air-supplied respiratory protective equipment is needed. Oxygen measurements are of particular importance for work in enclosed spaces, low-lying areas, or in the vicinity of accidents that have produced heavier-than-air vapors, which could displace ambient air. These oxygen-deficient areas are also prime locations for taking further organic vapor and combustible gas measurements, since the air that has been displaced by other substances will affect the readings of some instruments (e.g. combustible gas meters need normal oxygen levels for accurate results). Oxygen-enriched atmospheres increase the potential for fires.

E. Combustible Gases

The presence or absence of combustible vapors or gases must be determined. If readings approach or exceed 10% of the lower explosive limit (LEL), extreme caution should be exercised in continuing the investigation. If readings approach or exceed 25% LEL, personnel should be withdrawn immediately. Before resuming any on-site activities, project personnel in consultation with experts in fire or explosion prevention must develop procedures for continuing operations. Also, levels in this range are sure to be quite high with respect to initial action exposure limits.

F. Visual Observations

While on-site, the initial entry team should make visual observations which would help in evaluating site hazards - for example, dead fish or other animals, land features, wind direction, labels on containers indicating explosive, flammable, toxic, or corrosive material, conditions conducive to splash or contact with unconfined liquids, sludges, or solids, and other general conditions.

G. Direct-Reading Instruments

A variety of airborne toxics, (including organic and inorganic vapors, gases, or particulates) can be produced at, for example, abandoned waste sites, fires at chemical manufacturing, storage, reprocessing, or formulating facilities; or fires involving pesticides. Direct-reading field instruments will not detect or measure all of these substances. Thus, negative readings should not be interpreted as the complete absence of airborne toxic substances. Verification of negative results can only be done by collecting air samples and analyzing them in a laboratory.

H. Although it may seem that the process of transporting sampling equipment into a hazardous waste site would primarily rely on common sense, there are some general guidelines which should be followed. These are.

1. Set up decontamination stations for sampling equipment before moving equipment into contaminated area. (see FSOP #7)
2. Label all sampling containers.
3. Warm up equipment if necessary.
4. Calibrate equipment before and after use.
5. Test equipment to see if it is functioning properly.
6. Double bag all non-disposable sampling equipment as well as electrical and camera equipment.

TABLE 4-1

ATMOSPHERIC HAZARD GUIDELINES

Monitoring Equipment	Hazard	Ambient Level	Action
Combustible gas indicator	Explosive atmosphere	10% LEL	Continue investigation
		10%-25%	Continue on-site monitoring with extreme caution as higher levels are encountered.
		25% LEL	Potential explosion hazard, withdraw from area immediately.
Oxygen concentration meter	Oxygen	19.5%	Monitor wearing SCBA. NOTE Combustible gas readings are not valid in atmospheres with less than 19.5% oxygen.
		19.5-25%	Continue investigation with caution. SCBA not needed, based on oxygen content only.
		>25.00%	Discontinue inspection; fire hazard potential. Consult specialist.
Radiation survey	Radiation	1 mR/hr	Continue investigation. If radiation is detected above background levels, the presence of possible radiation sources is indicated, at this level, more thorough monitoring is advisable. Consult with a health physicist.
		10 mR/hr	Potential radiation hazard; evacuate site. Continue monitoring only upon the advice of a health physicist.
Colorimetric tubes	Organic and inorganic vapors/gases	Depends on species	Consult standard reference manuals for air concentrations/toxicity data.

TABLE 4-1 (Continued)

HNU photoionizer	Organic vapors/gases	1) Depends on species	Consult standard reference manuals for air concentrations/toxicity data.
Photoionization detector		2) Total response mode	Consult EPA Standard Operating Procedures.
Organic vapor analyzer/ Flame ionization detector	Organic	1) Depends on species	Consult standard reference manuals for air concentrations/toxicity data.
		2) Total response mode	Consult EPA Standard Operating Procedures.

SECTION VIII
SCBA CHECKOUT PROCEDURES

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SCBA CHECKOUT PROCEDURES

I. INTRODUCTION

Before a self-contained breathing apparatus can be used, it must be properly inspected. Both of the checklists that follow can help ensure proper inspection. The first checklist is for pressure-demand SCBA units with no mode-select lever, such as the MSA 401. The second checklist is for SCBAs with mode-select levers, such as Scott Airpaks and Survivair units. Note that both checklists indicate that inspection steps marked M are required monthly rather than prior to each use.

II. PRESSURE-DEMAND SCBA WITHOUT MODE SELECT LEVER

Prior to starting on checklist, make sure that:

- High-pressure nose connector is tight on cylinder fitting.
- Bypass valve is closed.
- Mainline valve is closed.
- Regulator outlet is not covered or obstructed.

A. Back Pack and Harness Assembly

1. Straps

- a. Visually inspect for complete set.
- b. Visually inspect for frayed or damaged straps.

2. Buckles

- a. Visually inspect for mating ends.
- b. Check locking function.

3. Back Plate and Cylinder Lock

- a. Visually inspect back plate for cracks and missing rivets or screws.
- b. Visually inspect cylinder hold-down strap. Physically check the strap tightener and lock to assure that it is fully engaged.