



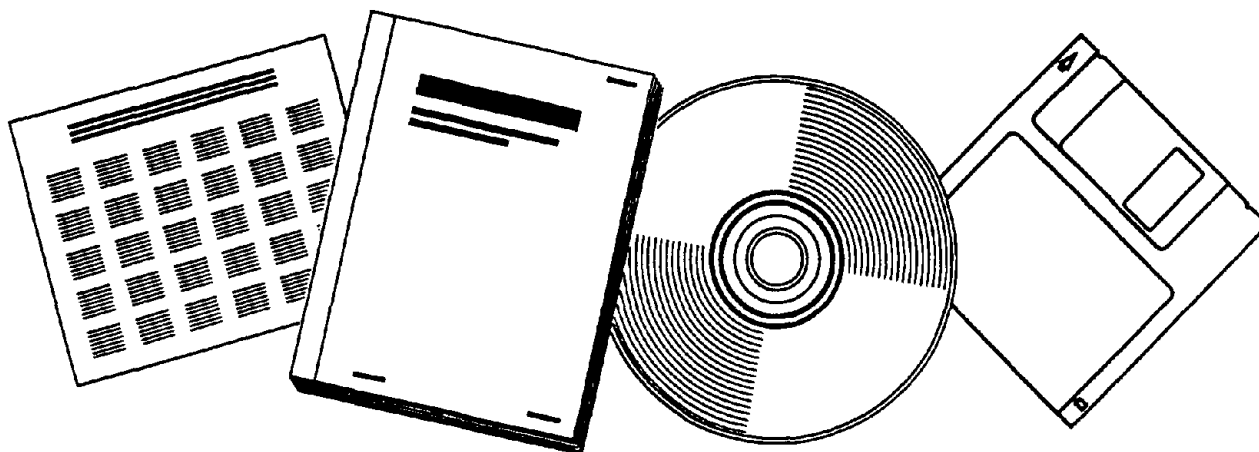
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HAZARDOUS WASTE ANNUAL REFRESHERS HELD IN SEATTLE, WASHINGTON ON JANUARY 29-31, 1997

WASHINGTON UNIV., SEATTLE

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HAZARDOUS WASTE ANNUAL REFRESHERS

January 29, 30, 31, 1997

University of Washington
Seattle, Washington

Sponsored by the

Northwest Center for Occupational Health and Safety
Department of Environmental Health
School of Public Health and Community Medicine
University of Washington

in cooperation with the
Centers for Education and Training of the NIOSH-funded
New York/ New Jersey Educational Resource Center

HAZARDOUS WASTE ANNUAL REFRESHERS

University of Washington

ACCREDITATION

This course has been approved for 1.0 CM point by the American Board of Industrial Hygiene.

Application for credit has been made to the Washington State Board of Registered Sanitarians.

Credit can be obtained for safety professionals by sending the course brochure and schedule to the Board of Certified Safety Professionals.



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16. Abstract (Limit: 200 words) This manual provided the information and course material for the University of Washington annual 1 day refresher on health and safety for hazardous waste site investigation personnel who have taken the 40 hour course. The program included a hazardous waste site investigation case study which discussed hazard recognition, levels of protection, air monitoring instruments, site investigation, and emergency response. Also included in the study program were site investigation and characterization, specifically focusing on work zones, site safety and health plans, and decontamination. New issues in the industry were discussed. Under the hazard recognition section were included legislation governing hazardous waste site operations, medical surveillance, engineering controls, work practices, and the use of personal protection equipment of employees, monitoring, handling of drums and containers. The levels of protection section discussed equipment, protection required, when protection should be used, and limiting criteria for each of several levels of protection requirements. Problem solving exercises were included throughout the course.			
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University of Washington

ADVISORY COMMITTEE

Nir Barnea

Industrial Hygienist
NOAA
Seattle, Washington

Teresa Bess

Program Coordinator
Department of Environmental Health
University of Washington

Jeff Burgess, MD

Acting Assistant Professor
Occupational and Environmental Medicine
Harborview Medical Center
Seattle, Washington

John Butler

Spills Operations Specialist
Department of Ecology
Olympia, Washington

Mary Evans

Operations Research Analyst
Hazardous Materials & Assessment Division
NOAA
Seattle, Washington

Chris Field

On-Scene Coordinator
U.S. Environmental Protection Agency, Region X
Seattle, Washington

Dean Ikeda, MS, CIH

Area Director
U.S. Department of Labor-OSHA
Bellevue, WA 98004

Sharon Morris

Assistant Chair for Community Outreach
Department of Environmental Health
University of Washington

Carl Osaki

Chief
Environmental Health Services
Seattle-King County Department of Public Health
Seattle, Washington

Lt. Jim Peschel

Assistant Chief
Marine Safety Office Puget Sound
U.S. Coast Guard
Seattle, Washington

Doug Pierce

Environmental Manager
Operations Division
Department of Transportation
Olympia, Washington

Janine Rees

Industrial Hygienist
Department of Labor and Industries
Seattle, Washington

Jan Schwert

Continuing Education Program Manager
Department of Environmental Health
University of Washington

Karen R. Stout-Abariotes, CIH

Industrial Hygiene Consultant
Division of Industrial Safety and Health
Department of Labor and Industries
Spokane, Washington

HAZARDOUS WASTE ANNUAL REFRESHERS

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FACULTY

John M. Malool, MS, Course Director
Lecturer
Centers for Education and Training
New York, New Jersey NIOSH Educational Resource Center
and
Chief of Operations
Hazmat Unit
Piscataway, New Jersey

HAZARDOUS WASTE ANNUAL REFRESHERS

University of Washington

PROGRAM SCHEDULE

- 8:00 am Registration and Continental Breakfast
- 8:15 Introduction
- 9:00 Hazardous Waste Site Investigation Case Study
- Hazard Recognition
 - Levels of Protection
 - Air Monitoring Instruments
 - Site Investigation
 - Emergency Response
- 12:15 pm Lunch (on your own)
- 1:00 Site Investigation and Characterization
- Work Zones
 - Site Safety and Health Plans
 - Decontamination
- 4:00 New Issues in the Industry
- 4:30 Exam/Course Evaluation
- 5:00 Adjourn

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ACKNOWLEDGEMENTS

REFRESHER FOR HEALTH AND SAFETY FOR HAZARDOUS WASTE SITE INVESTIGATION PERSONNEL is an 8-hour course designed for private and public sector engineers, technicians, and other employees who conduct site investigation and feasibility studies, who have taken the 40-hour course.

The Manual for this course was developed by John Malool, M.S., who is the Course Director for the Hazardous Waste Health and Safety Courses at UMDNJ-Robert Wood Johnson Medical School. Reviewers of the Manual for technical accuracy have included Tim Liverwright, M.D., Christine Proctor, M.S., Michael Gochfeld, M.D., Ph.D., and Gail Buckler, R.N., M.P.H.

Mitchel Rosen, M.S., developed the graphic design of the Manual and serves as the course coordinator for UMDNJ-Robert Wood Johnson Medical School. Clerical support has been provided by Arlene McBride, Patricia Billman, and Diana Corrette.

A critical component of this course is for us to assess the effectiveness of our curriculum. Participants are requested to provide feedback and may be contacted when they return to their work setting to assess the applicability of their new skills to their needs in the "real world." Directing the Center's evaluation efforts is Louise Weidner, Ph.D.

This course has been developed through a grant from the National Institute of Environmental Health Sciences (NIEHS). Gratitude is extended to David Rall, M.D., Ph.D. Director, NIEHS and Ronald D. Dobbins, Program Administrator, Division for Extramural Research and Training, NIEHS for their support in the development of this Center.

Appreciation is extended to the National Institute for Occupational Safety and Health (NIOSH) Division of Training and Manpower Development for providing stipends for public employees to participate in this course.

David Kotelchuck, Ph.D.
John Malool, B.S.
COURSE DIRECTORS

Audrey R. Gotsch, Dr. P.H.
CENTER DIRECTOR

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PROGRAM FACULTY AND STAFF

Course Directors

JOHN M. MALOOL, M.S., is a Safety and Health Trainer for the Division of Consumer Health Education, Department of Environmental Community Medicine, UMDNJ-Robert Wood Johnson Medical School and for the Environmental Science Program, Hunter College. In addition, he serves as the Hazardous Materials Response Team Coordinator for the Mid-Bergen HazMat Response Team. Formerly, he was a Senior Training Specialist for the US EPA Training Center in Edison, NJ and an Environmental Health and Safety Specialist for the Response and Prevention Branch of the United States Environmental Protection Agency. Prior to his five years experience with the US EPA, he managed a hazardous waste clean-up company. Mr. Malool holds a B.S. degree in Fire Protection and Safety Administration from Jersey City State College and a M.S. degree in Environmental and Occupational Health and Safety, Hunter College.

Course Coordinators

MITCHEL A. ROSEN, M.S., is Course Coordinator for the Hazardous Waste Training Programs conducted by UMDNJ-Robert Wood Johnson Medical School. He holds an M.S. degree in Public Health, Community Health Education from the University of Massachusetts at Amherst. He has experience as a Teaching Associate at the University of Massachusetts and as a Program Associate for the Environmental and Occupational Health Information Program, Division of Community Health Education, Department of Environmental and Community Medicine, UMDNJ-RWJMS.

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Center Evaluation

B. LOUISE WEIDNER, Ph.D., is the Director of Evaluation for the New Jersey/New York Hazardous Materials Worker Training Center. She participated in developing and evaluating Preventive Health Programs in six countries and has specialized in evaluation of education programs among non-literate and semi-literate adults. She also has a faculty appointment at the University of Utah School of Medicine, Department of Family and Preventive Medicine. She holds an MSPH from that school and Ph.D. in International and Development from the University of Utah Department of Anthropology.

Center Director

AUDREY R. GOTSCH, Dr. P.H., is Director of the New Jersey/New York Hazardous Materials Worker Training Center and Associate Professor and Chief, Division of Community Health Education, Department of Environmental and Community Medicine, UMDNJ-RWJMS. She also serves as Director, Public Education and Risk Communication Division, Environmental and Occupational Health Sciences Institute; Director, Continuing Education and Outreach Program, Universities Occupational Safety and Health Educational Resource Center (NIOSH); Deputy Director, Graduate Program in Public Health, UMDNJ-Robert Wood Johnson Medical School and Rutgers, The State University of New Jersey; Director, Mid-Atlantic Asbestos Training Center (EPA). Dr. Gotsch is the immediate Past-Chairperson, Public Health Education Section, American Public Health Association; Member of the New Jersey Public Health Council; and Co-Chair, Occupational Lung Disease Working Group, NIH Task Force on Research and Education for the Prevention and Control of Respiratory Disease. She received a M.P.H. degree with a concentration in Health Education from the University of Michigan and a Dr.P.H. in Sociomedical Sciences from Columbia University.

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FACTSHEET

LEGISLATION AND HAZARDOUS WASTE SITE OPERATIONS

EPA

Three major laws guide the U.S. Environmental Protection Agency:

RCRA (1976) - RESOURCE CONSERVATION AND RECOVERY ACT

This Act spells out how any operation that generates, treats, stores, or disposes of hazardous waste must handle it, from creation to final destination.

CERCLA (1980) - COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (The SUPERFUND)

This act provides remedial action for problems (mainly abandoned or uncontrolled hazardous waste sites) that were not operated under the guidelines of RCRA.

SARA (1986) - SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT

SARA extends and amends CERCLA, providing \$9 billion (from 1986-1990) to fund clean-up operations. (\$1.6 billion was authorized during the first 5 years of CERCLA.)

This law requires that any operation at a hazardous waste site must be carried out in a safe and healthy way. It instructs OSHA to write the specifics of the regulations.

OSHA

The Occupational Safety and Health Administration (OSHA), a Federal agency within the U.S. Department of Labor, was created by:

OSHAct (1970) - OCCUPATIONAL SAFETY AND HEALTH ACT

This act requires that private sector employees provide a "safe and healthful" workplace. OSHA rules and regulations can be enforced by inspection (with court order if necessary), citation, and fines.

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Public Employees - Federal OSHA rules and regulations do not automatically extend to state and local government workers. However, public employees can be covered by:

An OSHA "State Plan" (under Section 18 of the OSHAct) - state governments can get approval to act as OSHA's authorized agent in their own state. The state plan must be "at least as stringent" as the federal standard. New York has an approved State OSHA Plan just for public employees.

State Public Employees OSH laws (PEOSH) - Some states (such as New Jersey) have passed their own state laws to protect public employees.

EPA will enforce OSHA regulations for public employees in non-State Plan states.

The OSHA Hazardous Waste Operations and Emergency Response Rule (1910.120) outlines specific details of how a hazardous waste site operation must be run. The rule covers everyone with potential exposure to hazardous waste who is working at a CERCLA site, or a RCRA facility, or any employee who is expected to respond to an emergency (such as a spill or fire) involving hazardous chemicals.

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Regulatory Highlights OSHA 1910.120 Final Rule - March 6, 1989 **Section (c) - Site characterization and analysis**

Site characterization and analysis

- Hazardous waste sites must be evaluated to identify specific site hazards and to determine the appropriate safety and health control procedures.
- (1) A preliminary evaluation shall be done prior to site entry to aid in the selection of protective equipment.
 - Immediately after initial site entry, a more detailed site characterization shall be performed to aid in the selection of engineering controls and PPE.
 - (2) All serious or IDLH hazards shall be identified and evaluated.
 - (3) The following information shall be obtained (if possible) by the employer prior to employees entering the site:
 - Location and approximate size of the site;
 - Description of the response activity and job task to be performed;
 - Duration of the planned employee activity;
 - Site topography;
 - Site accessibility by air and roads;
 - Pathways for hazardous substance dispersion;
 - Present status and capabilities of emergency response teams;
 - Hazardous substances involved or expected at the site.
 - (4) PPE shall be provided and used during the initial site entry based upon the results of the preliminary site evaluation.
 - (6) Once the presence and concentrations of specific hazardous substances have been established, the risks associated will be identified.
 - Employees working on the site will be informed of any risks that have been identified.
 - (8) An ongoing air monitoring program in accordance to section (h) shall be implemented.

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Section (f) - Medical surveillance

- (1) Employees covered
 - Medical surveillance is to be provided to employees who have been or are expected to be exposed to hazardous substances or health hazards above established PELs, without regard to the use of respirators, for 30 or more days in a 12 month period.
- (2) Frequency of medical exams
 - Medical examinations or consultation shall be made available to employees who may have been exposed during an emergency incident to hazardous substances at above the PEL without regard the necessary personal protective equipment (PPE).
 - A baseline or initial medical exam is required, prior to initial assignment to an area where medical exams are required.
 - When an employee brings to the employers attention signs or symptoms indicating possible overexposure to hazardous substances.
 - Upon termination of employment, or upon reassignment to an area where medical exams are not required.
- (3) Content of medical exams
 - Exams will include a medical and work history
- (4) Exams by a physician and costs
 - Medical exams be provided under the supervision of a licensed physician.
 - Employer pays the cost, and it is given at a reasonable time and place.
- (5) Information provided by the employer to the physician
 - A copy of 1910.120.
 - A description of the employees duties.
 - Employees exposure records;
 - Personal protective equipment used by the employee.
- (6) Physicians written opinion
 - Physician will make a report to the employer of medical conditions which may put the employee at an increased risk from work at the site or may limit the use of PPE.
- (7) Record keeping
 - Records will be kept to assist in future evaluation of the employee's health.

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Section (g) - Engineering controls, work practices, and personal protective equipment for employee protection

- (1) and (2) Engineering controls, work practices, and PPE
 - Engineering controls, work practices, and (whenever these are not feasible) PPE shall be used to keep employee exposure below PELs or other appropriate exposure levels.
- (3) Personal protective equipment
 - PPE shall be used to which will protect employees from the hazards they are likely to encounter as identified during site characterization and analysis.
 - PPE selection shall be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the site, the task-specific conditions and duration, and the hazards and potential hazards identified on site.
 - Positive-pressure SCBA or positive-pressure air-line respirators equipped with an escape air-supply shall be used in IDLH condition.
 - Fully-encapsulating protective suits (level A) shall be used in conditions where contact of the skin by hazardous substances may result in an IDLH condition.
 - The level of PPE shall be increased whenever site conditions or additional information is necessary to reduce the employee exposure below established PELs.
 - The level of PPE may be decreased whenever information or site conditions show that decreased protection will not result in hazardous exposures to employees.
- (4) Totally-encapsulating chemical protective suits
 - Totally-encapsulating suits shall protect employees from the particular hazards identified during site characterization and analysis.
 - Level A suits shall be capable of maintaining positive air pressure.
- (5) Personal protective equipment (PPE) program
 - A PPE program shall be established which shall address the following elements:
 - Site hazards;
 - PPE selection;
 - PPE use;
 - Work mission duration;
 - PPE maintenance and storage;
 - PPE training and proper fitting;
 - PPE decontamination;
 - PPE donning and doffing procedures;
 - PPE inspection;
 - PPE in-use monitoring;
 - Evaluation of the effectiveness of the PPE program;
 - Limitations during temperature extremes.

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Section (h) - Monitoring

- (1) Identification and quantification of airborne contaminants is required to determine the level of employee protection needed.
- (2) Upon initial entry, air monitoring is required to identify IDLH conditions, exposure over PELs, or other dangerous conditions.
- (3) Periodic remonitoring is necessary if IDLH conditions may have developed, or increased exposures are suspected. Such situations are when:
 - Work begins on a different portion of the site;
 - New contaminants are being handled;
 - New operations are initiated;
 - Employees are handling leaking drums;
 - A reasonable amount of time has passed.
- (4) Personal monitoring of employees "likely to have the highest exposures" is required.

Section (j) - Handling drums and containers

- (1) General
 - Drums and containers used during clean-up must meet DOT, EPA, and OSHA regulations.
 - Drums and containers shall be inspected before being moved.
 - Unlabeled drums and containers shall be considered to contain hazardous substances until positively identified.
 - Drums and containers that cannot be moved without rupture, leakage, or spillage must be emptied into a sound container.
- (2) Opening drums and containers
 - Employees not actually involved in opening drums and containers shall be kept a safe distance from the opening of drums.
 - Controls for drum or container opening equipment, monitoring equipment, and fire suppression equipment must be kept behind an explosion proof barrier.
 - Employees shall not stand upon or work from drums or containers.
- (3) Material handling equipment
 - Equipment shall be chosen to minimize sources of ignition of vapors released from drums or containers by equipment.
- (4) Radioactive wastes
 - Drums and containers containing radioactive wastes shall not be handled until their hazard is properly assessed.
- (5) Shock sensitive wastes
 - All non-essential employees shall be evacuated from the area.
 - Material handling shall be provided with explosion containment devices.
 - Continuous communication between employee-in-charge and site safety and health supervisor.
 - Do not use communication methods that could cause shock sensitive materials to explode.

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- (6) Laboratory lab packs
 - Must follow same procedure as for shock sensitive waste.
 - Lab packs should be opened only when necessary and only by an individual knowledgeable in the inspection, classification and segregation of the containers within the pack.
 - If crystalline material is present, the contents should be handled as shock sensitive material.
- (7) Sampling drums and containers
 - Sampling will be done in accordance with a procedure outlined in the site safety plan.
- (8) Shipping and transport
 - Drums and containers shall be identified and classified before packing for shipment.
 - Bulking of hazardous waste shall be permitted only after a thorough characterization.
- (9) Tank and vault procedures
 - Tanks and vaults containing hazardous waste shall be handled in a manner similar to that for drums and containers.

Section (k) - Decontamination

- (1), (2), and (3) Decontamination procedures (and areas) must be developed, communicated, and implemented before employees enter hazardous areas on site in order to minimize hazardous exposures to employees (i.e., through contaminated PPE or employees).
- (4) All employees must be decontaminated before leaving a contaminated area.
- (5) Decon procedures must be monitored by the site safety and health officer.
- (6) Employees whose non-impermeable clothing becomes wetted with hazardous substances shall immediately remove clothing and shower.
- (10) Commercial laundries that decontaminate clothing shall be informed of the potentially harmful effects of the hazardous substance.
- (11) Clean change rooms and showers shall be provided.

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Section (I) - Emergency response

- (1) General
 - The emergency response (ER) plan must be available for use prior to the start of hazardous waste operations.
 - The ER plan must be written and available for inspection by employees, their representatives, and by OSHA.
 - The ER plan must include:
 - Pre-emergency planning;
 - Personnel role, line of authority, training, communication;
 - Emergency recognition and prevention;
 - Safe distances, places of refuge;
 - Site security and control;
 - Evacuation routes and procedures;
 - Decontamination;
 - Emergency medical treatment and first aid;
 - Emergency alerting and response procedures;
 - Critique of response and follow-up;
 - PPE and emergency equipment.
- (2) Emergency response at a hazardous waste clean-up site
 - Employees are to have the basic hazardous waste training plus training needed to develop and retain the necessary skills for anticipated ER activities.
 - Procedures for handling emergency incidents
 - Site topography, prevailing weather conditions, and procedures for reporting incidents to governmental agencies shall be included in ER plans;
 - The ER plan shall be integrated with fire and ER plans of local, state, and federal agencies;
 - The ER plan shall be rehearsed regularly, reviewed, and kept current;
 - An employee alarm system shall be installed.
- (3) Emergency response at sites other than hazardous waste clean-up sites.
 - Fire departments, emergency medical and first aid squads, fire brigades, and other similar ER teams would conduct monthly training sessions for their employees.

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ESTIMATES OF HAZARDOUS WASTE OPERATIONS AND POPULATIONS COVERED BY OSHA's PROPOSED RULE

<u>OPERATION</u>	<u>ESTIMATED # OF SITES OR INCIDENTS</u>	<u>ESTIMATED # OF WORKERS INVOLVED</u>
Uncontrolled Waste Site (1)	20,000	12,100
On Superfund Nat'l Priorities List	1,000	
RCRA Waste Sites	4,000	52,700
Hazardous Materials Spills	24,600 spills/yr	
Firefighters		944,500
HAZMAT Members		7,500
Industrial Fire Brigades		176,000

SUMMARY OF TRAINING REQUIREMENTS OSHA's FINAL RULE MARCH 6, 1989

<u>WORKER POPULATION</u>	<u>INITIAL TRAINING</u>	<u>REFRESHER TRAINING</u>
Uncontrolled Waste Site (1)	40 hours off-site + 3 days of actual field experience under the direct supervision of a trained experienced supervisor	8 hrs. annually
RCRA TSD Sites	24 hours	8 hrs. annually
Emergency Response Personnel (2) (Off-site)	24 hours	8 hrs. annually

(1) This category includes CERCLA sites, remedial actions at RCRA sites and sites designated for clean-up by state and local governments.

(2) Personnel responding to emergencies at hazardous waste clean-up sites are required to have the same training as waste site workers.

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HAZARD RECOGNITION EXERCISE

This exercise is designed to give you working experience on identifying and understanding hazards.

The class will divide up into groups, and each group will be given three situations to work with. For each situation, you will be asked to identify the TYPE of hazard, the most important aspects of the hazard, and what can be done to minimize it.

Work together as a group and discuss each question. Then complete the form together, and select one person to act as spokesperson.

SITUATION #1

You uncover an ordinary metal drum, which upon opening turns out to have multiple small containers labelled "Iodine 131". You also see syringes, IV bottles and tubing, and what appears to be empty test tubes, glassware and forceps.

1. What types of hazards are represented here?
2. For each hazard you identified, describe the greatest potential risk you face from exposure, and what characteristics would make the hazard greater or less.
3. Assume the container has spilled into a pit and sat there for two to three days, after which all the containers were removed. What can you say about the risk of continuing to work in that pit at this point?
4. Within your group, come up with one example of someone's actual on-site experience with one of these hazards and a description of what happened in that situation.

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HAZARD RECOGNITION EXERCISE

SITUATION #2

You find a large concrete pool around which are stacked about 20 55 gallon drums labelled "diethyl ether". (The flash point of diethyl ether is -27 degrees C).

About half of them have precipitated crystals visible around leaking cracks. (Ether on standing can precipitate out organic peroxides that are highly explosive and shock-sensitive.)

A site accident causes some of the barrels to spill into the concrete pool where there is now a large puddle of the compound. Some of the precipitated barrels are balanced precariously at the edge.

1. What types of hazards are represented here?
2. For each hazard you identified, describe the greatest potential risk you face from exposure, and what characteristics would make the hazard greater or less.
3. Try to project a chain of events for each hazard that could turn a potential problem into an actual one. Then, come up with methods that could prevent those events from happening.
4. Within your group, come up with one example of someone's actual on-site experience with one of these hazards and a description of what happened in that situation.

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HAZARD RECOGNITION EXERCISE

SITUATION #3

You discover a 500 gallon storage tank with the top open to the air at one end. About 50 gallons of 1,1,1-trichloroethane are in the bottom of the tank (vapor pressure=127 mm Hg; vapor density=4.6).

1. What types of hazards are represented here?
2. For each hazard you identified, describe the greatest potential risk you face from exposure, and what characteristics would make the hazard greater or less.
3. What symptoms would occur if a worker were over-exposed to this chemical (assume this substance acts primarily as a central nervous system depressant, or central acting poison).
4. Within your group, come up with one example of someone's actual on-site experience with one of these hazards and a description of what happened in that situation.

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HAZARD EVALUATION EXERCISE

Part A

The class will be divided into four groups. Each group will be given MSDSs and asked to fill out the information below using MSDSs.

1. Of the seven hazards listed below, which one(s) apply to your compound?

- Irritant/corrosive
- Central acting poison/asphyxiant
- Organ damage over time (specify organ)
- Allergen/sensitizer
- Carcinogen/mutagen/reproductive hazard
- Fire/flammability
- Explosion

2. For each hazard you designated, cite the specific data that documents that conclusion.

3. Hazards can be evaluated as relatively higher or lower. Using exposure limits, physical data, hazard warnings, etc. rate each hazard as higher or lower and explain why.

4. For each of the health hazards, describe the type and nature of protective measures that would be useful.

5. For each of the health hazards, describe the symptoms that would be experienced, and the basic mechanism of toxicity.

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HAZARD EVALUATION EXERCISE

Part B

You will now be given the name of one chemical. Using various references, develop the following information.

1. The specific hazards posed by the chemical.
2. The data that led you to those conclusions.
3. The relative extent of those hazards.
4. Effects and symptoms likely to be experienced by an exposed individual.
5. The routes of entry for each effect, and the levels of exposure likely to cause problems.

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MATERIAL SAFETY DATA SHEETS

The OSHA Hazard Communication Standard, 1910.120, requires chemical manufactures to determine if there are any health or physical hazards associated with a product they produce or import. The following information must appear on an MSDS:

Identity of the substance (manufacturer's name, address, telephone), the product name, formula, and synonyms; **Hazardous ingredients** and **physical data**, which includes boiling point vapor pressure, vapor density, specific gravity, melting point, evaporation rate, solubility in water, appearance and color, PELs, TLVs, and other exposure limits; **Fire and explosion data**, which includes Flash point, flammable limits, LEL, UEL, extinguishing method, special fire fighting procedures, and unusual fire and explosion hazards; **Reactivity data**, which includes stability, incompatible materials, hazardous decomposition or by-products, and hazardous polymerization; **Health hazard data**, which includes routes of entry, acute and chronic health hazards, carcinogenicity, signs and symptoms of exposure, medical conditions aggravated by exposure, and emergency first aid procedures; **Precautions for safe handling and use**, which includes steps to be taken in case material is spilled or released, waste disposal method, and precautions to be taken in handling and storing; and **control measures**, which includes respiratory protection needed, ventilation strategies, protective clothing and type, and work practices.

Annual Refresher on Health and Safety for Hazardous
Waste Site Investigation Personnel

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LEVELS OF PROTECTION

LEVEL A PROTECTION

Equipment:

- Pressure-demand, full facepiece SCBA or pressure-demand supplied-air respirator with escape SCBA.
- Fully encapsulating, chemical resistant suit.
- Inner chemical resistant gloves.
- Chemical resistant safety boots.
- Two way radio communications
- Hard hat
- Cooling unit*
- Coveralls*
- Long cotton underwear*
- Disposable gloves and boot covers*

*Optional

Protection provided:

- The highest available level of respiratory, skin, and eye protection.

Should be used when:

- The chemical substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either:

- measured or potential for high concentration of atmospheric vapors, gases, or particulates.
- site operations and work functions involving a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through the intact 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 conditions requiring Level A protection is determined.

Limiting criteria:

- Fully-encapsulating suit material must be compatible with the substances involved.

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LEVEL B PROTECTION

Equipment:

- Pressure-demand, full-face SCBA or pressure-demand supplied air respirator with escape SCBA.
 - Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one- or two-piece chemical splash suit; disposable chemical-resistant one piece suit.)
 - Inner and outer chemical resistant gloves.
 - Chemical resistant safety boots.
 - Hard hat
 - Two way communication • Coveralls* • Disposable boot covers*
 - Face shield* • Long cotton underwear*
- *optional

Protection provided:

- The same level of respiratory protection as Level A, but less skin protection.
- It is the minimum level recommended for initial site entries until the hazards have been further identified.

Should be used when:

- The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection. This involves atmospheres:
 - with IDLH concentrations of specific substances that do not represent a severe skin hazard;
 - that do not meet the criteria for use of air-purifying respirators.
- Atmosphere contains less than 19.5% oxygen.
- Presence of incompletely identified vapors or gases is indicated by direct reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals to skin or capable of being absorbed through the intact skin.

Limiting criteria:

- Use only when the vapor or gases present are not suspected of containing high concentrations of chemicals that are harmful to skin or capable of being absorbed through the intact skin.
- Use only when it is highly unlikely that the work being done will generate either high concentrations of vapors, gases, or particulates or splashes of material that will affect exposed skin.

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LEVEL C PROTECTION

Equipment:

- Full-facepiece, air-purifying, canister-equipped respirator
- Chemical-resistant clothing (coveralls and long-sleeved jacket; hooded, one- or two-piece chemical splash suit; disposable chemical-resistant one piece suit.)
- Inner and outer chemical resistant gloves.
- Chemical resistant safety boots.
- Hard hat
- Two way communication
- Coveralls*
- Disposable boot covers*
- Face shield*
- Long cotton underwear
- *optional

Protection provided:

- The same level of skin protection as Level B, but a lower level of respiratory protection.

Should be used when:

- The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any skin exposure.
- The types of air contaminants have been identified, concentrations measured, and a canister is available that can remove the contaminant.
- All criteria for the use of air-purifying respirators are met.

Limiting criteria:

- Atmospheric concentration of chemicals must not exceed IDLH levels.
- The atmosphere must contain at least 19.5% oxygen.

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LEVEL D PROTECTION

Equipment:

- Coveralls
- Safety boots/shoes
- Safety glasses or chemical splash goggles
- Hard hat
- Gloves*
- Escape mask*
- Face shield*

*optional

Protection provided:

- No respiratory protection.
- Minimal skin protection.

Should be used when:

- The atmosphere contains no known hazard.
- Work functions preclude splashes, immersion, or the inhalation of or contact with hazardous levels of any chemicals.

Limiting criteria:

- This level should not be worn in the Exclusion Zone.
- The atmosphere must contain at least 19.5% oxygen.

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LEVELS OF PROTECTION FOR UNKNOWN SUBSTANCES

<u>LEVEL</u>	<u>ATMOSPHERIC READING</u>
D	Background
C	Background - 5 units extreme caution continuous monitoring
B	5 - 500 units minimal initial entry
A	500 - 1000 units

Over 1000 units - **STOP** -

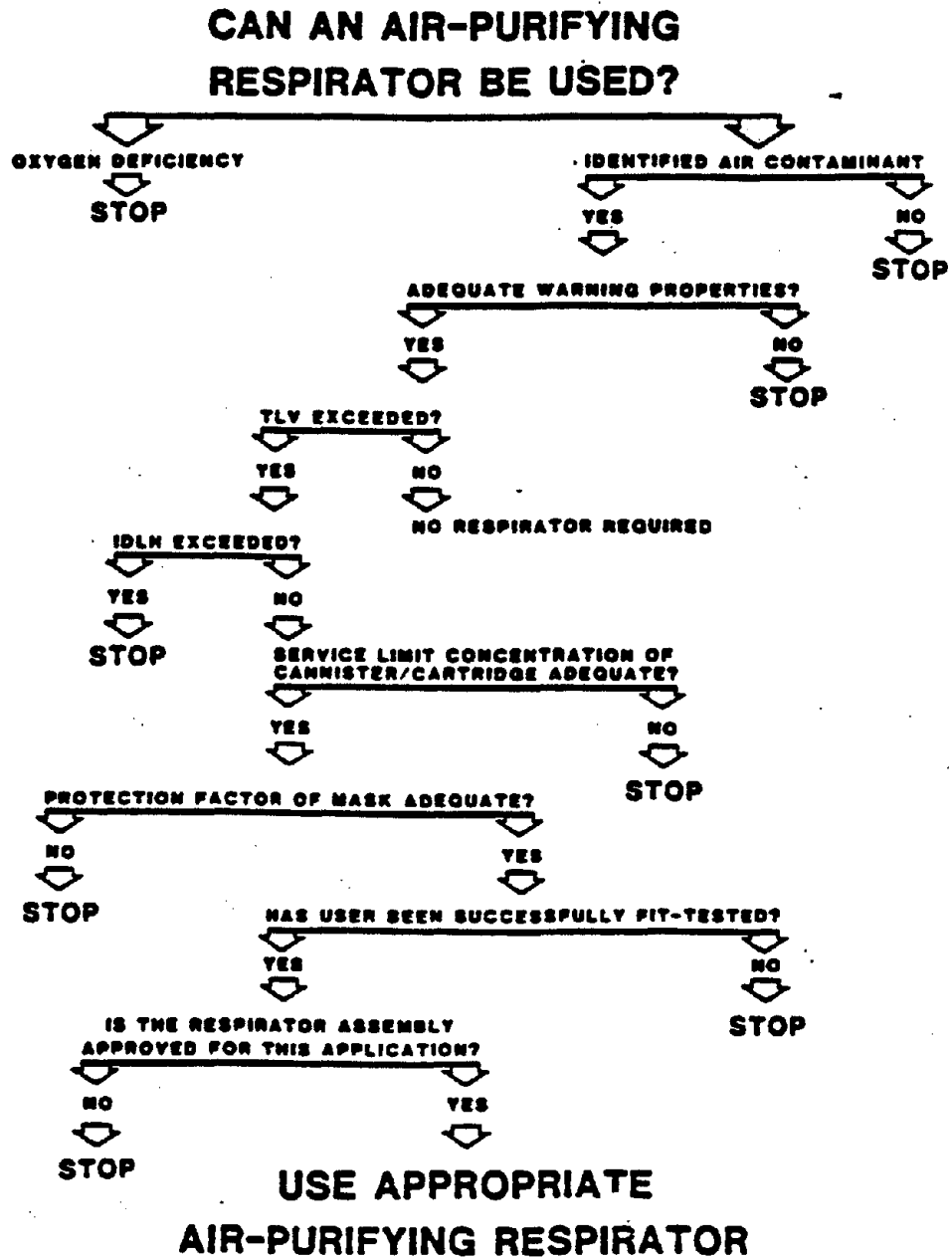
What am I doing here?

Why is there such a high reading?

What can be done to reduce it?

Re-evaluate what you are doing and why you are doing it.

RESPIRATOR DECISION LOGIC TREE



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FIT-TESTING RESPIRATORS

- I. Objective
Participants learn to qualitatively test a full-face air-purifying respirator with procedures suitable for field use.
- II. Procedure
 - A. Instructor demonstrates proper fit-testing with isoamyl acetate and irritant smoke.
 - B. Each person must fit test at least one participant. It is desirable for each person to fit-test a full face mask using both methods of testing.
 - C. Each participant should be fit tested until a full face mask is found that provided an adequate face seal.

FIT-TESTING PROCEDURES

1. Don respirator to be tested with cartridges appropriate for each atmosphere.
2. Place the participant's head in a plastic bag containing the test atmosphere. Participant test first in the isoamyl acetate tent. If no leakage is detected, participant repeats exercise in the irritant smoke tent. Irritant smoke must be added regularly to maintain the atmosphere.
3. If the participant notes any odor or irritation during the test, stop the test. Try adjusting the respirator or start over with a different respirator.
4. Breathe normally for about 10 seconds.
5. Breathe deeply for about 10 seconds.
6. Move head back and forth for about 10 seconds.
7. Move head up and down for about 10 seconds.
8. Count or recite for about 10 seconds.
9. Bend over and move around for about 10 seconds.
10. Run in place for about 10 seconds.
11. The wearer who detects no odor or irritation has passed the fit-test.

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FIT-TEST RECORD*

Name: _____
 Location: _____
 Signature: _____ Date: _____
 Name of fit-tester: _____
 Signature: _____ Date: _____

<u>Type of test</u>	<u>Isoamyl acetate</u>	<u>Irritant smoke</u>
Type of mask: Manufacturer: Model:	pass/fail	pass/fail
Type of mask: Manufacturer: Model:	pass/fail	pass/fail
Type of mask: Manufacturer: Model:	pass/fail	pass/fail
Type of mask: Manufacturer: Model:	pass/fail	pass/fail
Type of mask: Manufacturer: Model:	pass/fail	pass/fail
Type of mask: Manufacturer: Model:	pass/fail	pass/fail

*Record, not certification.

Comments:

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PROBLEM SOLVING EXERCISES - AIR-PURIFYING RESPIRATORS

1. You may be exposed to the solvent dimethylformamide during the investigation of an abandoned factory where parachutes were waterproofed.

For dimethylformamide:

PEL=10 ppm
IDLH=3500 ppm
Odor threshold=100 ppm

Based upon the above information, is an APR suitable?

2. You are asked to check on a removal in progress job in the South Bronx. An illegal temporary storage dump for open containers of asbestos were discovered at a parking lot in the South Bronx. A removal contractor was hired to open the bags of asbestos and send this hazardous waste to an approved landfill for asbestos waste in Pennsylvania. A site investigation revealed that all workers were wearing respirators listed under NIOSH TC-21C-Type S.

You question the contractor as to why the workers were not wearing at least a half-face APR with approved asbestos HEPA filters. The contractor justified his choice by citing the NIOSH Certified Equipment List as of October 1, 1986 document as well as the claims on the manufacturer's labels.

This NIOSH document states that the Type S particulate respirator may also be approved for pneumoconiosis-producing and fibrosis-producing dusts, or dusts and mists.

The manufacturer's labels for these respirators states: NIOSH/MSA approved for dusts and mists (including lead and asbestos).

What are your recommendations?

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FACTSHEET FORMS OF HEAT STRESS

<u>Disorder</u>	<u>Signs and symptoms</u>	<u>Causes</u>	<u>Treatment</u>
Heat cramps	Painful muscle spasms of extremities, abdomen, back.	Sodium and chloride depletion.	Adequate salt intake (Unless contra-indicated)
Heat Exhaustion	Weakness, vertigo, headache, anorexia, nausea vomiting, faintness, rapid pulse, low blood pressure, body pressure subnormal or normal, skin ashen, cold or clammy.	Failure of cardiovascular system to respond to in external temperature.	Rest in cool area, salted (unless contra-indicated)
Exertional Heat injury	Headache, chills, nausea, vomiting, muscle cramps, ataxia, unsteady gait, incoherent speech, body temperature 102-104°F rapid pulse, low blood pressure.	Exertion in high ambient temperatures with high humidity.	Place under cold wet sheets massage extremities, IV fluids hospital obs 36 hours.
Heat Stroke	Headache, vertigo, faintness, abdominal distress, confusion, hypernea, loss of consciousness, delirium in severe cases, prostration, body temperature 106°F or greater, rapid pulse, low blood pressure.	Breakdown of thermoregulatory system, inability to sweat and remove excess heat.	Place in ice water bath or soak clothing call ambulance immediately.

Other clinical events that may occur include:

Heat rash (prickly heat), which is caused when sweat cannot be easily evaporated from the skin and the sweat ducts become plugged.

Heat syncope (fainting), common in unacclimated workers after standing erect and immobile, which causes pooling of blood in the lower extremities.

Sunburn resulting from overexposure to ultraviolet rays.

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EMERGENCY RESPONSE EXERCISE

A large abandoned manufacturing plant/warehouse has undergone an extensive mitigative effort to remove the hazardous wastes left on the site. Your firm, an environmental consulting company has handled the entire site clean-up and all that is left to do is to supervise the hazardous waste removal, which will be done this morning. The drums are being loaded onto the tractor trailer trucks and the manifests are being prepared. It is during this loading operation that your troubles begin.

While picking up the drums with the forklift, the operator pierces two drums with the forks of the forklift. The drums are beginning to leak. Both of the drums contain toluene diisocyanate (TDI). In his extreme state of excitement, the forklift operator backs his forklift off the loading dock, where it crashes onto a pile of already staged drums. These drums similarly begin to leak. These drums contain acetic anhydride. The forklift operator appears to be injured and can be heard moaning.

Adjacent to the leaking drums of acetic anhydride is a storm sewer. Because of the age of the community, the storm sewers are hooked to the sanitary system. The weather is hot and humid, a brief thunderstorm has just passed. It is 7:30 am on a Friday morning. CONGRATULATIONS! Your clean-up has now become an emergency response. Using all the information available to you, answer the following questions.

1. What are the particular hazards of the chemicals involved?
2. What are the potential pathways of dispersion for the spilled chemicals?
3. What problems can be anticipated if the chemicals follow these dispersion pathways?
4. In what level of protective clothing would the responders wear to handle the various tasks involved with this incident?
5. What actions would you prescribe for the public?
6. What type of decontamination will be appropriate?
7. ANYTHING ELSE?

DECONTAMINATION PROCESS

Introduction

1.1. The objective of these procedures is to minimize the risk of exposure to hazardous substances. These procedures were derived from the US Environmental Protection Agency, Office of Emergency and Remedial Response's (OERR), "Interim Standard Operating Safety Guides (revised Sep. 82)". This version of the guides is in a format that is more appropriate for use in the field.

1.2. Protective equipment must be worn by personnel when response activities involve known or suspected hazardous substances. The procedures for decontaminating personnel upon leaving the contaminated area are addressed for each of the EPA, OERR designated levels of protection. The procedures given are for the maximum and minimum amount of decontamination used for each level of protection.

1.3. The maximum decontamination procedures for all levels of protection consist of specific activities at nineteen stations. Each station emphasizes an important aspect of decontamination. When establishing decontamination line, each aspect should be incorporated separately or combined with other aspects into a procedure with fewer steps (such as the Minimum Decontamination Procedures).

1.4. Decontamination lines are site specific since they are dependent upon the types of contamination and the type of work activities on site. A cooling station is sometimes necessary within the decontamination line during hot weather. It is usually a location in a shaded area in which the wind can help to cool personnel. In addition, site conditions may permit the use of cooling devices such as cool water hose, ice packs, cool towels, etc. When the decontamination line is no longer needed, contaminated wash and rinse solutions and contaminated articles must be contained and disposed of as hazardous waste in compliance with state and federal regulations.

**Source: Excerpted from Field Standard Operating Procedures for the Decontamination of Response Personnel (FSOP 7). EPA Office of Emergency and Remedial Response, Hazardous Response Support Division, Washington, DC. January 1985.*

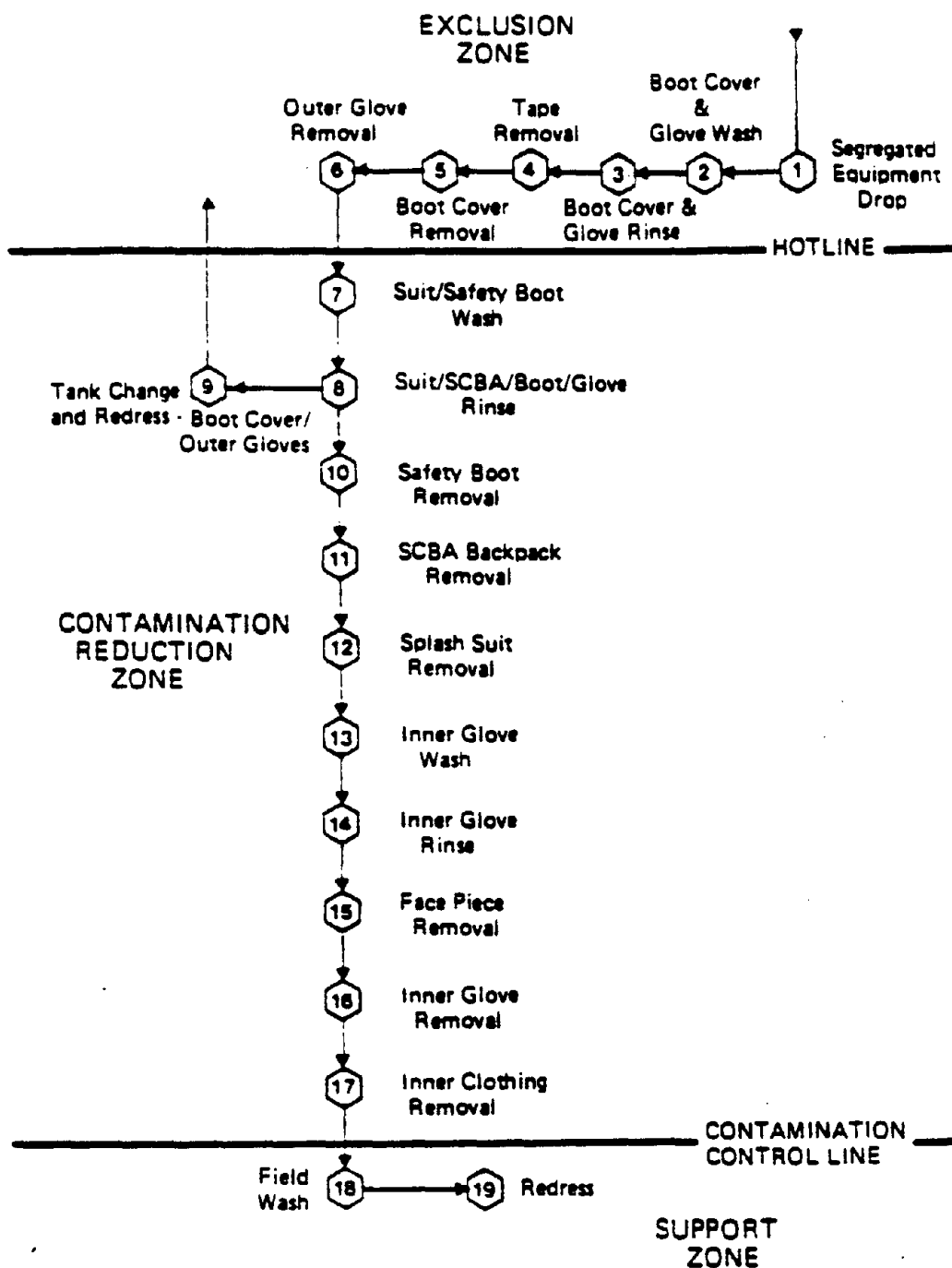
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PROCESS DECON PROCEDURES

MAXIMUM DECONTAMINATION LAYOUT

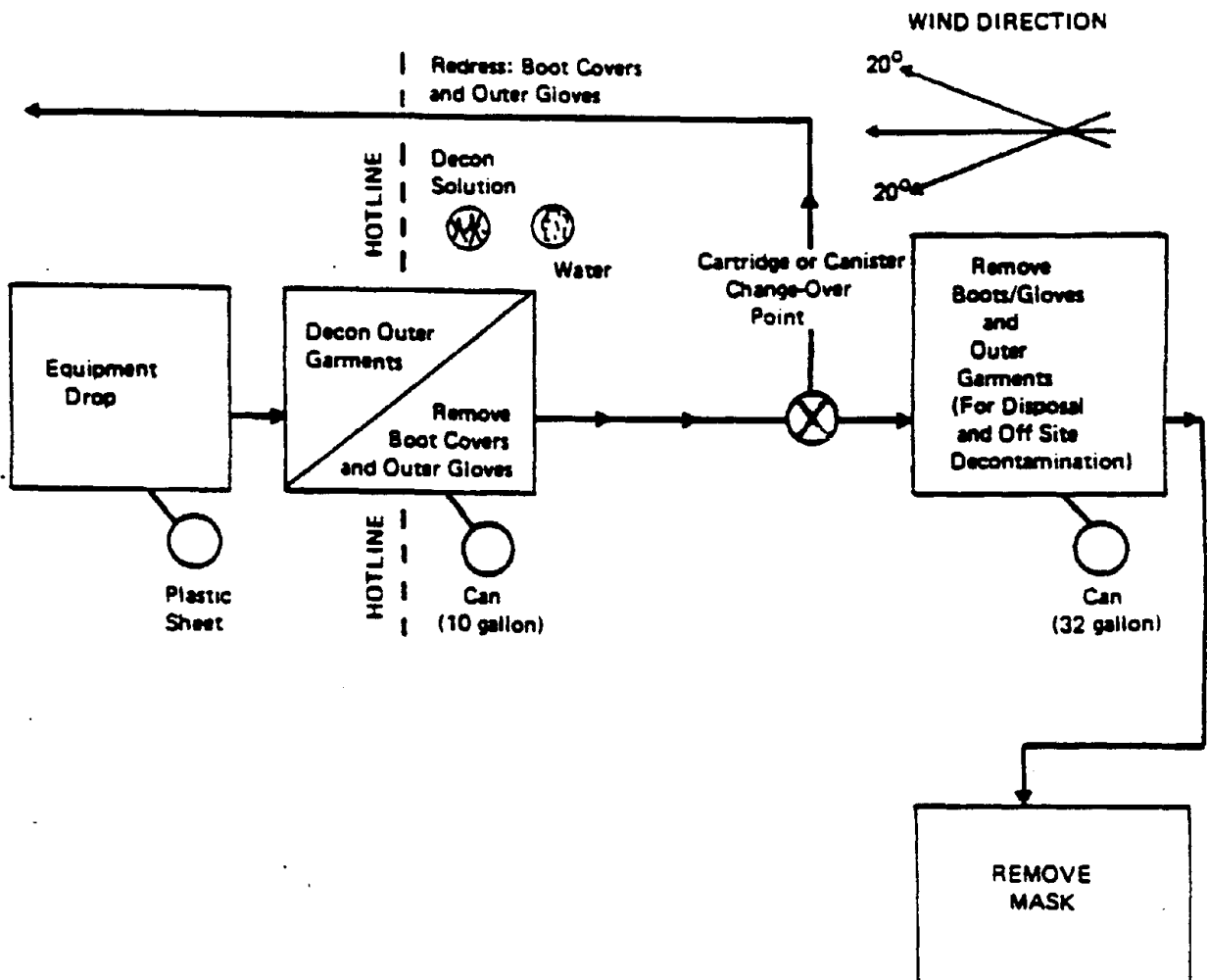
LEVEL B PROTECTION



PROCESS DECON PROCEDURES

MINIMUM DECONTAMINATION LAYOUT

LEVEL C PROTECTION



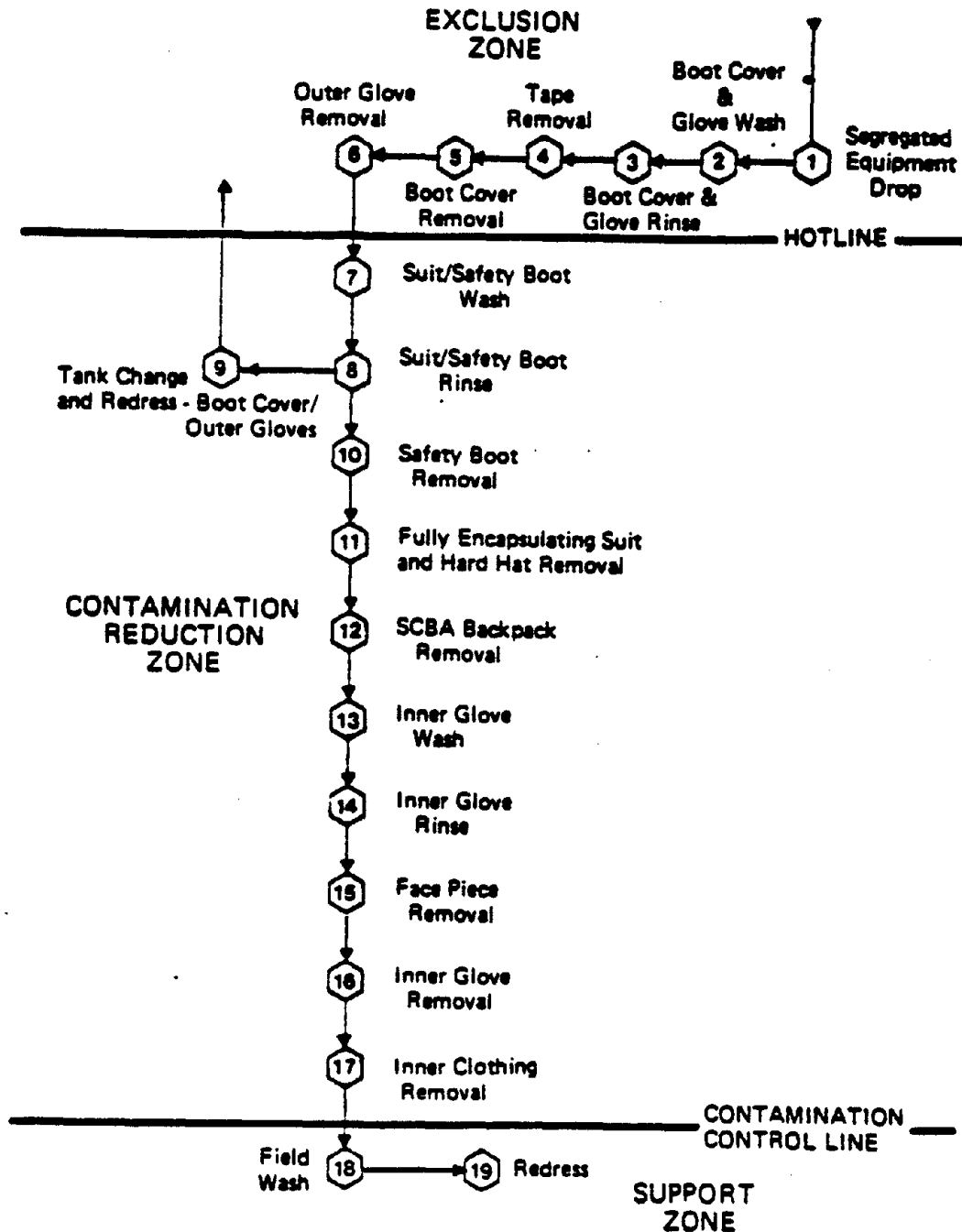
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FSOP 7

PROCESS DECON PROCEDURES

MAXIMUM DECONTAMINATION LAYOUT

LEVEL A PROTECTION



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EQUIPMENT NEEDED TO PERFORM MAXIMUM DECONTAMINATION MEASURES FOR LEVELS A, B, AND C

- | | |
|--|---|
| Station 1: a. various plastic containers
b. plastic liners
c. plastic drop cloths | Station 10: a. containers (20-30 gallons)
b. plastic liners
c. bench or stools |
| Station 2: a. containers (20-30 gallons)
b. decon solution or detergent water
c. 2-3 long-handles, soft-bristled scrub brushes | Station 11: a. rack
b. drop cloths
c. bench or stools |
| Station 3: a. containers (20-30 gallons)
OR
high pressure spray unit
b. water
c. 2-3 long-handles, soft-bristled scrub brushes | Station 12: a. Table |
| Station 4: a. containers (20-30 gallons)
b. plastic liners | Station 13: a. basin or bucket
b. decon solution
c. small table |
| Station 5: a. containers (20-30 gallons)
b. plastic liners
c. bench or stools | Station 14: a. water
b. basin or bucket
c. small table |
| Station 6: a. containers (20-30 gallons)
b. plastic liners | Station 15: a. containers (20-30 gallons)
b. plastic liners |
| Station 7: a. containers (20-30 gallons)
b. decon solution or detergent water
c. 2-3 long-handled, soft-bristled scrub brushes | Station 16: a. containers (20-30 gallons)
b. plastic liners |
| Station 8: a. containers (20-30 gallons)
OR
high pressure spray unit
b. water
c. 2-3 long-handled, soft-bristled scrub brushes | Station 17: a. containers (20-30 gallons)
b. plastic liners |
| Station 9: a. air tanks or face masks and cartridge depending on level
b. tape
c. boot covers
d. gloves | Station 18: a. water
b. soap
c. small table
d. basin or bucket
e. field showers
f. towels |
| | Station 19: a. dressing trailer is needed in inclement weather
b. tables
c. chairs
d. lockers
e. cloths |

EQUIPMENT NEEDED TO PERFORM MAXIMUM DECONTAMINATION MEASURES FOR LEVELS A, B, AND C

- | | |
|---|--|
| Station 1: a. various size containers
b. plastic liners
c. plastic drop cloths | Station 4: a. air tanks or face masks and cartridge depending on level
b. tape
c. boot covers
d. gloves |
| Station 2: a. containers (20-30 gallons)
b. decon solution
c. rinse water
d. 2-3 long-handled, soft-bristled scrub brushes | Station 5: a. containers (20-30 gallons)
b. plastic liners
c. bench or stools |
| Station 3: a. containers (20-30 gallons)
b. plastic liners
c. bench or stool | Station 6: a. plastic sheets
b. basin or bucket
c. soap and towels
d. bench or stool |
| | Station 7: a. water
b. soap
c. tables
d. wash basin or bucket |

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MAXIMUM MEASURES FOR LEVEL A DECONTAMINATION

- | | |
|---|--|
| Section 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 cool down station may be set up within this area. |
| Section 2: Boot cover and glove wash | 2. Scrub outer boot covers and gloves with decon solution or detergent/water. |
| Section 3: Boot cover and glove rinse | 3. Rinse off decon solution from station 2 using copious amounts of water. |
| Section 4: Tape removal | 4. Remove tape around boots and gloves and deposit in container with plastic liner. |
| Section 5: Boot cover removal | 5. Remove boot covers and deposit in container with plastic liner. |
| Section 6: Outer glove removal | 6. Remove outer gloves and deposit in container with plastic liner. |
| Section 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. |
| Section 8: Suit and boot rinse | 8. Rinse off decon solution using water. Repeat as many times as necessary. |
| Section 9: Tank change | 9. If an air tank is desired, this is the last step in the decontamination procedure. Air tank is exchanged, new outer gloves and boot covers are donned, and joints taped. Worker returns to duty. |
| Section 10: Safety boot removal | 10. Remove safety boots and deposit in container with plastic liner. |
| Section 11: Fully encapsulating suit and hard hat removal | 11. Fully encapsulated suit is removed with assistance of a helper and is laid out on a drop cloth or hung up. Hard hat is removed. Hot weather rest station maybe set up in this area for personnel returning to site. |
| Section 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. |
| Station 16: Inner glove removal | 16. Remove inner gloves and deposit in container with liner. |
| Station 17: Inner clothing removal | 17. Remove clothing 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-encapsulating suit. |
| Section 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 cloths |

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MINIMUM MEASURES FOR LEVEL A DECONTAMINATION

- | | |
|--|--|
| Station 1: 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 cool down station may be set up within this area. |
| Station 2: Outer garment, boots, and gloves wash and rinse | 2. Scrub outer boots, outer gloves, and fully-encapsulating suit with decon solution or detergent and water. Rinse off using copious amounts of water. |
| Station 3: Outer boot and glove removal | 3. Remove outer boots and gloves. Deposit in container with plastic liner. |
| Station 4: Tank change | 4. 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, joints taped, and worker returns to duty. |
| Station 5: Boot, gloves and outer garment removal | 5. Boots, fully-encapsulating suit, inner gloves removed and deposited in separate containers lined with plastic. |
| Station 6: SCBA removal | 6. SCBA backpack and face piece is removed (avoid touching face with fingers). SCBA deposited on plastic sheets. |
| Station 7: Field wash | 7. Hands and face are thoroughly washed. Shower as soon as possible. |

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FSOP 7

MAXIMUM MEASURES FOR LEVEL B DECONTAMINATION

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|-------------|----------------------------------|--|
| Section 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 cool down station may be set up within this area. |
| Section 2: | Boot cover and glove wash | 2. Scrub outer boot covers and gloves with decon solution or detergent/water. |
| Section 3: | Boot cover and glove rinse | 3. Rinse off decon solution from station 2 using copious amounts of water. |
| Section 4: | Tape removal | 4. Remove tape around boots and gloves and deposit in container with plastic liner. |
| Section 5: | Boot cover removal | 5. Remove boot covers and deposit in container with plastic liner. |
| Section 6: | Outer glove removal | 6. Remove outer gloves and deposit in container with plastic liner. |
| Section 7: | Suit and safety boot wash | 7. Wash chemical-resistant splash suit, SCBA, gloves, and safety boots. Scrub with long-handled, scrub brush and decon solution. Wrap regulator (if belt mounted type) with plastic to keep out of water. Wash backpack assembly with sponges or cloths. |
| Section 8: | Suit, SCBA, boot and glove rinse | 8. Rinse off decon solution using copious amounts of water. |
| Section 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, joints taped, and 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 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. |
| Station 16: | Inner glove removal | 16. Remove inner gloves and deposit in container with liner. |
| Station 17: | Inner clothing removal | 17. Remove clothing 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-encapsulating suit. |
| Section 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 cloths |

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MINIMUM MEASURES FOR LEVEL B DECONTAMINATION

- | | |
|--|--|
| Station 1: 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 cool down station may be set up within this area. |
| Station 2: Outer garment, boots, and gloves wash and rinse | 2. Scrub outer boots, outer gloves, and chemical-resistant suit with decon solution or detergent and water. Rinse off using copious amounts of water. |
| Station 3: Outer boot and glove removal | 3. Remove outer boots and gloves. Deposit in container with plastic liner. |
| Station 4: Tank change | 4. 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, joints taped, and worker returns to duty. |
| Station 5: Boot, gloves and outer garment removal | 5. Boots, chemical resistant suit, inner gloves removed and deposited in separate containers lined with plastic. |
| Station 6: SCBA removal | 6. SCBA backpack and face piece is removed. Avoid touching face with finger. SCBA deposited on plastic sheets. |
| Station 7: Field wash | 7. Hands and face are thoroughly washed. Shower as soon as possible. |

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MAXIMUM MEASURES FOR LEVEL C DECONTAMINATION

- | | | |
|---|-----|---|
| Section 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 cool down station may be set up within this area. |
| Section 2: Boot cover and glove wash | 2. | Scrub outer boot covers and gloves with decon solution or detergent/water. |
| Section 3: Boot cover and glove rinse | 3. | Rinse off decon solution from station 2 using copious amounts of water. |
| Section 4: Tape removal | 4. | Remove tape around boots and gloves and deposit in container with plastic liner. |
| Section 5: Boot cover removal | 5. | Remove boot covers and deposit in container with plastic liner. |
| Section 6: Outer glove removal | 6. | Remove outer gloves and deposit in container with plastic liner. |
| Section 7: Suit and boot wash | 7. | Wash splash suit, gloves, and safety boots. Scrub with long-handle scrub brush and decon solution. |
| Section 8: Suit and boot, and glove rinse | 8. | Rinse off decon solution using water. Repeat as many times as necessary. |
| Section 9: Canister or mask change | 9. | If worker leaves Exclusion Zone to change canister this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, joints taped, and 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 container with liner. |
| Station 16: Inner clothing removal | 16. | Remove clothing 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-encapsulating suit. |
| Section 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 cloths |

Annual Refresher on Health and Safety for Hazardous Waste Site Investigation Personnel

FSOP 7

MINIMUM MEASURES FOR LEVEL C DECONTAMINATION

- | | |
|--|--|
| Station 1: 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 cool down station may be set up within this area. |
| Station 2: Outer garment, boots, and gloves wash and rinse | 2. Scrub outer boots, outer gloves, and splash suit with decon solution or detergent and water. Rinse off using copious amounts of water. |
| Station 3: Outer boot and glove removal | 3. Remove outer boots and gloves. Deposit in container with plastic liner. |
| Station 4: Canister or mask change | 4. If worker leaves Exclusion Zone to change canister this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty. |
| Station 5: Boot, gloves and outer garment removal | 5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic. |
| Station 6: Face piece removal | 6. Facepiece is removed. Avoid touching face with fingers. Facepiece deposited on plastic sheet. |
| Station 7: Field wash | 7. Hands and face are thoroughly washed. Shower as soon as possible. |

Part P

Hazardous Waste Operations and Emergency Response

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WAC 296-62-300, Scope, application, and definitions.

**WISHA Regional Directive 84-13 B-1 may be applicable to this section.

**WISHA Regional Directive 91-1 is applicable to this section.

- (1) Scope. This section covers employers who have employees who work in the following operations:
 - (a) Clean-up operations required by a governmental body, whether federal, state, local, or other involving hazardous substances that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the EPA's National Priority Site List (NPL), state priority site lists, sites recommended for the EPA NPL, and initial investigations of government identified sites which are conducted before the presence or absence of hazardous substances has been ascertained).

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WAC 296-62-300 (Cont.)

- (b) Corrective actions involving clean-up operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA) as amended (42 U.S.C. 6901 et seq.);
 - (c) Voluntary clean-up operations at sites recognized by federal, state, local, or other governmental bodies as uncontrolled hazardous waste sites;
 - (d) Operations involving hazardous wastes that are conducted at treatment, storage, and disposal (TSD) facilities regulated by 40 CFR Parts 264 and 265 pursuant to RCRA; or by agencies under agreement with U.S.E.P.A. to implement RCRA regulations; and
 - (e) Emergency response operations for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard.
- (2) Application.
- (a) All requirements of this chapter and chapters 296-24 and 296-155 WAC apply pursuant to their terms to hazardous waste and emergency response operations whether covered by this part or not. If there is a conflict or overlap, the provision more protective of employee safety and health shall apply.
 - (b) Hazardous substance clean-up operations within the scope of subsection (1)(a), (b), and (c) of this section must comply with all sections (WAC 296-62-300 through 296-62-3145) except WAC 296-62-3140 and 296-62-3112.
 - (c) Operations within the scope of subsection (1)(d) of this section must comply only with the requirements of WAC 296-62-3140.

Notes and Exceptions:

- (i) All provisions of WAC 296-62-3140 cover any treatment, storage, or disposal (TSD) operation regulated by 40 CFR parts 264 and 265 or by state law authorized under RCRA, and required to have a permit or interim status from EPA pursuant to 40 CFR 270.1 or from a state agency pursuant to RCRA.
- (ii) Employers who are not required to have a permit or interim status because they are conditionally exempt small quantity generators under 40 CFR 261.5 or are generators who qualify under 40 CFR 262.34 for exemptions from regulation under 40 CFR parts 264, 265, and 270 ("excepted employers") are not covered by WAC 296-62-3140(1) through (7). Excepted employers who are required by the EPA or state agency to have their employees engage in emergency response or who direct their employees to engage in emergency response are covered by WAC 296-62-3140(8), and cannot be exempted by WAC 296-62-3140(8)(a). Excepted employers who are not required to have employees engage in emergency response, who direct their employees to evacuate in the case of such emergencies and who meet the requirements of WAC 296-62-3140(8)(a) are exempt from the balance of WAC 296-62-3140(8).
- (iii) If an area is used primarily for treatment, storage or disposal, any emergency response operations in that area shall comply with WAC 296-62-3140(8). In other areas not used primarily for treatment, storage or disposal, any emergency response operations shall comply with WAC 296-62-3112. Compliance with the requirements of WAC 296-62-3112 shall be deemed to be in compliance with the requirements of WAC 296-62-3140(8).

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WAC 296-62-300 (Cont.)

- (d) Emergency response operations for releases of, or substantial threats of releases of hazardous substances which are not covered by subsection (1)(a) through (d) of this section must only comply with the requirements of WAC 296-62-3112.

(3) Definitions.

- (a) "Buddy system" means a system of organizing employees into work groups in such a manner that each employee of the work group is designated to be observed by at least one other employee in the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.
- (b) "Clean-up operation" means an operation where hazardous substances are removed, contained, incinerated, neutralized, stabilized, cleared-up, or in any other manner processed or handled with the ultimate goal of making the site safer for people or the environment.
- (c) "Contamination reduction zone" means the buffer between the exclusion zone and the outermost clean zone.
- (d) "Decontamination" means the removal of hazardous substances from employees and their equipment to the extent necessary to preclude the occurrence of foreseeable adverse health effects.
- (e) "Emergency response" or "responding to emergencies" means a response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance. Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area or by maintenance personnel are not considered to be emergency responses within the scope of this standard. Responses to release of hazardous substances where there is no potential safety or health hazard (i.e., fire, explosion, or chemical exposure) are not considered to be emergency responses.
- (f) "Exclusion zone" means the innermost zone at a site where contamination does occur.
- (g) "Facility" means (i) any building structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly-owned treatment works), well, pit, pond, lagoon, impoundment, ditch, storage container, motor vehicle, rolling stock, or aircraft, or (ii) any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any water-borne vessel.
- (h) "Hazardous materials response (HAZMAT) team" means an organized group of employees, designated by the employer, who are expected to perform work, to handle and control actual or potential leaks or spills of hazardous substances requiring possible close approach to the substance. The team members perform responses to releases or potential releases of hazardous substances for the purpose of control or stabilization of the incident. A HAZMAT team is not a fire brigade nor is a typical fire brigade a HAZMAT team. A HAZMAT team, however, may be a separate component of a fire brigade or fire department.
- (i) "Hazardous substance" means any substance designated or listed under (i)(i) through (iv) of this subsection, exposure to which results or may result in adverse effects on the health or safety of employees:

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WAC 296-62-300 (Cont.)

- (i) Any substance defined under section 101(14) of CERCLA;
 - (ii) Any biological agent and other disease-causing agent which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any person, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations in such persons or their offspring;
 - (iii) Any substance listed by the United States Department of Transportation as hazardous materials under WAC 480-12-195; and
 - (iv) Hazardous waste as herein defined.
- (j) "Hazardous waste" means:
- A waste or combination of wastes as defined in (m) of this subsection.
- (k) "Hazardous waste operation" means any operation conducted within the scope of this standard.
- (l) "Hazardous waste site" or "site" means any facility or location within the scope of this standard at which hazardous waste operations take place.
- (m) "Health hazard" means a chemical, mixture of chemicals, or a pathogen for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. It also includes stress due to temperature extremes. Further definition of the terms used above can be found in Appendix A to WAC 296-62-054 through 296-62-05427.
- (n) "IDLH" or "immediately dangerous to life or health" means any atmospheric concentration of any toxic, corrosive, or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere.
- (o) "Oxygen deficiency" means that concentration of oxygen by volume below which atmosphere supplying respiratory protection must be provided. It exists in atmospheres where the percentage of oxygen by volume is less than 19.5 percent oxygen.
- (p) "Permissible exposure limit" means the exposure, inhalation, or dermal permissible limit specified in WAC 296-62-075 through 296-62-07515.
- (q) "Published exposure level" means the exposure limits published in "NIOSH Recommendations for Occupational Health Standards" dated 1986 incorporated by reference, or if none is specified, the exposure limits published in the standards specified by the American Conference of Governmental Industrial Hygienists in their publication "Threshold Limit Values and Biological Exposure Indices for 1988-89" dated 1988 incorporated by reference.

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WAC 296-62-300 (Cont.)

- (r) "Post emergency response" means that portion of an emergency response performed after the immediate threat of a release has been stabilized or eliminated and clean-up of the site has begun. If post emergency response is performed by an employer's own employees who were part of the initial emergency response, it is considered to be part of the initial response and not post emergency response. However, if a group of an employer's own employees, separate from the group providing initial response, performs the clean-up operation, then the separate group of employees would be considered to be performing post-emergency response and subject to WAC 296-62-3112(11).
- (s) "Qualified person" means a person with specific training, knowledge, and experience in the area for which the person has responsibility and the authority to control.
- (t) "Site safety and health supervisor (or official)" means the individual located on a hazardous waste site who is responsible to the employer and has the authority and knowledge necessary to implement the site safety and health plan and verify compliance with applicable safety and health requirements.
- (u) "Site work zones" means an exclusion zone, contamination reduction zone, and a clean zone established at a hazardous waste site before clean-up work begins to prevent or reduce the movement of contaminants from the site to uncontaminated areas and to control public, employee, and equipment exposure to hazardous substances.
 - (i) The exclusion zone is the innermost of the zones and is where contamination does occur. The contamination reduction zone is the zone between the exclusion zone and the clean zone and services as a transition and buffer between the contaminated and clean zone to further reduce the physical transfer of contaminating substances to the public, employees, and equipment. The clean zone is the outermost of the zones and is a noncontaminated or clean area. The level of contamination in these zones is not defined and some designated exclusion zones can have very little contamination directly affecting employees.
 - (ii) The contaminated reduction corridors are the designated areas within the contaminated reduction zone for the decontamination of personnel and equipment.
- (v) "Small quantity generator" means a generator of hazardous wastes who in any calendar month generates no more than 1000 kilograms (2205 pounds) of hazardous waste in that month.
- (w) "Uncontrolled hazardous waste site" means an area identified as an uncontrolled hazardous waste site by a governmental body, whether federal, state, local, or other where an accumulation of hazardous substances creates a threat to the health and safety of individuals or the environment or both. Some sites are found on public lands, such as those created by former municipal, county, or state landfills where illegal or poorly managed waste disposal has taken place. Other sites are found on private property, often belonging to generators or former generators of hazardous substance waste. Examples of such sites include, but are not limited to, surface impoundments, landfills, dumps, and tank or drum farms. Normal operations at TSD sites are not covered by this definition. [Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), §296-62-300, filed November 22, 1991, effective 12/24/91; 90-20-091 (Order 90-14), §296-62-300, filed 10/01/90, effective 11/15/90; 89-21-018 (Order 89-10), §296-62-300, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-300, filed 10/06/88, effective 11/07/88.]

WAC 296-62-3010, Safety and Health Program.

Note: Safety and health programs developed and implemented to meet other federal, state, or local regulations are considered acceptable in meeting this requirement if they cover or are modified to cover the topics required in this section. An additional or separate safety and health program is not required by this section.

(1) General.

- (a) Employers shall develop and implement a written safety and health program for their employees involved in hazardous waste operations. The program shall be designed to identify, evaluate, and control safety and health hazards and provide for emergency response for hazardous waste operations.
- (b) The written safety and health program shall incorporate the following:
 - (i) An organizational structure;
 - (ii) A comprehensive workplan;
 - (iii) A site-specific safety and health plan which need not repeat the employer's standard operating procedures required in (b)(vi) of this subsection;
 - (iv) The safety and health training program;
 - (v) The medical surveillance program;
 - (vi) The employer's standard operating procedures for safety and health; and
 - (vii) Any necessary interface between general program and site specific activities.
- (c) Site excavation. Site excavations created during initial site preparation or during hazardous waste operations shall be shored or sloped as appropriate to prevent accidental collapse in accordance with subpart N of chapter 296-155 WAC.
- (d) Contractors and subcontractors. An employer who retains contractor or subcontractor services for work in hazardous waste operations shall inform those contractors, subcontractors, or their representatives of the site emergency response procedures and any potential fire, explosion, health, safety, or other hazards of the hazardous waste operation that have been identified by the employer, including those identified in the employer's information program.
- (e) Program availability. The written safety and health program shall be made available to any contractor or subcontractor or their representative who will be involved with the hazardous waste operation; to employees; to employee designated representatives; to WISHA personnel, and to personnel of other federal, state, or local agencies with regulatory authority over the site.

(2) Organizational structure part of the site program.

- (a) The organizational structure part of program shall establish the specific chain of command and specify the overall responsibilities of supervisors and employees. It shall include at a minimum, the following elements:
 - (i) A general supervisor who has the responsibility and authority to direct all hazardous waste operations.

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WAC 296-62-3010 (Cont.)

- (ii) A site safety and health supervisor who has the responsibility and authority to develop and implement the site safety and health plan and verify compliance.
 - (iii) All other personnel needed for hazardous waste site operations and emergency response and their general functions and responsibilities.
 - (iv) The lines of authority, responsibility, and communication.
- (b) The organizational structure shall be reviewed and updated as necessary to reflect the current status of waste site operations.
- (3) Comprehensive workplan part of the site program. The comprehensive workplan shall address the tasks and objectives of site operations and the logistics and resources required to reach those tasks and objectives.
 - (a) The comprehensive workplan shall address anticipated clean-up activities as well as normal operating procedures which need not repeat the employer's procedures available elsewhere.
 - (b) The comprehensive workplan shall define work tasks and objectives and identify the methods for accomplishing those tasks and objectives.
 - (c) The comprehensive workplan shall establish personnel requirements for implementing the plan.
 - (d) The comprehensive workplan shall provide for the implementation of the training required in WAC 296-62-3040.
 - (e) The comprehensive workplan shall provide for the implementation of the required informational programs required in WAC 296-62-3080.
 - (f) The comprehensive workplan shall provide for the implementation of the medical surveillance program described in WAC 296-62-3050.
- (4) Site-specific safety and health plan part of the program.
 - (a) General. The site safety and health plan, which must be kept on site, shall address the safety and health hazards of each phase of site operation; and include the requirements and procedures for employee protection.
 - (b) Elements. The site safety and health plan, as a minimum, shall address the following:
 - (i) Names of key personnel and alternates responsible for site safety and health, including a site safety and health supervisor.
 - (ii) A safety and health risk or hazard analysis for each site task and operation found in the workplan.
 - (iii) Employee training assignments to assure compliance with WAC 296-62-3040.
 - (iv) Personal protective equipment to be used by employees for each of the site tasks and operations being conducted as required by the personal protective equipment program in WAC 296-62-3060(5).

WAC 296-62-3010 (Cont.)

- (v) Medical surveillance requirements in accordance with the program in WAC 296-62-3050.
 - (vi) Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment to be used.
 - (vii) Site control measures in accordance with the site control program required in WAC 296-62-3030.
 - (viii) Decontamination procedures in accordance with WAC 296-62-3100.
 - (ix) An emergency response plan meeting the requirements of WAC 296-62-3110 for safe and effective responses to emergencies, including the necessary PPE and other equipment.
 - (x) Confined space entry procedures.
 - (xi) A spill containment program meeting the requirements of WAC 296-62-3090.
- (c) Preentry briefing. The site specific safety and health plan shall provide for preentry briefings to be held prior to initiating any site activity, and at such other times as necessary to ensure that employees are apprised of the site safety and health plan and that this plan is being followed. The information and data obtained from site characterization and analysis work required in WAC 296-62-3020 shall be used to prepare and update the site safety and health plan.
- (d) Effectiveness of site safety and health plan. Inspections shall be conducted by the site safety and health supervisor or, in the absence of that individual, another individual who is knowledgeable in occupational safety and health acting on behalf of the employer as necessary to determine the effectiveness of the site safety and health plan. Any deficiencies in the effectiveness of the site safety and health plan shall be corrected by the employer. [Statutory Authority: Chapter 49.17 RCW. 89-21-018 (Order 89-10), §296-62-3010, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3010, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3020, Site characterization and analysis.

- (1) General. Hazardous waste sites shall be evaluated in accordance with this section to identify specific site hazards and to determine the appropriate safety and health control procedures needed to protect employees from the identified hazards.
- (2) Preliminary Evaluation. A preliminary evaluation of a site's characteristics shall be performed prior to site entry by a qualified person in order to aid in the selection of appropriate employee protection methods prior to site entry. Immediately after initial site entry, a more detailed evaluation of the site's specific characteristics shall be performed by a qualified person in order to further identify existing site hazards and to further aid in the selection of the appropriate engineering controls and personal protective equipment for the tasks to be performed.

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WAC 296-62-3020 (Cont.)

- (3) **Hazard identification.** All suspected conditions that may pose inhalation or skin absorption hazards that are immediately dangerous to life or health (IDLH), or other conditions that may cause death or serious harm, shall be identified during the preliminary survey and evaluated during the detailed survey. Examples of such hazards include, but are not limited to, confined space entry, potentially explosive or flammable situations, visible vapor clouds, or areas where biological indicators such as dead animals or vegetation are located.
- (4) **Required information.** The following information to the extent available shall be obtained by the employer prior to allowing employees to enter a site:
 - (a) Location and approximate size of the site.
 - (b) Description of the response activity and/or the job task to be performed.
 - (c) Duration of the planned employee activity.
 - (d) Site topography and accessibility by air and roads.
 - (e) Safety and health hazards expected at the site.
 - (f) Pathways for hazardous substance dispersion.
 - (g) Present status and capabilities of emergency response teams that would provide assistance to hazardous waste clean-up site employees at the time of an emergency.
 - (h) Hazardous substances and health hazards involved or expected at the site and their chemical and physical properties.
- (5) **Personal protective equipment.** Personal protective equipment (PPE) shall be provided and used during initial site entry in accordance with the following requirements:
 - (a) Based upon the results of the preliminary site evaluation, an ensemble of PPE shall be selected and used during initial site entry which will provide protection to a level of exposure below established permissible exposure limits and published exposure levels for known or suspected hazardous substances and health hazards, and which will provide protection against other known and suspected hazards identified during the preliminary site evaluation. If there is no permissible exposure limit or published exposure level, the employer may use other published studies and information as a guide to appropriate personal protective equipment. Level A and Level B personal protective equipment is required for the most hazardous actual or potential exposures.
 - (b) If positive-pressure self-contained breathing apparatus is not used as part of the entry ensemble, and if respiratory protection is warranted by the potential hazards identified during the preliminary site evaluation, an escape self-contained breathing apparatus of at least five minute's duration shall be carried by employees during initial site entry.
 - (c) If the preliminary site evaluation does not produce sufficient information to identify the hazards or suspected hazards of the site an ensemble providing protection equivalent to Level B PPE shall be provided as minimum protection and direct reading instruments shall be used as appropriate for identifying IDLH conditions. (See WAC 296-62-3170 - Appendix B for a description of Level B hazards and the recommendations for Level B protective equipment.)
 - (d) Once the hazards of the site have been identified, the appropriate PPE shall be selected and used in accordance with WAC 296-62-3060.

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WAC 296-62-3020 (Cont.)

- (6) **Monitoring.** The following monitoring shall be conducted during initial site entry when the site evaluation produces information that shows the potential for ionizing radiation or IDLH conditions, or when the site information is not sufficient to rule out these possible conditions:
- (a) Monitoring with direct reading instruments for hazardous levels of ionizing radiation.
 - (b) Monitoring the air with appropriate direct reading equipment (i.e., combustible gas meters, detector tubes) for IDLH and other conditions that may cause death or serious harm (combustible or explosive atmospheres, oxygen deficiency, toxic substances).
 - (c) Visually observing for signs of actual or potential IDLH or other dangerous conditions.
 - (d) An ongoing air monitoring program in accordance with WAC 296-62-3070 shall be implemented after site characterization has determined the site is safe for the start-up of operations.
- (7) **Risk identification.** Once the presence and concentrations of specific hazardous substances and health hazards have been established, the risks associated with these substances shall be identified. Employees who will be working on the site shall be informed of any risks that have been identified. In situations covered by WAC 296-62-054 through 296-62-05427, training required by those standards need not be duplicated.

Note: Risks to consider include, but are not limited to:

- (a) Exposures exceeding the permissible exposure limits and published exposure levels.
 - (b) IDLH concentrations.
 - (c) Potential skin absorption and irritation sources.
 - (d) Potential eye irritation sources.
 - (e) Explosion sensitivity and flammability ranges.
 - (f) Oxygen deficiency.
- (8) **Employee notification.** Any information concerning the chemical, physical, and toxicologic properties of each substance known or expected to be present on site that is available to the employer and relevant to the duties an employee is expected to perform shall be made available to all employees prior to the commencement of their work activities. The employer may utilize information developed for the hazard communication standard for this purpose. [Statutory Authority: Chapter 49.17 RCW. 90-20-091 (Order 90-14), §296-62-3020, filed 10/1/90, effective 11/15/90; 89-21-018 (Order 89-10), §296-62-3020, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3020, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3030, Site control.

- (1) **General.** Appropriate site control procedures shall be implemented to control employee exposure to hazardous substances before clean-up work begins.
- (2) **Site control program.** A site control program for protecting employees which is part of the employer's site safety and health program required in WAC 296-62-3010 shall be developed during the planning stages of a hazardous waste clean-up operation and modified as necessary as new information becomes available.

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WAC 296-62-3030 (Cont.)

- (3) Elements of the site control program. The site control program shall, as a minimum, include: A site map; site work zones; the use of a "buddy system"; site communications including alerting means for emergencies; the standard operating procedures or safe work practices; and, identification of nearest medical assistance. Where these requirements are covered elsewhere they need not be repeated.
- (4) Site work zones.
 - (a) The site work zones shall be the exclusion zone, contamination reduction zone, and the clean zone.
 - (b) Decontamination procedures shall take place in the contamination reduction corridor consisting, if practical, of separate corridors for personnel and for equipment.
 - (c) An entry and exit check point must be established at the boundary of the exclusion zone to regulate the flow of personnel and equipment into and out of the zone. Exit from the exclusion zone must be through a contamination reduction corridor.
 - (d) Access to the contamination reduction zone from the clean zone is through a control point. Personnel entering or working in the contamination zone shall wear the prescribed personnel protective equipment, if required, for working in this zone. Entering the clean zone requires removal of any protective equipment worn in the contamination reduction zone. [Statutory Authority: Chapter 49.17 RCW. 89-21-018 (Order 89-10), §296-62-3030, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3030, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3040, Training.

- (1) General.
 - (a) All employees working on site (such as but not limited to equipment operators, general laborers, and others) exposed to hazardous substances, health hazards, or safety hazards, and their supervisors and management responsible for the site, shall receive training meeting the requirements of this subsection before they are permitted to engage in hazardous waste operations that could expose them to hazardous substances, safety, or health hazards, and they shall review training as specified in this subsection.
 - (b) Employees shall not be permitted to participate in or supervise field activities until they have been trained to a level required by their job function and responsibility.
- (2) Elements to be covered. The training shall thoroughly cover the following:
 - (a) Names of personnel and alternates responsible for site safety and health;
 - (b) Safety, health, and other hazards present on the site;
 - (c) Use of personal protective equipment;
 - (d) Work practices by which the employee can minimize risks from hazards;
 - (e) Safe use of engineering controls and equipment on the site;
 - (f) Medical surveillance requirements including recognition of symptoms and signs which might indicate overexposure to hazards; and

WAC 296-62-3040 (Cont.)

- (g) The contents of items (vii) through (x) of the site safety and health plan set forth in WAC 296-62-3010(4)(b).
- (3) Initial training. General site workers (such as equipment operators, general laborers, and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive the following required training:
 - (a) General site workers required to wear Level A or Level B personal protective equipment because of the types of hazards to which they are exposed or have the potential for being exposed are required to have 80 hours of training and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor.
 - (b) General site workers required to wear Level C or D personal protective equipment, equipment operators or transport vehicle operators, are required to have 40 hours of training and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor.
 - (c) General site workers on site only occasionally for specific limited tasks, and supervisors not working in the two inner zones are required to have 24 hours of training. For example, certain Environmental Protection Agency, and department of ecology employees, labor and industries inspectors and other short-term monitoring and surveying personnel would be required to only have 24 hours of training if they are on-site only occasionally for a specific limited task and are unlikely to be exposed over permissible exposure levels and published exposure limits. A minimum of one day actual field experience under direct supervision is also required.
 - (d) Workers regularly on-site who work in areas which have been monitored and fully characterized indicating that exposures are under permissible exposure limits and published exposure limits where respirators are not necessary, and the characterization indicates that there are no health hazards or the possibility of an emergency developing, shall receive a minimum of 24 hours of instruction off the site and the minimum one day actual field experience under the direct supervision of a trained, experienced supervisor.
 - (e) Workers with 24 hours of training who are covered by (c) and (d) of this subsection, and who become general site workers or who are required to wear respirators, shall have the additional 16 hours and two days of training necessary to total the training specified in (b) of this subsection.
- (4) Management and supervisor training. On-site management and supervisors directly responsible for, or who supervise employees engaged in, hazardous waste operations shall receive the same initial training as listed in subsection (3) of this section, and three days of supervised field experience and at least eight additional hours of specialized training at the time of job assignment on such topics as, but not limited to, the employer's safety and health program and the associated employee training program, personal protective equipment program, spill containment program, and health hazard monitoring procedure and techniques.
- (5) Law enforcement at illicit drug labs.

Exception: WISHA did not intend application of the 80 hour training requirement to law enforcement personnel required to enter illicit drug labs, secure the premise, and obtain necessary evidence for law enforcement purposes. Attendance at a specific 40 hours course, such as that presented by the criminal justice training commission, is acceptable.

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Note: If cleanup activities are conducted by law enforcement personnel, then appropriate hazardous waste cleanup training would be required.

(6) Training Course Content.

- (a) 40 and 80 hour hazardous waste cleanup courses. As a minimum, the training course content for the 40 hour and 80 hour training program shall include the following topics:
 - (i) Overview of the applicable sections of Part P of chapter 296-62 WAC and the elements of an employer's effective occupational safety and health program.
 - (ii) Effect of chemical exposure to hazardous substances (i.e., toxicity, carcinogens, irritants, sensitizers, etc.).
 - (iii) Effects of biological and radiological exposures.
 - (iv) Fire and explosion hazards (i.e., flammable and combustible liquids, reactive materials).
 - (v) General safety hazards, including electrical hazards, powered equipment hazards, walking-working surface hazards and those hazards associated with hot and cold temperature extremes.
 - (vi) Confined space, tank, and vault hazards and entry procedures.
 - (vii) Names of personnel and alternates, where appropriate, responsible for site safety and health at the site.
 - (viii) Specific safety, health, and other hazards that are to be addressed at a site and in the site safety and health plan.
 - (ix) Use of personal protective equipment and the implementation of the personal protective equipment program.
 - (x) Work practices that will minimize employee risk from site hazards.
 - (xi) Safe use of engineering controls and equipment and any new relevant technology or procedure.
 - (xii) Content of the medical surveillance program and requirements, including the recognition of signs and symptoms of overexposure to hazardous substances.
 - (xiii) The contents of an effective site safety and health plan.
 - (xiv) Use of monitoring equipment with "hands-on" experience and the implementation of the employee and site monitoring program.
 - (xv) Implementation and use of the information program.
 - (xvi) Drum and container handling procedures and the elements of a spill containment program.
 - (xvii) Selection and use of material handling equipment.

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- (xviii) Methods for assessment of risk and handling of radioactive wastes.
 - (xix) Methods for handling shock-sensitive wastes.
 - (xx) Laboratory waste pack handling procedures.
 - (xxi) Container sampling procedures and safeguards.
 - (xxii) Safe preparation procedures for shipping and transport of containers.
 - (xxiii) Decontamination program and procedures.
 - (xxiv) Emergency response plan and procedures including first aid.
 - (xxv) Safe site illumination levels.
 - (xxvi) Site sanitation procedures and equipment for employee needs.
 - (xxvii) Review of the applicable appendices to Part P of chapter 296-62 WAC.
 - (xxviii) Overview and explanation of WISHA's hazard communication standard Part C of chapter 296-62 WAC.
 - (xxix) Sources of reference, additional information and efficient use of relevant manuals and hazard coding systems.
 - (xxx) Principles of toxicology and biological monitoring.
 - (xxxi) Rights and responsibilities of employees and employers under WISHA and CERCLA.
 - (xxxii) "Hands-on" field exercises and demonstrations.
- (b) 24-hour hazardous waste cleanup course. As a minimum, the 24-hour training course required in WAC 296-62-3040(3)(c) and (d) for employees engaged in occasional visits to uncontrolled hazardous waste sites shall include the following topics where they are applicable to the job function to be performed:
- (i) Overview of applicable sections of Part P of chapter 296-62 WAC and the elements of the employer's effective occupational safety and health program.
 - (ii) Employee rights and responsibilities under WISHA and CERCLA.
 - (iii) Overview of relevant chemical exposures to hazardous substances (i.e., toxics, carcinogens, irritants, sensitizers, etc.).
 - (iv) Overview of the principles of toxicology and biological monitoring.
 - (v) Use of monitoring equipment with hands-on practice and an overview of a site monitoring program.
 - (vi) Overview of site hazards including fire and explosion, confined spaces, oxygen deficiency, electrical hazards, powered equipment hazards, walking-working surface hazards.

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- (vii) The contents of an effective site safety and health plan.
 - (viii) Use of personal protective equipment and the implementation of the personal protective equipment program.
 - (ix) Work practices that will minimize employee risk from site hazards.
 - (x) Site simulations with "hands-on" exercises and practice.
 - (xi) Emergency response planning and response including first aid.
 - (xii) Content of the medical surveillance program and requirements, including the recognition of signs and symptoms of overexposure to hazardous substances.
 - (xiii) Decontamination programs and procedures.
 - (xiv) Safe use of engineering controls and equipment.
 - (xv) Sources of references and efficient use of relevant manuals and knowledge of hazard coding systems.
- (c) 16-hour supplemental training for hazardous waste sites. As a minimum, employees who have received 24 hours of training for hazardous waste site operations shall receive training in the following topics before they are allowed to work as general site workers or if they are required to wear respirators:
- (i) Relevant chemical exposures to hazardous substances beyond that previously covered.
 - (ii) Site hazards including fire and explosion, confined spaces, oxygen deficiency, electrical, powered equipment, and walking-working surfaces beyond that previously covered.
 - (iii) Names of personnel and alternates responsible for site safety and health at the site, where appropriate.
 - (iv) Use of monitoring equipment and the implementation of the employee and the site monitoring program beyond that previously covered.
 - (v) Implementation and use of the informational program.
 - (vi) Drum and container handling procedures and the elements of a spill containment program.
 - (vii) Selection and use of material handling equipment.
 - (viii) Methods for assessment of risk and handling of radioactive wastes.
 - (ix) Methods for handling shock-sensitive wastes.
 - (x) Laboratory waste pack handling procedures.
 - (xi) Container sampling procedures and safeguards.

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- (xii) Safe preparation procedures for shipping and transport of containers.
 - (xiii) Decontamination program and procedures.
 - (xiv) Safety site illumination levels.
 - (xv) Site sanitation procedures and equipment.
 - (xvi) Review of the applicable appendices to Part P of chapter 296-62 WAC.
 - (xvii) Overview and explanation of WISHA's Hazard Communication Standard Part C of chapter 296-62 WAC.
 - (xviii) Sources of reference and additional information.
- (d) Additional 8 hours of training for supervisors and managers. Supervisors and managers shall receive an additional eight hours of training in the following subjects:
- (i) Management of hazardous wastes and their disposal.
 - (ii) Federal, state, and local agencies to be contacted in the event of a release of hazardous substances.
 - (iii) Management of emergency procedures in the event of a release of hazardous substances.
- (7) Qualifications for trainers. Trainers shall be qualified to instruct employees about the subject matter that is being presented in training. Such trainers shall have satisfactorily completed a training program for teaching the subjects they are expected to teach, or they shall have the academic credentials and instructional experience necessary for teaching the subjects. Instructors shall demonstrate competent instructional skills and knowledge of the applicable subject matter.
- (8) Training certification. Employees and supervisors that have received and successfully completed the training and field experience specified in subsections (1) through (4) of this section shall be certified by their instructor or the head instructor and trained supervisor as having successfully completed the necessary training. A written certificate shall be given to each person so certified. Any person who has not been so certified or who does not meet the requirements of subsection (11) of this section shall be prohibited from engaging in hazardous waste operations.
- (9) Emergency response. Employees who are engaged in responding to hazardous emergency situations at hazardous waste clean-up sites that may expose them to hazardous substances shall be trained in how to respond to expected emergencies.
- (10) Refresher training. Employees specified in subsection (1) of this section, and managers specified in subsection (4) of this section, shall receive eight hours of refresher training annually on the items specified in subsections (2) and/or (4) of this section, any critique of incidents that have occurred in the past year that can serve as training examples of related work, and other relevant topics.

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- (11) Equivalent training. Employers who can show by documentation or certification that an employee's work experience and/or training has resulted in training equivalent to that training required in subsections (1) through (4) of this section shall not be required to provide the initial training requirements of those sections to such employees and shall provide a copy of the certification or documentation to the employee upon request. However, certified employees or employees with equivalent training new to a site shall receive appropriate, site specific training before site entry and have appropriate supervised field experience at the new site. Equivalent training includes any academic training or the training that existing employees might have already received from actual hazardous waste site work experience. The 80 hours of instruction required can be fulfilled as followed:
- (a) Instruction can include a combination of presently available 40 hour training sessions and other related classes or training including additional supervised on-the-job training as long as material covered includes elements required in the training section WAC 296-62-3040(2) of the regulations. A single 80 hour training session is also acceptable.
 - (b) Previously attended courses including eight-hour refresher courses apply toward the 80 hour requirement and need not be repeated.
 - (c) Documentation of previous experience and training by qualified trainers is required of employers and must be available to inspectors for review.
 - (d) When calculating hours of training, WISHA assumes a "normal" work day to be eight hours with sufficient time for lunch and other breaks. [Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), §296-62-3040, filed November 22, 1991, effective 12/24/91; 90-20-091 (Order 90-14), §296-62-3040, filed 10/1/90, effective 11/15/90; 89-21-018 (Order 89-10), §296-62-3040, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3040, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3050, Medical surveillance.

- (1) General. Employers engaged in operations specified in WAC 296-62-300 (1)(a) through (d) and not covered by WAC 296-62-300(2), exceptions; and employers of employees specified in WAC 296-62-3112(9) shall institute a medical surveillance program in accordance with this subsection.
- (2) Employees covered. The medical surveillance program shall be instituted by the employer for the following employees:
 - (a) All employees who are or may be exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year;
 - (b) All employees who wear a respirator for 30 days or more a year or as required by WAC 296-62-071; and
 - (c) All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation; and
 - (d) Members of the HAZMAT teams.
- (3) Frequency of medical examinations and consultations. Medical examinations and consultations shall be made available by the employer to each employee covered under subsection (1) of this section on the following schedules:

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WAC 296-62-3050 (Cont.)

- (a) For employees covered under WAC 296-62-3050(2)(a), (b), and (d):
 - (i) Prior to assignment;
 - (ii) At least once every twelve months for each employee covered unless the attending physician believes a longer interval (not greater than biennially) is appropriate;
 - (iii) At termination of employment or reassignment to an area where the employee would not be covered if the employee has not had an examination within the last six months;
 - (iv) As soon as possible upon notification by an employee that the employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that the employee has been injured or exposed above the permissible exposure limits, or published exposure levels in an emergency situation;
 - (v) At more frequent times, if the examining physician determines that an increased frequency of examination is medically necessary.
- (b) For employees covered under subsection (1)(c) of this section and for all employees including those employees covered by WAC 296-62-300(1)(e) who may have been injured, received a health impairment, developed signs or symptoms which may have resulted from exposure to hazardous substances resulting from an emergency incident, or exposed during an emergency incident to hazardous substances at concentrations above the permissible exposure limits or the published exposure levels without the necessary personal protective equipment being used:
 - (i) As soon as possible following the emergency incident or development of signs or symptoms;
 - (ii) At additional times, if the examining physician determines that follow-up examinations or consultations are medically necessary.
- (4) Content of medical examinations and consultations.
 - (a) Medical examinations required by subsection (3) of this section shall include a medical and work history (or updated history if one is in the employee's file) with special emphasis on symptoms related to the handling of hazardous substances and health hazards, and to fitness for duty including the ability to wear any required PPE under conditions (i.e., temperature extremes) that may be expected at the worksite.
 - (b) The content of medical examinations or consultations made available to employees pursuant to this section shall be determined by the examining physician. The guidelines in the Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (See Appendix D, Reference #10) should be consulted.
- (5) Examination by a physician and costs. All medical examinations and procedures shall be performed by or under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine, and shall be provided without cost to the employee, without loss of pay, and at a reasonable time and place.
- (6) Information provided to the physician. The employer shall provide one copy of this standard and its appendices to the examining physician, and in addition, the following for each employee:
 - (a) A description of the employee's duties as they relate to the employee's exposures;

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- (b) The employee's exposure levels or anticipated exposure levels;
 - (c) A description of any personal protective equipment used or to be used;
 - (d) Information from previous medical examinations of the employee which is not readily available to the examining physician; and
 - (e) Information required in WAC 296-62-071 through 296-62-07121.
- (7) Physician's written opinion.
 - (a) The employer shall obtain and furnish the employee with a copy of a written opinion from the examining physician containing the following:
 - (i) The physician's opinion as to whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from work in hazardous waste operations or emergency response or from respirators use.
 - (ii) The physician's recommended limitations upon the employees assigned work.
 - (iii) The results of the medical examination and tests if requested by the employee.
 - (iv) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further examination or treatment.
 - (b) The written opinion obtained by the employer shall not reveal specific findings or diagnoses unrelated to occupational exposures.
- (8) Recordkeeping.
 - (a) An accurate record of the medical surveillance required by this section shall be retained. This record shall be retained for the period specified and meet the criteria of Part B of chapter 296-62 WAC.
 - (b) The record required in (a) of this subsection shall include at least the following information:
 - (i) The name and Social Security number of the employee;
 - (ii) Physicians' written opinions, recommended limitations, and results of examinations and tests;
 - (iii) Any employee medical complaints related to exposure to hazardous substances;
 - (iv) A copy of the information provided to the examining physician by the employer, with the exception of the standard and its appendices. [Statutory Authority: Chapter 49.17 RCW. 91-11-070 (Order 91-01), §296-62-3050, filed 05/20/91, effective 06/20/91; 90-20-091 (Order 90-14), §296-62-3050, filed 10/1/90, effective 11/15/90; 89-21-018, §296-62-3050, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3050, filed 10/6/88, effective 11/7/88.]

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WAC 296-62-3060, Engineering controls, work practices, and personal protective equipment for employee protection.

- (1) Engineering controls, work practices, personal protective equipment, or a combination of these shall be implemented in accordance with this section to protect employees from exposure to hazardous substances and health hazards.

- (a) Engineering controls, work practices, and PPE for substances regulated in chapter 296-62 WAC.

Engineering controls and work practices shall be instituted to reduce and maintain employee exposure to or below the permissible exposure limits for substances regulated by this chapter, except to the extent that such controls and practices are not feasible.

Note: Engineering controls which may be feasible include the use of pressurized cabs or control booths on equipment, and/or the use of remotely operated material handling equipment. Work practices which may be feasible are removing all nonessential employees from potential exposure during opening of drums, wetting down dusty operations, and locating employees upwind of possible hazards.

- (b) Whenever engineering controls and work practices are not feasible, or not required, any reasonable combination of engineering controls, work practices, and PPE shall be used to reduce and maintain exposures to or below the permissible exposure limits or dose limits for substances regulated by chapter 296-62 WAC.
- (c) The employer shall not implement a schedule of employee rotation as a means of compliance with permissible exposure limits or dose limits except when there is no other feasible way of complying with the airborne or dermal dose limits for ionizing radiation.
- (d) The provisions of WAC 296-62-080 through 296-62-09013, 296-62-09015 through 296-62-09055, and 296-62-100 through 296-62-130 shall be followed.
- (2) Engineering controls, work practices, and personal protective equipment for substances not regulated in chapter 296-62 WAC. An appropriate combination of engineering controls, work practices, and personal protective equipment shall be used to reduce and maintain employee exposure to or below published exposure levels for hazardous substances and health hazards not regulated by chapter 296-62 WAC. The employer may use the published literature and MSDS as a guide in making the employer's determination as to what level of protection the employer believes is appropriate for hazardous substances and health hazards for which there is no permissible exposure limit or published exposure level.
- (3) Personal protective equipment selection.
- (a) Personal protective equipment (PPE) shall be selected and used which will protect employees from the hazards and potential hazards they are likely to encounter as identified during the site characterization and analysis.
- (b) Personal protective equipment selection shall be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the site, the task-specific conditions and duration, and the hazards and potential hazards identified at the site.
- (c) Positive pressure self-contained breathing apparatus, or positive pressure air-line respirators equipped with an escape air supply shall be used when chemical exposure levels present will create a substantial possibility of immediate death, immediate serious illness or injury, or impair the ability to escape.

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WAC 296-62-3060 (Cont.)

- (d) Totally-encapsulating chemical protective suits (protection equivalent to Level A protection as recommended in Appendix B) shall be used in conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate death, immediate serious illness or injury, or impair the ability to escape.
 - (e) The level of protection provided by PPE selection shall be increased when additional information or site conditions indicate that increased protection is necessary to reduce employee exposures below permissible exposure limits and published exposure levels for hazardous substances and health hazards. (See WAC 296-62-3170 - Appendix B for guidance on selecting PPE ensembles.)

Note: The level of employee protection provided may be decreased when additional information or site conditions show that decreased protection will not result in increased hazardous exposures to employees.
 - (f) Personal protective equipment shall be selected and used to meet the requirements of chapter 296-24 WAC, Part A-1, and additional requirements specified in this part.
- (4) Totally-encapsulating chemical protective suits.
- (a) Totally-encapsulating suits shall protect employees from the particular hazards which are identified during site characterization and analysis.
 - (b) Totally-encapsulating suits shall be capable of maintaining positive air pressure. (See WAC 296-62-3160 - Appendix A for a test method which may be used to evaluate this requirement.)
 - (c) Totally-encapsulating suits shall be capable of preventing inward test gas leakage of more than 0.5 percent. (See WAC 296-62-3160 - Appendix A for a test method which may be used to evaluate this requirement.)
- (5) Personal protective equipment (PPE) program. A written personal protective equipment program, which is part of the employer's safety and health program required in WAC 296-62-3010 and which shall be part of the site-specific safety and health plan shall be established. The PPE program shall address the elements listed below. When elements, such as donning and doffing procedures, are provided by the manufacturer of a piece of equipment and are attached to the plan, they need not be rewritten into the plan as long as they adequately address the procedure or element.
- (a) PPE selection based on site hazards,
 - (b) PPE use and limitations of the equipment,
 - (c) Work mission duration,
 - (d) PPE maintenance and storage,
 - (e) PPE decontamination and disposal,
 - (f) PPE training and proper fitting,
 - (g) PPE donning and doffing procedures,
 - (h) PPE inspection procedures prior to, during, and after use,

WAC 296-62-3060 (Cont.)

- (i) Evaluation of the effectiveness of the PPE program, and
- (j) Limitations during temperature extremes, heat stress, and other appropriate medical considerations. [Statutory Authority: Chapter 49.17 RCW. 90-20-091 (Order 90-14), §296-62-3060, filed 10/1/90, effective 11/15/90; 89-21-018, §296-62-3060, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3060, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3070, Monitoring.

- (1) General.
 - (a) Monitoring shall be performed in accordance with this section where there may be a question of employee exposure to concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices, and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits or published exposure levels if there are no permissible exposure limits, for hazardous substances.
 - (b) Air monitoring shall be used to identify and quantify airborne levels of hazardous substances and safety and health hazards in order to determine the appropriate level of employee protection needed on site.
- (2) Initial entry. Upon initial entry, representative air monitoring shall be conducted to identify any IDLH condition, exposure over permissible exposure limits or published exposure levels, exposure over a radioactive material's dose limits, or other dangerous condition, such as the presence of flammable atmospheres or oxygen-deficient environments.
- (3) Periodic monitoring. Periodic monitoring shall be conducted when the possibility of an IDLH condition or flammable atmosphere has developed or when there is indication that exposures may have risen over permissible exposure limits or published exposure levels since prior monitoring. Situations where it shall be considered whether the possibility that exposures have risen are as follows:
 - (a) When work begins on a different portion of the site.
 - (b) When contaminants other than those previously identified are being handled.
 - (c) When a different type of operation is initiated (e.g., drum opening as opposed to exploratory well drilling).
 - (d) When employees are handling leaking drums or containers or working in areas with obvious liquid contamination (e.g., a spill or lagoon).
 - (e) When a sufficient reasonable interval has passed so that exposures may have significantly increased.
- (4) Monitoring of high-risk employees. After the actual clean-up phase of any hazardous waste operation commences; for example, when soil, surface water, or containers are moved or disturbed; the employer shall monitor those employees likely to have the highest exposures to hazardous substances and health hazards likely to be present above permissible exposure limits or published exposure levels by using personal sampling frequently enough to characterize employee exposures. If the employees likely to have the highest exposure are over permissible exposure limits or published exposure levels, then monitoring shall continue to determine all employees likely to be above those limits. The employer may utilize a representative sampling approach by documenting that the employees and chemicals chosen for monitoring are based on the criteria stated in this subsection.

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WAC 296-62-3070 (Cont.)

Note: It is not required to monitor employees engaged in site characterization operations covered by WAC 296-62-3020. [Statutory Authority: Chapter 49.17 RCW. 90-20-091 (Order 90-14), §296-62-3070, filed 10/1/90, effective 11/15/90; 89-21-018, §296-62-3070, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3070, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3080, Informational programs.

Employers shall develop and implement a program which is part of the employer's safety and health program required in WAC 296-62-3010 to inform employees, contractors, and subcontractors (or their representative) actually engaged in hazardous waste operations of the nature, level, and degree of exposure likely as a result of participation in such hazardous waste operations. Employees, contractors, and subcontractors working outside of the operations part of a site are not covered by this standard. [Statutory Authority: Chapter 49.17 RCW. 89-21-018, §296-62-3080, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3080, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3090, Handling drums and containers.

- (1) General.
 - (a) Hazardous substances and contaminated soils, liquids, and other residues shall be handled, transported, labeled, and disposed of in accordance with this section.
 - (b) Drums and containers used during the clean-up shall meet the appropriate DOT, OSHA, WISHA, and EPA regulations for the wastes that they contain.
 - (c) When practical, drums and containers shall be inspected and their integrity shall be assured prior to being moved. Drums or containers that cannot be inspected before being moved because of storage conditions (i.e., buried beneath the earth, stacked behind other drums, stacked several tiers high in a pile, etc.) shall be moved to an accessible location and inspected prior to further handling.
 - (d) Unlabeled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled.
 - (e) Site operations shall be organized to minimize the amount of drum or container movement.
 - (f) Prior to movement of drums or containers, all employees exposed to the transfer operation shall be warned of the potential hazards associated with the contents of the drums or containers.
 - (g) United States Department of Transportation specified salvage drums or containers and suitable quantities of proper absorbent shall be kept available and used in areas where spills, leaks, or ruptures may occur.
 - (h) Where major spills may occur, a spill containment program, which is part of the employer's safety and health program required in WAC 296-62-3010, shall be implemented to contain and isolate the entire volume of the hazardous substance being transferred.
 - (i) Drums and containers that cannot be moved without rupture, leakage, or spillage shall be emptied into a sound container using a device classified for the material being transferred.
 - (j) A ground-penetrating system or other type of detection system or device shall be used to estimate the location and depth of buried drums or containers.

WAC 296-62-3090 (Cont.)

- (k) Soil or covering material shall be removed with caution to prevent drum or container rupture.
- (l) Fire extinguishing equipment meeting the requirements of Part G of chapter 296-24 WAC shall be on hand and ready for use to control incipient fires.
- (2) Opening drums and containers. The following procedures shall be followed in areas where drums or containers are being opened:
 - (a) Where an airline respirator system is used, connections to the source of air supply shall be protected from contamination and the entire system shall be protected from physical damage.
 - (b) Employees not actually involved in opening drums or containers shall be kept a safe distance from the drums or containers being opened.
 - (c) If employees must work near or adjacent to drums or containers being opened, a suitable shield that does not interfere with the work operation shall be placed between the employee and the drums or containers being opened to protect the employee in case of accidental explosion.
 - (d) Controls for drum or container opening equipment, monitoring equipment, and fire suppression equipment shall be located behind the explosion-resistant barrier.
 - (e) When there is a reasonable possibility of flammable atmospheres being present, material handling equipment and hand tools shall be of the type to prevent sources of ignition.
 - (f) Drums and containers shall be opened in such a manner that excess interior pressure will be safely relieved. If pressure cannot be relieved from a remote location, appropriate shielding shall be placed between the employee and the drums or containers to reduce the risk of employee injury.
 - (g) Employees shall not stand upon or work from drums or containers.
- (3) Material handling equipment. Material handling equipment used to transfer drums and containers shall be selected, positioned, and operated to minimize sources of ignition related to the equipment from igniting vapors released from ruptured drums or containers.
- (4) Radioactive wastes. Drums and containers containing radioactive wastes shall not be handled until such time as their hazard to employees is properly assessed.
- (5) Shock-sensitive wastes. As a minimum, the following special precautions shall be taken when drums and containers containing or suspected of containing shock-sensitive wastes are handled:
 - (a) All nonessential employees shall be evacuated from the area of transfer.
 - (b) Material handling equipment shall be provided with explosive containment devices or protective shields to protect equipment operators from exploding containers.
 - (c) An employee alarm system capable of being perceived above surrounding light and noise conditions shall be used to signal the commencement and completion of explosive waste handling activities.

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- (d) Continuous communications (i.e., portable radios, hand signals, telephones, as appropriate) shall be maintained between the employee-in-charge of the immediate handling area and the site safety and health supervisor and/or command post until such time as the handling operation is completed. Communication equipment or methods that could cause shock-sensitive materials to explode shall not be used.
- (e) Drums and containers under pressure, as evidenced by bulging or swelling, shall not be moved until such time as the cause for excess pressure is determined and appropriate containment procedures have been implemented to protect employees from explosive relief of the drum.
- (f) Drums and containers containing packaged laboratory wastes shall be considered to contain shock-sensitive or explosive materials until they have been characterized.

Caution: Shipping of shock-sensitive wastes may be prohibited under United States Department of Transportation regulations. Employers and their shippers should refer to WAC 480-12-195.

- (6) Laboratory waste packs. In addition to the requirements of subsection (4) of this section, the following precautions shall be taken, as a minimum, in handling laboratory waste packs (lab packs):
 - (a) Lab packs shall be opened only when necessary and then only by an individual knowledgeable in the inspection, classification, and segregation of the containers within the pack according to the hazards of the wastes.
 - (b) If crystalline material is noted on any container, the contents shall be handled as a shock-sensitive waste until the contents are identified.
- (7) Sampling of drum and container contents. Sampling of containers and drums shall be done in accordance with a sampling procedure which is part of the site safety and health plan developed for and available to employees and others at the specific worksite.
- (8) Shipping and transport.
 - (a) Drums and containers shall be identified and classified prior to packaging for shipment.
 - (b) Drum or container staging areas shall be kept to the minimum number necessary to identify and classify materials safely and prepare them for transport.
 - (c) Staging areas shall be provided with adequate access and egress routes.
 - (d) Bulking of hazardous wastes shall be permitted only after a thorough characterization of the materials has been completed.
- (9) Tank and vault procedures.
 - (a) Tanks and vaults containing hazardous substances shall be handled in a manner similar to that for drums and containers, taking into consideration the size of the tank or vault.
 - (b) Appropriate tank or vault entry procedures as described in WAC 296-62-14503 and the employer's safety and health plan shall be followed whenever employees must enter a tank or vault. [Statutory Authority: Chapter 49.17 RCW. 91-11-070 (Order 91-01), §296-62-3090, filed 05/20/91, effective 06/20/91; 89-21-018 (Order 89-10), §296-62-3090, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3090, filed 10/6/88, effective 11/7/88.]

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WAC 296-62-3100, Decontamination.

- (1) General. Procedures for all phases of decontamination shall be developed and implemented in accordance with this section.
- (2) Decontamination procedures.
 - (a) A decontamination procedure shall be developed, communicated to employees and implemented before any employees or equipment may enter areas on site where potential for exposure to hazardous substances exists.
 - (b) Standard operating procedures shall be developed to minimize employee contact with hazardous substances or with equipment that has contacted hazardous substances.
 - (c) All employees leaving a contaminated area shall be appropriately decontaminated; all contaminated clothing and equipment leaving a contaminated area shall be appropriately disposed of or decontaminated.
 - (d) Decontamination procedures shall be monitored by the site safety and health supervisor to determine their effectiveness. When such procedures are found to be ineffective, appropriate steps shall be taken to correct any deficiencies.
- (3) Location. Decontamination shall be performed in geographical areas that will minimize the exposure of uncontaminated employees or equipment to contaminated employees or equipment.
- (4) Equipment and solvents. All equipment and solvents used for decontamination shall be decontaminated or disposed of properly.
- (5) Personal protective clothing and equipment.
 - (a) Protective clothing and equipment shall be decontaminated, cleaned, laundered, maintained, or replaced as needed to maintain their effectiveness.
 - (b) Employees whose nonimpermeable clothing becomes wetted with hazardous substances shall immediately remove that clothing and proceed to shower. The clothing shall be disposed of or decontaminated before it is removed from the work zone.
- (6) Unauthorized employees. Unauthorized employees shall not remove protective clothing or equipment from change rooms.
- (7) Commercial laundries or cleaning establishments. Commercial laundries or cleaning establishments that decontaminate protective clothing or equipment shall be informed of the potentially harmful effects of exposures to hazardous substances.
- (8) Showers and change rooms. Where the decontamination procedure indicates a need for regular showers and change rooms outside of a contaminated area, they shall be provided and meet the requirements of Part B-1 of chapter 296-24 WAC. If temperature conditions prevent the effective use of water, then other effective means for cleansing shall be provided and used. [Statutory Authority: Chapter 49.17 RCW. 89-21-018 (Order 89-10), §296-62-3100, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3100, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3110, Emergency response by employees at uncontrolled hazardous waste sites.

- (1) Emergency response plan.
 - (a) An emergency response plan shall be developed and implemented by all employers within the scope of WAC 296-62-300(1)(a) and (b) to handle anticipated emergencies prior to the commencement of hazardous waste operations. The plan shall be in writing and available for inspection and copying by employees, their representatives, WISHA personnel, and other governmental agencies with relevant responsibilities.
 - (b) Employers who will evacuate their employees from the danger area when an emergency occurs, and who do not permit any of their employees to assist in handling the emergency are exempt from the requirements of this section if they provide an emergency action plan complying with WAC 296-24-567(1).
- (2) Elements of an emergency response plan. The employer shall develop an emergency response plan for emergencies which shall address as a minimum, the following:
 - (a) Preemergency planning.
 - (b) Personnel roles, lines of authority, and communication.
 - (c) Emergency recognition and prevention.
 - (d) Safe distances and places of refuge.
 - (e) Site security and control.
 - (f) Evacuation routes and procedures.
 - (g) Decontamination procedures which are not covered by the site safety and health plan.
 - (h) Emergency medical treatment and first aid.
 - (i) Emergency alerting and response procedures.
 - (j) Critique of response and follow-up.
 - (k) PPE and emergency equipment.
- (3) Procedures for handling emergency incidents.
 - (a) In addition to the elements for the emergency response plan required in subsection (2) of this section, the following elements shall be included for emergency response plans:
 - (i) Site topography, layout, and prevailing weather conditions.
 - (ii) Procedures for reporting incidents to local, state, and federal governmental agencies.
 - (b) The emergency response plan shall be a separate section of the site safety and health plan.
 - (c) The emergency response plan shall be compatible and integrated with the disaster, fire and/or emergency response plans of local, state, and federal agencies.
 - (d) The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations.

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WAC 296-62-3110 (Cont.)

- (e) The site emergency response plan shall be reviewed periodically and, as necessary, be amended to keep it current with new or changing site conditions or information.
- (f) An employee alarm system shall be installed in accordance with WAC 296-24-631 through 296-24-63199 to notify employees of an on-site emergency situation, to stop work activities if necessary, to lower background noise in order to speed communication, and to begin emergency procedures.
- (g) Based upon the information available at the time of the emergency, the employer shall evaluate the incident and the site response capabilities and proceed with the appropriate steps to implement the on-site emergency response plan. [Statutory Authority: Chapter 49.17 RCW. 90-20-091 (Order 90-14), §296-62-3110, filed 10/1/90, effective 11/15/90; 90-09-026 (Order 90-01), §296-62-3110, filed 4/10/90, effective 5/25/90; 89-21-018 (Order 89-10), §296-62-3110, filed 10/10/89, effective 11/24/89; Statutory Authority: Chapter 49.17 RCW. 88-21-002 (Order 88-23), §296-62-3110, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3112, Emergency Response to Hazardous Substance Releases.

This section covers employers whose employees are engaged in emergency response no matter where it occurs except that it does not cover employees engaged in operations specified in WAC 296-62-300 (1)(a) through (d).

Those emergency response organizations who have developed and implemented programs equivalent to this section for handling releases of hazardous substances pursuant to Section 303 of SARA Title III shall be deemed to have met the requirements of this section.

- (1) Emergency response plan. An emergency response plan shall be developed and implemented to handle anticipated emergencies prior to the commencement of emergency response operations. The plan shall be in writing and available for inspection and copying by employees, their representatives, and WISHA personnel. Employers who will evacuate their employees from the danger area when an emergency occurs, and who do not permit any of their employees to assist in handling the emergency, are exempt from the requirements of this section if they provide an emergency action plan in accordance with WAC 296-24-567(1).
- (2) Elements of an emergency response plan. The employer shall develop an emergency response plan for emergencies which shall address, as a minimum, the following to the extent that they are not addressed elsewhere:
 - (a) Preemergency planning and coordination with outside parties.
 - (b) Personnel roles, lines of authority, training, and communication.
 - (c) Emergency recognition and prevention.
 - (d) Safe distances and places of refuge.
 - (e) Site security and control.
 - (f) Evacuation routes and procedures.
 - (g) Decontamination.
 - (h) Emergency medical treatment and first aid.

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WAC 296-62-3112 (Cont.)

- (i) Emergency alerting and response procedures.
 - (j) Critique of response and follow-up.
 - (k) PPE and emergency equipment.
 - (l) Emergency response organizations may use the local emergency response plan or the state emergency response plan or both, as part of their emergency response plan to avoid duplication. Those items of the emergency response plan that are being properly addressed by the SARA Title III plans may be substituted into their emergency plan or otherwise kept together for the employer and employee's use.
- (3) Procedures for handling emergency response.
- (a) The senior emergency response official responding to an emergency shall become the individual in charge of a site-specific incident command system (ICS). All emergency responders and their communications shall be coordinated and controlled through the individual in charge of the ICS assisted by the senior official present for each employer.

Note: The "senior official" at an emergency response is the most senior official on the site who has the responsibility for controlling the operations at the site. Initially it is the senior officer on the first-due piece of responding emergency apparatus to arrive on the incident scene. As more senior officers arrive (i.e., battalion chief, fire chief, state law enforcement official, site coordinator, etc.), the position is passed up the line of authority which has been previously established.
 - (b) The individual in charge of the ICS shall identify, to the extent possible, all hazardous substances or conditions present and shall address as appropriate site analysis, use of engineering controls, maximum exposure limits, hazardous substance handling procedures, and use of any new technologies.
 - (c) Based on the hazardous substances and/or conditions present, the individual in charge of the ICS shall implement appropriate emergency operations, and assure that the personal protective equipment worn is appropriate for the hazards to be encountered. However, personal protective equipment shall meet, at a minimum, the criteria contained in WAC 296-24-58513 when worn while performing fire fighting operations beyond the incipient stage for any incident.
 - (d) Employees engaged in emergency response and exposed to hazardous substances presenting an inhalation hazard or potential inhalation hazard shall wear positive pressure self-contained breathing apparatus while engaged in emergency response, until such time that the individual in charge of the ICS determines through the use of air monitoring that a decreased level of respiratory protection will not result in hazardous exposures to employees.
 - (e) The individual in charge of the ICS shall limit the number of emergency response personnel at the emergency site, in those areas of potential or actual exposure to incident or site hazards, to those who are actively performing emergency operations. However, operations in hazardous areas shall be performed using the buddy system in groups of two or more.
 - (f) Back-up personnel shall stand by with equipment ready to provide assistance or rescue. Advance first-aid support personnel, as a minimum, shall also stand by with medical equipment and transportation capability.

WAC 296-62-3112 (Cont.)

- (g) The individual in charge of the ICS shall designate a safety official, who is knowledgeable in the operations being implemented at the emergency response site, with specific responsibility to identify and evaluate hazards and to provide direction with respect to the safety of operations for the emergency at hand.
 - (h) When activities are judged by the safety official to be an IDLH condition and/or to involve an imminent danger condition, the safety official shall have the authority to alter, suspend, or terminate those activities. The safety official shall immediately inform the individual in charge of the ICS of any actions needed to be taken to correct these hazards at the emergency scene.
 - (i) After emergency operations have terminated, the individual in charge of the ICS shall implement appropriate decontamination procedures.
 - (j) When deemed necessary for meeting the tasks at hand, approved self-contained compressed air breathing apparatus may be used with approved cylinders from other approved self-contained compressed air breathing apparatus provided that such cylinders are of the same capacity and pressure rating. All compressed air cylinders used with self-contained breathing apparatus shall meet United States Department of Transportation and National Institute for Occupational Safety and Health criteria.
- (4) Skilled support personnel. Personnel, not necessarily an employer's own employees, who are skilled in the operation of certain equipment, such as mechanized earth moving or digging equipment or crane and hoisting equipment, and who are needed temporarily to perform immediate emergency support work that cannot reasonably be performed in a timely fashion by an employer's own employees, and who will be or may be exposed to the hazards at an emergency response scene, are not required to meet the training required in this subsection for the employer's regular employees. However, these personnel shall be given an initial briefing at the site prior to their participation in any emergency response.
- The initial briefing shall include instruction in the wearing of appropriate personal protective equipment, what chemical hazards are involved, and what duties are to be performed. All other appropriate safety and health precautions provided to the employer's own employees shall be used to assure the safety and health of these personnel.
- (5) Specialist employees. Employees who, in the course of their regular job duties, work with and are trained in the hazards of specific hazardous substances, and who will be called upon to provide technical advice or assistance at a hazardous substance release incident to the individual in charge, shall receive training or demonstrate competency in the area of their specialization annually.
 - (6) Training. Training shall be based on the duties and functions to be performed by each responder of an emergency response organization. The skill and knowledge levels required for all new responders, those hired after the effective date of this standard, shall be conveyed to them through training before they are permitted to take part in actual emergency operations on an incident.

Employees who participate, or are expected to participate, in emergency response, shall be given training in accordance with the following:

- (a) First responder awareness level. First responders at the awareness level are individuals who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the proper authorities of the release. They would take no further action beyond notifying the authorities of the release. First responders at the awareness level shall have sufficient training or have had sufficient experience to objectively demonstrate competency in the following areas:

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WAC 296-62-3112 (Cont.)

- (i) An understanding of what hazardous substances are and the risks associated with them in an incident.
 - (ii) An understanding of the potential outcomes associated with an emergency created when hazardous substances are present.
 - (iii) The ability to recognize the presence of hazardous substances in an emergency.
 - (iv) The ability to identify the hazardous substances, if possible.
 - (v) An understanding of the role of the first responder awareness individual in the employer's emergency response plan including site security and control and the United States Department of Transportation's Emergency Response Guidebook.
 - (vi) The ability to realize the need for additional resources and to make appropriate notifications to the communication center.
- (b) First responder operations level. First responders at the operations level are individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and protect exposures. First responders at the operational level shall have received at least eight hours of training or have had sufficient experience to objectively demonstrate competency in the following areas in addition to those listed for the awareness level and the employer shall so certify:
- (i) Knowledge of the basic hazard and risk assessment techniques.
 - (ii) Know how to select and use proper personal protective equipment provided to the first responder operational level.
 - (iii) An understanding of basic hazardous materials terms.
 - (iv) Know how to perform basic control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.
 - (v) Know how to implement basic decontamination procedures.
 - (vi) An understanding of the relevant standard operating procedures and termination procedures.
- (c) Hazardous materials technician. Hazardous materials technicians are individuals who respond to releases or potential releases for the purpose of stopping the release. They assume a more aggressive role than a first responder at the operations level in that they will approach the point of release in order to plug, patch, or otherwise stop the release of hazardous substance. Hazardous materials technicians shall have received at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and the employer shall so certify:
- (i) Know how to implement the employer's emergency response plan.

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- (ii) Know the classification, identification, and verification of known and unknown materials by using field survey instruments and equipment.
 - (iii) Be able to function within an assigned role in the incident command system.
 - (iv) Know how to select and use proper specialized chemical personal protective equipment provided to the hazardous materials technician.
 - (v) Understand hazard and risk assessment techniques.
 - (vi) Be able to perform advance control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with the unit.
 - (vii) Understand and implement decontamination procedures.
 - (viii) Understand termination procedures.
 - (ix) Understand basic chemical and toxicological terminology and behavior.
- (d) **Hazardous materials specialist.** Hazardous materials specialists are individuals who respond with and provide support to hazardous materials technicians. Their duties parallel those of the hazardous materials technician, however, those duties require a more directed or specific knowledge of the various substances they may be called upon to contain. The hazardous materials specialist would also act as the site liaison with federal, state, local, and other government authorities in regard to site activities.

Hazardous materials specialists shall have received at least 24 hours of training equal to the technician level and in addition have competency in the following areas and the employer shall so certify:

- (i) Know how to implement the local emergency response plan.
- (ii) Understand classification, identification, and verification of known and unknown materials by using advanced survey instruments and equipment.
- (iii) Know of the state emergency response plan.
- (iv) Be able to select and use proper specialized chemical personal protective equipment provided to the hazardous materials specialist.
- (v) Understand in-depth hazard and risk techniques.
- (vi) Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available.
- (vii) Be able to determine and implement decontamination procedures.
- (viii) Have the ability to develop a site safety and control plan.
- (ix) Understand chemical, radiological, and toxicological terminology and behavior.

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- (e) On scene incident commander. Incident commanders, who will assume control of the incident scene beyond the first responder awareness level, shall receive at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and the employer shall so certify:
 - (i) Know and be able to implement the employer's incident command system.
 - (ii) Know how to implement the employer's emergency response plan.
 - (iii) Know and understand the hazards and risks associated with employees working in chemical protective clothing.
 - (iv) Know how to implement the local emergency response plan.
 - (v) Know of the state emergency response plan and of the Federal Regional Response Team.
 - (vi) Know and understand the importance of decontamination procedures.
- (7) Trainers. Trainers who teach any of the above training subjects shall have satisfactorily completed a training course for teaching the subjects they are expected to teach, such as the courses offered by the United States National Fire Academy, or they shall have the training and/or academic credentials and instructional experience necessary to demonstrate competent instructional skills and a good command of the subject matter of the courses they are to teach.
- (8) Refresher training.
 - (a) Those employees who are trained in accordance with subsection (6) of this section shall receive annual refresher training of sufficient content and duration to maintain their competencies, or shall demonstrate competency in those areas at least yearly.
 - (b) A statement shall be made of the training or competency, and if a statement of competency is made, the employer shall keep a record of the methodology used to demonstrate competency.
- (9) Medical surveillance and consultation.
 - (a) Members of an organized and designated HAZMAT team and hazardous materials specialists shall receive a baseline physical examination and be provided with medical surveillance as required in WAC 296-62-3050.
 - (b) Any emergency response employees who exhibit signs or symptoms which may have resulted from exposure to hazardous substances during the course of an emergency incident, either immediately or subsequently, shall be provided with medical consultation as required in WAC 296-62-3050(3)(b).
- (10) Chemical protective clothing. Chemical protective clothing and equipment to be used by organized and designated HAZMAT team members, or to be used by hazardous materials specialists, shall meet the requirements of WAC 296-62-3060 (3) through (5).
- (11) Postemergency response operations. Upon completion of the emergency response, if it is determined that it is necessary to remove hazardous substances, health hazards, and materials contaminated with them (such as contaminated soil or other elements of the natural environment) from the site of the incident, the employer conducting the clean-up shall comply with one of the following:

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- (a) Meet all of the requirements of WAC 296-62-3010, 296-62-3020, 296-62-3030, 296-62-3040, 296-62-3050, 296-62-3060, 296-62-3070, 296-62-3080, 296-62-3090, 296-62-3100, 296-62-3110, 296-62-3120, 296-62-3130, and 296-62-3138; or
- (b) Where the clean-up is done on plant property using plant or workplace employees, such employees shall have completed the training requirements of WAC 296-24-567(1), 296-62-071, and 296-62-054, and other appropriate safety and health training made necessary by the tasks that they are expected to be performed such as personal protective equipment and decontamination procedures. All equipment to be used in the performance of the clean-up work shall be in serviceable condition and shall have been inspected prior to use. [Statutory Authority: Chapter 49.17 RCW. 90-20-091 (Order 90-14), §296-62-3112, filed 10/1/90, effective 11/15/90; 89-21-018, §296-62-3112, filed 10/10/89, effective 11/24/89.]

WAC 296-62-3120, Illumination.

Areas accessible to employees shall be lighted to not less than the minimum illumination intensities listed in Table 1 while any work is in progress:

TABLE 1-120.1 - MINIMUM ILLUMINATION
Intensities in Foot-Candles

Foot-candles	Area or operation
5	General site area.
3	Excavation and waste areas, accessways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoors: Warehouses, corridors, hallways, and exitways.
5	Tunnels, shafts, and general underground work areas; exception: Minimum of ten foot-candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines approved cap lights shall be acceptable for use in the tunnel heading.
10	General shops (e.g., mechanical and electrical equipment rooms, active storerooms, barracks or living quarters, locker or dressing rooms, dining areas, and indoor toilets and workrooms).
30	First aid stations, infirmaries, and offices.

[Statutory Authority: Chapter 49.17 RCW. 89-21-018, §296-62-3120, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3120, filed 10/6/88, effective 11/7/88.]

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WAC 296-62-3130, Sanitation at temporary workplaces.

- (1) Potable water.
 - (a) An adequate supply of potable water shall be provided on the site.
 - (b) Portable containers used to dispense drinking water shall be capable of being tightly closed, and equipped with a tap. Water shall not be dipped from containers.
 - (c) Any container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose.
 - (d) Where single service cups (to be used but once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.
- (2) Nonpotable water.
 - (a) Outlets for nonpotable water, such as water for fire fighting purposes shall be identified to indicate clearly that the water is unsafe and is not to be used for drinking, washing, or cooking purposes.
 - (b) There shall be no cross-connection, open or potential, between a system furnishing potable water and a system furnishing nonpotable water.
- (3) Toilet facilities.
 - (a) Toilets shall be provided for employees according to Table 2.

TABLE 2 -- TOILET FACILITIES

Number of employees	Minimum number of facilities
20 or fewer	One.
More than 20, fewer than 200	One toilet seat and one urinal per 40 employees.
More than 200	One toilet seat and one urinal per 50 employees.

- (b) Under temporary field conditions, provisions shall be made to assure that at least one toilet facility is available.
- (c) Hazardous waste sites, not provided with a sanitary sewer shall be provided with the following toilet facilities unless prohibited by local codes:
 - (i) Chemical toilets;
 - (ii) Recirculating toilets;
 - (iii) Combustion toilets; or
 - (iv) Flush toilets.

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WAC 296-62-3130 (Cont.)

- (d) The requirements of this section for sanitation facilities shall not apply to mobile crews having transportation readily available to nearby toilet facilities.
- (e) Doors entering toilet facilities shall be provided with entrance locks controlled from inside the facility.
- (4) Food handling. All food service facilities and operations for employees shall meet the applicable laws, ordinances, and regulations of the jurisdictions in which they are located.
- (5) Temporary sleeping quarters. When temporary sleeping quarters are provided, they shall be heated, ventilated, and lighted.
- (6) Washing facilities. The employer shall provide adequate washing facilities for employees engaged in operations where hazardous substances may be harmful to employees. Such facilities shall be in near proximity to the worksite, in areas where exposures are below permissible exposure limits and published exposure levels and which are under the controls of the employer, and shall be so equipped as to enable employees to remove hazardous substances from themselves.
- (7) Showers and change rooms. When hazardous waste clean-up or removal operations commence on a site and the duration of the work will require six months or greater time to complete, the employer shall provide showers and change rooms for all employees exposed to hazardous substances and health hazards involved in hazardous waste clean-up or removal operations.
 - (a) Showers shall be provided and shall meet the requirements of WAC 296-24-12009(3).
 - (b) Change rooms shall be provided and shall meet the requirements of WAC 296-24-12011. Change rooms shall consist of two separate change areas separated by the shower area required in (a) of this subsection. One change area, with an exit leading off the worksite, shall provide employees with a clean area where they can remove, store, and put on street clothing. The second area, with an exit to the worksite, shall provide employees with an area where they can put on, remove and store work clothing and personal protective equipment.
 - (c) Showers and change rooms shall be located in areas where exposures are below the permissible exposure limits and published exposure levels. If this cannot be accomplished, then a ventilation system shall be provided that will supply air that is below the permissible exposure limits and published exposure levels.
 - (d) Employers shall assure that employees shower at the end of their work shift and when leaving the hazardous waste site. [Statutory Authority: Chapter 49.17 RCW. 89-21-018, §296-62-3130, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3130, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3138, New Technology Programs.

- (1) The employer shall develop and implement procedures for the introduction of effective new technologies and equipment developed for the improved protection of employees working with hazardous waste clean-up operations, and the same shall be implemented as part of the site safety and health program to assure that employee protection is being maintained.

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WAC 296-62-3138 (Cont.)

- (2) New technologies, equipment or control measures available to the industry, such as the use of foams, absorbents, adsorbents, neutralizers, or other means to suppress the level of air contaminants while excavating the site or for spill control, shall be evaluated by employers or their representatives. Such an evaluation shall be done to determine the effectiveness of the new methods, materials, or equipment before implementing their use on a large scale for enhancing employee protection. Information and data from manufacturers or suppliers may be used as part of the employer's evaluation effort. Such evaluations shall be made available to WISHA upon request. [Statutory Authority: Chapter 49.17 RCW. 89-21-018, §296-62-3138, filed 10/10/89, effective 11/24/89.]

WAC 296-62-3140, Certain operations conducted under the Resource Conservation and Recovery Act of 1976 (RCRA).

****WISHA Regional Directive 84-13 B-1 may be applicable to this section.
(296-62-3140).**

Employers conducting operations at treatment, storage, and disposal (TSD) facilities specified in WAC 296-62-300 (1)(d) shall provide and implement the programs specified in this section. See the "Notes and Exceptions" of WAC 296-62-300(2)(c) for employers not covered.

- (1) **Safety and health program.** The employer shall develop and implement a written safety and health program for employees involved in hazardous waste operations that shall be available for inspection by employees, their representatives and WISHA personnel. The program shall be designed to identify, evaluate and control safety and health hazards in their facilities for the purpose of employee protection, to provide for emergency response meeting the requirements of WAC 296-62-3110 and to address as appropriate site analysis, engineering controls, maximum exposure limits, hazardous waste handling procedures and uses of new technologies.
- (2) **Hazard Communication program.** The employer shall implement a hazard communication program meeting the requirements of WAC 296-62-054 through 296-62-05427 as part of the employer's safety and health program.

Note: The exemption for hazardous waste provided in WAC 296-62-054 is applicable to this section.

- (3) **Medical surveillance program.** The employer shall develop and implement a medical surveillance program meeting the requirements of WAC 296-62-3050.
- (4) **Decontamination program.** The employer shall develop and implement a decontamination procedure meeting the requirements of WAC 296-62-3100.
- (5) **New technology programs.** The employer shall develop and implement procedures meeting the requirements of WAC 296-62-3138 for introducing new and innovative equipment into the workplace.
- (6) **Material handling program.** Where employees will be handling drums or containers, the employer shall develop and implement procedures meeting the requirements of WAC 296-62-3090(1)(b) through (h) and (k), as well as WAC 296-62-3090(3) and (8), prior to starting such work.
- (7) **Training program.**

WAC 296-62-3140 (Cont.)

- (a) New employees. The employer shall develop and implement a training program, which is part of the employer's safety and health program, for employees exposed to health hazards or hazardous substances at TSD operations to enable employees to perform their assigned duties and functions in a safe and healthful manner so as not to endanger themselves or other employees. The initial training shall be for 24 hours and refresher training shall be for eight hours annually. Employees who have received the initial training required by this section shall be given a written certificate attesting that they have successfully completed the necessary training.
 - (b) Current employees. Employers who can show by an employee's previous work experience and/or training that the employee has had training equivalent to the initial training required by this section, shall be considered as meeting the initial training requirements of this section as to that employee. Equivalent training includes that training that existing employees might have already received from actual site work experience. Current employees shall receive eight hours of refresher training annually.
 - (c) Trainers. Trainers who teach initial training shall have satisfactorily completed a training course for teaching the subjects they are expected to teach or they shall have the academic credentials and instruction experience necessary to demonstrate a good command of the subject matter of the courses and competent instructional skills.
- (8) Emergency response program.
- (a) Emergency response plan. An emergency response plan shall be developed and implemented by all employers. Such plans need not duplicate any of the subjects fully addressed in the employer's contingency planning required by permits, such as those issued by the United States Environmental Protection Agency, provided that the contingency plan is made part of the emergency response plan. The emergency response plan shall be a written portion of the employer's safety and health program required in this section. Employers who will evacuate their employees from the worksite location when an emergency occurs and who do not permit any of their employees to assist in handling the emergency are exempt from the requirements of WAC 296-62-3140(1) if they provide an emergency action plan complying with WAC 296-24-567.
 - (b) Elements of an emergency response plan. The employer shall develop an emergency response plan for emergencies which shall address, as a minimum, the following areas to the extent that they are not addressed in any specific program required in this section:
 - (i) Preemergency planning and coordination with outside parties.
 - (ii) Personnel roles, lines of authority, and communication.
 - (iii) Emergency recognition and prevention.
 - (iv) Safe distances and places of refuge.
 - (v) Site security and control.
 - (vi) Evacuation routes and procedures.
 - (vii) Decontamination procedures.
 - (viii) Emergency medical treatment and first aid.

WAC 296-62-3140 (Cont.)

- (ix) Emergency alerting and response procedures.
 - (x) Critique of response and follow-up.
 - (xi) PPE and emergency equipment.
- (c) Training.
- (i) Training for emergency response employees shall be completed before they are called upon to perform in real emergencies. Such training shall include the elements of the emergency response plan, standard operating procedures the employer has established for the job, the personal protective equipment to be worn, and procedures for handling emergency incidents.

Exception #1: An employer need not train all employees to the degree specified if the employer divides the workforce in a manner such that a sufficient number of employees who have responsibility to control emergencies have the training specified, and all other employees, who may first respond to an emergency incident, have sufficient awareness training to recognize that an emergency response situation exists and that they are instructed in that case to summon the fully trained employees and not attempt to control activities for which they are not trained.

Exception #2: An employer need not train all employees to the degree specified if arrangements have been made in advance for an outside fully trained emergency response team to respond in a reasonable period and all employees, who may come to the incident first, have sufficient awareness training to recognize that an emergency response situation exists and they have been instructed to call the designated outside fully trained emergency response team for assistance.
 - (ii) Employee members of TSD facility emergency response organizations shall be trained to a level of competence in the recognition of health and safety hazards to protect themselves and other employees. This would include training in the methods used to minimize the risk from safety and health hazards; in the safe use of control equipment; in the selection and use of appropriate personal protective equipment; in the safe operating procedures to be used at the incident scene; in the techniques of coordination with other employees to minimize risks; in the appropriate response to over exposure from health hazards or injury to themselves and other employees; and in the recognition of subsequent symptoms which may result from over exposures.
 - (iii) The employer shall certify that each covered employee has attended and successfully completed the training required in this subsection, or shall certify the employee's competency at least yearly. The method used to demonstrate competency for certification of training shall be recorded and maintained by the employer.
- (d) Procedures for handling emergency incidents.
- (i) In addition to the elements for the emergency response plan required in (b) of this subsection, the following elements shall be included for emergency response plans to the extent that they do not repeat any information already contained in the emergency response plan:
 - (A) Site topography, layout, and prevailing weather conditions.

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WAC 296-62-3140 (Cont.)

- (B) Procedures for reporting incidents to local, state, and federal governmental agencies.
- (ii) The emergency response plan shall be compatible and integrated with the disaster, fire, and/or emergency response plans of local, state, and federal agencies.
- (iii) The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations.
- (iv) The site emergency response plan shall be reviewed periodically and, as necessary, be amended to keep it current with new or changing site conditions or information.
- (v) An employee alarm system shall be installed in accordance with WAC 296-24-631 to notify employees of an emergency situation; to stop work activities if necessary; to lower background noise in order to speed communication; and to begin emergency procedures.
- (vi) Based upon the information available at time of the emergency, the employer shall evaluate the incident and the site response capabilities and proceed with the appropriate steps to implement the site emergency response plan. [Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), §296-62-3140, filed November 22, 1991, effective 12/24/91; 90-20-091 (Order 90-14), §296-62-3140, filed 10/1/90, effective 11/15/90; 89-21-018, §296-62-3140, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3140, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3152, Appendices to Part P--Hazardous waste operations and emergency response.

Note: The following appendices serve as nonmandatory guidelines to assist employees and employers in complying with the appropriate requirements of this part. However, WAC 296-62-3060 makes mandatory in certain circumstances the use of Level A and Level B personal protective equipment protection. [Statutory Authority: Chapter 49.17 RCW. 89-21-018, §296-62-3152, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3152, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3160, Appendix A--Personal protective equipment test methods.

****WISHA Regional Directive 84-13 B-1 may be applicable to this section.**

This appendix sets forth the nonmandatory examples of tests which may be used to evaluate compliance with WAC 296-62-3060. Other tests and other challenge agents may be used to evaluate compliance.

- (1) Totally-encapsulating chemical protective suit pressure test.
 - (a) Scope.
 - (i) This practice measures the ability of a gas tight totally-encapsulating chemical protective suit material, seams, and closures to maintain a fixed positive pressure. The results of this practice allow the gas tight integrity of a total-encapsulating chemical protective suit to be evaluated.
 - (ii) Resistance of the suit materials to permeation, penetration, and degradation by specific hazardous substances is not determined by this test method.

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WAC 296-62-3160 (Cont.)

- (b) Definition of terms.
 - (i) "Totally-encapsulated chemical protective suit (TECP suit)" means a full body garment which is constructed of protective clothing materials; covers the wearer's torso, head, arms, and legs; may cover the wearer's hands and feet with tightly attached gloves and boots; completely encloses the wearer and respirator by itself or in combination with the wearer's gloves and boots.
 - (ii) "Protective clothing material" means any material or combination of materials used in an item of clothing for the purpose of isolating parts of the body from direct contact with a potentially hazardous liquid or gaseous chemicals.
 - (iii) "Gas tight" means for the purpose of this test method the limited flow of a gas under pressure from the inside of a TECP suit to atmosphere at a prescribed pressure and time interval.
- (c) Summary of test method. The TECP suit is visually inspected and modified for the test. The test apparatus is attached to the suit to permit inflation to the pretest suit expansion pressure for removal of suit wrinkles and creases. The pressure is lowered to the test pressure and monitored for three minutes. If the pressure drop is excessive, the TECP suit fails the test and is removed from service. The test is repeated after leak location and repair.
- (d) Required supplies.
 - (i) Source of compressed air.
 - (ii) Test apparatus for suit testing including a pressure measurement device with a sensitivity of at least 1/4 inch water gauge.
 - (iii) Vent valve closure plugs or sealing tape.
 - (iv) Soapy water solution and soft brush.
 - (v) Stop watch or appropriate timing device.
- (e) Safety precautions. Care shall be taken to provide the correct pressure safety devices required for the source of compressed air used.
- (f) Test procedure. Prior to each test, the tester shall perform a visual inspection of the suit. Check the suit for seam integrity by visually examining the seams and gently pulling on the seams. Ensure that all air supply lines, fittings, visor, zippers, and valves are secure and show no signs of deterioration.
 - (i) Seal off the vent valves along with any other normal inlet or exhaust points (such as umbilical air line fittings or facepiece opening) with tape or other appropriate means (caps, plugs, fixture, etc.). Care should be exercised in the sealing process not to damage any of the suit components.
 - (ii) Close all closure assemblies.

WAC 296-62-3160 (Cont.)

- (iii) Prepare the suit for inflation by providing an improvised connection point on the suit for connecting an airline. Attach the pressure test apparatus to the suit to permit suit inflation from a compressed air source equipped with a pressure indicating regulator. The leak tightness of the pressure test apparatus should be tested before and after each test by closing off the end of the tubing attached to the suit and assuring a pressure of three inches water gauge for three minutes can be maintained. If a component is removed for the test, that component shall be replaced and a second test conducted with another component removed to permit a complete test of the ensemble.
- (iv) The pretest expansion pressure (A) and the suit test pressure (B) shall be supplied by the suit manufacturer, but in no case shall they be less than (A) = 3 inches water gauge and (B) = 2 inches water gauge. The ending suit pressure (C) shall be no less than eighty percent of the test pressure (B); i.e., the pressure drop shall not exceed twenty percent of the test pressure (B).
- (v) Inflate the suit until the pressure inside is equal to pressure (A), the pretest expansion suit pressure. Allow at least one minute to fill out the wrinkles in the suit. Release sufficient air to reduce the suit pressure to pressure (B), the suit test pressure. Begin timing. At the end of three minutes, record the suit pressure as pressure (C), the ending suit pressure. The difference between the suit test pressure and the ending suit test pressure (B)-(C) shall be defined as the suit pressure drop.
- (vi) If the suit pressure drop is more than twenty percent of the suit test pressure (B) during the three minute test period, the suit fails the test and shall be removed from service.
- (g) Retest procedure.
 - (i) If the suit fails the test check for leaks by inflating the suit to pressure (A) and brushing or wiping the entire suit (including seams, closures, lens gaskets, glove-to-sleeve joints, etc.) with a mild soap and water solution. Observe the suit for the formation of soap bubbles, which is an indication of a leak. Repair all identified leaks.
 - (ii) Retest the TECP suit as outlined in (f) of this subsection.
- (h) Report. Each TECP suit tested by this practice shall have the following information recorded.
 - (i) Unique identification number, identifying brand name, date of purchase, material of construction, and unique fit features; e.g., special breathing apparatus.
 - (ii) The actual values for test pressures (A), (B), and (C) shall be recorded along with the specific observation times. If the ending pressure (C) is less than eighty percent of the test pressure (B), the suit shall be identified as failing the test. When possible, the specific leak location shall be identified in the test records. Retest pressure data shall be recorded as an additional test.
 - (iii) The source of the test apparatus used shall be identified and the sensitivity of the pressure gauge shall be recorded.

WAC 296-62-3160 (Cont.)

- (iv) Records shall be kept for each pressure test even if repairs are being made at the test location.

Caution. Visually inspect all parts of the suit to be sure they are positioned correctly and secured tightly before putting the suit back into service. Special care should be taken to examine each exhaust valve to make sure it is not blocked. Care should also be exercised to assure that the inside and outside of the suit is completely dry before it is put into storage.

(2) Totally-encapsulating chemical protective suit qualitative leak test.

(a) Scope.

- (i) This practice semiqualitatively tests gas tight totally-encapsulating chemical protective suit integrity by detecting inward leakage of ammonia vapor. Since no modifications are made to the suit to carry out this test, the results from this practice provide a realistic test for the integrity of the entire suit.
- (ii) Resistance of the suit materials to permeation, penetration, and degradation is not determined by this test method. ASTM test methods are available to test suit materials for those characteristics and the tests are usually conducted by the manufacturers of the suits.

(b) Definition of terms.

- (i) "Totally-encapsulated chemical protective suit (TECP suit)" means a full body garment which is constructed of protective clothing materials; covers the wearer's torso, head, arms, and legs; may cover the wearer's hands and feet with tightly attached gloves and boots; completely encloses the wearer and respirator by itself or in combination with the wearer's gloves and boots.
- (ii) "Protective clothing material" means any material or combination of materials used in an item of clothing for the purpose of isolating parts of the body from direct contact with a potentially hazardous liquid or gaseous chemicals.
- (iii) "Gas tight" means for the purpose of this test method the limited flow of a gas under pressure from the inside of a TECP suit to atmosphere at a prescribed pressure and time interval.
- (iv) "Intrusion coefficient." A number expressing the level of protection provided by a gas tight totally-encapsulating chemical protective suit. The intrusion coefficient is calculated by dividing the test room challenge agent concentration by the concentration of challenge agent found inside the suit. The accuracy of the intrusion coefficient is dependent on the challenge agent monitoring methods. The larger the intrusion coefficient, the greater the protection provided by the TECP suit.

WAC 296-62-3160 (Cont.)

- (c) Summary of recommended practice. The volume of concentrated aqueous ammonia solution (ammonia hydroxide, NH_4OH) required to generate the test atmosphere is determined using the directions outlined in WAC 296-62-3190 (2)(f)(i). The suit is donned by a person wearing the appropriate respiratory equipment (either a positive pressure self-contained breathing apparatus or a supplied air respirator) and worn inside the enclosed test room. The concentrated aqueous ammonia solution is taken by the suited individual into the test room and poured into an open plastic pan. A two-minute evaporation period is observed before the test room concentration is measured using a high range ammonia length of stain detector tube. When the ammonia reaches a concentration of between 1000 and 1200 ppm, the suited individual starts a standardized exercise protocol to stress and flex the suit. After this protocol is completed the test room concentration is measured again. The suited individual exits the test room and his stand-by person measures the ammonia concentration inside the suit using a low range ammonia length of stain detector tube or other more sensitive ammonia detector. A stand-by person is required to observe the test individual during the test procedure, aid the person in donning and doffing the TECP suit and monitor the suit interior. The intrusion coefficient of the suit can be calculated by dividing the average test area concentration by the interior suit concentration. A colorimetric indicator strip of bromophenol blue is placed on the inside of the suit facepiece lens so that the suited individual is able to detect a color change and know if the suit has a significant leak. If a color change is observed the individual should leave the test room immediately.
- (d) Required supplies.
 - (i) A supply of concentrated aqueous ammonium hydroxide, 58% by weight.
 - (ii) A supply of bromophenol/blue indicating paper, sensitive to 5-10 ppm ammonia or greater over a two-minute period of exposure [pH 3.0 (yellow) to pH 4.6 (blue)].
 - (iii) A supply of high range (0.5-10 volume percent) and low range (5-700 ppm) detector tubes for ammonia and the corresponding sampling pump. More sensitive ammonia detectors can be substituted for the low range detector tubes to improve the sensitivity of this practice.
 - (iv) A shallow plastic pan (PVC) at least 12":14":1" and a half pint plastic container (PVC) with tightly closing lid.
 - (v) A graduated cylinder or other volumetric measuring device of at least fifty milliliters in volume with an accuracy of at least ± 1 milliliters.
- (e) Safety precautions.
 - (i) Concentrated aqueous ammonium hydroxide, NH_4OH is a corrosive volatile liquid requiring eye, skin, and respiratory protection. The person conducting the test shall review the MSDS for aqueous ammonia.
 - (ii) Since the established permissible exposure limit for ammonia is 35 ppm as a 15 minute STEL, only persons wearing a positive pressure self-contained breathing apparatus or a supplied air respirator shall be in the chamber. Normally only the person wearing the total-encapsulating suit will be inside the chamber. A stand-by person shall have a self-contained breathing apparatus, or a positive pressure supplied air respirator available to enter the test area should the suited individual need assistance.

WAC 296-62-3160 (Cont.)

- (iii) A method to monitor the suited individual must be used during this test. Visual contact is the simplest but other methods using communication devices are acceptable.
 - (iv) The test room shall be large enough to allow the exercise protocol to be carried out and then to be ventilated to allow for easy exhaust of the ammonia test atmosphere after the test(s) are completed.
 - (v) Individuals shall be medically screened for the use of respiratory protection and checked for allergies to ammonia before participating in this test procedure.
- (f) Test procedure.
- (i) Measure the test area to the nearest foot and calculate its volume in cubic feet. Multiply the test area volume by 0.2 milliliters of concentrated aqueous ammonia per cubic foot of test area volume to determine the approximate volume of concentrated aqueous ammonia required to generate 1000 ppm in the test area.
 - (A) Measure this volume from the supply of concentrated ammonia and place it into a closed plastic container.
 - (B) Place the container, several high range ammonia detector tubes and the pump in the clean test pan and locate it near the test area entry door so that the suited individual has easy access to these supplies.
 - (ii) In a noncontaminated atmosphere, open a presealed ammonia indicator strip and fasten one end of the strip to the inside of the suit face shield lens where it can be seen by the wearer. Moisten the indicator strip with distilled water. Care shall be taken not to contaminate the detector part of the indicator paper by touching it. A small piece of masking tape or equivalent should be used to attach the indicator strip to the interior of the suit face shield.
 - (iii) If problems are encountered with this method of attachment the indicator strip can be attached to the outside of the respirator facepiece being used during the test.
 - (iv) Don the respiratory protective device normally used with the suit, and then don the TECP suit to be tested. Check to be sure all openings which are intended to be sealed (zippers, gloves, etc.) are completely sealed. DO NOT, however, plug off any venting valves.
 - (v) Step into the enclosed test room such as a closet, bathroom, or test booth, equipped with an exhaust fan. No air should be exhausted from the chamber during the test because this will dilute the ammonia challenge concentrations.
 - (vi) Open the container with the premeasured volume of concentrated aqueous ammonia within the enclosed test room, and pour the liquid into the empty plastic test pan. Wait two minutes to allow for adequate volatilization of the concentrated aqueous ammonia. A small mixing fan can be used near the evaporation pan to increase the evaporation rate of the ammonia solution.
 - (vii) After two minutes a determination of the ammonia concentration within the chamber should be made using the high range colorimetric detector tube. A concentration of 1000 ppm ammonia or greater shall be generated before the exercises are started.

WAC 296-62-3160 (Cont.)

- (viii) To test the integrity of the suit the following four minute exercise protocol should be followed:
 - (A) Raising the arms above the head with at least fifteen raising motions completed in one minute.
 - (B) Walking in place for one minute with at least fifteen raising motions of each leg in a one-minute period.
 - (C) Touching the toes with at least ten complete motions of the arms from above the head to touching of the toes in a one-minute period.
 - (D) Knee bends with at least ten complete standing and squatting motions in a one-minute period.
- (ix) If at any time during the test the colorimetric indicating paper should change colors the test should be stopped and (f)(x) and (xi) of this subsection initiated.
- (x) After completion of the test exercise, the test area concentration should be measured again using the high range colorimetric detector tube.
- (xi) Exit the test area.
- (xii) The opening created by the suit zipper or other appropriate suit penetration should be used to determine the ammonia concentration in the suit with the low range length of stain detector tube or other ammonia monitor. The internal TECP suit air should be sampled far enough from the enclosed test area to prevent a false ammonia reading.
- (xiii) After completion of the measurement of the suit interior ammonia concentration the test is concluded and the suit is doffed and the respirator removed.
- (xiv) The ventilating fan for the test room should be turned on and allowed to run for enough time to remove the ammonia gas. The fan shall be vented to the outside of the building.
- (xv) Any detectable ammonia in the suit interior (5 ppm ammonia (NH₃) or more for the length of stain detector tube) indicates the suit failed the test. When other ammonia detectors are used, a lower level of detection is possible and it should be specified as the pass/fail criteria.
- (xvi) By following this test method an intrusion coefficient of approximately two hundred or more can be measured with the suit in a completely operational condition. If the intrusion coefficient is 200 or more, then the suit is suitable for emergency response and field use.
- (g) Retest procedures.
 - (i) If the suit fails this test, check for leaks by following the pressure test in test (A) above.
 - (ii) Retest the TECP suit as outlined in the test procedure in (f) of this subsection.

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(h) Report.

- (i) Each gas tight totally-encapsulating chemical protective suit tested by this practice shall have the following information recorded.
 - (A) Unique identification number, identifying brand name, date of purchase, material of construction, and unique suit features; e.g., special breathing apparatus.
 - (B) General description of test room used for test.
 - (C) Brand name and purchase date of ammonia detector strips and color change data.
 - (D) Brand name, sampling range, and expiration date of the length of stain ammonia detector tubes. The brand name and model of the sampling pump should also be recorded. If another type of ammonia detector is used, it should be identified along with its minimum detection limit for ammonia.
 - (E) Actual test results shall list the two test area concentrations, their average, the interior suit concentration, and the calculated intrusion coefficient. Retest data shall be recorded as an additional test.
- (ii) The evaluation of the data shall be specified as "suit passed" or "suit failed" and the date of the test. Any detectable ammonia (5 ppm or greater for the length of stain detector tube) in the suit interior indicates the suit fails this test. When other ammonia detectors are used, a lower level of detection is possible and it should be specified as the pass/fail criteria.

Caution. Visually inspect all parts of the suit to be sure they are positioned correctly and secured tightly before putting the suit back into service. Special care should be taken to examine each exhaust valve to make sure it is not blocked.

Care should also be exercised to assure that the inside and outside of the suit is completely dry before it is put into storage. [Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), §296-62-3160, filed November 22, 1991, effective 12/24/91; 90-20-091 (Order 90-14), §296-62-3160, filed 10/1/90, effective 11/15/90; 89-21-018, §296-62-3160, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3160, filed 10/6/88, effective 11/7/88.] Reviser's Note: The brackets and enclosed material in the text of the above section occurred in the copy filed by the agency.

WAC 296-62-3170, Appendix B—General description and discussion of the levels of protection and protective gear.

- (1) This appendix sets forth information about personal protective equipment (PPE) protection levels which may be used to assist employers in complying with the PPE requirements of this section.
- (2) As required by the standard, PPE must be selected which will protect employees from the specific hazards which they are likely to encounter during their work on-site.

WAC 296-62-3170 (Cont.)

- (3) Selection of the appropriate PPE is a complex process which must take into consideration a variety of factors. Key factors involved in this process are identification of the hazards or suspected hazards, their routes of potential hazard to employees (inhalation, skin absorption, ingestion, and eye or skin contact), and the performance of the PPE materials (and seams) in providing a barrier to these hazards. The amount of protection provided by PPE is material-hazard specific. That is, protective equipment materials will protect well against some hazardous substances and poorly, or not at all, against others. In many instances, protective equipment materials cannot be found which will provide continuous protection from the particular hazardous substance. In these cases the breakthrough time of the protective material should exceed the work durations.
- (4) Other factors in this selection process to be considered are matching the PPE to the employee's work requirements and task-specific conditions. The durability of PPE materials, such as tear strength and seam strength, must be considered in relation to the employee's tasks. The effects of PPE in relation to heat stress and task duration are a factor in selecting and using PPE. In some cases layers of PPE may be necessary to provide sufficient protection, or to protect expensive PPE inner garments, suits or equipment.
- (5) The more that is known about the hazards at the site, the easier the job of PPE selection becomes. As more information about the hazards and conditions at the site becomes available, the site supervisor can make decisions to up-grade or down-grade the level of PPE protection to match the tasks at hand.
- (6) The following are guidelines which an employer can use to begin the selection of the appropriate PPE. As noted above, the site information may suggest the use of combinations of PPE selected from the different protection levels (i.e., A, B, C, or D) as being more suitable to the hazards of the work. It should be cautioned that the listing below does not fully address the performance of the specific PPE material in relation to the specific hazards at the job site, and that PPE selection, evaluation and reselection is an ongoing process until sufficient information about the hazards and PPE performance is obtained.
- (7) Personal protective equipment has been divided into four categories based on the degree of protection afforded (see subsection (8) of this section for further explanation of Levels A, B, C, and D hazards):
 - (a) Level A. To be selected when the greatest level of skin, respiratory, and eye protection is required. The following constitute Level A equipment; it may be used as appropriate:
 - (i) Positive pressure, full-facepiece 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).
 - (ii) Totally-encapsulating chemical-protective suit.
 - (iii) Coveralls.*
 - (iv) Long underwear.*
 - (v) Gloves, outer, chemical-resistant.
 - (vi) Gloves, inner, chemical-resistant.
 - (vii) Boots, chemical-resistant steel toe and shank.
 - (viii) Hard hat (under suit).*

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- (ix) Disposable protective suit, gloves, and boots. (Depending on suit construction, may be worn over totally-encapsulating suit.)

*Optional, as applicable.

- (b) **Level B.** The highest level of respiratory protection is necessary but a lesser level of skin protection is needed. The following constitute Level B equipment; it may be used as appropriate:

- (i) Positive pressure, full-facepiece self-contained breathing apparatus (SCBA), or positive pressure supplied-air respirator with escape SCBA (NIOSH approved).
- (ii) Hooded chemical-resistant clothing (overalls and long-sleeved jacket, coveralls, one or two-piece chemical-splash suit, disposable chemical-resistant overalls).
- (iii) Coveralls.*
- (iv) Gloves, outer, chemical-resistant.
- (v) Gloves, inner, chemical-resistant.
- (vi) Boots, outer, chemical-resistant steel toe and shank.
- (vii) Boot-covers, outer, chemical-resistant (disposable).*
- (viii) Hard hat.
- (ix) Face shield.*

*Optional, as applicable.

- (c) **Level C.** The concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air purifying respirators are met. The following constitute Level C equipment; it may be used as appropriate.

- (i) Full-face or half-mask, air purifying respirators (NIOSH approved).
- (ii) Hooded chemical-resistant clothing (overalls; two-piece chemical-splash suit; disposable chemical-resistant overalls).
- (iii) Coveralls.*
- (iv) Gloves, outer, chemical-resistant.
- (v) Gloves, inner, chemical-resistant.
- (vi) Boots (outer), chemical-resistant steel toe and shank.*
- (vii) Boot-covers, outer, chemical-resistant (disposable).*
- (viii) Hard hat.
- (ix) Escape mask.*

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- (x) Face shield.*

*Optional, as applicable.

- (d) Level D. - A work uniform affording minimal protection: Used for nuisance contamination only. The following constitute Level D equipment; it may be used as appropriate.

- (i) Coveralls.
- (ii) Gloves.*
- (iii) Boots/shoes, chemical-resistant steel toe and shank.
- (iv) Boots, outer, chemical-resistant (disposable).*
- (v) Safety glasses or chemical splash goggles.*
- (vi) Hard hat.
- (vii) Escape mask.*
- (viii) Face shield.*

*Optional, as applicable.

- (8) Part B. The types of hazards for which Levels A, B, C, and D protection are appropriate are described below:

- (a) Level A - Level A protection should be used when:

- (i) The hazardous substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either the measured (or potential for) high concentration of atmospheric vapors, gases, or particulates; or the site operations and work functions involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through the intact skin;
- (ii) Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible; or
- (iii) Operations are being conducted in confined, poorly ventilated areas, and the absence of conditions requiring Level A have not yet been determined.

- (b) Level B protection should be used when:

- (i) The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection;
- (ii) The atmosphere contains less than 19.5 percent oxygen; or
- (iii) The presence of incompletely identified vapors or gases is indicated by a direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin.

WAC 296-62-3170 (Cont.)

Note: This involves atmospheres with IDLH concentrations of specific substances present severe inhalation hazards and that do not represent a severe skin hazard; or that do not meet the criteria for use of air-purifying respirators.

- (c) Level C protection should be used when:
 - (i) The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin;
 - (ii) The types of air contaminants have been identified, concentrations measured, and an air-purifying respirator is available that can remove the contaminants; and
 - (iii) All criteria for the use of air-purifying respirators are met.

- (d) Level D protection should be used when:
 - (i) The atmosphere contains no known hazard; and
 - (ii) Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

Note: As stated before combinations of personal protective equipment other than those described for Levels A, B, C, and D protection may be more appropriate and may be used to provide the proper level of protection.

- (9) As an aid in selecting suitable chemical protective clothing, it should be noted that the National Fire Protection Association is developing standards on chemical protective clothing. These standards are currently undergoing public review prior to adoption, including:
 - (a) NFPA 1991 - Standard on Vapor-Protective Suits for Hazardous Chemical Emergencies (EPA Level A Protective Clothing);
 - (b) NFPA 1992 - Standard on Liquid Splash-Protective Suits for Hazardous Chemical Emergencies (EPA Level B Protective Clothing);
 - (c) NFPA 1993 - Standard on Liquid Splash-Protective Suits for Nonemergency, Nonflammable Hazardous Chemical Situations (EPA Level B Protective Clothing).
- (10) These standards would apply documentation and performance requirements to the manufacture of chemical protective suits. Chemical protective suits meeting these requirements would be labelled as compliant with the appropriate standard. When these standards are adopted by the National Fire Protection Association, it is recommended that chemical protective suits which meet these standards be used. [Statutory Authority: Chapter 49.17 RCW. 90-20-091 (Order 90-14), §296-62-3170, filed 10/1/90, effective 11/15/90; 89-21-018, §296-62-3170, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3170, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3180, Appendix C—Compliance guidelines.

- (1) Occupational safety and health program. Each hazardous waste site clean-up effort will require an occupational safety and health program headed by the site coordinator or the employer's representative. The purpose of the program will be the protection of employees at the site and will be an extension of the employer's overall safety and health program. The program will need to be developed before work begins on the site and implemented as work proceeds as stated in WAC 296-62-3010. The program is to facilitate coordination and communication of safety and health issues among personnel responsible for the various activities which will take place at the site. It will provide the overall means for planning and implementing the needed safety and health training and job orientation of employees who will be working at the site. The program will provide the means for identifying and controlling worksite hazards and the means for monitoring program effectiveness. The program will need to cover the responsibilities and authority of the site coordinator or the employer's manager on the site for the safety and health of employees at the site, and the relationships with contractors or support services as to what each employer's safety and health responsibilities are for their employees on the site. Each contractor on the site needs to have its own safety and health program so structured that it will smoothly interface with the program of the site coordinator or principal contractor. Also those employers involved with treating, storing, or disposal of hazardous waste as covered in WAC 296-62-3140 must have implemented a safety and health plan for their employees. This program is to include the hazard communication program required in WAC 296-62-3140(1) and the training required in WAC 296-62-3140(4) and (5) as parts of the employers comprehensive overall safety and health program. This program is to be in writing.
 - (a) Each site or workplace safety and health program will need to include the following:
 - (i) Policy statements of the line of authority and accountability for implementing the program, the objectives of the program and the role of the site safety and health officer or manager and staff;
 - (ii) Means or methods for the development of procedures for identifying and controlling workplace hazards at the site;
 - (iii) Means or methods for the development and communication to employees of the various plans, work rules, standard operating procedures and practices that pertain to individual employees and supervisors;
 - (iv) Means for the training of supervisors and employees to develop the needed skills and knowledge to perform their work in a safe and healthful manner;
 - (v) Means to anticipate and prepare for emergency situations; and
 - (vi) Means for obtaining information feedback to aid in evaluating the program and for improving the effectiveness of the program. The management and employees should be trying continually to improve the effectiveness of the program thereby enhancing the protection being afforded those working on the site.
 - (b) Accidents on the site should be investigated to provide information on how such occurrences can be avoided in the future. When injuries or illnesses occur on the site or workplace, they will need to be investigated to determine what needs to be done to prevent this incident from occurring again. Such information will need to be used as feedback on the effectiveness of the program and the information turned into positive steps to prevent any reoccurrence. Receipt of employee suggestions or complaints relating to safety and health issues involved with site or workplace activities is also a feedback mechanism that can be used effectively to improve the program and may serve in part as an evaluative tool(s).

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WAC 296-62-3180 (Cont.)

- (c) For the development and implementation of the program to be the most effective, professional safety and health personnel should be used. Certified safety professionals, board-certified industrial hygienists, or registered professional safety engineers are good examples of professional stature for safety and health managers who will administer the employer's program.
- (2) The training programs for employees subject to the requirements of WAC 296-62-3040 are expected to address: The safety and health hazards employees should expect to find on sites; what control measures or techniques are effective for those hazards; what monitoring procedures are effective in characterizing exposure levels; what makes an effective employer's safety and health program; what a site safety and health plan should include; hands-on training with personal protective equipment and clothing they may be expected to use; the contents of the WISHA standard relevant to the employee's duties and functions; and, employee's responsibilities under WISHA and other regulations. Supervisors will need training in their responsibilities under the safety and health program and its subject areas such as the spill containment program, the personal protective equipment program, the medical surveillance program, the emergency response plan and other areas.
 - (a) The training programs for employees subject to the requirements of WAC 296-62-3140 should address: The employers safety and health program elements impacting employees; the hazard communication program; the medical surveillance program; the hazards and the controls for such hazards that employees need to know for their job duties and functions. All require annual refresher training.
 - (b) The training programs for employees covered by the requirements of WAC 296-62-3110(3) will address those competencies required for the various levels of response such as: The hazards associated with hazardous substances; hazard identification and awareness; notification of appropriate persons; the need for and use of personal protective equipment including respirators; the decontamination procedures to be used; preplanning activities for hazardous substance incidents including the emergency response plan; company standard operating procedures for hazardous substance emergency responses; the use of the incident command system and other subjects. Hands-on training should be stressed whenever possible. Critiques done after an incident which include any evaluation of what worked, and what did not, and how can we do better the next time, may be counted as training time.
 - (c) For hazardous materials specialists (usually members of hazardous materials teams), the training will need to address the care, use and/or testing of chemical protective clothing including totally encapsulating suits, the medical surveillance program, the standard operating procedures for the hazardous materials team including the use of plugging and patching equipment and other subject areas.
 - (d) Officers and leaders who may be expected to be in charge at an incident will need to be fully knowledgeable of their company's incident command system. They will need to know where and how to obtain additional assistance and be familiar with the local district's emergency response plan and the state emergency response plan.
 - (e) Specialist employees such as technical experts, medical experts, or environmental experts that work with hazardous materials in their regular jobs, who may be sent to the incident scene by the shipper, manufacturer or governmental agency to advise and assist the person in charge of the incident will have training on an annual basis. Their training must include the care and use of personal protective equipment including respirators; knowledge of the incident command system and how they are to relate to it; and those areas needed to keep them current in their respective field as it relates to safety and health involving specific hazardous substances.

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- (f) Those skilled support personnel, such as employees who work for public works departments or equipment operators who operate bulldozers, sand trucks, backhoes, etc., who may be called to the incident scene to provide emergency support assistance, will need to have at least a safety and health briefing before entering the area of potential or actual exposure. These specially skilled support personnel, who have not been a part of the emergency plan and do not meet the training requirements, must be made aware of the hazards they face and be provided all necessary protective clothing and equipment required for their tasks.
 - (g) There are two National Fire Protection Association standards, NFPA 472--"Standard for Professional Competence of Responders to Hazardous Material Incidents" and NFPA 471--"Recommended Practice for Responding to Hazardous Material Incidents," which are excellent resource documents to aid fire departments and other emergency response organizations in developing their training program materials. NFPA 472 provides guidance on the skills and knowledge needed for first responder awareness level, first responder operations level, hazmat technicians, and hazmat specialist. It also offers guidance for the officer corp who will be in charge of hazardous substance incidents.
- (3) Decontamination. Decontamination procedures will be tailored to the specific hazards of the site and will vary in complexity, and number of steps, depending on the level of hazard and the employee's exposure to the hazard. Decontamination procedures and PPE decontamination methods will vary depending upon the specific substance, since one procedure or method will not work for all substances. Evaluation of decontamination methods and procedures should be performed, as necessary, to assure that employees are not exposed to hazards by reusing PPE. References in WAC 296-62-3190, Appendix D, may be used for guidance in establishing an effective decontamination program. In addition, the United States Coast Guard Manual, "Policy Guidance for Response to Hazardous Chemical Releases," United States Department of Transportation, Washington D.C. (COMDTINST M16465.30), is a good reference for establishing an effective decontamination program.
- (4) Emergency response plans. States, along with designated districts within the states, will be developing or have developed emergency response plans. These state and district plans are to be utilized in the emergency response plans called for in this standard. Each employer needs to assure that its emergency response plan is compatible with the local plan. The major reference being used to aid in developing the state and local district plans is the Hazardous Materials Emergency Planning Guide, NRT-1. The current Emergency Response Guidebook from the United States Department of Transportation, CMA's CHEMTREC and the Fire Service Emergency Management Handbook may also be used as resources.
- Employers involved with treatment, storage, and disposal facilities for hazardous waste, which have the required contingency plan called for by their permit, would not need to duplicate the same planning elements. Those items of the emergency response plan that are properly addressed in the contingency plan may be substituted into the emergency response plan required in WAC 296-62-3112 or otherwise kept together for employer and employee use.
- (5) Personal protective equipment programs. The purpose of personal protective clothing and equipment (PPE) is to shield or isolate individuals from the chemical, physical, and biologic hazards that may be encountered at a hazardous substance site.
- (a) As discussed in Appendix B, no single combination of protective equipment and clothing is capable of protecting against all hazards. Thus PPE should be used in conjunction with other protective methods and its effectiveness evaluated periodically.

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- (b) The use of PPE can itself create significant worker hazards, such as heat stress, physical and psychological stress, and impaired vision, mobility, and communication. For any given situation, equipment and clothing will be selected that provide an adequate level of protection. However, over-protection, as well as under-protection, can be hazardous and should be avoided where possible.
 - (c) Two basic objectives of any PPE program will be to protect the wearer from safety and health hazards, and to prevent injury to the wearer from incorrect use and/or malfunction the PPE. To accomplish these goals, a comprehensive PPE program will include hazard identification, medical monitoring, environmental surveillance, selection, use, maintenance, and decontamination of PPE and its associated training.
 - (d) The written PPE program will include policy statements, procedures, and guidelines. Copies will be made available to all employees and a reference copy will be made available at the worksite. Technical data on equipment, maintenance manuals, relevant regulations, and other essential information will also be collected and maintained.
- (6) Incident command system (ICS): WAC 296-62-3112 (3)(b) requires the implementation of the ICS. The ICS is an organized approach to effectively control and manage operations at an emergency incident. The individual in charge of the ICS is the senior official responding to the incident. The ICS is not much different than the "command post" approach used for many years by the fire service. During large complex fires involving several companies and many pieces of apparatus, a command post would be established. This enables one individual to be in charge of managing the incident, rather than having several officers from different companies making separate, and sometimes conflicting, decisions. The individual in charge of the command post would delegate responsibility for performing various tasks to subordinate officers. Additionally, all communications were routed through the command post to reduce the number of radio transmissions and eliminate confusion. However, strategy, tactics, and all decisions were made by one individual.
- (a) The ICS is a very similar system, except it is implemented for emergency response to all incidents, both large and small, that involve hazardous substances.
 - (b) For a small incident, the individual in charge of the ICS may perform many tasks of the ICS. There may not be any, or little, delegation of tasks to subordinates. For example, in response to a small incident, the individual in charge of the ICS, in addition to normal command activities, may become the safety officer and may designate only one employee (with proper equipment) as a back-up to provide assistance if needed. WISHA does recommend, however, that at least two employees be designated as back-up personnel since the assistance needed may include rescue.
 - (c) To illustrate the operation of the ICS, the following scenario might develop during a small incident, such as an overturned tank truck with a small leak of flammable liquid.
 - (d) The first responding senior officer would implement and take command of the ICS. That person would size-up the incident and determine if additional personnel and apparatus were necessary; would determine what actions to take to control the leak; and, determine the proper level of personal protective equipment. If additional assistance is not needed, the individual in charge of the ICS would implement actions to stop and control the leak using the fewest number of personnel that can effectively accomplish the tasks. The individual in charge of the ICS then would designate him or herself as the safety officer and two other employees as a back-up in case rescue may become necessary. In this scenario, decontamination procedures would not be necessary.

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- (e) A large complex incident may require many employees and difficult, time-consuming efforts to control. In these situations, the individual in charge of the ICS will want to delegate different tasks to subordinates in order to maintain a span of control that will keep the number of subordinates, that are reporting, to a manageable level.
 - (f) Delegation of tasks at large incidents may be by location, where the incident scene is divided into sectors, and subordinate officers coordinate activities within the sector that they have been assigned.
 - (g) Delegation of tasks can also be by function. Some of the functions that the individual in charge of the ICS may want to delegate at a large incident are: Medical services; evacuation; water supply; resources (equipment, apparatus); media relations; safety; and, site control (integrate activities with police for crowd and traffic control). Also for a large incident, the individual in charge of the ICS will designate several employees as back-up personnel; and a number of safety officers to monitor conditions and recommend safety precautions.
 - (h) Therefore, no matter what size or complexity an incident may be, by implementing an ICS there will be one individual in charge who makes the decisions and gives directions; and, all actions and communications are coordinated through one central point of command. Such a system should reduce confusion, improve safety, organize and coordinate actions, and should facilitate effective management of the incident.
- (7) Site safety and control plans.
- (a) The safety and security of response personnel and others in the area of an emergency response incident site should be of primary concern to the incident commander. The use of a site safety and control plan could greatly assist those in charge of assuring the safety and health of employees on the site.
 - (b) A comprehensive site safety and control plan should include the following: Summary analysis of hazards on the site and a risk analysis of those hazards; site map or sketch; site work zones (clean zone, transition or decontamination zone, work or hot zone); use of the buddy system; site communications; command post or command center; standard operating procedures and safe work practices; medical assistance and triage area; hazard monitoring plan (air contaminant monitoring, etc.); decontamination procedures and area; and other relevant areas. This plan should be a part of the employer's emergency response plan or an extension of it to the specific site.
- (8) Medical surveillance programs.
- (a) Workers handling hazardous substances may be exposed to toxic chemicals, safety hazards, biologic hazards, and radiation. Therefore, a medical surveillance program is essential to assess and monitor workers' health and fitness for employment in hazardous waste operations and during the course of work; to provide emergency and other treatment as needed; and to keep accurate records for future reference.
 - (b) The Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities developed by the National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA), the United States Coast Guard (USCG), and the Environmental Protection Agency (EPA); October 1985 provides an excellent example of the types of medical testing that should be done as part of a medical surveillance program.

WAC 296-62-3180 (Cont.)

- (9) New technology and spill containment programs. Where hazardous substances may be released by spilling from a container that will expose employees to the hazards of the materials, the employer will need to implement a program to contain and control the spilled material. Diking and ditching, as well as use of absorbents like diatomaceous earth, are traditional techniques which have proven to be effective over the years. However, in recent years new products have come into the marketplace, the use of which complement and increase the effectiveness of these traditional methods. These new products also provide emergency responders and others with additional tools or agents to use to reduce the hazards of spilled materials.

These agents can be rapidly applied over a large area and can be uniformly applied or otherwise can be used to build a small dam, thus improving the workers' ability to control spilled material. These application techniques enhance the intimate contact between the agent and the spilled material allowing for the quickest effect by the agent or quickest control of the spilled material. Agents are available to solidify liquid spilled materials, to suppress vapor generation from spilled materials, and to do both. Some special agents, which when applied as recommended by the manufacturer, will react in a controlled manner with the spilled material to neutralize acids or caustics, or greatly reduce the level of hazard of the spilled material.

There are several modern methods and devices for use by emergency response personnel or others involved with spill control efforts to safely apply spill control agents to control spilled material hazards. These include portable pressurized applicators similar to hand-held portable fire extinguishing devices, and nozzle and hose systems similar to portable fire fighting foam systems which allow the operator to apply the agent without having to come into contact with the spilled material. The operator is able to apply the agent to the spilled material from a remote position.

The solidification of liquids provides for rapid containment and isolation of hazardous substance spills. By directing the agent at run-off points or at the edges of the spill, the reactant solid will automatically create a barrier to slow or stop the spread of the material. Clean-up of hazardous substances is greatly improved when solidifying agents, acid or caustic neutralizers, or activated carbon absorbents are used. Properly applied, these agents can totally solidify liquid hazardous substances or neutralize or absorb them, which results in materials which are less hazardous and easier to handle, transport, and dispose of. The concept of spill treatment, to create less hazardous substances, will improve the safety and level of protection of employees working at spill clean-up operations or emergency response operations to spills of hazardous substances.

The use of vapor suppression agents for volatile hazardous substances, such as flammable liquids and those substances which present an inhalation hazard, is important for protecting workers. The rapid and uniform distribution of the agent over the surface of the spilled material can provide quick vapor knockdown. There are temporary and long-term foam-type agents which are effective on vapors and dusts, and activated carbon adsorption agents which are effective for vapor control and soaking-up of the liquid. The proper use of hose lines or hand-held portable pressurized applicators provides good mobility and permits the worker to deliver the agent from a safe distance without having to step into the untreated spilled material. Some of these systems can be recharged in the field to provide coverage of larger spill areas than the design limits of a single charged applicator unit. Some of the more effective agents can solidify the liquid flammable hazardous substances and at the same time elevate the flashpoint above 140 deg. F so the resulting substance may be handled as a nonhazardous waste material if it meets the United States Environmental Protection Agency's 40 CFR part 261 requirements (see particularly Sec. 261.21).

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All workers performing hazardous substance spill control work are expected to wear the proper protective clothing and equipment for the materials present and to follow the employer's established standard operating procedures for spill control. All involved workers need to be trained in the established operating procedures; in the use and care of spill control equipment; and in the associated hazards and control of such hazards of spill containment work.

These new tools and agents are the things that employers will want to evaluate as part of their new technology program. The treatment of spills of hazardous substances or wastes at an emergency incident as part of the immediate spill containment and control efforts is sometimes acceptable to EPA and a permit exception is described in 40 CFR 264.1(g)(8) and 265.1(c)(11). [Statutory Authority: Chapter 49.17 RCW. 90-20-091 (Order 90-14), §296-62-3180, filed 10/1/90, effective 11/15/90; 89-21-018 (Order 89-10), §296-62-3180, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3180, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3190, Appendix D—References.

The following references may be consulted for further information on the subject of this notice:

- (1) OSHA Instruction DFO CPL 2.70 - January 29, 1986, Special Emphasis Program: Hazardous Waste Sites.
- (2) OSHA Instruction DFO CPL 2-2.37A - January 29, 1986, Technical Assistance and Guidelines for Superfund and Other Hazardous Waste Site Activities.
- (3) OSHA Instruction DTS CPL 2.74 - January 29, 1986, Hazardous Waste Activity Form, OSHA 175.
- (4) Hazardous Waste Inspections Reference Manual, U.S. Department of Labor, Occupational Safety and Health Administration, 1986.
- (5) Memorandum of Understanding Among the National Institute for Occupational Safety and Health, the Occupational Safety and Health Administration, the United States Coast Guard, and the United States Environmental Protection Agency; Guidance for Worker Protection During Hazardous Waste Site Investigations and Clean-up and Hazardous Substance Emergencies; December 18, 1980.
- (6) National Priorities List, 1st Edition, October 1984; U.S. Environmental Protection Agency, Revised periodically.
- (7) The Decontamination of Response Personnel, Field Standard Operating Procedures (F.S.O.P.) 7; U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Hazardous Response Support Division, December 1984.
- (8) Preparation of a Site Safety Plan, Field Standard Operating Procedures (F.S.O.P.) 9; U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Hazardous Response Support Division, April 1985.
- (9) Standard Operating Safety Guidelines; U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Hazardous Response Support Division, Environmental Response Team; November 1984.
- (10) Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, National Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA), U.S. Coast Guard (USCG), and Environmental Protection Agency (EPA); October 1985.

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- (11) Protecting Health and Safety at Hazardous Waste Sites: An Overview, U.S. Environmental Protection Agency, EPA/625/9-85/006; September 1985.
- (12) Hazardous Waste Sites and Hazardous Substance Emergencies, NIOSH Worker Bulletin, U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health; December 1982.
- (13) Personal Protective Equipment for Hazardous Materials Incidents: A Selection Guide; U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health; October 1984.
- (14) Fire Service Emergency Management Handbook, International Association of Fire Chiefs Foundation, 101 East Holly Avenue, Unit 10B, Sterling, VA 22170, January 1985.
- (15) Emergency Response Guidebook, U.S. Department of Transportation, Washington, D.C., 1987.
- (16) Report to the Congress on Hazardous Materials Training, Planning and Preparedness, Federal Emergency Management Agency, Washington, D.C., July 1986.
- (17) Workbook for Fire Command, Alan V. Brunacini and J. David Beageron, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269, 1985.
- (18) Fire Command, Alan V. Brunacini, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269, 1985.
- (19) Incident Command System, Fire Protection Publications, Oklahoma State University, Stillwater, OK 74078, 1983.
- (20) Site Emergency Response Planning, Chemical Manufacturers Association, Washington, D.C. 20037, 1986.
- (21) Hazardous Materials Emergency Planning Guide, NRT-1, Environmental Protection Agency, Washington D.C., March 1987.
- (22) Community Teamwork: Working Together to Promote Hazardous Materials Transportation Safety. U.S. Department of Transportation, Washington, D.C., May 1983.
- (23) Disaster Planning Guide for Business and Industry, Federal Emergency Management Agency, Publication No. FEMA 141, August 1987. [Statutory Authority: Chapter 49.17 RCW. 90-20-091 (Order 90-14), §296-62-3190, filed 10/1/90, effective 11/15/90; 89-21-018 (Order 89-10), §296-62-3190, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), §296-62-3190, filed 10/6/88, effective 11/7/88.]

Federal Register

**Monday
March 6, 1989**

Part III

Department of Labor

**Occupational Safety and Health
Administration**

29 CFR Part 1910

**Hazardous Waste Operations and
Emergency Response; Final Rule**

DEPARTMENT OF LABOR^{*}

Occupational Safety and Health Administration

29 CFR Part 1910

[Docket No. S-760A]

Hazardous Waste Operations and Emergency Response

AGENCY: Occupational Safety and Health Administration; Labor.

ACTION: Final rule.

SUMMARY: The Occupational Safety and Health Administration (OSHA) is amending the OSHA standard for hazardous waste operations and emergency response found in 29 CFR 1910.120. This final rule will replace the existing interim final rule required by Congress in the Superfund Amendments and Reauthorization Act of 1986 (as amended) (SARA) (Pub. L. 99-499, 29 U.S.C. 655 note). When this final rule becomes effective one year from today, the interim final rule promulgated December 19, 1986 (51 FR 45654) will be revoked. The interim final rule remains in effect until then. The Notice of Proposed Rulemaking for this final rule was published in the Federal Register on August 10, 1987 (52 FR 29620).

This rule will regulate the safety and health of employees involved in clean-up operations at uncontrolled hazardous waste sites being cleaned-up under government mandate, in certain hazardous waste treatment, storage, and disposal (TSD) operations conducted under the Resource Conservation and Recovery Act of 1976 as amended (RCRA) (42 U.S.C. 6901 *et seq.*), and in any emergency response to incidents involving hazardous substances.

This standard provides for employee protection during initial site characterization and analysis, monitoring activities, materials handling activities, training, and emergency response.

DATES: This final rule will become effective March 6, 1990.

Paperwork authorization has been granted by the Office of Management and Budget (OMB) under control number 1218-0138.

ADDRESS: In compliance with 28 U.S.C. 2112(a), the Agency designates for receipt of petitions for review of the standard, the Associate Solicitor for Occupational Safety and Health, Office of the Solicitor, Room S-4004, U.S. Department of Labor, 200 Constitution Avenue NW., Washington, DC 20210.

FOR FURTHER INFORMATION CONTACT: Mr. James F. Foster, U.S. Department of

Labor, Occupational Safety and Health Administration, Division of Consumer Affairs, Room N-3647, 200 Constitution Avenue NW., Washington, DC 20210, 202-523-3151.

SUPPLEMENTARY INFORMATION

I. Background

The U.S. Environmental Protection Agency estimates that approximately 57 million metric tons of hazardous waste are produced each year in the United States.¹ These wastes must be treated and stored or disposed in a manner that protects the environment from the adverse effects of the various constituents of those wastes.

In response to the need to protect the environment from the improper disposal of these hazardous wastes, Congress, over the years, has enacted several pieces of legislation intended to control the nation's hazardous waste problem. Federal laws passed in 1965² and 1970³ initially addressed solid waste disposal. Several other pieces of legislation have been enacted by Congress that have ultimately led to the development of this rule and they are discussed below.

A. The Resource Conservation and Recovery Act of 1976

The first comprehensive federal effort to deal with the solid waste problem in general and hazardous waste specifically, came with the passage of the Resource Conservation and Recovery Act of 1976 (RCRA)⁴. The act provides for the development of federal and state programs for otherwise unregulated land disposal of waste materials and for the development of resource recovery programs. It regulates anyone engaged in the creation, transportation, treatment, and disposal of "hazardous wastes." It also regulates facilities for the disposal of all solid wastes and prohibits the use of open dumps for solid wastes in favor of requiring sanitary landfills.

There are, however, many hazardous waste disposal sites that were created prior to the passage of RCRA. These sites are often abandoned and contain unknown quantities of unknown wastes.

B. The Comprehensive Environmental Response, Compensation and Liability Act of 1980

In response to the need to clean-up and properly reclaim these pre-RCRA

sites, Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)⁵ commonly known as "Superfund." Superfund established two related funds to be used for the immediate removal of hazardous substances released into the environment. Superfund is intended to establish a mechanism of response for the immediate clean-up of hazardous waste contamination from accidental spills and from chronic environmental damage such as is associated with abandoned hazardous waste disposal sites.

The treatment and disposal of hazardous wastes under RCRA and CERCLA creates a significant risk to the safety and health of employees who work in treatment and disposal operations. Exposure to hazardous wastes through skin contact, skin absorption, and inhalation pose the most significant risks to employees. Employee exposure to these risks occurs when employees respond to hazardous substance or waste emergencies, when they work with hazardous wastes during storage, treatment and disposal operations or when they participate in the clean-up of abandoned-waste sites.

This risk of exposure and the need protecting employees exposed to hazardous wastes is addressed in the "Superfund Amendments and Reauthorization Act of 1986" (SARA).

C. Superfund Amendments and Reauthorization Act of 1986

On October 17, 1986, the President signed into law the "Superfund Amendments and Reauthorization Act of 1986" (SARA).⁶ As part of SARA, in section 126 of Title I Congress addressed the risk of injury to employees by providing that the Secretary of Labor ("Secretary") issue interim final worker protection regulations within 60 days after the date of enactment of SARA that would provide no less protection for workers engaged in hazardous waste operations than the protections contained in the U.S. Environmental Protection Agency's (EPA) "Health and Safety Requirements for Employees Engaged in Field Activities" manual (EPA Order 1440.2) dated 1981, and the existing OSHA standards under Subpart C of 29 CFR Part 1926. OSHA published those interim final regulations in the Federal Register on December 19, 1986 (51 FR 45654). A correction notice was published on May 4, 1987 (52 FR 18241).

¹ U.S. Environmental Protection Agency, *Everybody's Problem Hazardous Waste* at 1 (1988).

² Solid Waste Disposal Act, Pub. L. No. 88-572, 78 Stat. 88.

³ Resource Recovery Act, Pub. L. No. 91-612, 84 Stat. 1427 and Pub. L. 90-14, 67 Stat. 2.

⁴ 42 U.S.C. 6901 *et seq.*

⁵ 42 U.S.C. 9601 *et seq.*

⁶ Pub. L. 99-499.

With the exception of a few provisions that had delayed start-up dates, OSHA's interim final regulations became effective on December 19, 1986 in accordance with section 128(e) of SARA, and apply to all regulated workplaces until the final rule developed under sections 128 (a)-(d) becomes effective.

Section 128(a) of SARA provides that the Secretary shall . . . pursuant to section 6 of the Occupational Safety and Health Act of 1970, promulgate standards for the health and safety of employees engaged in hazardous waste operations." These standards must be promulgated within one year after the date of enactment of SARA. This notice completes the development of those standards by issuing a final rule based upon the proposed regulations as indicated in sections 128(a) and 128(b) of SARA.

Pursuant to section 128(c) of SARA, the final regulations issued today are to take effect in one year. Section 128(c) also provides that the final regulations are to include each of the worker protection provisions listed in section 128(b), unless the Secretary determines that the evidence in the public record developed during this rulemaking and considered as a whole does not support inclusion of any such provision. A discussion of the public record for this rulemaking and the changes made to the proposed regulations issued August 10, 1987 follows.

This final rule has been adapted from the language of the proposed rule. Changes have been made to address more fully the provisions which Congress directed the Agency to cover and the comments made in the public record. OSHA utilized several sources for the proposal. These included the EPA manual entitled "Health and Safety Requirements for Employees Engaged in Field Activities" (1981), the language of OSHA's safety and health standards in Subpart C of 29 CFR Part 1926 and various documents issued either jointly or separately by the EPA, OSHA, the U.S. Coast Guard, and the National Institute for Occupational Safety and Health (NIOSH).

OSHA specifically used the joint OSHA/EPA/USCG/NIOSH manual entitled, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities" (Preamble Reference 6), as an outline in preparing the interim rule and the proposed rule. This manual was developed as a result of the collaborative efforts of professionals representing the four agencies. These professionals, who are knowledgeable in hazardous waste operations, worked with over 100

experts and organizations in the development of the criteria contained in this manual. The manual was published in October 1985 and is public information. The manual is a guidance document for managers responsible for occupational safety and health programs at inactive hazardous waste sites. The manual is intended for use by government officials at all levels and contractors involved in hazardous waste operations. The manual provides general guidance and is intended to be used as a preliminary basis for developing a specific health and safety program for hazardous waste operations. Further, the major subject areas listed in section 128(b) of SARA are nearly identical to the major chapters in the manual.

Based upon the extensive public comments and hearing testimony, OSHA has modified the proposal. The final rule takes into account the entire record. In addition, the language of this final rule clarifies some areas of confusion in the interim rule that OSHA has identified during the public comment period and since the promulgation of the interim final rule. The final rule also reorganizes some of the sections to clarify the standard.

D. Regulatory History

The Superfund Amendments and Reauthorization Act of 1986 (SARA) gave the Secretary of Labor 90 days to issue interim final regulations which would provide no less protection for workers employed by contractors and emergency response workers than the protections contained in the Environmental Protection Agency Manual (1981) "Health and Safety Requirements for Employees Engaged in Field Activities" and existing standards under the Occupational Safety and Health Act of 1970 found in Subpart C of Part 1926 of the Code of Federal Regulations. Those interim final regulations were to take effect upon issuance and would apply until final regulations became effective (SARA, § 128(a)). OSHA issued its interim final regulations on December 19, 1986 (51 FR 45654).

SARA also instructed the Secretary of Labor to promulgate, within one year after the date of the enactment of section 128 of SARA and pursuant to section 6 of the Occupational Safety and Health Act of 1970, standards for the health and safety protection of employees engaged in hazardous waste operations (SARA, section 128(a)). On August 10, 1987 OSHA issued a Notice of Proposed Rulemaking and Public Hearings (52 FR 29620). That Notice set forth OSHA's proposed language for its

final rule and announced public hearings that would be held to gather further information to aid the agency in developing its permanent final rule.

Informal public hearings on the subject of this rulemaking were scheduled and held to afford interested parties the opportunity to comment on OSHA's proposals. The hearings were held October 13-16 and 20-21, 1987 in Washington, DC and October 27-28, 1987 in Seattle, Washington. The hearings originally scheduled for San Francisco, CA in the August 10, 1987 Notice of Proposed Rulemaking were rescheduled for Seattle, WA in an October 13, 1987 announcement (52 FR 37973).

Testimony from over 40 witnesses was presented at the hearings. Further, over 30 post hearing comments were submitted to the record of this rulemaking. In addition to the public hearings and the testimony received in response to those hearings, OSHA received over 123 written comments on its proposed language for a final rule.

II. Summary and Explanation of the Standard

Paragraph (a)—Scope, Application, and Definitions

1. *Scope.* OSHA proposed to define the scope of this final rule in paragraphs (a)(1) and (a)(2). "Scope" defines the specific worker populations to be covered by this rule.

The scope of this rulemaking has been an issue during the development and promulgation of the final rule. OSHA requested specific comment on whether the proposed rule was appropriate.

Eastman Kodak's comment (10-36) states, "The preamble of the proposed standard at page 29622 requested 'specific comment on whether [OSHA's] interpretation of scope is too broad or too narrow.' The scope of applicability of the standard, especially with regard to ongoing operations at hazardous waste management facilities regulated under RCRA and/or corresponding state programs, appears to be appropriate."

While the language of the final rule is somewhat different from the language of the proposed rule, the four major areas of scope remain essentially the same. These four areas of scope include (1) clean-up operations at uncontrolled hazardous waste disposal sites that have been identified for clean-up by a governmental health or environmental agency, (2) routine operations at hazardous waste treatment, storage and disposal facilities or those portions of any facility regulated by 40 CFR Parts 264 and 265, (3) emergency response

operations at sites where hazardous substances have been or may be released, and (4) corrective actions at RCRA sites. In addition OSHA has clarified that the agency intends to cover voluntary clean-ups at government identified sites.

OSHA's proposal addressed the three specific populations of workers at the above operations. First, it was proposed to regulate those operations where employees are engaged in the clean-up of uncontrolled hazardous waste sites. These operations include those hazardous substance response operations under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended (CERCLA), including initial investigations at CERCLA sites before the presence or absence of hazardous substances has been ascertained; those major corrective actions taken in clean-up operations under the Resource Conservation and Recovery Act of 1976 as amended (RCRA), and those hazardous waste operations at sites that have been designated for clean-up by state or local governmental authorities.

The second worker population proposed to be covered included those employees engaged in operations involving hazardous waste treatment, storage, and disposal (TSD) facilities regulated under 40 CFR Parts 264 and 265 pursuant to RCRA, except for small quantity generators and those employers with less than 90 days accumulation of hazardous wastes as defined in 40 CFR 262.34.

The third and final worker population proposed to be covered were those employees engaged in emergency response operations for releases or substantial threats of releases of hazardous substances, and post-emergency response operations in such releases at all workplaces.

In paragraph (a)(1)(i) of the final rule OSHA is regulating all government mandated clean-up operations at uncontrolled hazardous waste disposal sites. These operations were included in paragraphs (a)(1)(i) and (a)(1)(iii) of the proposal. For the purposes of this final rule, "Superfund" and other uncontrolled hazardous waste disposal sites include hazardous substance response operations at sites regulated under 40 CFR Part 300, Subpart F; RCRA closure activities conducted under 40 CFR Part 265, Subpart G; and those similar uncontrolled hazardous waste disposal sites that have been designated for clean-up by Federal, state or local governments.

OSHA intends and the change in language clarifies that all government mandated clean-ups are covered. These

include not only sites on the various "Superfund" lists, but also all other government mandated clean-ups as well. The changed language makes clear that such clean-ups are covered whether or not they are financed by the government. The language further clarifies that clean-ups mandated by any level of government are covered.

In paragraph (a)(1)(ii) of the final rule, OSHA is regulating corrective actions at RCRA facilities. This paragraph adopts the language proposed in paragraph (a)(1)(ii) of the proposal with one change. The term "major" has been deleted as a modifier of "corrective action." Several commenters requested clarification of the term "major corrective action." International Technologies, a major hazardous waste clean-up contractor, requested in their comment (10-44), "Please clarify 'major corrective actions conducted under RCRA.' What distinguishes 'major' corrective actions from other corrective actions?" The State of Indiana commented (10-23), "There is no definition of what constitutes a 'major corrective action' under RCRA." In addition, the term "major" is not used in EPA terminology.

"Corrective action" is a term unique to RCRA and has been defined for use with RCRA. OSHA's addition of the modifier "major" raised many definitional questions. Therefore OSHA, in the final rule, is deleting the word "major" to be consistent with EPA terminology and eliminate confusion. Rather than define "major corrective action," OSHA is amending the language of the proposal to include a phrase describing the level of corrective action that is to be regulated in the scope of this rule. OSHA will be regulating those corrective actions that potentially expose employees to a "safety or health hazard." OSHA is not concerned with those corrective actions that are intended to abate environmental risks without exposing employees to safety or health hazards. The phrase "safety or health hazard" in the introductory language is the phrase that OSHA has used to differentiate the type of releases that this standard regulates versus those releases that may pose only environmental threats rather than safety or health threats to employees.

OSHA has decided to add a new paragraph (a)(1)(iii) to the final rule that would include within the scope of this rule those voluntary clean-up operations conducted at sites recognized by governmental bodies as uncontrolled hazardous waste disposal sites. All other voluntary clean-ups would be exempt from 29 CFR 1910.120. OSHA

does not have the statutory responsibility to identify hazardous waste sites. It will leave to agencies with that authority the responsibility to identify those sites. Those voluntary sites that are not recognized by the government as uncontrolled hazardous waste disposal sites would be exempt from 29 CFR 1910.120; however, they would still be regulated by the other OSHA general industry or construction industry standards applicable to the work being performed at the site.

OSHA did not propose to cover voluntary clean-ups of hazardous substances in its proposed rule. Many comments suggested this, however, the Agency has concluded that individuals involved in voluntary clean-ups may be exposed to the same safety and health risks at voluntary sites identified by the government whether or not the government is compelling action. However, it would be difficult to know whether or not sites not identified by the government are hazardous waste sites without a structured evaluation system for such potential sites.

OSHA raised an issue on the scope in the preamble to the proposal that generated several comments. On page 2822 of the preamble to the proposal OSHA listed several TSD facilities that would not be covered by the final rule. The exemptions were taken from a list published by the U.S. EPA that are not directly regulated by U.S. EPA. However, the proposed standard's language did not grant these exemptions. Comments did not support the exemptions and OSHA did not believe that they were appropriate.

The particular exemption that generated the most comment exempted those TSD facilities which operate under a state hazardous waste program pursuant to RCRA section 3006. These state hazardous waste programs are recognized by U.S. EPA in a similar fashion to the OSHA state plan states under section 18 of the OSH Act. A number of commenters, such as the State of Indiana (10-23), objected to this type of exemption by OSHA as not being appropriate. They stated OSHA jurisdiction should not be impacted by U.S. EPA state agreements, but only those state agreements provided in the OSH Act. OSHA agrees with these commenters and therefore OSHA jurisdiction will be delegated to only those states which OSHA has formal agreements with under the OSH Act. However, it should be noted that the U.S. EPA jurisdictions under SARA section 129 may make use of their state agreements.

Other commenters, EXXON[®] (10-33) and CONOCO (10-32), suggested that OSHA incorporate the exemptions on page 29622 as a separate paragraph in the final rule.

Typical TSD facilities range from the hazardous waste generator with a hazardous waste storage area to the large, complex hazardous waste disposal facility. EPA estimates that approximately 80 percent of all generators also treat, store, or dispose of their hazardous wastes and thereby qualify as a TSD facility. Over 30,000 TSD facilities notified EPA in 1980 that they would qualify for regulation under section 3004 of RCRA.

OSHA continues to regulate RCRA TSD facilities in paragraph (a)(1)(iv) of the final rule as it was proposed in the regulatory language of the proposal. The list of exemptions on page 29622 will not be incorporated into the final rule. OSHA believes that such a list would create too great a gap in the protection of workers. For example, with respect to workers at TSD facilities operating under a state hazardous waste program pursuant to RCRA section 3006, OSHA agrees with a comment made by the State of Indiana (10-23) that it is possible that the workers in those 42 authorized states identified by Indiana could be without the protections mandated by Congress.

In paragraph (a)(1)(v) OSHA would continue to regulate emergency response operations for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the operation as proposed in paragraph (a)(2) of the proposal. Such emergency response operations are not limited to those responses at uncontrolled hazardous waste disposal sites or RCRA TSD facilities. With respect to transportation incidents, responders to the scene are covered but operators (i.e., truck drivers and train crews) are not covered unless they become actively involved in the response action.

OSHA is making major revisions to proposed paragraph (1). These revisions have been made in response to comments concerning OSHA's involvement in regulating emergency response at every site involving hazardous substance release or potential release. Some of the comments were in favor of OSHA's continued involvement with emergency response (i.e., American Chemical Society, 10-44) and others were opposed to continued involvement (i.e., ECOLAB, 10-64). Others supported OSHA involvement in emergency response activities at uncontrolled hazardous waste sites and certain RCRA facilities but opposed the

agency's involvement with non-waste clean-up or non-RCRA facilities (i.e., The Chlorine Institute, 10-24). Yet others called for two separate areas in the rule: one for hazardous waste operations, and one for emergency response (i.e., Allied Signal, 10-38). Others opposed coverage of emergency response to petroleum spills (CONOCO, Ex. 10-32).

OSHA after reviewing all the comments, continues to believe that it is the clear intent of Congress that any employees participating in an emergency response to the release or potential for release of hazardous substance be covered by this rulemaking. This Congressional intent applies to all such emergency responses including those both off and on hazardous waste sites.

The statutory language indicates that all emergency responses where the threat of hazardous substance spills exist are to be covered.

Section 128(b)(11) of SARA specifically provides that "requirements for emergency response" are to be included and is not limited to hazardous waste sites.

In addition, section 128(d)(4) states:

Training of Emergency Response Personnel.—Such training standards shall set forth requirements for the training of workers who are responsible for responding to hazardous emergency situations who may be exposed to toxic substances in carrying out their responsibilities. (emphasis added)

This is very broad language that is not limited to hazardous waste operations or hazardous wastes or substances on CERCLA or RCRA sites. It covers all "hazardous emergency situations" for all "toxic substances" which would clearly cover all types of emergency response for chemical spills including chemical tanker spills and the like. It should also be noted that once a tank truck spills a toxic chemical in an emergency it creates a hazardous waste in the very real sense.

Further, the grant provision of the statute clearly indicates that grants can be made to train workers for emergency response at any location, not just on hazardous waste sites.

Section 128(g)(1) states:

Grant Purposes.—Grants for the training and education of workers who are or may be engaged in activities related to hazardous waste removal or containment or emergency response may be under this section. (emphasis added)

Other statutory sections also indicate the legislative intent to cover all emergency responses where hazardous chemical spills are possible.

In addition to the statutory language, the documents cited by Congress as the

minimum guides for OSHA to use in developing this rule refer to all emergency responses. The EPA manual and the OSHA construction standards referred to in the statute require preparations and planning for emergencies generally, not just for hazardous waste site emergencies.

In addition the legislative history indicates that Congress intended Section 128 to cover emergency response to all situations where spills of hazardous chemicals were a possibility and not just emergency response on hazardous waste sites. For example, Senator Hatch stated:

This amendment will address the concerns that have been raised that the Department of Labor issue standards for employees engaged in hazardous waste operations, as well as emergency response. (9/24/88 Cong. Rec. pg. S-12031)

As discussed elsewhere in this preamble OSHA believes there is a clear need for training and other provisions to protect workers engaged in all emergency responses when there is the possibility of hazardous substance spills. This is needed whether or not the emergency occurs on a hazardous waste site. The agency believes that the hazards are the same in these cases.

Finally, other parts of SARA, in particular Title III, address emergency response actions and planning by communities and local government employers outside of the hazardous waste clean-up operation. The Congressional concerns on toxic emergencies also discussed in *Task Force on Toxic Emergencies*, Environmental and Energy Study Conference Special Report, September 18, 1986. This report stresses the need for training of emergency response personnel as well as emergency response planning and related areas. This was part of the legislative research which led to the passage of section 128 of SARA.

OSHA's final rule rulemaking divides emergency response into three separate areas. First, OSHA is regulating emergency response by employees at uncontrolled hazardous waste sites in paragraph (1) of the final rule. This paragraph contains the requirements that were in paragraphs (1)(1) and (1)(2) of the proposal and the interim rule. These regulations applied to the "on-site" operations of the interim rule. Second, OSHA is regulating emergency response at RCRA facilities in paragraph (p)(8). This paragraph contains the requirements that were in paragraphs (1)(1) and (1)(3) of the proposal and interim rule. These regulations applied to the "off-site"

operations of the interim rule. Third, OSHA is regulating emergency response to hazardous substance releases by employees not covered by paragraphs (l) and (p)(6) in paragraph (q). Paragraph (q) contains the requirements proposed in paragraphs (l)(1), (l)(3), (l)(4), and (l)(5) of the proposal and interim rule. These regulations were directed toward emergency response teams, industrial fire brigades, and hazardous materials teams.

In its proposal OSHA covered emergency response to releases of hazardous substances. The agency did not propose to limit emergency response to uncontrolled hazardous waste sites but decided instead to propose to cover all emergency response whether it was done at uncontrolled hazardous waste sites or anywhere else, including petrochemical and similar manufacturing facilities.

OSHA's decision to propose coverage of all emergency response was based upon the high risk associated with emergency response by untrained and unprotected employees and the need for proper training and equipment to be provided for emergency response to hazardous substance releases. In testimony during the public hearings on this rulemaking, Mr. William Bunner stated, "The highest-risk incidents are the persons who respond to spills and accidental releases of hazardous chemicals; and those personnel, particularly public first responders, have had the least protection in terms of chemical emergency response safety and health plans, training and equipment." (Tr. pgs. 24-25). Mr. Bunner goes on to state, "The real strength of 29 CFR 1910.120 is that it not only provides for a more consistent and thorough approach to protecting workers involved in hazardous waste operations, but also for personnel who face extremely high risk to life and health that's associated with chemical emergency response." (Tr. pg. 25).

Another witness, Mr. Ray Simpson, one of OSHA's expert witnesses on fire suppression, fire inspection, and training, testified, "I like to support any concept that advocates properly equipping, training, and supporting emergency responders. When I talk about an emergency responder, I'm not talking simply about fire fighters although that's basically my expertise. I'm talking about the emergency medical technicians, the people who handle the victims. I'm talking about the police officer who, many times, is first on the scene before any of us get there; the many who really must make, in some situations, the initial decision about

what's going to happen. I have learned over these many years that the two greatest dangers that face us as emergency responders are ignorance or non-awareness of what we're facing and the lack of plan or any procedure that will take us to the end that we're trying to accomplish." (Tr. pgs. 89-90).

Margaret Seminario, Associate Director, Department of Occupational Safety, Health and Social Security of the American Federation of Labor-Congress of Industrial Organizations (AFL-CIO) also testified at OSHA's public hearings on the issue of emergency response. Ms. Seminario discussed the participation of the AFL-CIO in hearings before the House Subcommittee on Employment and Housing of the Government Operations Committee and the Safety and Health Subcommittee of Education and Labor. Ms. Seminario stated, "Those hearings dealt with the issues of the problems for hazardous waste workers in both Superfund operations and RCRA operations, but they also got into an issue that had really not been explored very fully: the problems facing emergency response workers, particularly for the AFL-CIO firefighters. The members of our firefighter's union were the ones who were called in when there were spills, leaks and other accidental releases. These weren't hazardous waste sites, per se, at the time. They became hazardous waste sites and were defined as such after the fact but they were routinely called in without information, without adequate protection to deal with these problems. That was an issue, as I said, that was fully explored in those hearings and it was the reason that, when we moved from those hearings into a legislative opportunity in Superfund, we looked beyond the language that we had come up with in the 1980 law which dealt only with hazardous waste and expanded it to include emergency response operations." (Tr. pgs. 345-346).

Further, OSHA still believes that Congress intended this rule to have such coverage. This is indicated by the language of SARA as well as the legislative history.

As OSHA stated in the preamble to the proposed rule, "The language of section 126(a) mandates safety and health standards for the protection of employees engaged 'in hazardous waste operations.' The term 'hazardous waste operation' is not limited in the legislation and a response to spills of hazardous substances on the highway or from a railway tank car in order to control and contain the hazardous substance (which has become a waste

once it is not contained) is in the common sense meaning a hazardous waste operation."

"This interpretation is reinforced by the fact that SARA is a free-standing statutory provision and not an amendment to CERCLA. The clear Congressional intent then is to provide protection to employees whenever they deal with hazardous wastes."

In addition section 126(d)(4) discussing training for emergency response personnel utilizes the very broad term "hazardous emergency situation." Section 126(g)(1) indicates that training grants may be given independently for emergency response training separate from hazardous waste removal training. Section 126(b)(11) also indicates emergency response is an independent concept separate from hazardous waste removal operation. For those and other reasons OSHA believes section 126 is intended to cover emergency response to hazardous substances whether on an uncontrolled hazardous waste disposal site, a RCRA site or elsewhere. However, the clarified language in the scope sections makes it clear the only employers whose employees have the reasonable possibility of engaging in emergency response are covered. Emergency response employees who respond or respond to incidents involving hazardous substances are covered by this final rule to the extent that they are exposed to hazardous substances. State and local government employees in states that have agreements with OSHA under section 18 of the OSH Act must be regulated by state regulations at least as effective as those to protect public employees. Those state regulations must be issued within six months of the date of promulgation of this final rule.

However, some commenters have commented that OSHA has exceeded the intent of Congress with the scope of the proposed rule. Many of these commenters stated that OSHA's coverage of emergency response at sites other than specific cleanup or TSD facilities was too broad and unwarranted. AMOCO's comment (10-26) is representative of some of the comments made on this issue. In their comment AMOCO stated that, "Section 126(a) of SARA is the directive to OSHA to promulgate standards 'for the health and safety protection of employees engaged in hazardous waste operations.' There is no reference whatsoever in this directive to promulgate standard(sic) with respect to emergency response activities outside of hazardous waste operations." However, other comments received from the petrochemical

industry support, on a limited basis. OSHA's decision to cover emergency response with the scope of the standard. CONOCO's comment (10-32) is representative of this point of view. CONOCO states, "Conoco's primary concern with the proposed rule centers on the extremely broad scope of employee coverage under this standard and compared to Congress' intent to cover 'hazardous waste operations and emergency response.' We believe that Congress intended section 125 of SARA to cover employees engaged in hazardous waste operations and emergency response to these operations on a full-time basis." While this comment would seem to support OSHA's coverage of employees engaged in emergency response, that support is limited to those employees engaged in response on a full-time basis at hazardous waste operations.

Based upon public testimony and written comments received into the record of this rulemaking, OSHA has concluded, that because of the high risk associated with emergency response to the releases of hazardous substances and the number of these incidents occurring, that coverage of workers conducting such emergency response activities is both appropriate and necessary.

OSHA believes that the scope of this final rule carries out the intent of Congress and is consistent with good occupational safety and health policy. Employees performing clean-up operations under CERCLA, RCRA (corrective actions) and state or local government designated sites—generally those employees likely to have the highest exposures to hazardous substances over a longer period—would be covered by virtually all the provisions of this final rule. Employees exposed to hazardous wastes in routine RCRA hazardous waste operations, who are regularly exposed to hazardous wastes but in a more controlled environment, would be covered by the more limited requirements of paragraphs (p) and (q). Emergency response workers, exposed usually for short periods to often unknown but possibly high levels of hazardous substances, would be regulated by paragraph (q).

2. Application. OSHA proposed to define the application of this final rule in paragraph (a)(3) of OSHA's Notice of Proposed Rulemaking (NPRM) published on August 10, 1987 (52 FR 29620). "Application" establishes which regulations within this rule apply to the specific worker populations to be protected by this rule.

In paragraph (a)(3)(i) OSHA proposed that the employer would have to comply

with the standards in 29 CFR Parts 1910 and 1926, as well as with the requirements specifically covered in the proposed rule. If there were a conflict or overlap between standards, it was proposed that the more protective provisions would apply. Since this rule does not cover all of the hazards present at hazardous waste operations, other OSHA standards in Parts 1910 and 1926 should apply to ensure employee safety and health. Other OSHA standards regulate many other hazards, and OSHA wants to make clear that the other standards continue to apply. Also, OSHA proposed that hazardous waste operators who are not within the scope of this standard should continue to be regulated by the Parts 1910 and 1926 standards. OSHA is keeping those provisions in the final rule for the reasons stated with minor editorial changes for clarification.

In paragraph (a)(3)(ii), OSHA proposed that all paragraphs of section 1910.120 except paragraph (o) would apply to hazardous waste operations at CERCLA sites, at major corrective action at RCRA sites, and at sites designated for clean-up by state and local governments. Paragraph (o) of the proposal addressed certain operations conducted under the Resource Conservation and Recovery Act of 1976 (RCRA).

OSHA recognizes that the hazards presented to employees engaged in clean-up operations involving uncontrolled hazardous wastes are far greater than those presented to employees engaged in the routine, day-to-day operations of an EPA licensed TSD facility.

OSHA has made two editorial changes in its proposed language in paragraph (a)(3)(ii) without changing the intent of the paragraph. First, rather than referring to each of the types of sites individually, OSHA is making reference to the scope paragraphs (a)(1)(i) through (a)(1)(iii) to identify the sites that this application paragraph addresses. The sites to be addressed remain the same as proposed. Second, because the codification of paragraphs has changed in this final rule due to changes made to the proposal, paragraph (p) of § 1910.120 rather than paragraph (o) will apply specifically to hazardous waste operations at RCRA sites which are involved in treatment, storage, disposal and handling of hazardous waste. The new requirements of paragraph (p) are discussed later in the preamble.

In paragraph (a)(3)(iii), OSHA proposed that the requirements set forth in paragraph (o) of section 1910.120 would apply specifically to the

hazardous waste operations at RCRA sites which are involved in treatment, storage, disposal and handling of hazardous waste. The proposal contained a limited exclusion from these regulations for certain small quantity generators and less than 90-day accumulators, such as dry cleaners and gas stations, which come within the purview of RCRA, but are not hazardous waste operations in the normal meaning of the term. The exclusion was available to these operations depending upon the employer's decision to provide or not provide emergency response by employees to releases of, or substantial threats of releases of, hazardous substances.

OSHA proposed to exempt small quantity generators and less than 90 day accumulators from all parts of the rule if they did not provide emergency response by their employees to releases of, or substantial threats of releases of, hazardous substances. OSHA further proposed to exempt small quantity generators and less than 90 day accumulators from all parts of the rule except paragraph (l) if they did provide emergency response by their employees to releases of, or substantial threats of releases of, hazardous substances.

OSHA recognized that many small quantity generators are smaller businesses with limited employee populations. Since most of these establishments rely on the emergency response services of local fire and rescue departments, OSHA is providing a complete exemption from these proposed standards when the employer can show that employees are not required or encouraged to engage in emergency response, but are directed in the case of emergency spills of hazardous substances to maintain a safe distance and to call local fire or other emergency response organizations. In cases where such establishments do provide emergency response by employees, and thereby expose employees to hazardous substances, OSHA proposed that such employers meet the emergency response requirements of paragraph (l) of this proposed rule. OSHA concludes its proposal is supported by the record.

Without these exemptions, these regulations could be interpreted to cover gas stations, dry cleaners, and other small businesses which temporarily store small quantities of a hazardous waste. These businesses are not engaged in hazardous waste operations as that term is conceived of normally. In addition, it is not believed that Congress intended such businesses to be covered. They do not present the relatively high

exposure to a number of hazardous health risks to employees that hazardous waste sites typically do.

In paragraph (a)(3)(iv) OSHA proposed that the requirements set forth in paragraph (I) of this section would specifically apply to the work conducted by emergency response personnel when they respond to hazardous substance emergency incidents. Emergency response personnel include firefighters, EMS personnel, and police as well as other employees.

The regulation of employees providing emergency response has been discussed under the "Scope" portion of this preamble discussion. Further discussion of OSHA's changes to the emergency response portion of this rulemaking is contained in the discussion of paragraph (I) of the proposal.

OSHA also requested comment on what other operations should be and are intended by Congress to be covered, and whether specific operations should be excluded because of low exposures. For example, municipal or other sanitary landfills that handle domestic wastes would not normally be regulated by this rule. Similarly, waste paper or scrap metal operations would not normally be regulated because of the type of wastes they handle. However, both types of operations would be regulated if they have clean-ups for or handle hazardous wastes meeting the scope provisions of the standard.

Also, employees at hazardous waste disposal sites who will not be exposed to, or do not have the potential to be exposed to, hazardous substances are not covered by this rule. The provisions of these regulations are designed to protect employees who have or may have exposures, and would not be needed for those employees who do not.

Operations with no exposure to hazardous substances, i.e., road building for site access, construction of or the setting up of temporary facilities in the clean zone, or the closure of a RCRA site involving the building of a clay cap over hazard wastes, are considered to be construction activities covered by the standards in 29 CFR Part 1926.

As a result of the comments received during the public comment phase of this rulemaking, OSHA has made some changes to the degree of regulation for emergency response workers. However, the scope of this standard continues to cover such workers and paragraph (a)(2)(iv) identifies the new paragraphs within the rule that reflect the changes and identifies the standards that apply to emergency response operations.

3. Definitions. In paragraph (a)(4), *Definitions*, OSHA proposed to identify and define the various terms used in this

rulemaking that may cause confusion. However, the following new definitions have been added as a result of comments made in the record: "published exposure level" and "uncontrolled hazardous waste site". Except for the definition of "established exposure level" which has been amended to define "published exposure level," no definitions have been removed from the proposal.

The term "established permissible exposure limit" was incorporated as part of the determination of whether medical surveillance was required. There were a number of comments on this definition.

One commenter, Four Seasons Industrial Services (10-5), believed that the definition should be broadened. Four Seasons stated, "The routes of chemical exposure are through inhalation, skin absorption, and ingestion. All of these have to be considered when dealing with permissible exposure limits. Your definition as written does not include ingestion." Other commenters were concerned that OSHA included the NIOSH Recommended Exposure Limits in the definition of PELs. The E. I. DuPont de Nemours, Co. (10-28) comments summarize many of those received against the NIOSH levels. DuPont stated, "NIOSH limits have not undergone public review and comment as have national consensus standards and regulatory exposure standards. Therefore, they should not be included in the definition of 'established exposure limits'." CONOCO (10-32) agreed when they stated, "These NIOSH limits are not subject to peer review or public comment as are OSHA's PELs. We encourage OSHA to remove the references to these NIOSH limits. We strongly urge OSHA to only use PELs given in 29 CFR 1910, Subpart Z."

Dr. James Melius, Division of Environment Health Assessment, State of New York Department of Health Medical Surveillance, and one of OSHA's expert witnesses in occupational medicine, stated in his testimony (Tr. pg. 115) that, "I think it's important that the OSHA standards be supplemented by information from NIOSH and ACGIH, both of which cover a larger number of chemicals or toxic substances and both of which include, or at least consider, more up to date information on the toxicity of these substances."

In addition, during the public hearings, OSHA, through its panel of staff members specifically asked Captain Richard A. Lemen, Director of the Division of Standards Development and Technology Transfer within NIOSH, about the peer review process of NIOSH

RELs. Mr. Thomas Seymour of OSHA directed the following question to Captain Lemen (Tr. pg. 195).

[Mr. Seymour:] We have received some feedback in our record about the order of the hierarchy that we have used for permissible exposure limits. There have been statements made that the RELs are not peer-reviewed or developed. I wonder if you might describe to us how the RELs have been developed by the National Institute for Occupational Safety and Health.

Captain Lemen's response (Tr. pgs. 195-197) to Mr. Seymour was:

Okay. In response to the peer review question, I would say that probably the RELs were more peer reviewed than most recommendations. The first process of developing an REL at National Institute for Occupational Safety and Health is to propose such a recommendation be developed to the Director of NIOSH through a position paper.

That is then reviewed by senior NIOSH staff. Once that approval is given, a criteria manager then develops the recommended exposure standard in the form of a criteria document.

Once the criteria document has gone through several layers of review within NIOSH, it is then sent out for external review. On the average, we usually send out to more than 40 experts in the field that document for their external comments.

We receive those comments back. We incorporate those comments where appropriate. We then submit the document through the same internal review within NIOSH. It goes through every division within the Institute and it finally winds up in the senior review staff at the directors' level at our headquarters in Atlanta.

A meeting is then held with the Director of NIOSH at which time the criteria manager and the senior scientists within the Institute (review) all of the reviewer—external and internal reviewer—comments and a decision is made by the Director of NIOSH whether or not to publish a recommended exposure limit.

If the decision is to publish, then we do so and submit that criteria document to the Director of OSHA.

So it goes through a very extensive peer review process compared to, for example, an article submitted to peer-review journal which is written by a researcher and generally sent out to three to five individuals to review before it's placed in a peer review journal.

So the extensiveness of our review process, I think, is much greater than that for a peer-review journal article.

In light of these comments OSHA has concluded that the NIOSH REL's have undergone the necessary peer review to be included in the standard's hierarchy of limits.

The term "established exposure levels" was defined in the proposal to indicate the levels which would trigger medical surveillance of the exposed employees. The term included not only OSHA established PELs, but also

exposure limits suggested by NIOSH and ACGIH. After review of these and other comments, OSHA concludes that it is appropriate to go beyond the OSHA established PELs in triggering medical surveillance. First, medical surveillance is appropriate for workers exposed to toxic chemicals other than those covered by the PEL's. Second, because of the broadly-worded language in section 128(b)(3), which requires medical surveillance for workers engaged in hazardous waste operations "which would expose them to toxic substances." Some of these "toxic substances" are not included in the OSHA PELs. When OSHA completes its rulemaking on the air contamination proposal (PEL's project), there will be fewer toxic substances not covered by PEL's. But in light of Congressional language and the large number of hazardous chemicals present in an uncontrolled hazardous waste site, OSHA concludes that this definition is appropriate to protect employee safety and health.

The term "permissible exposure limits" was defined in the proposal as the inhalation or dermal permissible exposure limit specified in 29 CFR Part 1910, Subpart Z. As a result of the comments received in the record, OSHA has amended its definition that ignored the health limits specified in Subpart G, for "permissible exposure limits."

OSHA has amended the definition for "permissible exposure limits" to include a reference to Subpart G of Part 1910. It now includes both Subpart Z health hazards and those requirements in Subpart G of Part 1910.

First, OSHA has changed the term "established exposure levels" to the term "published exposure level" to reduce confusion. Second, the term "published exposure level" is defined as the exposure limits published in "NIOSH Recommendations for Occupational Health Standards" dated 1986, incorporated by reference, or if none is specified, the exposure limits published in the standards specified by the American Conference of Governmental Industrial Hygienists in their publication "Threshold Limit Values and Biological Exposure Indices for 1987-88" dated 1987, incorporated by reference. Third, the provisions of (f)(2) on medical surveillance have been changed to cover overexposures to both PEL's and, if none, then over-exposure to published exposure limits. OSHA concludes that with these changes the definitions are clear, comprehensive and carry out both statutory directives and appropriate medical criteria in determining whether medical

surveillance is required. Some commenters stated a broader guide is necessary for respirator use and that is discussed under paragraph (g).

OSHA requested comment on the appropriateness of its definitions of hazardous waste, health hazard and hazardous substance and whether they were consistent with EPA and DOT practice. Several comments were received on these issues. One set of comments criticized OSHA's incorporation of petroleum and petroleum products in its definition of hazardous substances.

A typical comment was made by EXXON (10-33). In their comments EXXON presented the following discussion:

Perhaps the most fundamental misinterpretation contained in this rule is the inclusion of petroleum and petroleum products in the definition of hazardous substances. As discussed in Comment I.A.A.v. below at pages 11 to 14 (internal EXXON comment references), Congress, the Environmental Protection Agency (EPA), and the Department of Transportation (DOT) have uniformly recognized the inappropriateness of characterizing petroleum as a hazardous substance. There is no indication in SARA Section 128 that Congress intended to change the petroleum exclusion or to subject petroleum releases to emergency response regulation.

EXXON further stated:

It is EXXON's understanding that a situation is not an emergency response subject to the requirements of paragraph (1) unless there is a release of a "hazardous substance." Therefore it is essential that the definition of "hazardous substance" be accurate and correct.

The proposed definition of "hazardous substance" references the Department of Transportation's definition of "hazardous materials" under 49 CFR 171.8. By so doing, petroleum and petroleum products have been included as hazardous substances; and, related spills may be subject to the burdensome requirements for emergency response operations.

Congress, in the very CERCLA sections cited in the proposed definition of "hazardous substance," has recognized that petroleum and petroleum products are excluded from the federal definition of "hazardous substance." EPA regulations under CERCLA have incorporated this congressional directive. See 40 CFR Part 302 and discussion at 50 FR 13436, 13460 (April 4, 1985). DOT has specifically recognized this Federal petroleum exclusion and incorporated the exclusion in its definition of "hazardous substance." See 52 FR 24474 (July 1, 1987). As such, the proposed OSHA definition is inconsistent with the CERCLA, EPA and DOT definitions of "hazardous substance."

The proposed definition of "hazardous waste" includes the EPA RCRA definition of hazardous waste and the DOT definition at 49 CFR 171.8. The cited DOT regulation defines both hazardous substances and

hazardous wastes. As noted above, the DOT definition of hazardous substance at 49 CFR 171.8 should properly be incorporated in the proposed OSHA definition of hazardous substance. It is not a waste definition. Therefore, the proposed definition of hazardous waste should be limited to waste materials; and, the DOT definition of hazardous substance should be clearly excluded.

OSHA does not agree with these arguments. Section 128 of SARA is directed to protecting workers from the hazards of all hazardous waste spills. Petroleum products create significant health and safety hazards. Many comments supported OSHA's incorporation of petroleum and petroleum products.

During the questioning of Dr. Kenneth H. Chase, M.D., President of the Washington Occupational Health Associates, Inc., Mr. Chappell Pierce of the OSHA panel asked Dr. Chase the following question (Tr. pg. 551): "Do you feel that medical monitoring for these types of products (petroleum products) is appropriate?"

Dr. Chase responded, "Petroleum products is just too broad a term for me to answer that in a general way. Certain petroleum derivatives are more toxic than others. Some have acute toxicity; others subacute toxicity; and others, the concern is more about chronic toxicity that is most difficult to detect."

During the hearings, OSHA asked many of the individuals who testified if petroleum and petroleum products should be included in the definition of hazardous substances.

Representative of the responses made to this question was the testimony of the Prince Georges County Fire Department; the International Association of Fire Fighters, AFL-CIO; NIOSH; and the Seattle, Washington Fire Department.

Mr. Gregory Noll, the Hazardous Materials Coordinator for the Prince George's County Maryland Fire Department, testified on the issue (Tr. pg. 448). Mr. Thomas Seymour of the OSHA panel addressed Mr. Noll by stating: "I notice in your testimony, on page 3, that you indicate that at least 50 percent of your responses are involved with flammable liquids or gas emergencies. The definition that OSHA is using in this rulemaking for hazardous substances dealing with and covering flammable liquids and gases you find, then, appropriate?"

Mr. Noll responded, "I think realistically, from the perspective of fire service, we've been successfully handling flammable liquid and gas emergencies for a number of years. Today, with HAZMATs being the buzz word, certainly those categories of

commodities have been thrown into the hazardous materials field.

"We now regard them in the hazardous materials field from a practical perspective."

Mr. Thomas Seymour of the OSHA panel asked Mr. Richard Duffy of the International Association of Fire Fighters (Tr. pg. 110). "Mr. Duffy, we have had some previous commenters who have advocated that petroleum and petroleum products be excluded from the scope of the standard.

The example that you just gave about the propane tank inside the building exploding and killing fire fighters, what is your opinion about whether we should exclude petroleum products from this standard?"

Mr. Duffy responded: "I don't know how we would classify them. I would object to that. I mean, I don't know how to better qualify—I could talk to you for days about incidents involving petroleum products. I don't see any reason to exclude them any more than excluding the oxidizers or any group. I mean, you could pick lots of products and ask to exclude them. And I'm sure a lot of the lobbying entities can establish reasons for it. But I can't see any in terms for fire fighters."

Mr. Charles Gordon of the Department of Labor's Office of the Solicitor and a member of the OSHA panel asked Captain Richard A. Lemen, Director of the Division of Standards Development and Technology Transfer of, NIOSH the following question (Tr. pg. 200-201): "In the case of spills of petroleum or petroleum products in either an emergency-response situation or as a hazardous waste dump were there are petroleum products as one of the major contaminants, is it appropriate for all the provisions of the OSHA standard or the recommendations to apply in those circumstances?"

Captain Lemen responded. "We believe it is appropriate and they should apply in those circumstances, as well."

Mr. Seymour also asked Deputy Chief Roger Ramsey of the Seattle Fire Department (Tr. pg. 142): "I gather from what you have also said that the definition we have, including the DOT hazardous material definition for hazardous substance and materials is appropriate, and that we should not exclude petroleum products from the coverage of this standard?"

Deputy Chief Ramsey responded. "Absolutely not."

Many spills and emergency response to these spills involve petroleum products. These spills present both health and safety risks. Training is necessary to protect employees who respond to petroleum spills as with

other spills. In fact, these are usually the same employees.

OSHA concludes that it is crucial to cover responses to petroleum spills as well as all other spills because petroleum products constitute a substantial threat to employees responding to accidental releases of these substances. Many petroleum products present health hazards as well as fire and explosion hazards. In addition they often contain fractions which present high health hazards. For example, many contain benzene, a carcinogen to which employees may be exposed.

Therefore, OSHA is not amending its definition for "hazardous substance" to include the petroleum exclusion referenced by some of the commenters.

The other definitions are discussed in the preamble to the proposal for this rulemaking. There were no major comments. OSHA concludes that those definitions are appropriate for the reasons stated in the proposal preamble.

Paragraph (b)—Safety and Health Program

Paragraph (b) of the proposal has been reorganized for clarity as a result of the public comment. Basic requirements remain the same. Specific changes are discussed below. This paragraph basically requires that a written safety and health program cover safety and health organization and specific work practices to assure employee safety and health. OSHA has concluded that it is crucial for employee safety and health to have a written safety and health program that would force the systematic identification of site hazards and identify employee response to those hazards. The written plan is necessary to communicate hazards to employees for their awareness and protection. (See preamble discussion at 52 FR 29824.)

OSHA received many comments supporting the requirement for a written safety and health program (i.e., State of Wyoming, 10-9; James T. Dufour, 10-78; International Association of Fire Fighters Local 291, 10-12); other commenters have made suggestions for changes to the proposed language.

OSHA concludes that for the reasons stated a written program is necessary. The following discussion covers specific changes.

OSHA has included a non-mandatory note at the beginning of new paragraph (b) that explains the acceptability of safety and health programs developed and implemented to meet other Federal, state, or local regulations in meeting the requirements of this paragraph. Some commenters believed that OSHA's

requirements for a safety and health program were somewhat duplicative of the contingency plans and emergency response plans required by the E.P.A. for its permit requirements (i.e., Tennessee Valley Authority, 10-43; National Paint and Coating Association, 10-72; Johnson Wax, 10-84). OSHA will permit existing programs that have been designed to meet other government or corporate requirements. For example, contingency plans developed under 40 CFR 265.50 are acceptable in meeting this requirement if they are supplemented with the provisions established by the OSHA standard. OSHA does not intend to require the duplication of efforts made to meet other governmental regulations. Therefore, any plan containing all of the elements required for the OSHA plan will be acceptable in meeting this requirement without the need for developing a separate OSHA plan.

In paragraph (b)(1) of the final rule OSHA has taken the language proposed in paragraphs (b)(1)(i), (b)(2), and (b)(3) of the proposal and subdivided it into paragraphs (b)(1)(i), (b)(1)(ii), (b)(1)(iii), and (b)(1)(iv). Paragraph (b)(1)(i) contains the first two sentences of the proposal along with two new sentences that clarify what the safety and health program shall include. OSHA has included the new sentences and the new note to this paragraph to provide further guidance to employers who may need assistance in developing their safety and health program.

In paragraph (b)(1)(ii) of the final rule OSHA is using the last sentence and the list of chapters proposed in paragraph (b)(1)(i) and subparagraphs (A) through (C). There are no changes made to the language as proposed other than a recodification of the paragraphs.

In paragraph (b)(1)(iii) of the final rule OSHA is using the exact language proposed in paragraph (b)(2). The proposed language has been moved to this paragraph because it contains a requirement that is of a general nature.

In paragraph (b)(1)(iv) of the final rule OSHA is using the language proposed in paragraph (b)(3)(i) with one exception. A new phrase would require the employer to inform contractors and subcontractors of the site emergency response procedures in addition to the proposed information. One commenter, CDM Federal Programs Corporation (10-83), suggested revised language to the proposal that would assure that the contractors and subcontractors received the site specific safety and health plan as well as the safety and health programs. OSHA agrees with the suggestion of the commenter and that

the new language accomplishes the recommended change suggested by CDM Federal Programs.

In paragraph (b)(1)(v) of the final rule OSHA is using the exact language of proposed paragraph (b)(3)(iii).

In paragraphs (b)(2), (b)(3), and (b)(4) of the final rule OSHA is using the exact language of paragraphs (b)(1)(ii), (b)(1)(iii), and (b)(1)(iv) of the proposal. One commenter, James T. Dufour (10-78), while supporting the use of safety and health plans as an appropriate communication tool for identifying site hazards, suggested that OSHA should require a more comprehensive review and control of the plan to assure its professional quality. OSHA believes that the language of paragraph (b)(4)(iv) would provide for this type of oversight and control. Therefore, the only change to paragraphs (b)(1)(ii) through (b)(1)(iv) is a recodification of the paragraphs.

Paragraph (c)—Site Characterization and Analysis.

The employer needs to know the hazards faced by employees in order to develop and implement effective control measures. Site characterization provides the information needed to identify site hazards and to select employee protection methods. The more accurate, detailed, and comprehensive the information available about a site, the more the protective measures can be tailored to the actual hazards that the employees may encounter. Congress clearly intended that such a requirement be included. Section 126(b)(1) of SARA provides that the proposal include "requirements for a formal hazard analysis of the site . . ."

It is important to recognize that site characterization is a continuous process. At each phase of site characterization, information is obtained and evaluated to define the potential hazards of the site. This assessment is to be used to develop a safety and health plan for the next phase of work. In addition to the formal information gathering that takes place during the phases of site characterization described above, all site personnel should be constantly alert for new information about site conditions.

In paragraph (c) of the final rule OSHA has used most of the language in paragraph (c) of the proposal. New headnotes have been added to the major paragraphs to make reading the requirements easier.

In paragraphs (c)(1) through (c)(4) of the final rule, OSHA has used the language of paragraphs (c)(1) through (c)(3) of the proposal. The reason for the one additional paragraph in the final rule is that OSHA has numbered the

initial unnumbered paragraph in the proposal, and renumbered the rest. This is an editorial change and does not change any of the proposed requirements.

In paragraph (c)(5) of the final rule, OSHA is using the language of paragraph (c)(4) of the proposal with one change. Paragraph (c)(4)(ii) of the proposal has been revised as paragraph (c)(5)(ii). The new requirement still requires the use of a five minute escape self-contained breathing apparatus, however, its need is now based upon two conditions. In the proposal, all employees had to have access to an ESCBA during initial site entry. Two commenters, the State of Wyoming (10-9) and CDM Federal Programs Corporation (10-83), suggested that OSHA revise this requirement to recognize that the use of ESCBAs should be determined by the nature of the health hazards and the nature of the work to be performed. OSHA agrees that all employees who cannot be exposed to site conditions where possible health hazards may occur should not be required to carry ESCBAs. Therefore OSHA has amended its proposal as follows. Two conditions will now limit the employee population that must be provided access to ESCBA. They are (1) if positive-pressure self-contained breathing apparatus is not used as part of the entry personal protective equipment; and (2) if respiratory protection is warranted by the potential hazards identified during the preliminary site evaluation. Workers in populations where these two conditions are not met need not be provided with ESCBA.

Paragraphs (c)(3)(i), (c)(5)(iii), and (c)(5)(iv) contain the exact language as proposed in paragraphs (c)(4)(i), (c)(4)(iii), and (c)(4)(iv).

In paragraph (c)(6) of the final rule, OSHA is using the language from paragraph (c)(5) of the proposal with some changes.

In paragraph (c)(6)(ii) of the final rule, OSHA has required that direct reading instruments be used where available. In the proposal OSHA had required only that appropriate equipment be used. The agency believes that direct reading instruments, where they are available for specific chemical hazards, will provide a more expeditious assessment of the hazards when there is not enough time during a specific work cycle to send samples out to a laboratory for analysis. In some situations, employees may be present at a particular job site for only a brief time. Certain sampling techniques, other than direct reading instruments, may require a longer time for analysis than the employee's actual

exposure time on the job. Therefore, OSHA is amending its proposal by recognizing direct reading instruments as an alternative to standard testing procedures. OSHA has added the phrase "appropriate direct reading test equipment" in place of "appropriate equipment."

OSHA has also added a paragraph (c)(6)(iv) that would require that an ongoing air monitoring program be implemented in accordance with paragraph (h) of the final rule after site characterization has determined that the site is safe for start-up of operations. This is not a new requirement since it uses the same language as that proposed in paragraph (c)(6) of the proposal. OSHA has moved the paragraph from its position in the proposal to paragraph (c)(6)(iv) of the final rule because it is related to the subject matter of paragraph (c)(6). OSHA considers this to be an editorial change because there is no change in the proposed language.

Paragraphs (c)(6)(i) and (c)(6)(iii) continue to use the language of proposed paragraphs (c)(5)(i) and (c)(5)(iii).

In paragraph (c)(7) of the final rule OSHA is using the language of proposed paragraph (c)(6) with one change. In the note which describes risks to be considered, OSHA has amended paragraph (a) by changing the language to reflect the exposure limits and levels to be used in the final rule. Direct references to Permissible Exposure Limits (PELs), Threshold Limit Values (TLVs), or Recommended Exposure Limits (RELs) has been deleted and a reference is made to permissible exposure limits and published exposure levels as defined in the final rule. No substantive change is made since those terms incorporate PELs, TLVs, and RELs by definition.

Paragraph (d)—Site Control

In paragraph (d) of the final rule OSHA is using the language of paragraph (d) of the proposal. Minor editorial changes have been made for clarity without changing the proposed requirements. The need for requirements for site control is discussed at 52 FR 29625 in the preamble to our proposal. There were few substantive comments. OSHA concludes that these provisions are necessary as discussed in the proposal.

Paragraph (e)—Training

The proposed rule included specific provisions for initial and routine training of employees before they would be permitted to engage in hazardous waste operations that could expose them to

safety and health hazards. Section 126(b)(2) of SARA requires initial and recurrent training to be included in the final rule. The intent of the final training provisions is to provide employees with the knowledge and skills necessary to perform hazardous waste clean-up operations with minimal risk to their safety and health.

The proposed requirements for training in paragraph (e) addressed the needs of employees who will be working at CERCLA sites, certain RCRA sites, and sites designated or identified for clean-up by state or local governments.

The proposed provisions included a minimum of 40 hours of initial instruction off the site, and a minimum of three days of actual field experience under the direct supervision of a trained and experienced supervisor, at the time of job assignment. Congress has specifically imposed these hour and day requirements under section 126(d) of SARA for the proposed final standard. The proposed requirement represented a one-time effort by the employer for each employee covered by this standard. Employees would not need to be retrained for 40 hours at each site at which they work. Employees who had received the required training at one site could use that training to meet the proposed requirement at other sites even if it involved a different employee, provided the previous training addressed the hazards at the new site.

There are often many hazards at a waste site. The employee must be trained to recognize the hazards and appropriate work practices to minimize those hazards. The employee must also be well trained in the use of respirators and other forms of personal protective equipment. Without training, that equipment may not be used effectively and may not provide adequate protection. An extensive training program is necessary to assure that employees can use personal protective equipment effectively.

Managers and supervisors at regulated facilities, who are directly responsible for the site's operations, must have the same training as that of site employees and additional time for specialized training on managing hazardous waste operations. Since these managers and supervisors are responsible for directing others, it is necessary to enhance their ability to provide guidance and to make informed decisions. Section 126(d)(2) of SARA provides that there shall be eight hours of additional training for supervisors and managers.

The provisions also proposed that employees be retrained on an annual basis on relevant matters such as review

of health hazards and the use of personal protective equipment. Employees at hazardous waste operations may face serious health and safety risks. Reminders are needed of this and of work practices necessary to avoid hazards. Personal protective equipment provides much of this protection. If there is no retraining in the use, care and maintenance of personal protective equipment, such equipment is unlikely to be properly utilized to provide adequate protection.

In all areas of training, whether it be for general site employees, supervisors at the site, or for the use of specific equipment, the level of training provided must be consistent with the worker's job function and responsibilities. Refresher training must be provided to reemphasize the initial training and to update employees on any new policies or procedures.

Section 126(d)(3) of SARA requires that OSHA provide for certification that an employee has received the training required by the standard. Section 126(d)(1) provides that OSHA not require training for employees who have already received equivalent training. The final standard has provisions to meet this directive.

OSHA requested comment as to whether its proposed training requirements were appropriate for hazardous waste operations. OSHA's proposed training requirements in paragraph (e) were limited to hazardous waste operations that involve the clean-up of uncontrolled hazardous waste disposal sites. Of all the issues raised by OSHA in its proposal, training was one that received a substantial amount of comment. Important comments directed to the paragraph (e) training requirements follow. Comments addressing the training of emergency response workers will be discussed later in this preamble under the appropriate paragraphs.

In paragraph (e)(1) of the final rule OSHA has combined the introductory paragraph of proposed paragraph (e) with the language proposed in paragraph (e)(5). The introductory paragraph of the proposal has been designated paragraph (e)(1)(i) and proposed paragraph (e)(5) has been designated (e)(1)(ii). OSHA considers this an editorial change which groups two general requirements under a single paragraph titled "General."

In paragraph (e)(2) of the final rule OSHA is using the language of paragraph (e)(1) in the proposal. Some minor changes are made to reflect the renumbering of the paragraph without changing any of the proposed requirements.

In paragraph (e)(3) of the final rule OSHA is revising the proposed language of paragraph (e)(2) of the proposal. Several comments addressed the proposed 40-hour training requirement for all employees who work on hazardous waste sites (i.e., Wassau Insurance Company, 10-8; International Technologies, 10-44; Cooperweld Steel, 10-41; James T. Dufour, 10-78). Some of the commenters believed that 40 hours of training for some employees at this type of site was excessive. For example, it was argued that 40 hours of training was excessive for general laborers who may be installing perimeter fencing around an unopened site and who are not exposed to any hazards. This type of employee normally will not be wearing the type of protective equipment or be performing the type of tasks normally associated with removal of hazardous wastes. On the other hand, employees who will be "digging in the dirt" after the site has been opened in order to remove hazardous waste may need additional training because of the types of equipment they will be using and the types of hazards to which they will be exposed.

Wassau Insurance commented, "I feel the 40 hour minimum training requirement is excessive for many employees who will never be required to work above level D protection." The commenter continues, "The excessive training requirements of the current proposal add a significant burden to employers in situations where only low levels of protection are required (e.g., level D and level C situations)."

OSHA has revised its proposal for 40 hours of training for all employees engaged in hazardous waste operations at uncontrolled hazardous waste sites. For general site workers, OSHA is retaining the 40-hour, three-day on-the-job training requirement. OSHA has concluded that this level of training is necessary to protect general site workers because they are engaged in difficult work in areas with safety and health hazards. Moreover, OSHA believes the Congressional language is quite clear on this matter.

However, for certain types of other workers, OSHA has concluded that less training may be appropriate. For example, those workers who visit sites only on occasion and then under the supervision of experienced site workers are required to have 24 hours of training and one-day of on-the-job training. OSHA has also concluded that this same level of training would be appropriate for those general site workers who work in areas which have been monitored and fully characterized

indicating that exposures are under both permissible exposure limits and published exposure limits and that respirators are not necessary.

In paragraph (e)(4) of the final rule OSHA is using the language proposed in paragraph (e)(3).

In paragraph (e)(5) of the final rule OSHA is using the language proposed in paragraph (e)(4) with the addition of a new sentence. Some commenters thought that the proposed language for the qualification of trainers was too broad and ambiguous. The State of Indiana (10-23) offered a representative comment: "Knowledge or training equivalent to (redundant phrase removed) a level of training higher than the level that they are presenting is no assurance that an employee is capable of providing adequate training to other employees."

Another commenter, the International Union of Operating Engineers (10-58), stated, "We believe it irresponsible to summarily state that trainers must be 'qualified,' without defining the term other than to suggest that one who knows more than the person he trains may be a qualified trainer."

Subsequent to the receipt of post-hearing briefs, Congress amended section 128(d) of SARA to require the Secretary of Labor to develop requirements for the certification of training programs offered to employees and employers who must meet the training requirements of this standard. OSHA will soon be publishing a Notice of Proposed Rulemaking to carry out this Congressional direction. The requirements of that rulemaking will expand on the provisions stated in this rulemaking.

In order to provide interim guidance to employees and employers in determining the competency of trainers and their qualifications, OSHA has added two sentences to the proposed language. These sentences require the use and demonstration of training, credentials and experience to show competency as a trainer.

In paragraph (e)(6) of the final rule OSHA is using the language of proposed paragraph (e)(6) with one minor change. In addition to permitting certification to be given by the classroom instructor, OSHA will also recognize certifications given by the head or supervisory instructor of the training facility. This change recognizes the fact that some training certificates are signed by the head instructor upon recommendation of the classroom instructor, rather than by the individual classroom instructor.

In paragraph (e)(7) of the final rule OSHA is using the exact language of proposed paragraph (e)(7).

In paragraph (e)(8) of the final rule OSHA is using the language of proposed paragraph (e)(8) with the addition of an example of the type of refresher training that OSHA would consider acceptable. OSHA considers, and has now suggested, that critiques of prior emergency response performance can serve as a means of refresher training. Critiques of performance during an emergency response can give employees a training experience in which they have actual knowledge of the acceptable or nonacceptable actions taken during the response. Such critiques can also provide employees with the experience they may need to perform in a more appropriate manner during their next response. The proposed requirement for annual refresher training has not been changed.

In paragraph (e)(9) of the final rule OSHA is using the exact language of paragraph (e)(9) in the proposal.

Paragraph (f)—Medical Surveillance

The proposed rule included specific provisions for baseline, periodic and termination medical examinations. Section 128(b)(3) of SARA provides that this rule include requirements for medical examinations of workers engaged in hazardous waste operations. In addition, the EPA manual referred to in section 128(e) of SARA has more detailed requirements for initial or baseline, periodic and termination medical examinations. The clear Congressional direction is to provide a comprehensive medical surveillance program for employees engaged in hazardous waste operations where it is medically prudent.

In paragraphs (f)(1) and (f)(2) OSHA is making some changes for clarity. In addition, OSHA is using the new term "permissible exposure limits or published exposure levels" instead of the term "established exposure levels." The reasoning for this change has been discussed under the paragraph of this preamble addressing definitions.

OSHA would like to clarify an issue concerning who is covered by medical surveillance under paragraph (f)(2) that has caused confusion since the promulgation of the interim final rule. After reviewing the record of comments addressing medical surveillance, it seems that several commenters, in particular from the fire service (i.e., 10-1, 10-3, 10-4, 10-12, 10-32, 10-79), believe that all firefighters must have the medical surveillance protections of paragraph (f) since they may wear respirators 30 days or more a year. Firefighters responding to structural fires will typically wear self-contained breathing apparatus when they enter

burning structures or other hazardous locations and they may make such responses 30 days or more a year. OSHA is not requiring all firefighters who wear respirators 30 days or more a year to have medical surveillance. Paragraph (f) applies only to individuals within the scope of paragraph (a)(1)(i) through (a)(1)(iii) as set forth in paragraph (a)(2)(ii). Typical firefighters from local fire departments do not fall within this scope. These firefighters are normally covered by the requirements of paragraph (q) as specified in paragraph (a)(2)(iv). Paragraph (q) does not contain requirements for medical surveillance of firefighters unless they are members of an organized and designated hazardous materials response team, are hazardous materials specialists, or have been injured due to an overexposure to health hazards during an emergency incident involving hazardous substances as established in paragraphs (e)(9) (i) and (ii) of the final rule.

In paragraph (f)(3) of the final OSHA is using the language proposed in paragraph (f)(2) with some changes. In new paragraph (f)(3)(i)(B), OSHA is adding the phrase "unless the attending physician believes a longer interval is appropriate" to the proposed language of paragraph (f)(2)(i)(B). Several commenters (State of Wyoming, 10-9; American Society of Safety Engineers, 10-29; Union Carbide Corporation, 10-56) suggested that an annual medical examination may be excessive for some employees, particularly when an attending physician can make a recommendation for a less frequent schedule. The American Society of Safety Engineers (10-29) stated, "This reviewer concurs in the approach that OSHA has outlined in this comment area that the practical health benefit of annual medical examination for hazardous waste operation workers is indeed uncertain. This is a broad area that requires input from the attending physician, the employee and the employer. It is recommended that annual medical examination not be required rigidly, that this be a flexible time frequency."

Wyoming (10-9) stated, "Periodic occupational health physical examination on an annual basis may not be warranted under all conditions." They go on to state, "It seems reasonable that a good occupational health program requiring physical examination would be based upon documented personal exposure levels and a medical physician's recommendation rather than on an arbitrary administrative decision to require personnel to undergo annual

periodic physicals if they fit into the categories under § 1910.120 (f)(1)(i) and (f)(1)(ii)."

Union Carbide (10-56) said, "The frequency of medical examinations and consultations in this proposed rule has been redefined and the proposed change clarifies the issue of medical surveillance but retains the annual requirement for all employees who wear a respirator . . . This frequency of examination is arbitrary. There is not medically-supportable rationale for this annual requirement."

There were also comments in support of OSHA's annual physical examination requirement. The Occupational Health Nurses (10-30) stated, "AAOHN supports pre-exposure, annual, and exit examinations with provision of additional exams if over-exposure or signs or symptoms develop." Lockheed (10-45) responded to OSHA's question on whether examinations should be performed yearly, or at other intervals by stating, "Medical exams should be performed at least yearly."

GSX Chemical Services, Inc. (10-63) stated, "(12) Paragraph (f) describes medical surveillance requirements. The general program described by OSHA for pre-employment, annual, post-exposure, and termination medical examinations is excellent."

BP America, Inc. (10-85) stated, "The need for medical surveillance of workers who would be covered under the provisions of the proposed regulation is appropriate and is supported." They further state, "The proposed requirement to examine workers exposed in emergency situations, but not continue periodic surveillance simply because of the single episode, *per se*, is logical, and is strongly supported. Having such employees continue under periodic medical surveillance on the basis of the findings of the medical examination is, of course, appropriate."

Because of variations in employee exposures due to work schedules, annual physicals may not be medically necessary. OSHA concludes that annual medical examinations may not always be appropriate. Accordingly the standard is amended to permit the physician to reduce the frequency to not less than bi-annually if the physician believes it is appropriate. The physician may also increase the frequency if it is medically appropriate.

OSHA has also replaced the term "established exposure limits" with the phrase "permissible exposure limits or published exposure levels" in new paragraph (f)(3)(i)(D) since the terms have been redefined as previously explained.

The rest of the language in new paragraph (f)(3) remains as it was proposed in paragraph (f)(2).

In paragraph (f)(4)(i) of the final rule OSHA is using the exact language proposed in paragraph (f)(3)(i).

In paragraph (f)(4)(ii) of the final rule OSHA is using the language of proposed paragraph (f)(3)(ii) with one change. OSHA is still requiring that the content of medical examination and consultations be determined by the attending physician. However, OSHA has added language that would direct the employee, employer, and physician to Appendix D for guidelines in developing the examination.

Several commenters requested guidance on the content of the medical examinations required by the proposal. The Okolona Fire District (10-1) commented, "As written the current document is rather vague." They continued, ". . . the document should give guidance on what the physical examination should entail." The American Association of Occupational Health Nurses (10-30), suggested, "At least minimum content of the physical examination should be specified. An 'exam' may be no more than visual inspection of an individual's eyes, ears and throat and have no relevance to the exposure situation."

Other commenters supported OSHA's proposal for the employer and the physician to determine examination protocols. Eastman Kodak (10-36) commented, "We support OSHA's position that the physician is best able to determine an appropriate medical surveillance protocol. As noted by OSHA, employees may be exposed to differing substances and may be required to use differing levels of personal protective equipment, such as respirators. In view of the particular circumstances presented, the physician is in the best position to formulate and follow an appropriate medical protocol. OSHA should not include a detailed protocol for medical surveillance." Lockheed (10-45) responded to OSHA's issue on protocols, "No. As with training, differences in amounts, kinds and combinations of exposures in different working situations require that protocol for medical surveillance be left to the discretion of the attending physician."

Dr. James Melius testified, "I'd like to direct most of my testimony to discussions of medical surveillance programs for hazardous waste and emergency response workers. I'd like to begin by saying that programs for both of these sets of workers are extremely important." (Tr. pg. 107) He goes on to say, "The medical surveillance program

for the workers, therefore, should start with initially assessing their ability to work at the site and their capability for conducting that work. It should include an assessment that focuses through a medical history and initial physical examination on their cardiovascular and respiratory system, also looking for signs of other major medical problems. Selective testing may also be useful in these instance, including pulmonary function testing, chest x-rays and electrocardiograms. However, the workers may differ in their benefits from this testing depending on their age and other risk factors." (Tr. pgs. 110-111)

OSHA believes both sides of the argument can be addressed by placing recommended criteria for medical examination protocols in the Appendix to this section. Some commenters have suggested protocols that OSHA considered for placement in the Appendix. The St. Petersburg Fire Department (10-4) suggested, "A full physical examination: height, weight, eyeright, pulse, blood pressure, respiratory, skin examination, neurological examination, heart and lungs, medical history, and any other aspects determined by the physician. Also included are: Pulmonary function test, chest X-ray, urine analysis, SMA 18 blood test, and hearing examination." The chapter on medical surveillance found in the OSHA/NIOSH/EPA/Coast Guard manual in Appendix F also provides guidance. OSHA also believes that the language of Appendix F will provide guidance for developing the examination protocol.

In paragraph (f)(5) of the final rule OSHA is using the language of paragraph (f)(4) in the proposal with one change. OSHA has added a recommendation that a physician licensed in occupational medicine be used to supervise or administer the examination. Several commenters suggested that the use of such a physician would assure a more complete occupation-oriented examination than one offered by a physician licensed in another field.

Representative of these comments was the suggestion of the American Association of Occupational Health Nurses (10-30). The AAOHN (10-30) stated, "The nature of the potential exposures in hazardous waste operations requires specialized knowledge in toxicology—knowledge of signs and symptoms and effects of exposure to various substances—not common in basic health professional curricula. This is information that both occupational health nurses and physicians may have via advance

education degrees or continuing education, certification and experience." The AAOHIN recommended that OSHA change its proposed language to require the examination to be performed "by a registered professional nurse or licensed physician with training and expertise in evaluating exposures to hazardous substances."

In recognition of AAOHIN's comments, OSHA has added the recommendation for the use of a physician from the field of occupational health. The language of the final rule, while it does not preclude the use of occupational nurses, does not specifically call for the use of an occupational nurse. The final language requires that the examination be conducted under the supervision of a licensed physician and that would certainly allow the use of occupational nurses if the attending physician permits.

In paragraphs (f)(6), (f)(7) and (f)(8) of the final rule OSHA is using the exact language proposed in paragraphs (f)(5), (f)(6) and (f)(7).

Paragraph (g)—Engineering controls, work practices, and personal protective equipment for employee protection

OSHA is using the same opening paragraph for paragraph (g) that was in the opening paragraph for paragraph (g) in the proposal.

In paragraph (g)(1)(i) of the final rule OSHA is using the language of paragraph (g)(1)(i) of the proposal.

In paragraphs (g)(1)(ii) and (g)(1)(iii) of the final rule OSHA is using the exact language of paragraphs (g)(1)(ii) and (g)(1)(iii) of the proposal, except that the reference to Subpart G is deleted. A new paragraph (g)(1)(iv) is added to cross reference the requirements of Subpart G for clarity.

In paragraph (g)(2) of the final rule OSHA is using the language proposed in paragraph (g)(2) with some editorial modifications.

In paragraphs (g)(3), (g)(4) and (g)(5) of the final rule OSHA is using the language of paragraphs (g)(3), (g)(4) and (g)(5) in the proposal with minor editorial corrections to be consistent with the terms and language of the final rule.

Paragraph (h)—Monitoring

In paragraph (h)(1) of the final rule OSHA has combined the proposed language in the opening paragraph and paragraph (h)(1) of the proposal with a clarification. The new paragraphs are designated (h)(1)(i) and (h)(1)(ii).

In paragraph (h)(1)(i), OSHA has modified its proposed language by adding the phrase, "where it is not obvious that an exposure does or does

not exist." OSHA is adding this phrase to clarify that monitoring is not necessary where the site environment or safety precautions taken by the employer prevent employee exposure to hazardous levels of chemical exposure. OSHA is only requiring monitoring where there may be a question as to an employee's exposure. When there is a question then the employer should monitor. Where there is no question of exposure, then monitoring is not necessary. For example, if it is obvious through site characterization and analysis that there are no exposures at the worksite, monitoring need not be performed unless worksite conditions or work practices change to the extent that workers could be potentially exposed to hazardous concentrations of chemical exposure. If an employer decides that employees should wear level B protection in an area where exposure will most probably be below the PEL's, then during initial entry monitoring will not be necessary because the employees are more than adequately protected.

In paragraphs (h)(2) and (h)(3) of the final rule, OSHA is using the language proposed in paragraphs (h)(2) and (h)(3) except for two changes. First, OSHA is adding language to clarify that monitoring should be used to determine exposure above permissible exposure limits which are not immediately dangerous to life or health. Second, OSHA is deleting proposed subparagraph (h)(3)(v) because it is too general in nature and the previous four subparagraphs adequately cover the hazard.

In paragraph (h)(4) OSHA is using the exact language proposed in paragraph (h)(4) with one addition. If employees with the highest exposure are overexposed, then representative samples of other employees who may be overexposed must be taken to determine if controls or PPE are needed.

Paragraph (i)—Informational programs

In paragraph (i) of the final rule OSHA is using the language of paragraph (i) of the proposal. Minor editorial changes have been made for clarity without changing the proposed requirements. The need for requirements for informational programs is discussed at 52 FR 29628 in the preamble to our proposal. There were few substantive comments. OSHA concludes that these provisions are necessary as discussed in the proposal.

Paragraph (j)—Handling drums and containers

In paragraph (j) of the final rule OSHA is using the language proposed in paragraph (j). Minor editorial changes

have been made for clarity without changing the proposed requirements. The need for requirements for handling drums and containers is discussed at 52 FR 29629 in the preamble to our proposal. There were few substantive comments. OSHA concludes that these provisions are necessary as discussed in the proposal.

Paragraph (k)—Decontamination

In paragraph (k) of the final rule OSHA is using the language of paragraph (k) in the proposal. However, the agency has reorganized the paragraph and provided headnotes to make the reading of the paragraph easier. The need for requirements for decontamination is discussed at 52 FR 29629 in the preamble to our proposal. There were few substantive comments. OSHA concludes that these provisions are necessary as discussed in the proposal.

Paragraph (l)—Emergency response by employees at uncontrolled hazardous waste sites

In paragraph (l)(1) OSHA is using the exact language from proposed paragraph (l)(1)(i).

In paragraphs (l)(2)(i) through (l)(2)(xi) OSHA is using the exact text from paragraph (l)(1)(ii)(A) through (l)(1)(ii)(K).

In paragraph (l)(3) OSHA is using the language of proposed paragraph (l)(2)(i)(A) with some modification. The modifications are considered editorial and are made because of OSHA's reorganization of the overall proposed paragraph (l). In paragraph (l)(3) OSHA will require that employees performing emergency response at uncontrolled hazardous waste sites be trained in accordance with paragraph (e) of this section. This requirement is the same as proposed in the first part of proposed paragraph (l)(2)(i)(A). The portion of proposed paragraph (l)(2)(i)(A) that addresses training at RCRA sites is moved to the discussion of training in paragraph (p) of this rulemaking because of OSHA's reorganization of this paragraph.

The language proposed in paragraph (l)(2)(i)(B) has been moved to paragraph (e)(9) of this final rule. This move is considered editorial since it does not change any duties imposed on the employer, it only reflects the reorganization of proposed paragraph (l).

In paragraphs (l)(4)(i) through (l)(4)(vii) OSHA is using the exact language from paragraphs (l)(2)(ii)(A) through (l)(2)(ii)(G).

In summary, paragraphs (l)(1) through (l)(4) of the final rule use the language of paragraphs (l)(1) and (l)(2) of the proposal with some modifications due to the reorganization of the emergency response requirements of the proposal.

Paragraph (m)—Illumination

In paragraph (m) and Table H-120.2 of the final rule OSHA is using the language of paragraph (m) and Table H-102.1 of the proposal with one minor change. OSHA has combined the language of the opening paragraph and paragraph (m)(1) of the proposal into one paragraph designated paragraph (m). Minor editorial changes have been made for clarity without changing the proposed requirements. OSHA has combined the language of the opening paragraph and paragraph (m)(1) of the proposal into one paragraph designated paragraph (m). The need for requirements for illumination is discussed at 52 FR 29631 in the preamble to our proposal. There were few substantive comments. OSHA concludes that these provisions are necessary as discussed in the proposal.

Paragraph (n)—Sanitation at temporary workplaces

In paragraph (n) of the final rule OSHA is using the language of paragraph (n) in the proposal with some minor editorial changes. The opening paragraph of proposed paragraph (n) has been deleted because it is not a requirement, and Table H-102.2 has been renumbered Table H-102.3. Minor editorial changes have been made for clarity without changing the proposed requirements. The need for requirements for illumination is discussed at 52 FR 29631 in the preamble to our proposal. There were few substantive comments. OSHA concludes that these provisions are necessary as discussed in the proposal.

Paragraph (o)—New technology programs

In paragraph (o) of the final rule OSHA is using the language of proposed paragraph (p). This change is necessary due to the reorganization of the emergency response requirements and the moving of proposed paragraph (o), *Certain Operations Conducted Under the Resource Conservation and Recovery Act of 1976 (RCRA)*. Proposed paragraph (o) has been moved to paragraph (p) of the final rule.

In paragraph (o)(1) of the final rule OSHA is using the exact language that was proposed in paragraph (p)(1).

In paragraph (o)(2) of the final rule OSHA has used the language of paragraph (p)(2) with some changes.

OSHA has revised the paragraph to include some additional examples of acceptable means of suppression. The agency has also added additional information to provide guidance to the employer in making evaluations of products and new technologies. These changes are considered to be editorial since the requirement of the proposal has not changed.

Paragraph (p)—Certain operations conducted under the Resource Conservation and Recovery Act of 1976 (RCRA)

In paragraph (p) of the final rule OSHA is using the language proposed in paragraph (o) with some changes.

OSHA has revised the opening paragraph of the proposal to include large quantity generators of hazardous waste that store those wastes less than 90 days within the scope of this paragraph.

In paragraphs (p)(1), (p)(2), (p)(3), and (p)(4) of the final rule OSHA has used the proposed language of paragraphs (o)(1), (o)(2), (o)(3), and (o)(4) with some minor editorial changes. The proposed requirements for each individual paragraph remain the same.

OSHA is adding two new paragraphs, (p)(5) and (p)(6), to address new technology programs and material handling programs respectively. In paragraph (p)(5) OSHA requires the employee to develop and implement procedures for using new technologies and equipment. Congress, in the SARA legislation, directed OSHA to address new technology programs in its rule. The language of the proposal limited new technology programs to uncontrolled hazardous waste sites. OSHA is adding this paragraph to complete Congress's directive and to address these programs at RCRA TSD facilities.

In paragraph (p)(6) OSHA is requiring employers to develop and implement a material handling program for the same reasons as stated above.

In paragraph (p)(7) OSHA is using the language from paragraph (o)(5) of the proposal with some changes. In paragraph (p)(7)(i) OSHA is using the language of paragraph (o)(5)(i) with one change. OSHA has moved a requirement to paragraph (p)(7)(i) from the last sentence of proposed paragraph (o)(5)(ii) that requires employers to provide employees with a certificate indicating that they have successfully completed the training required in the paragraph. OSHA believes that the issuance of this certificate will make it easier for employers to determine if new employees have completed the necessary training and are ready for employment.

In paragraph (p)(7)(ii) of the final rule OSHA is using the language from paragraph (o)(5)(ii) of the proposal with two exceptions. First, the last sentence of proposed paragraph (o)(5)(ii) has been moved to paragraph (p)(7)(i) of the final rule as discussed above. Second, the requirement for eight hours of annual refresher training is added to this paragraph. OSHA has added this requirement to this paragraph because the new format of the final rule now addresses training for new employees and current employees separately. In the proposal there was no distinction between the two groups of employees.

In paragraph (p)(7)(iii) OSHA has added a new paragraph addressing the training of trainers who will be providing the required training to employees. OSHA received many comments on trainers' qualifications. The proposed language for RCRA facilities did not address these qualifications. Therefore OSHA is now requiring that trainers be properly trained and qualified to conduct the type of training that they are expected to provide.

In paragraph (p)(8) of the final rule OSHA is addressing emergency response at RCRA facilities. Paragraph (p)(8) addresses the subject matter proposed in paragraph (1) of the proposal as a paragraph applied to RCRA TSD facilities. Most of the language used in this paragraph has been taken from proposed paragraphs (l)(1).

In paragraph (p)(8)(i) of the final rule OSHA has used some of the language from paragraph (l)(1)(i) of the proposal. The basic requirement for the development and implementation of a written emergency action plan that addresses site procedures for handling emergency response is the same in the final rule as it was in the proposal. OSHA will still permit an exemption from this paragraph if the employer totally evacuates the facility at the time of the emergency and has an emergency action plan meeting the requirements of 29 CFR 1910.38(a). OSHA considers the changes made in this paragraph to be editorial since the proposed obligations of the employer remain the same.

In paragraph (p)(8)(ii) of the final rule OSHA has used the language of proposed paragraph (l)(1)(ii). This paragraph contains the minimum elements that must be addressed in the employers emergency response plan. The basic elements of the required plan remain the same as proposed.

As stated before, training and certification of training were among many issues discussed during the rulemaking for this final rule. Several

commenters indicated that there was a need for more specific training criteria for the courses to be offered and the quality of the instructors presenting the courses. In light of those comments, OSHA has added a new paragraph (p)(8)(iii) that addresses emergency response training on RCRA TSD facilities. The language that is used in the final rule was developed from that suggested in the comments made to the record of this proceeding.

Basically OSHA is requiring that all employees who are expected to perform emergency response at RCRA TSD facilities be trained in how to safely perform emergency response duties prior to being called upon to perform those duties [See paragraph (p)(8)(iii)(A)]. Examples of the types of training to be provided have been given. Exemptions are provided in Exception #1 and Exception #2 when employee exposure is reduced through pre-emergency planning that includes development of employee awareness of hazards. OSHA is also requiring that employees who have attended and successfully completed the training that is required in paragraph (p)(8) be certified as having done so. Employers would also have to certify the continued competency of employees on an annual basis [See paragraph (p)(8)(iii)(C)].

In paragraph (p)(8)(iv) of the final rule OSHA is addressing the procedures to be used for handling emergency incidents. The language in the final rule has been taken from paragraph (1)(2)(ii) and the requirements remain the same as proposed.

Paragraph (g)—Emergency response to hazardous substance releases not previously covered

In paragraph (q) OSHA is covering those emergency response situations that occur at locations other than uncontrolled hazardous waste sites and RCRA TSD facilities. The typical site covered by this paragraph would be a transportation accident where hazardous substances are or have the potential for leaking into the environment. Other sites covered by this paragraph would include hazardous substance releases at chemical manufacturing facilities such as the release that occurred at the Union Carbide plants in Bhopal, India, and Institute, WV.

A typical scenario where this paragraph would be applicable would be the emergency response to a derailed tank car containing a hazardous substance that has begun to leak its contents into the atmosphere. The emergency response to this type of accident would usually include the first

responders (i.e., witnesses, police, employees on the train), the first dispatched-responders (i.e., the first due rescue and fire apparatus), any multiple alarm dispatches (i.e., additional fire and rescue apparatus, HAZMAT teams, state fire marshal, Coast Guard or Federal E.P.A. national response teams), and the clean-up crew (i.e., initial response employees of the site owner who clean-up the release). Employees of outside clean-up contractors would be covered by paragraphs (b) through (p).

As the clean-up scenario proceeds towards completion, the various employees on the scene will need different levels of training and protective equipment required in this paragraph.

In paragraph (q)(1) of the final rule OSHA is using the language taken from paragraph (1)(1)(i) with some minor editorial changes. OSHA wants to emphasize that employers who will evacuate their employees from the workplace when an emergency occurs and who do not permit any of their employees to assist in handling the emergency are exempt from the requirements of this paragraph if they provide an emergency action plan in accordance with § 1910.38(a).

In paragraph (q)(2) of the final rule OSHA is using the exact language of paragraph (1)(1)(ii).

In paragraph (q)(3) of the final rule OSHA is using the language proposed in paragraph (1)(3)(ii) with the following changes. In paragraph (q)(3)(i) OSHA has used the language proposed in paragraph (1)(3)(ii)(A) with some change. OSHA has deleted the requirement that the senior official responding to an hazardous substance emergency establish the Incident Command System (ICS). As a result of other requirements in this final rule, the Incident Command System should already be established prior to an emergency. The senior official responding to an incident scene should only need to take charge of the incident and begin to implement the preplanned ICS.

In paragraph (q)(3)(iv) OSHA has used the proposed language of paragraph (1)(3)(ii)(D) with a change. The proposed language required all employees engaged in emergency response and exposed to hazardous substances in any way to wear positive pressure self-contained breathing apparatus while engaged in emergency response. The final rule will require only those employees engaged in emergency response and exposed to hazardous substances "presenting an inhalation hazard or potential inhalation hazard" to wear positive pressure self-contained breathing apparatus. OSHA has made

this change since several comments suggested that some individuals engaged in emergency response may be exposed to hazardous substances that do not pose an inhalation hazard and, therefore, would negate the need for respiratory protection. Such protection would become a burden to those employees engaged in operations not requiring the use of such equipment.

In paragraph (q)(3)(vi) of the final rule OSHA has used the language of paragraph (1)(3)(ii)(F) with the following change. In the proposal OSHA called for "qualified basic life support" personnel to be present at the site. In some emergency medical service (EMS) systems the term "basic-life support (BLS)" identifies a unique group of trained individuals who have received an established level of specialized training. Typically emergency medical response begins at the first-responder level, and progresses through basic-first aid and basic-life support to advanced-life support (ALS). The amount of training and expertise increases as individuals progress through the system. As a result of several comments, OSHA has decided to reduce the level of training required for a minimum stand-by capability at a hazardous waste site. Employees trained and qualified in basic first aid have the basic skills such as initial patient assessment, maintenance of airway, control of bleeding, immobilization of fractures, and possibly cardiopulmonary resuscitation (CPR) to control injuries until a higher level responder arrives. If response time for BLS or ALS is long enough that it is necessary for this level of training to be at the site in case of an emergency, this rule does not prohibit the stationing of this level at the site. However, OSHA believes that if BLS or ALS service is available within a reasonable time, a qualified basic first aider can provide the necessary interim care.

The rest of the language in paragraph (q)(3) contains the language that was proposed in paragraph (1)(3)(ii) without change.

In paragraph (q)(4) of the final rule OSHA has used the language from paragraph (1)(3)(ii)(C) with some minor editorial changes to reflect the changes made to other paragraphs in this rule. The basic requirement for the use and training of skilled support personnel remains the same as it was proposed.

In paragraph (q)(5) of the final rule OSHA has used the language from paragraph (1)(3)(ii)(B) with one major change. OSHA has eliminated the requirement for 24 hours of training for specialist employees and has replaced it

with a requirement for annual training or demonstration of competency in their area of specialization. The required minimum hours of training was deleted because some employees may need more or may need less than 24 hours for their area of specialization. Specialized employees are by definition individuals specialized in their area of expertise and should only require whatever level of training is necessary to maintain their level of competency. OSHA considers the other changes made to the language of this paragraph to be editorial.

In paragraph (q)(6) of the final rule OSHA addresses the training requirements for employees who will be responding to hazardous materials incidents. In paragraph (q)(6) (i), (ii), (iii), and (iv) OSHA has provided tiered training criteria for those employees who may be designated as members of an emergency response team. The various levels of response and the required competency levels are based upon recognized levels of response being discussed in the hazardous materials response industry as recommended in several of the comments made during this rulemaking.

To illustrate OSHA's tiered approach to training, the following scenario describes a possible emergency response call.

A state trooper is on routine patrol along a highway passing through a residential and light industrial area of a large metropolitan city. Ahead in his path of travel, the trooper notices a multi-vehicle accident involving a large overturned tank truck. Immediately the trooper uses his radio to contact his dispatcher to report the accident. After letting the dispatcher know the location and type of accident, the trooper places his vehicle across the travel lanes of the highway approaching the accident site to stop traffic. While he is doing this the dispatcher is alerting the fire and rescue companies in the immediate area and dispatching an established number of fire and rescue vehicles. The trooper then surveys the accident scene from his vehicle trying to identify the type of cargo on the overturned truck. Seeing three different U.S. DOT placards on the vehicle the trooper makes note of the four digit numbers and checks his DOT Emergency Response Guide for a summary of actions to be taken for the chemicals identified on the placards. After determining his next on-site responsibility, he recontacts his dispatcher with the additional information and secures the scene. He stays away from the immediate accident site and does not become involved in rescue or site mitigation.

While the trooper has been securing the scene, the fire and rescue units dispatched after his first radio call begin to arrive on the scene with the additional information from the trooper's second call. The officer-in-charge (OIC) of the fire/rescue response stops his vehicles in a safe location and contacts the state trooper. After determining the type of accident and vehicles involved, the OIC takes control of the scene and directs his crews to take a predetermined defensive action in controlling a leak that has begun on the tanker. The OIC then contacts the dispatcher and reports his assessment of the accident scene including the fact that the tanker is now leaking. He requests the dispatcher to send him the closest hazardous materials response team. He also asks for representatives from the shipper of the liquid and the liquid's manufacturer.

In the meantime, firefighters have established a perimeter defense of the accident scene using fire hose lines and proper personal protective equipment. They begin to evacuate surrounding homes and businesses as indicated in the Emergency Response Guide in case the leaking tanker should explode. They construct dikes and diversion pits to contain water and chemical run-off from the fire hose lines. Rescue personnel, including emergency medical technicians, have made a preliminary assessment of the accident scene and have determined whether any individuals in the spill area are trapped in their vehicles or need immediate assistance. They report their observations to the OIC.

A decision is made by the OIC, based upon the reports of the police officer, the emergency response crew, and the data on the DOT placards, that no rescue attempts can be made safely until such time as the leaking liquid is positively identified and controlled by the HAZMAT team. The proper local authorities are notified under the requirements of SARA Title III.

As firefighters continue to provide defensive protection of the scene and as emergency medical technicians establish a triage area for the treatment of injured passengers, the HAZMAT team arrives and begins to take control of the accident scene. Hazardous materials technicians and specialists assess the scene and plan their attack on the leaking tanker.

After equipping themselves properly, the HAZMAT team makes a final, pre-attack evaluation of the scene, including a scan of the area with appropriate monitoring equipment, and reports its findings to the fire and rescue personnel.

Based upon the results of the pre-attack evaluation and a determination by HAZMAT team members using monitoring equipment that the spill area is non-hazardous, rescue personnel now enter the area of the accident to provide emergency medical treatment to injured passengers and to extricate those passengers who may have been trapped in their vehicles. The HAZMAT team proceeds to the point of release and secures the leak.

After all the injured have been cared for and after the leak has been stopped, the firefighters and HAZMAT team begin to clean-up the accident scene in accordance with pre-planned procedures.

All four levels of hazardous materials response have played a role in this scenario. The state trooper, the first on the scene, is the first responder awareness level. The first responding fire and rescue companies who provided the defensive attack are the first responder operations level. The responding HAZMAT team had both hazardous materials technicians and hazardous materials specialists. In this scenario the state trooper would have to have a sufficient amount of training, the first responding fire/rescue companies would need eight hours of training, or the HAZMAT team would need 24 hours of training. The tiered training schedule is based upon the duties and responsibilities of the individuals involved in the various levels of response illustrated in the scenario.

In paragraph (q)(7) of the final rule OSHA is addressing the competency of the trainers who will be providing the training necessary for those employees responding to hazardous materials incidents. As discussed before, several commenters were concerned that OSHA's proposal for the qualifications of trainers was too weak.

In paragraph (q)(8) of the final rule OSHA is addressing refresher training for those employees who have been trained in accordance with paragraph (q)(6). In paragraph (i)(3)(i)(A) of the proposal OSHA addressed the training of employees who perform emergency response at non-hazardous waste clean-up sites. OSHA is using this proposed language in paragraphs (q)(8)(i) and (q)(8)(ii) because the language of the proposal was intended to cover the type of emergency response now regulated by paragraph (q).

In paragraph (q)(9) of the final rule OSHA is using the language of paragraph (i)(4)(ii) of the proposal with some editorial change. The basic requirement that employees who are members of an organized or designated

HAZMAT team and hazardous materials specialists receive a baseline physical examination in accordance with paragraph (f) of this section remains the same as proposed.

In paragraph (q)(10) of the final rule OSHA is using the proposed language of paragraph (i)(4)(iii).

In paragraph (q)(11) of the final rule OSHA is using the exact language as proposed in paragraph (i)(5). In paragraph (i)(5) OSHA regulated post-emergency clean-up and the language used in that paragraph has caused some confusion. Rather than change the basic requirement, OSHA is offering the following clarification of the intent of paragraph (q)(11):

Post-emergency response can be performed by two basic groups of employees: employees of the site, or employees from off of the site. Post-emergency clean-up begins when the individual in charge of the initial emergency response declares the site to be under control and ready for clean-up. For the purposes of this rule, paragraph (q)(11) will apply to those employees who come from other employers located off-of-the-site to perform post-emergency clean-up. Employees of the employer at the site where the release occurred, and who perform post-emergency clean-up, are considered, under this rule, to be part of the initial emergency response and not subject to paragraph (q)(11). The reason for this distinction is that employees at the site are more familiar with the types of emergencies that may occur and the types of clean-up operations that may have to take place. The more hazardous exposure to employees occurs when outside contractors or other off-site employees are brought into a strange environment and are expected to clean-up the residue from a release. With this clarification, OSHA concludes that no change to the proposed language is necessary.

III. Summary of the Preliminary Regulatory Impact and Regulatory Flexibility Analysis and Environmental Impact Assessment

Introduction

Executive Order 12291 (40 FR 13197, February 19, 1981) requires that a regulatory impact analysis be conducted for any rule having major economic consequences for the national economy, individual industries, geographical regions, or levels of government. In addition, the Regulatory Flexibility Act of 1980 (Pub. L. 96-353, 94 Stat. 1184 (5 U.S.C. 601 *et seq.*)) requires the Occupational Safety and Health Administration (OSHA) to determine

whether a regulation will have a significant economic impact on a substantial number of small entities, and the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321, *et seq.*) requires the agency to assess the environmental consequences of regulatory actions.

In order to comply with these requirements, OSHA has prepared a Regulatory Impact and Regulatory Flexibility Analysis (RIA) for the hazardous waste operations and emergency response standard. This analysis includes a profile of the industries that will be affected, the estimated number of employees who are at risk from occupational exposures to hazardous wastes, technological feasibility, costs, benefits, and an overall economic impact of the standard. The RIA is available in the OSHA Docket Office.

Data Sources

The primary sources of information used for this analysis are: an April 1987 report by the Eastern Research Group (ERG) entitled, "Preparation of Data To Support a Regulatory Analysis and Environmental Assessment of the Proposed Standard for Working at Hazardous Waste Sites;" and the comments supplied in response to the Notice of Proposed Rulemaking, the comments made during the public hearings, and the post-hearing comments and submissions. The information contained in the ERG report was gathered from the Environmental Protection Agency sources, industry sources, experts in the area of hazardous waste management, etc. Consequently, OSHA believes that it has given due notice to all responsive parties and that the data used are the best available data for this final Regulatory Impact Analysis (RIA).

Industry Profile

The standard will affect about 20,000 uncontrolled hazardous waste sites; about 4,000 hazardous waste operations conducted under the Resource Conservation and Recovery Act (RCRA) of 1976, about 13,600 spills of hazardous materials that occur annually outside a fixed facility, and about 11,000 spills of hazardous material that occur annually inside a fixed facility. The firms that will be affected by this standard are as follows: about 100 contractors that perform hazardous waste site clean-ups, about 50 engineering or technical services firms that perform hazardous waste preliminary assessments or site investigations and remedial investigations or feasibility studies for hazardous waste site cleanups, about

300 RCRA-regulated commercial treatment, storage and disposal facilities; about 3,700 RCRA-regulated facilities that are operated by a hazardous waste generator; about 19,000 state and local police departments; about 28,000 fire departments; about 730 private hazardous materials (HAZMAT) response teams; and about 22,000 manufacturers that use in-hours personnel to respond to emergency spills of hazardous materials within the facility.

Population at Risk

As many as 1.758 million employees, police officers, and firefighters may be at risk from exposure to hazardous waste or to hazardous materials during an emergency response to a hazardous material spill. Of these employees, about 14,000 work at uncontrolled hazardous waste site cleanups, 32,700 at RCRA-regulated facilities, 583,200 are police officers, 944,500 are firefighters, 7,500 are private HAZMAT members, and 176,000 are members of industrial fire brigades that provide in-plant emergency responses to hazardous material spills. Most of these employees, however, do not work fulltime around hazardous waste. In fact, most police officers will not face a hazardous material emergency response and most fire fighters and industrial fire brigade personnel, who are at risk, are annually exposed to hazardous materials for only a few hours.

Feasibility

The standard does not require the use of any large-scale capital equipment that is not currently used in normal work operations. In addition, each provision requires equipment and work practices that are currently available. Thus, OSHA has determined that the standard is technologically feasible.

Benefits

This standard will protect 1.757 million employees and firefighters from health and safety hazards caused by their exposure to hazardous wastes. The benefits of this standard are quantified in Chapter 3 of the Final Regulatory Analysis (FRA). The FRA indicates that this standard will prevent 20 cancer deaths per year and from 6 to 20 deaths per year from cardiovascular, neurological, renal and liver disorders. The standard will also prevent 1,925 injuries per year involving 18,700 lost work days. The FRA also estimates that 6 fatalities that are not illness related will be prevented. This last figure is likely to be an underestimate. Individual incidents which are discussed in

Chapter 3 and which may have been prevented by following the standard have sometimes led to more than 6 deaths. Also, the FRA does not take into account the benefits to the surrounding, non-worker community derived from the better handling of hazardous waste and emergency response incidents by the more qualified, properly trained and equipped response teams that are likely to result from compliance with this standard.

Chapter 3 of the FRA also presents risk rates. For example, the 17 excess cancer deaths per 1000 exposed hazardous waste workers for an occupational lifetime of exposures is likely to be reduced by 75 per cent.

OSHA concludes therefore, that this standard will substantially reduce the significant risk of material impairment of health which results from exposure to hazardous waste either at hazardous waste operations or from emergency response.

However, section 126 of SARA gives OSHA clear statutory directions to issue this standard and is reasonably explicit about what type of provisions should be included. Section 126 is also a free standing provision and not an amendment to the OSH Act. Accordingly, it evidences a legislative intent to issue these regulations without the specific need to quantify benefits and reach significant risk conclusions.

Cost of Compliance

OSHA used current work practices as its baseline for estimating the cost of full compliance with the standard. This estimated cost does not include any cost that is currently being incurred by employers as part of their work practices because those work practices, and therefore those costs, would continue whether or not the final standard were promulgated.

OSHA estimated that the total annualized incremental cost of full compliance with the standard will be about \$133.422 million, of which \$27.986 million will be spent by contractors on government-mandated clean-ups of uncontrolled hazardous waste sites. \$18.372 million will be spent by RCRA-regulated facility cleanups and operations, \$17.332 million will be spent by police departments, \$50.553 million will be spent by fire departments, \$4.226 million will be spent by private HAZMAT teams, and \$29.179 million will be spent by industrial fire brigades. The provision with the largest annual cost of compliance is the employee training provision (\$92.978 million), followed by the medical surveillance provision (\$11.293 million), the use of escape self-contained breathing

apparatus (\$9.507 million), and the written plan to minimize employee exposure to hazardous materials during postemergency cleanups of hazardous materials spills (\$8.381 million).

Economic Impacts

Most of the incremental cost of compliance will be paid by the government or the private firm responsible for the hazardous waste cleanup. OSHA calculated that it is economically feasible for every affected industry or group to comply with the standard. There may be an impact upon some labor markets as a consequence of the provision that only sufficiently experience employees, or employees certified to have received the necessary training at an appropriate training facility, will be allowed to work on hazardous waste sites. This provision will effectively curtail the current practice of using local subcontractors to provide short-term employees for hazardous waste site cleanups and limit the number of employees eligible to work at hazardous waste sites. This in turn, may increase future wage rates and the cost of hazardous waste site cleanups.

Regulatory Flexibility Analysis

Pursuant to the Regulatory Flexibility Act of 1980, the Assistant Secretary has assessed the expected impacts of the standard on small entities. Based on the available information, OSHA determined that the standard may have some impact upon some small entities. The cost of adequately training an employee off-site prior to working at a hazardous waste site cleanup will substantially reduce the use of subcontractor labor on a one-time basis. Thus, some local subcontractors face a potential reduction in hazardous waste site cleanup work. The majority of this subcontracted work will probably be performed by those subcontractors who concentrate upon this type of work. Subcontractors who have performed cleanup work but who do not elect to train employees needed to qualify for future work will probably be excluded from working in this market.

In addition, there could be an economic impact upon some small local fire departments depending upon the amount of financial resources available to them for additional training. With the allowance for different amounts of training hours depending upon the expected extent of involvement with hazardous materials spills, OSHA believes that this economic impact will not significantly affect a substantive number of local fire departments.

Environmental Impact Assessment—Finding of No Significant Impact

OSHA reviewed the final standard and concluded that no significant environmental impacts are likely to result from its promulgation. In OSHA's December 19, 1986, interim final rule for the protection of workers engaged in hazardous waste and emergency response operations, information was solicited from the public on various issues, including possible environmental impacts of the regulation. On the basis of the review detailed below, and in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq.), the Council on Environmental Quality (CEQ) NEPA regulations (40 CFR Part 1500 et seq.), and the Department of Labor's implementing regulations for NEPA compliance (29 CFR Part 11), the Assistant Secretary determined that the standard will not have a significant impact on the external environment.

In most OSHA regulatory actions, two environments may be affected: (1) The workplace environment, and (2) the general human environment external to the workplace, including impacts on air and water pollution, solid waste, and energy and land use. The hazardous waste standard, however, is unique, that it focuses on the external environment because during these operations, the workplace and the external environment are usually one and the same. The standard is also unusual in that it is the first regulation since the passage of the Occupational Safety and Health Act of 1970 (the Act) to be mandated specifically by Congress under section 126 of the Superfund Amendments and Reauthorization Act (SARA). As indicated in the earlier sections of this Notice, the provisions of section 126 detail those protections that OSHA must include for workers at hazardous waste and emergency response operations. For example, section 126 requires that provisions for site analysis, training, and medical surveillance, among others, be included in the standard. In addition, there is a wide range of OSHA, EPA, and other standards that already apply to some activities that occur at hazardous waste sites and during emergency response operations. For example, there are existing OSHA standards that cover construction activities, onsite machinery and equipment, selection and use of personal protective equipment, handling of toxic and explosive materials, and general environmental and safety issues such as walking-working surfaces, noise, and illumination. Moreover, the final

standard, in many instances either reflects OSHA regulations, procedures adopted by other federal agencies (e.g., EPA), or practices that are commonly used by those knowledgeable in hazardous waste and emergency response operations. To the extent that existing standards, rules, or standard operating procedures are incorporated into this rule, no significant change in the environment is anticipated.

Potential Positive Environmental Effects

While OSHA does not anticipate any significant environmental effects as a result of this standard, there is a potential for some beneficial impacts. In general, as the work practices and procedures requirements of the standard reduce the incidence of employee injury, an indirect result should be a reduction in the likelihood of environmental releases of hazardous materials. (Virtually all provisions of the standard can be categorized in this manner, because once they are implemented, they will have a positive influence on worker safety.) As these requirements also provide guidance for routine reactions to situations encountered in emergencies, they may help to reduce the severity of such emergencies. Additional potentially positive impacts might be categorized as follows: (1) Direct benefits associated with reduced incidences in, or the severity of, the release of hazardous materials, and (2) indirect benefits associated with the improved flow of information and increased worker awareness of hazardous materials or with improved worker preparedness (either for normal site operations or for unexpected accidents). The following discussion highlights those provisions with potentially beneficial environmental effects.

Monitoring (h). The requirements of this provision will increase the amount of monitoring for airborne hazardous substances at uncontrolled hazardous waste sites. In some cases, hazardous materials will be detected, and steps will be taken to more quickly control the release to the atmosphere, thereby providing an environmental benefit.

Handling drums and containers (j). A number of specific requirements of this paragraph will result in potentially positive environmental impacts. Relevant subsections include: inspecting drums and containers; making salvage drums or absorbents available; initiating a spill containment program; emptying unsound drums and containers; requiring ground penetrating radar; and decontaminating equipment. These are discussed briefly in the following sections.

Inspection of drums/containers before moving (j)(1)(iii). This section requires that drums and containers be inspected for their integrity prior to handling and moving. Under current practices at hazardous waste cleanup sites, drums and containers are often handled with mechanized equipment (e.g., a barrel grapple on a backhoe arm) before being inspected, if unsound drums rupture or leak, any solid contaminated by the rupture or leak is removed for disposal upon completion of drum handling operations. This provision will, through worker awareness, increase the probability of averting ruptures and leakage. In addition, any hazardous materials in containers that cannot be moved without rupturing will have to be transferred to safe containers (as required in paragraph (j)(1)(ix)), with obvious positive environmental effect. These procedures will reduce the volume of contaminated soil requiring disposal and will also lower the possibility that leachate or runoff will carry contaminants offsite. This requirement does not have an impact on emergency response actions because the routines outlined are already standard procedure.

Availability of salvage drums/absorbents (j)(1)(vii). This provision specifies that salvage drums or containers as well as suitable amounts of proper absorbent be kept available for use in areas where spills, leaks, or ruptures might occur. This requirement will result in increased availability of salvage drums and spill absorbents at uncontrolled hazardous waste sites and in emergency response situations where spills are imminent, thereby reducing the environmental consequences related to spills of hazardous materials. In those instances where salvage drums/absorbents would have been inadequate without this requirement, there is a potential benefit to the environment.

Implement a spill containment program (j)(1)(viii). The purpose of this provision is to develop a program to be implemented, in the event of a major spill, that would contain and isolate hazardous materials being transferred into containers and drums. To the extent that this program is implemented, there will be a potential for reducing the negative environmental effects that occur as a result of spills, leakage, etc. This requirement will reduce the environmental impact of potential spills at cleanup sites.

Empty unsound drum/containers (j)(1)(ix). Unsound containers often rupture during handling operations. This provision requires that drums and containers that cannot be moved

without spillage, leakage, or rupture be emptied into a sound container. This requirement will reduce the incidence of drum and container rupture and will provide concomitant environmental benefits.

Use of a ground penetrating system to estimate depth and location of containers (j)(1)(x). At present, when preliminary investigations at hazardous waste sites indicate that buried drums or containers may be present, ground penetrating systems are frequently used to determine the depth and location of the drums. The requirements of this provision will very likely cause an increase in the use of these systems, thereby reducing the number of instances in which buried containers would go undetected or where undetected containers would be accidentally ruptured during excavation activities. Where it applies, the requirement will help prevent accidental ruptures and spills, improve the thoroughness of remedial actions, and benefit the site environment.

Develop Decontamination Procedures (k). The requirement to clean and decontaminate equipment, personnel, and personal protective equipment will prevent the migration of hazardous substances offsite, thereby benefitting the surrounding environment. It will also eliminate or minimize the contamination of personnel. Decontamination is already standard practice at most cleanup sites.

Inform Contractors of Existing Hazards (b)(1)(iv). Under this provision, contractors are to be informed of any "fire, explosion, health or other safety hazards" that are present. By ensuring that contractors know the location and nature of site hazards, this requirement will reduce the possibility that contractor activities will result in inadvertent releases or spills of hazardous materials.

Gather information Before Site Entry (c)(4). Among the various requirements for site evaluation are those for information to be gathered regarding the (a) pathways for hazardous substance dispersion, and (b) status and capability of emergency response teams. These procedural requirements will result in an increased ability to predict and prevent movement offsite of hazardous materials, will mitigate emergency situations quickly and effectively, and will reduce the possibility or severity of contaminant release. As the requirements of the section mirror current practices, compliance will be accomplished with little difficulty.

Provide Worker Training (e). The training requirement will assure that site

activities will be carried out by qualified personnel, with the knowledge and ability to fulfill their job functions in a safe and responsible manner. To the extent that this occurs, there will be a potential benefit to the environment (in emergency-response situations, similar benefits accrue from emergency response training and RCRA-regulated facility employee training.) For example, worker training will result in a more careful handling of materials accompanied by a reduction in the potential for inadvertent spills, improper disposal, etc. In emergency situations this training will assure a more efficient and effective cleanup of hazardous materials or a quicker response to avert further hazardous material releases.

Informational Programs (i). These provisions include requirements for a site safety and health plan, pre-entry briefings, and site inspections. These requirements will not directly affect the existing environment; their purpose is to provide workers with the information necessary to carry out their activities safely. To the extent that this occurs, there will be a potential benefit to the environment. For example, implementing comprehensive site plans will reduce the incidence of accident releases of hazardous materials. Similarly, requiring pre-entry briefings will reduce the likelihood of employees unknowingly encountering contaminants or allowing their improper release or disposal.

Emergency Response Plan (l) and (r). The development and implementation of a response plan for on-site and off-site emergencies will provide for greater worker preparedness. In emergencies, workers will be able to respond more quickly and effectively, thereby benefitting the environment.

Potentially Negative Impacts

In some situations, there may be a potential for negative effects on the environment as a result of the standard. Any potential negative impacts, however, are not expected to be significant. To illustrate this, negative impacts may occur if there is an increase in the time required to implement specific cleanup and spill response activities, or to implement safe work practices or procedures required by the standard. Any such effects are likely to be negligible, however, since response teams already have established operating procedures similar to those in OSHA's standard.

Another potential negative impact may result from the requirement that salvage drums and absorbents be readily available. This may increase the number of repacked hazardous waste

drums and the amount of spent absorbent used, which could add to the amount of material that would require safe disposal. Similarly, the requirements for implementation of proper decontamination procedures for all equipment, personal protective gear, and personnel at hazardous waste emergencies, cleanup sites, and RCRA sites may result in an increase in the frequency and use of decontamination materials. This, in turn, could generate a larger volume of spent decontamination fluids which would then require proper handling and disposal. Again, any such impact should be negligible since decontamination is largely standard procedure for most hazardous waste operations. A possible exception may be during activities that take place in the early stages of site evaluation before cleanup, or at spill response, where decontamination procedures are not yet standardized.

Conclusion

To the extent that the work practices and procedures are implemented, increased worker awareness and preparedness will result in a safer and more healthful work environment, which may indirectly benefit the environment. Any negative impacts that may occur as a result of the implementation of these work practices or procedures are expected to be negligible. Based on this assessment and the information presented earlier in the preamble, OSHA concludes that no significant environmental changes are anticipated as a result of the standard.

IV. International Trade

OSHA has evaluated the potential impact that this final standard would have upon international trade. OSHA has determined that the final standard would have a minimal potential impact upon the prices of products, so that there would be no effective change in the level of exported or imported products.

V. OMB Approval Under the Paperwork Reduction Act

This section contains a collection of information pertaining to the preparation of a written safety and health plan, site characterization and analysis, site control, training, medical surveillance, emergency controls, work practices, PPE, monitoring, informational programs, handling drums and containers, decontamination, emergency response planning, and emergency response drills. OMB has reviewed these collections and has approved them under approval number 1218-0739.

VI. Public Reporting Burden

Public reporting burden for the collection of information identified in paragraph IV above is estimated to average 1.7 hours per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other suggestions for reducing this burden to the Director, Directorate of Safety Standards Programs, OSHA Room N-3605, U.S. Department of Labor, Washington, DC 20210; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

VII. State Plan States

This Federal Register document amends an interim final rule (section 1910.120, "Hazardous Waste Operations and Emergency Response") in Subpart H of 29 CFR Part 1910, OSHA's general industry standards on hazardous materials. The 23 states with their own OSHA approved occupational safety and health plans must develop a comparable standard applicable to both the private and public (state and local government employees) sectors within six months of the publication date of this permanent final rule or show OSHA why there is no need for action, e.g., because an existing state standard covering this area is already "at least as effective" as the new Federal standard. These states are Alaska, Arizona, California (for state and local government employees only), Connecticut (for state and local government employees only), Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, New York (for state and local government employees only), North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Virgin Islands, Washington, and Wyoming. After the effective date of this final rule, until such time as a state standard is promulgated, Federal OSHA will provide interim enforcement assistance, as appropriate, in these states.

VIII. Federal and State Coverage of the Public Sector and Volunteers

Federal OSHA is specifically precluded by section 3(5) of the Occupational Safety and Health Act from covering employees of any State -- political subdivision thereof. However, States that elect to have their own occupational safety and health program

under a plan approved and monitored by OSHA under section 18(b) of the Act are required to extend their coverage to these employees (see section VII of this preamble for a list of these states). Thus, a State hazardous waste operations standard that is either identical to or at least as effective as this Federal OSHA standard will apply to public sector as well as private sector employees in these States. Public sector employees in States without State plans will be protected from exposure to hazardous waste under Title I, section 126(f) of the Superfund Amendments and Reauthorization Act of 1986 (SARA), administered by the U.S. Environmental Protection Agency (EPA). This section requires EPA to promulgate, within 90 days of the promulgation date of this Federal OSHA standard, an identical standard that applies to employees of State and local governments in each State which does not have an OSHA-approved State plan.

OSHA's hazardous waste operations standard and the identical or equivalent standards which will be promulgated by States with OSHA-approved State plans apply under certain circumstances to volunteer firefighters and other volunteers engaged in emergency response operations or hazardous waste operations within the scope of these standards (see paragraphs (a) (1) and (2) of this standard). In many communities, fire and other emergency response services are provided by volunteer companies. In some cases, these companies are established as independent, private sector entities. In others, they are considered a component of State or local government (see 29 CFR 1975.5 for factors to consider in determining whether or not an entity is a public agency). A volunteer working for a public or private entity in a State with an OSHA-approved State plan must be considered an employee under State law in order to be covered by the State's hazardous waste operations and emergency response standard—for example, because of an employer-employee relationship or because of pay, retirement benefits, health insurance coverage, workers' compensation benefits, etc. This determination is made by each State as part of its standards promulgation process. In a State without an OSHA-approved State plan, a private entity fire company with one or more paid employees would be covered under this Federal standard (29 CFR 1975.4).

IX. Federalism

This final regulation has been reviewed in accordance with Executive Order 12612 (52 FR 41685; October 30,

1987) regarding Federalism. Executive Order 12612 requires that agencies, to the extent possible, refrain from limiting state policy options, consult with states prior to taking any actions that would restrict state policy options, and take such actions only when there is clear constitutional authority and the presence of a problem of national scope. The Executive Order provides for preemption of state law only if there is a clear Congressional intent for the Agency to do so. Any such preemption is to be limited to the extent possible.

During the development of this rule, OSHA has, to the extent possible, refrained from limiting state policy options by developing a rule that permits flexibility on the part of the States through the use of performance language. We have also consulted with the States, in particular those states with approved state OSHA plans, during the public hearings and comment period called for in the notice of proposed rulemaking for this rule. We will continue to work with the States that have state occupational safety and health plans approved under section 18 of the OSHA Act to encourage those states to develop their own policies to achieve program objectives and continue to work with appropriate state officials as they present their state standards for approval.

This rulemaking is directed by Congress under the Superfund Amendments and Reauthorization Act of 1986 (SARA). The Constitutional authority and Congressional intent for Federal action in the area of worker protection standards for employees engaged in hazardous waste operations is mandated clearly in section 126 of SARA. Congress therefore has identified the protection of employees engaged in hazardous waste operations and emergency response as a problem of national scope through the enactment of SARA.

Section 18 of the Occupational Safety and Health Act (OSH Act), permits any state to develop its own independent state occupational safety and health program. Any state may develop and submit to OSHA, for approval and use, a state occupational safety and health program that provides, among other things, worker protection "at least as effective as" that protection provided under the Federal program.

With respect to Section 4 of Executive Order 12612, Section 18 of the OSH Act also expresses Congress' clear intent to preempt state laws relating to issues with respect to which Federal OSHA has promulgated occupational safety or health standards. Under the OSH Act, a

state can avoid preemption only if it submits, and obtains Federal OSHA approval of, a plan for the development of such standards and their enforcement as mentioned above. Occupational safety and health standards developed by such approved Plan-States must, among other things, be as least as effective in providing safe and healthful employment and places of employment as the Federal standards.

OSHA has used its regulatory preemption of State law to the minimum level necessary to achieve the objectives of the OSH Act and section 126 of SARA.

Section 126 of SARA, under paragraph (f), requires that the U.S. Environmental Protection Agency (EPA) provide those state and local government workers who are not covered by the protections of approved OSHA state plans with protection that is identical to that provided under the Federal OSHA standards. Non-state and local government employees would be regulated by the Federal OSHA standard. State and local government workers, employed in 25 non-OSHA state plan states, would not normally be covered by standards promulgated under Federal OSHA or approved state OSHA programs. OSHA has worked with EPA in the development of this final rule to assure that the protections provided to all state and local government employees is consistent with that provided by the Federal OSHA standard and the OSH Act. EPA as the regulatory authority for the non-OSHA state plan states will address their actions with respect to worker protection policies that have federalism implications in their rulemaking.

This final rule is written so that employees engaged in hazardous waste operations and related emergency response operations in every state, including those state and local government employees in states regulated by EPA, would be protected by general, performance oriented standards. To the extent that there are state or regional peculiarities caused by the types of hazardous waste operations, including the types of related emergency response provided, states with occupational safety and health plans approved by OSHA under section 18 of the OSH Act would be able to develop their own state standards to address any special problems. This would assure the compatibility of state or local emergency response plans developed independently by state or local emergency planning committees under Title III of SARA with Federal

worker protection standards issued by OSHA and EPA.

And, under the OSH Act, if a state develops its own OSHA approved state program, it could make additional requirements in its standards. States that will be covered by regulations issued by EPA under paragraph 128(f) of SARA will be provided the same option. Moreover, the performance nature of this final rule, of and by itself, allows for flexibility by states and owners or operators of hazardous waste sites or providers of emergency response to provide as much safety as possible using varying methods consonant with the conditions in each state.

In summary, there is a clear national problem, identified by Congress, related to occupational safety and health in hazardous waste operations and related emergency response. While the individual states, if all acted collectively, might be able to deal with the safety problems involved, most have not elected to do so in the seventeen years since the enactment of the OSH Act. Those states which have elected to participate under section 18 of the OSH Act, would not be preempted by this final regulation and would be able to address special, local conditions within the framework provided by this performance oriented standard while ensuring that their standards are at least as effective as the Federal standard. State comments were invited on the proposal and those that were submitted to the record were fully considered prior to promulgation of this Final Rule.

The agency certifies that this document has been assessed in light of the principles, criteria, and requirements stated in sections 2 through 3 of Executive Order 12621. There are no provisions of this rulemaking that are inconsistent with the principles, criteria, and requirements stated in sections 2 through 3 of Executive Order 12621. States which have approved state occupational safety and health plans may incur additional costs associated with standards development and enforcement as a result of this rulemaking. Funding for these approved state plan programs is available from OSHA under section 18 of the OSH Act. This rulemaking would not change the State's ability to discharge traditional State governmental functions or other aspects of State sovereignty.

An outline of § 1910.120 is included for the convenience of the reader as follows:

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- ##### (i) Informational programs.
- (1) Handling drums and containers.
 - (1) General.
 - (2) Opening drums and containers.
 - (3) Material handling equipment.
 - (4) Radioactive wastes.
 - (5) Shock sensitive wastes.
 - (6) Laboratory waste packs.
 - (7) Sampling of drum and container contents.
 - (8) Shipping and transport.
 - (9) Tank and vault procedures.

(k) Decontamination.

- (1) General.
 - (2) Decontamination procedures.
 - (3) Location.
 - (4) Equipment and solvents.
 - (5) Personal protective clothing and equipment.
 - (6) Unauthorized employees.
 - (7) Commercial laundries or cleaning establishments.
 - (8) Showers and change rooms.
- ##### (l) Emergency response by employees at uncontrolled hazardous waste sites.
- (1) Emergency response plan.
 - (2) Elements of an emergency response plan.
 - (3) Procedures for handling emergency incidents.

(m) Illumination.

(n) Sanitation at temporary workplaces.

- (1) Potable water.
- (2) Nonpotable water.
- (3) Toilets facilities.
- (4) Food handling.
- (5) Temporary sleeping quarters.
- (6) Washing facilities.
- (7) Showers and change rooms.

(o) New technology programs.

(p) Certain Operations Conducted Under the Resource Conservation and Recovery Act of 1976 (RCRA).

- (1) Safety and health program.
 - (2) Hazard communication program.
 - (3) Medical surveillance program.
 - (4) Decontamination program.
 - (5) New technology program.
 - (6) Material handling program.
 - (7) Training program.
 - (i) New employees.
 - (ii) Current employees.
 - (iii) Trainers.
 - (8) Emergency response program.
 - (i) Emergency response plan.
 - (ii) Elements of an emergency response plan.
 - (iii) Training.
 - (iv) Procedures for handling emergency incidents.
- ##### (q) Emergency response to hazardous substance releases by employees not previously covered.
- (1) Emergency response plan.
 - (2) Elements of an emergency response plan.
 - (3) Procedures for handling emergency response.

- (4) Skilled support personnel.
- (5) Specialist employees.
- (6) Training.
 - (i) First responder awareness level.
 - (ii) First responder operations level.
 - (iii) Hazardous materials technician.
 - (iv) Hazardous materials specialist.
 - (v) On scene commander.
- (7) Trainers.
- (8) Refresher training.
- (9) Medical surveillance and consultation.
- (10) Chemical protective clothing.
- (11) Post-emergency response operations.

Appendices to § 1910.120—Hazardous Waste Operations and Emergency Response

Appendix A—Personnel Protective Equipment Test Methods.

Appendix B—General Description and Discussion of the Levels of Protection and Protective Gear.

Appendix C—Compliance Guidelines.

Appendix D—References.

List of Subjects in 29 CFR Part 1910

Containers. Drums. Emergency response. Flammable and combustible liquids. Hazardous materials. Hazardous substances. Hazardous wastes. Incorporation by reference. Materials handling and storage. Personal protective equipment. Storage areas. Training. Waste disposal.

Authority

This document has been prepared under the direction of John A. Pendergrass, Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue NW., Washington, DC 20210. Pursuant to section 128 of the Superfund Amendments and Reauthorization Act of 1986 as amended (Pub. L. 99-499, 100 Stat. 1690 as amended by Pub. L. 100-202, section 101(f), 101 Stat. 1329-198, 29 U.S.C. 655 note), sections 6 and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 655, 657), section 4 of the Administrative Procedures Act (5 U.S.C. 553), 29 CFR Part 1911 and Secretary of Labor's Order 9-83 (48 FR 35738), it is proposed to amend 29 CFR Part 1910 by revising § 1910.120, Hazardous Waste Operations and Emergency Response, as set forth below.

Signed at Washington, DC this 28th day of February 1989.

John A. Pendergrass,
Assistant Secretary of Labor.

PART 1910—OCCUPATIONAL SAFETY AND HEALTH STANDARDS

1. The authority citation for Subpart H

of Part 1910 is amended by adding the following paragraph:

Authority: . . .

Section 1910.120 issued under the authority of section 128 of the Superfund Amendments and Reauthorization Act of 1986 as amended (29 U.S.C. 655 note), sections 6 and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 655, 657), section 4 of the Administrative Procedure Act (5 U.S.C. 553), 29 CFR Part 1911 and Secretary of Labor's Order 9-83 (48 FR 35738).

2. Section 1910.120 of Title 29 of the Code of Federal Regulations is revised to read as follows:

§ 1910.120 Hazardous waste operations and emergency response.

(a) *Scope, application, and definitions*—(1) *Scope*. This section covers the following operations, unless the employer can demonstrate that the operation does not involve employee exposure or the reasonable possibility for employee exposure to safety or health hazards:

(i) Clean-up operations required by a governmental body, whether Federal, state, local or other involving hazardous substances that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the EPA's National Priority Site List (NPL), state priority site lists, sites recommended for the EPA NPL, and initial investigations of government identified sites which are conducted before the presence or absence of hazardous substances has been ascertained);

(ii) Corrective actions involving clean-up operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA) as amended (42 U.S.C. 6901 *et seq.*);

(iii) Voluntary clean-up operations at sites recognized by Federal, state, local or other governmental bodies as uncontrolled hazardous waste sites;

(iv) Operations involving hazardous wastes that are conducted at treatment, storage, and disposal (TSD) facilities regulated by 40 CFR Parts 264 and 265 pursuant to RCRA; or by agencies under agreement with U.S.E.P.A. to implement RCRA regulations; and

(v) Emergency response operations for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard.

(2) *Application*. (i) All requirements of Part 1910 and Part 1926 of Title 29 of the Code of Federal Regulations apply

pursuant to their terms to hazardous waste and emergency response operations whether covered by this section or not. If there is a conflict or overlap, the provision more protective of employee safety and health shall apply without regard to 29 CFR 1910.5(c)(1).

(ii) Hazardous substance clean-up operations within the scope of paragraphs (a)(1)(i) through (a)(1)(iii) of this section must comply with all paragraphs of this section except paragraphs (p) and (q).

(iii) Operations within the scope of paragraph (a)(1)(iv) of this section must comply only with the requirements of paragraph (p) of this section.

Exceptions: For large quantity generators of hazardous waste who store those wastes less than 90 days and for small quantity generators of hazardous wastes, who have emergency response teams that respond to releases of, or substantial threats of releases of, hazardous substances, for their RCRA workplaces only paragraph (p)(6) of this section is applicable. Such generators of hazardous wastes who do not have emergency response teams that respond to releases of, or substantial threats of releases of, hazardous substances are exempt from the requirements of this section.

(iv) Emergency response operations for releases of, or substantial threats of releases of, hazardous substances which are not covered by paragraphs (a)(1)(i) through (a)(1)(iv) of this section must only comply with the requirements of paragraph (q) of this section.

(3) *Definitions*—“*Buddy system*” means a system of organizing employees into work groups in such a manner that each employee of the work group is designated to be observed by at least one other employee in the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

“*Clean-up operation*” means an operation where hazardous substances are removed, contained, incinerated, neutralized, stabilized, cleared-up, or in any other manner processed or handled with the ultimate goal of making the site safer for people or the environment.

“*Decontamination*” means the removal of hazardous substances from employees and their equipment to the extent necessary to preclude the occurrence of foreseeable adverse health effects.

“*Emergency response*” or “*responding to emergencies*” means a response effort by employees from outside the

immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance. Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel are not considered to be emergency responses within the scope of this standard. Responses to releases of hazardous substances where there is no potential safety or health hazard (i.e., fire, explosion, or chemical exposure) are not considered to be emergency responses.

"Facility" means (A) any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, storage container, motor vehicle, rolling stock, or aircraft; or (B) any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any water-borne vessel.

(3) **"Hazardous materials response (HAZMAT) team"** means an organized group of employees, designated by the employer, who are expected to perform work to handle and control actual or potential leaks or spills of hazardous substances requiring possible close approach to the substance. The team members perform responses to releases or potential releases of hazardous substances for the purpose of control or stabilization of the incident. A HAZMAT team is not a fire brigade nor is a typical fire brigade a HAZMAT team. A HAZMAT team, however, may be a separate component of a fire brigade or fire department.

"Hazardous substance" means any substance designated or listed under paragraphs (A) through (D) of this definition, exposure to which results or may result in adverse effects on the health or safety of employees:

(A) Any substance defined under section 101(14) of CERCLA;

(B) Any biological agent and other disease-causing agent as defined in section 101(33) of CERCLA;

(C) Any substance listed by the U.S. Department of Transportation as hazardous materials under 49 CFR 172.101 and appendices; and

(D) Hazardous waste as herein defined.

"Hazardous waste" means—

(A) A waste or combination of wastes as defined in 40 CFR 261.3, or

(B) Those substances defined as hazardous wastes in 49 CFR 171.8.

"Hazardous waste operation" means any operation conducted within the scope of this standard.

"Hazardous waste site" or "Site" means any facility or location within the scope of this standard at which hazardous waste operations take place.

"Health hazard" means a chemical, mixture of chemicals or a pathogen for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. It also includes stress due to temperature extremes. Further definition of the terms used above can be found in Appendix A to 29 CFR 1910.1200.

"IDLH" or "Immediately dangerous to life or health" means an atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere.

"Oxygen deficiency" means that concentration of oxygen by volume below which atmosphere supplying respiratory protection must be provided. It exists in atmospheres where the percentage of oxygen by volume is less than 19.5 percent oxygen.

"Permissible exposure limit" means the exposure, inhalation or dermal permissible exposure limit specified in 29 CFR Part 1910, Subparts G and Z.

"Published exposure level" means the exposure limits published in "NIOSH Recommendations for Occupational Health Standards" dated 1986 incorporated by reference, or if none is specified, the exposure limits published in the standards specified by the American Conference of Governmental Industrial Hygienists in their publication "Threshold Limit Values and Biological Exposure Indices for 1987-88" dated 1987 incorporated by reference.

"Post emergency response" means that portion of an emergency response performed after the immediate threat of a release has been stabilized or

eliminated and clean-up of the site has begun. If post emergency response is performed by an employer's own employees who were part of the initial emergency response, it is considered to be part of the initial response and not post emergency response. However, if a group of an employer's own employees, separate from the group providing initial response, performs the clean-up operation, then the separate group of employees would be considered to be performing post-emergency response and subject to paragraph (g)(11) of this section.

"Qualified person" means a person with specific training, knowledge and experience in the area for which the person has the responsibility and the authority to control.

"Site safety and health supervisor (or official)" means the individual located on a hazardous waste site who is responsible to the employer and has the authority and knowledge necessary to implement the site safety and health plan and verify compliance with applicable safety and health requirements.

"Small quantity generator" means a generator of hazardous wastes who in any calendar month generates no more than 1,000 kilograms (2,205 pounds) of hazardous waste in that month.

"Uncontrolled hazardous waste site" means an area where an accumulation of hazardous waste creates a threat to the health and safety of individuals or the environment or both. Some sites are found on public lands, such as those created by former municipal, county or state landfills where illegal or poorly managed waste disposal has taken place. Other sites are found on private property, often belonging to generators or former generators of hazardous waste. Examples of such sites include, but are not limited to, surface impoundments, landfills, dumps, and tank or drum farms. Normal operations at TSD sites are not covered by this definition.

(b) *Safety and health program.*

Note to (b): Safety and health programs developed and implemented to meet other Federal, state, or local regulations are considered acceptable in meeting this requirement if they cover or are modified to cover the topics required in this paragraph. An additional or separate safety and health program is not required by this paragraph.

(1) *General.* (i) Employers shall develop and implement a written safety and health program for their employees involved in hazardous waste operations. The program shall be designed to identify, evaluate, and control safety and health hazards, and provide for

emergency response for hazardous waste operations.

(ii) The written safety and health program shall incorporate the following:

(A) An organizational structure;

(B) A comprehensive workplan;

(C) A site-specific safety and health plan which need not repeat the employer's standard operating procedures required in paragraph (b)(1)(ii)(F) of this section;

(D) The safety and health training program;

(E) The medical surveillance program;

(F) The employer's standard operating procedures for safety and health; and

(G) Any necessary interface between general program and site specific activities.

(iii) *Site excavation.* Site excavations created during initial site preparation or during hazardous waste operations shall be shored or sloped as appropriate to prevent accidental collapse in accordance with Subpart P of 29 CFR Part 1926.

(iv) *Contractors and sub-contractors.* An employer who retains contractor or sub-contractor services for work in hazardous waste operations shall inform those contractors, sub-contractors, or their representatives of the site emergency response procedures and any potential fire, explosion, health, safety or other hazards of the hazardous waste operation that have been identified by the employer, including those identified in the employer's information program.

(v) *Program availability.* The written safety and health program shall be made available to any contractor or subcontractor or their representative who will be involved with the hazardous waste operation; to employees; to employee designated representatives; to OSHA personnel, and to personnel of other Federal, state, or local agencies with regulatory authority over the site.

(2) *Organizational structure part of the site program.*—(i) The organizational structure part of the program shall establish the specific chain of command and specify the overall responsibilities of supervisors and employees. It shall include, at a minimum, the following elements:

(A) A general supervisor who has the responsibility and authority to direct all hazardous waste operations.

(B) A site safety and health supervisor who has the responsibility and authority to develop and implement the site safety and health plan and verify compliance.

(C) All other personnel needed for hazardous waste site operations and emergency response and their general functions and responsibilities.

(D) The lines of authority, responsibility, and communication.

(ii) The organizational structure shall be reviewed and updated as necessary to reflect the current status of waste site operations.

(3) *Comprehensive workplan part of the site program.* The comprehensive workplan part of the program shall address the tasks and objectives of the site operations and the logistics and resources required to reach those tasks and objectives.

(i) The comprehensive workplan shall address anticipated clean-up activities as well as normal operating procedures which need not repeat the employer's procedures available elsewhere.

(ii) The comprehensive workplan shall define work tasks and objectives and identify the methods for accomplishing those tasks and objectives.

(iii) The comprehensive workplan shall establish personnel requirements for implementing the plan.

(iv) The comprehensive workplan shall provide for the implementation of the training required in paragraph (e) of this section.

(v) The comprehensive workplan shall provide for the implementation of the required informational programs required in paragraph (i) of this section.

(vi) The comprehensive workplan shall provide for the implementation of the medical surveillance program described in paragraph (f) of this section.

(4) *Site-specific safety and health plan part of the program.*—(i) *General.* The site safety and health plan, which must be kept on site, shall address the safety and health hazards of each phase of site operation and include the requirements and procedures for employee protection.

(ii) *Elements.* The site safety and health plan, as a minimum, shall address the following:

(A) A safety and health risk or hazard analysis for each site task and operation found in the workplan.

(B) Employee training assignments to assure compliance with paragraph (e) of this section.

(C) Personal protective equipment to be used by employees for each of the site tasks and operations being conducted as required by the personal protective equipment program in paragraph (g)(5) of this section.

(D) Medical surveillance requirements in accordance with the program in paragraph (f) of this section.

(E) Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment to be used.

(F) Site control measures in accordance with the site control program required in paragraph (d) of this section.

(G) Decontamination procedures in accordance with paragraph (k) of this section.

(H) An emergency response plan meeting the requirements of paragraph (l) of this section for safe and effective responses to emergencies, including the necessary PPE and other equipment.

(I) Confined space entry procedures.

(J) A spill containment program meeting the requirements of paragraph (j) of this section.

(iii) *Pre-entry briefing.* The site specific safety and health plan shall provide for pre-entry briefings to be held prior to initiating any site activity, and at such other times as necessary to ensure that employees are apprised of the site safety and health plan and that this plan is being followed. The information and data obtained from site characterization and analysis work required in paragraph (c) of this section shall be used to prepare and update the site safety and health plan.

(iv) *Effectiveness of site safety and health plan.* Inspections shall be conducted by the site safety and health supervisor or, in the absence of that individual, another individual who is knowledgeable in occupational safety and health, acting on behalf of the employer as necessary to determine the effectiveness of the site safety and health plan. Any deficiencies in the effectiveness of the site safety and health plan shall be corrected by the employer.

(c) *Site characterization and analysis.*—(1) *General.* Hazardous waste sites shall be evaluated in accordance with this paragraph to identify specific site hazards and to determine the appropriate safety and health control procedures needed to protect employees from the identified hazards.

(2) *Preliminary evaluation.* A preliminary evaluation of a site's characteristics shall be performed prior to site entry by a qualified person in order to aid in the selection of appropriate employee protection methods prior to site entry. Immediately after initial site entry, a more detailed evaluation of the site's specific characteristics shall be performed by a qualified person in order to further identify existing site hazards and to further aid in the selection of the appropriate engineering controls and personal protective equipment for the tasks to be performed.

(3) *Hazard identification.* All suspected conditions that may pose

inhalation or skin absorption hazards that are immediately dangerous to life or health (IDLH), or other conditions that may cause death or serious harm, shall be identified during the preliminary survey and evaluated during the detailed survey. Examples of such hazards include, but are not limited to, confined space entry, potentially explosive or flammable situations, visible vapor clouds, or areas where biological indicators such as dead animals or vegetation are located.

(4) *Required information.* The following information to the extent available shall be obtained by the employer prior to allowing employees to enter a site:

- (i) Location and approximate size of the site.
- (ii) Description of the response activity and/or the job task to be performed.
- (iii) Duration of the planned employee activity.
- (iv) Site topography and accessibility by air and roads.
- (v) Safety and health hazards expected at the site.
- (vi) Pathways for hazardous substance dispersion.
- (vii) Present status and capabilities of emergency response teams that would provide assistance to hazardous waste clean-up site employees at the time of an emergency.
- (viii) Hazardous substances and health hazards involved or expected at the site, and their chemical and physical properties.

(5) *Personal protective equipment.* Personal protective equipment (PPE) shall be provided and used during initial site entry in accordance with the following requirements:

- (i) Based upon the results of the preliminary site evaluation, an ensemble of PPE shall be selected and used during initial site entry which will provide protection to a level of exposure below permissible exposure limits and published exposure levels for known or suspected hazardous substances and health hazards, and which will provide protection against other known and suspected hazards identified during the preliminary site evaluation. If there is no permissible exposure limit or published exposure level, the employer may use other published studies and information as a guide to appropriate personal protective equipment.
- (ii) If positive-pressure self-contained breathing apparatus is not used as part of the entry ensemble, and if respiratory protection is warranted by the potential hazards identified during the preliminary site evaluation, an escape self-contained breathing apparatus of at

least five minute's duration shall be carried by employees during initial site entry.

(iii) If the preliminary site evaluation does not produce sufficient information to identify the hazards or suspected hazards of the site, an ensemble providing protection equivalent to Level B PPE shall be provided as minimum protection, and direct reading instruments shall be used as appropriate for identifying IDLH conditions. (See Appendix B for a description of Level B hazards and the recommendations for Level B protective equipment.)

(iv) Once the hazards of the site have been identified, the appropriate PPE shall be selected and used in accordance with paragraph (g) of this section.

(6) *Monitoring.* The following monitoring shall be conducted during initial site entry when the site evaluation produces information that shows the potential for ionizing radiation or IDLH conditions, or when the site information is not sufficient reasonably to eliminate these possible conditions:

- (i) Monitoring with direct reading instruments for hazardous levels of ionizing radiation.
- (ii) Monitoring the air with appropriate direct reading test equipment (i.e., combustible gas meters, detector tubes) for IDLH and other conditions that may cause death or serious harm (combustible or explosive atmospheres, oxygen deficiency, toxic substances).
- (iii) Visually observing for signs of actual or potential IDLH or other dangerous conditions.
- (iv) An ongoing air monitoring program in accordance with paragraph (h) of this section shall be implemented after site characterization has determined the site is safe for the start-up of operations.

(7) *Risk identification.* Once the presence and concentrations of specific hazardous substances and health hazards have been established, the risks associated with these substances shall be identified. Employees who will be working on the site shall be informed of any risks that have been identified. In situations covered by the Hazard Communication Standard, 29 CFR 1910.1200, training required by that standard need not be duplicated.

Note to (c)(7).—Risks to consider include, but are not limited to:

- (a) Exposures exceeding the permissible exposure limits and published exposure levels.
- (b) IDLH concentrations.
- (c) Potential skin absorption and irritation sources.

- (d) Potential eye irritation sources.
- (e) Explosion sensitivity and flammability ranges.
- (f) Oxygen deficiency.

(8) *Employee notification.* Any information concerning the chemical, physical, and toxicologic properties of each substance known or expected to be present on site that is available to the employer and relevant to the duties an employee is expected to perform shall be made available to the affected employees prior to the commencement of their work activities. The employer may utilize information developed for the hazard communication standard for this purpose.

(d) *Site control*—(1) *General.* Appropriate site control procedures shall be implemented to control employee exposure to hazardous substances before clean-up work begins.

(2) *Site control program.* A site control program for protecting employees which is part of the employer's site safety and health program required in paragraph (b) of this section shall be developed during the planning stages of a hazardous waste clean-up operation and modified as necessary as new information becomes available.

(3) *Elements of the site control program.* The site control program shall, as a minimum, include: A site map; site work zones; the use of a "buddy system"; site communications including alerting means for emergencies; the standard operating procedures or safe work practices; and, identification of the nearest medical assistance. Where these requirements are covered elsewhere they need not be repeated.

(e) *Training*—(1) *General.* (i) All employees working on site (such as but not limited to equipment operators, general laborers and others) exposed to hazardous substances, health hazards, or safety hazards and their supervisors and management responsible for the site shall receive training meeting the requirements of this paragraph before they are permitted to engage in hazardous waste operations that could expose them to hazardous substances, safety, or health hazards, and they shall receive review training as specified in this paragraph.

(ii) Employees shall not be permitted to participate in or supervise field activities until they have been trained to a level required by their job function and responsibility.

(2) *Elements to be covered.* The training shall thoroughly cover the following:

- (i) Names of personnel and alternates responsible for site safety and health:

(ii) Safety, health and other hazards present on the site;

(iii) Use of personal protective equipment;

(iv) Work practices by which the employee can minimize risks from hazards;

(v) Safe use of engineering controls and equipment on the site;

(vi) Medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards; and

(vii) The contents of paragraphs (G) through (J) of the site safety and health plan set forth in paragraph (b)(4)(ii) of this section.

(3) *Initial training.* (i) General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor.

(ii) Workers on site only occasionally for a specific limited task (such as, but not limited to, ground water monitoring, land surveying, or geo-physical surveying) and who are unlikely to be exposed over permissible exposure limits and published exposure limits shall receive a minimum of 24 hours of instruction off the site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

(iii) Workers regularly on site who work in areas which have been monitored and fully characterized indicating that exposures are under permissible exposure limits and published exposure limits where respirators are not necessary, and the characterization indicates that there are no health hazards or the possibility of an emergency developing, shall receive a minimum of 24 hours of instruction off the site and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

(iv) Workers with 24 hours of training who are covered by paragraphs (a)(3)(ii) and (a)(3)(iii) of this section, and who become general site workers or who are required to wear respirators, shall have the additional 16 hours and two days of training necessary to total the training specified in paragraph (e)(3)(i).

(4) *Management and supervisor training.* On-site management and supervisors directly responsible for, or who supervise employees engaged in,

hazardous waste operations shall receive 40 hours initial training, and three days of supervised field experience (the training may be reduced to 24 hours and one day if the only area of their responsibility is employees covered by paragraphs (e)(3)(ii) and (e)(3)(iii)) and at least eight additional hours of specialized training at the time of job assignment on such topics as, but not limited to, the employer's safety and health program and the associated employee training program, personal protective equipment program, spill containment program, and health hazard monitoring procedure and techniques.

(5) *Qualifications for trainers.* Trainers shall be qualified to instruct employees about the subject matter that is being presented in training. Such trainers shall have satisfactorily completed a training program for teaching the subjects they are expected to teach, or they shall have the academic credentials and instructional experience necessary for teaching the subjects. Instructors shall demonstrate competent instructional skills and knowledge of the applicable subject matter.

(6) *Training certification.* Employees and supervisors that have received and successfully completed the training and field experience specified in paragraphs (e)(1) through (e)(4) of this section shall be certified by their instructor or the head instructor and trained supervisor as having successfully completed the necessary training. A written certificate shall be given to each person so certified. Any person who has not been so certified or who does not meet the requirements of paragraph (e)(9) of this section shall be prohibited from engaging in hazardous waste operations.

(7) *Emergency response.* Employees who are engaged in responding to hazardous emergency situations at hazardous waste clean-up sites that may expose them to hazardous substances shall be trained in how to respond to such expected emergencies.

(8) *Refresher training.* Employees specified in paragraph (e)(1) of this section, and managers and supervisors specified in paragraph (e)(4) of this section, shall receive eight hours of refresher training annually on the items specified in paragraph (e)(2) and/or (e)(4) of this section, any critique of incidents that have occurred in the past year that can serve as training examples of related work, and other relevant topics.

(9) *Equivalent training.* Employers who can show by documentation or certification that an employee's work experience and/or training has resulted in training equivalent to that training

required in paragraphs (e)(1) through (e)(4) of this section shall not be required to provide the initial training requirements of those paragraphs to such employees. However, certified employees new to a site shall receive appropriate, site specific training before site entry and have appropriate supervised field experience at the new site. Equivalent training includes any academic training or the training that existing employees might have already received from actual hazardous waste site work experience.

(f) *Medical surveillance—(1) General.* Employers engaged in operations specified in paragraphs (a)(1)(i) through (a)(1)(iv) of this section and not covered by (a)(2)(iii) exceptions and employers of employees specified in paragraph (q)(9) shall institute a medical surveillance program in accordance with this paragraph.

(2) *Employees covered.* The medical surveillance program shall be instituted by the employer for the following employees:

(i) All employees who are or may be exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year;

(ii) All employees who wear a respirator for 30 days or more a year or as required by § 1910.134;

(iii) All employees who are injured due to overexposure from an emergency incident involving hazardous substances or health hazards; or

(iv) Members of HAZMAT teams.

(3) *Frequency of medical examinations and consultations.* Medical examinations and consultations shall be made available by the employer to each employee covered under paragraph (f)(2) of this section on the following schedules:

(i) For employees covered under paragraphs (f)(2)(i), (f)(2)(ii), and (f)(2)(iv):

(A) Prior to assignment;

(B) At least once every twelve months for each employee covered unless the attending physician believes a longer interval (not greater than biennially) is appropriate;

(C) At termination of employment or reassignment to an area where the employee would not be covered if the employee has not had an examination within the last six months;

(D) As soon as possible upon notification by an employee that the employee has developed signs or symptoms indicating possible

overexposure to hazardous substances or health hazards, or that the employee has been injured or exposed above the permissible exposure limits or published exposure levels in an emergency situation:

(E) At more frequent times, if the examining physician determines that an increased frequency of examination is medically necessary.

(ii) For employees covered under paragraph (f)(2)(iii) and for all employees including those of employers covered by paragraph (a)(1)(v) who may have been injured, received a health impairment, developed signs or symptoms which may have resulted from exposure to hazardous substances resulting from an emergency incident, or exposed during an emergency incident to hazardous substances at concentrations above the permissible exposure limits or the published exposure levels without the necessary personal protective equipment being used:

(A) As soon as possible following the emergency incident or development of signs or symptoms;

(B) At additional times, if the examining physician determines that follow-up examinations or consultations are medically necessary.

(4) *Content of medical examinations and consultations.* (i) Medical examinations required by paragraph (f)(3) of this section shall include a medical and work history (or updated history if one is in the employee's file) with special emphasis on symptoms related to the handling of hazardous substances and health hazards, and to fitness for duty including the ability to wear any required PPE under conditions (i.e., temperature extremes) that may be expected at the work site.

(ii) The content of medical examinations or consultations made available to employees pursuant to paragraph (f) shall be determined by the attending physician. The guidelines in the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (See Appendix D, Reference #10) should be consulted.

(5) *Examination by a physician and costs.* All medical examinations and procedures shall be performed by or under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine, and shall be provided without cost to the employee, without loss of pay, and at a reasonable time and place.

(6) *Information provided to the physician.* The employer shall provide one copy of this standard and its appendices to the attending physician,

and in addition the following for each employee:

(i) A description of the employee's duties as they relate to the employee's exposures.

(ii) The employee's exposure levels or anticipated exposure levels.

(iii) A description of any personal protective equipment used or to be used.

(iv) Information from previous medical examinations of the employee which is not readily available to the examining physician.

(v) Information required by § 1910.134.

(7) *Physician's written opinion.* (i) The employer shall obtain and furnish the employee with a copy of a written opinion from the attending physician containing the following:

(A) The physician's opinion as to whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from work in hazardous waste operations or emergency response, or from respirator use.

(B) The physician's recommended limitations upon the employee's assigned work.

(C) The results of the medical examination and tests if requested by the employee.

(D) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further examination or treatment.

(ii) The written opinion obtained by the employer shall not reveal specific findings or diagnoses unrelated to occupational exposures.

(8) *Recordkeeping.* (i) An accurate record of the medical surveillance required by paragraph (f) of this section shall be retained. This record shall be retained for the period specified and meet the criteria of 29 CFR 1910.20.

(ii) The record required in paragraph (f)(5)(i) of this section shall include at least the following information:

(A) The name and social security number of the employee;

(B) Physician's written opinions, recommended limitations, and results of examinations and tests;

(C) Any employee medical complaints related to exposure to hazardous substances;

(D) A copy of the information provided to the examining physician by the employer, with the exception of the standard and its appendices.

(g) *Engineering controls, work practices, and personal protective equipment for employee protection.* Engineering controls, work practices, personal protective equipment, or a combination of these shall be

implemented in accordance with this paragraph to protect employees from exposure to hazardous substances and safety and health hazards.

(1) *Engineering controls, work practices and PPE for substances regulated in Subparts C and Z.* (i) Engineering controls and work practices shall be instituted to reduce and maintain employee exposure to or below the permissible exposure limits for substances regulated by 29 CFR Part 1910, to the extent required by Subpart Z, except to the extent that such controls and practices are not feasible.

Note to (g)(1)(i): Engineering controls which may be feasible include the use of pressurized cabs or control booths on equipment, and/or the use of remotely operated material handling equipment. Work practices which may be feasible are removing all non-essential employees from potential exposure during opening of drums, venting down dusty operations and locating employees upwind of possible hazards.

(ii) Whenever engineering controls and work practices are not feasible, PPE shall be used to reduce and maintain employee exposures to or below the permissible exposure limits or dose limits for substances regulated by 29 CFR Part 1910, Subpart Z.

(iii) The employer shall not implement a schedule of employee rotation as a means of compliance with permissible exposure limits or dose limits except when there is no other feasible way of complying with the airborne or dermal dose limits for ionizing radiation.

(iv) The provisions of 29 CFR, Subpart G, shall be followed.

(2) *Engineering controls, work practices, and PPE for substances not regulated in Subparts C and Z.* An appropriate combination of engineering controls, work practices and personal protective equipment shall be used to reduce and maintain employee exposure to or below published exposure levels for hazardous substances and health hazards not regulated by 29 CFR Part 1910, Subparts C and Z. The employer may use the published literature and MSDS as a guide in making the employer's determination as to what level of protection the employer believes is appropriate for hazardous substances and health hazards for which there is no permissible exposure limit or published exposure limit.

(3) *Personal protective equipment selection.* (i) Personal protective equipment (PPE) shall be selected and used which will protect employees from the hazards and potential hazards they are likely to encounter as identified during the site characterization and analysis.

(ii) Personal protective equipment selection shall be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the site, the task-specific conditions and duration, and the hazards and potential hazards identified at the site.

(iii) Positive pressure self-contained breathing apparatus, or positive pressure air-line respirators equipped with an escape air supply, shall be used when chemical exposure levels present will create a substantial possibility of immediate death, immediate serious illness or injury, or impair the ability to escape.

(iv) Totally-encapsulating chemical protective suits (protection equivalent to Level A protection as recommended in Appendix B) shall be used in conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate death, immediate serious illness or injury, or impair the ability to escape.

(v) The level of protection provided by PPE selection shall be increased when additional information on site conditions indicates that increased protection is necessary to reduce employee exposures below permissible exposure limits and published exposure levels for hazardous substances and health hazards. (See Appendix B for guidance on selecting PPE ensembles.)

Note to (v)(3): The level of employee protection provided may be decreased when additional information or site conditions show that decreased protection will not result in hazardous exposures to employees.

(vi) Personal protective equipment shall be selected and used to meet the requirements of 29 CFR Part 1910, Subpart I, and additional requirements specified in this section.

(4) *Totally-encapsulating chemical protective suits.* (i) Totally-encapsulating suits shall protect employees from the particular hazards which are identified during site characterization and analysis.

(ii) Totally-encapsulating suits shall be capable of maintaining positive air pressure. (See Appendix A for a test method which may be used to evaluate this requirement.)

(iii) Totally-encapsulating suits shall be capable of preventing inward test gas leakage of more than 0.5 percent. (See Appendix A for a test method which may be used to evaluate this requirement.)

(5) *Personal protective equipment (PPE) program.* A written personal protective equipment program, which is part of the employer's safety and health program required in paragraph (b) of

this section or required in paragraph (p)(1) of this section and which is also a part of the site-specific safety and health plan shall be established. The PPE program shall address the elements listed below. When elements, such as donning and doffing procedures, are provided by the manufacturer of a piece of equipment and are attached to the plan, they need not be rewritten into the plan as long as they adequately address the procedure or element.

(i) PPE selection based upon site hazards.

(ii) PPE use and limitations of the equipment.

(iii) Work mission duration.

(iv) PPE maintenance and storage.

(v) PPE decontamination and disposal.

(vi) PPE training and proper fitting.

(vii) PPE donning and doffing procedures.

(viii) PPE inspection procedures prior to, during, and after use.

(ix) Evaluation of the effectiveness of the PPE program, and

(x) Limitations during temperature extremes, heat stress, and other appropriate medical considerations.

(h) *Monitoring—(1) General.* (i) Monitoring shall be performed in accordance with this paragraph where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits or published exposure levels for hazardous substances.

(ii) Air monitoring shall be used to identify and quantify airborne levels of hazardous substances and safety and health hazards in order to determine the appropriate level of employee protection needed on site.

(2) *Initial entry.* Upon initial entry, representative air monitoring shall be conducted to identify any IDLH condition, exposure over permissible exposure limits or published exposure levels, exposure over a radioactive material's dose limits or other dangerous condition such as the presence of flammable atmospheres or oxygen-deficient environments.

(3) *Periodic monitoring.* Periodic monitoring shall be conducted when the possibility of an IDLH condition or flammable atmosphere has developed or when there is indication that exposures may have risen over permissible exposure limits or published exposure levels since prior monitoring. Situations where it shall be considered whether the possibility that exposures have risen are as follows:

(i) When work begins on a different portion of the site.

(ii) When contaminants other than those previously identified are being handled.

(iii) When a different type of operation is initiated (e.g., drum opening as opposed to exploratory well drilling).

(iv) When employees are handling leaking drums or containers or working in areas with obvious liquid contamination (e.g., a spill or lagoon).

(4) *Monitoring of high-risk employees.* After the actual clean-up phase of any hazardous waste operation commences: for example, when soil, surface water or containers are moved or disturbed; the employer shall monitor those employees likely to have the highest exposures to hazardous substances and health hazards likely to be present above permissible exposure limits or published exposure levels by using personal sampling frequently enough to characterize employee exposures. If the employees likely to have the highest exposure are over permissible exposure limits or published exposure limits, then monitoring shall continue to determine all employees likely to be above those limits. The employer may utilize a representative sampling approach by documenting that the employees and chemicals chosen for monitoring are based on the criteria stated above.

Note to (4): It is not required to monitor employees engaged in site characterization operations covered by paragraph (c) of this section.

(i) *Informational programs.* Employers shall develop and implement a program, which is part of the employer's safety and health program required in paragraph (b) of this section, to inform employees, contractors, and subcontractors (or their representative) actually engaged in hazardous waste operations of the nature, level and degree of exposure likely as a result of participation in such hazardous waste operations. Employees, contractors and subcontractors working outside of the operations part of a site are not covered by this standard.

(j) *Handling drums and containers—(1) General.* (i) Hazardous substances and contaminated soils, liquids, and other residues shall be handled, transported, labeled, and disposed of in accordance with this paragraph.

(ii) Drums and containers used during the clean-up shall meet the appropriate DOT, OSHA, and EPA regulations for the wastes that they contain.

(iii) When practical, drums and containers shall be inspected and their integrity shall be assured prior to being

moved. Drums or containers that cannot be inspected before being moved because of storage conditions (i.e., buried beneath the earth, stacked behind other drums, stacked several tiers high in a pile, etc.) shall be moved to an accessible location and inspected prior to further handling.

(iv) Unlabelled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled.

(v) Site operations shall be organized to minimize the amount of drum or container movement.

(vi) Prior to movement of drums or containers, all employees exposed to the transfer operation shall be warned of the potential hazards associated with the contents of the drums or containers.

(vii) U.S. Department of Transportation specified salvage drums or containers and suitable quantities of proper absorbent shall be kept available and used in areas where spills, leaks, or ruptures may occur.

(viii) Where major spills may occur, a spill containment program, which is part of the employer's safety and health program required in paragraph (b) of this section, shall be implemented to contain and isolate the entire volume of the hazardous substance being transferred.

(ix) Drums and containers that cannot be moved without rupture, leakage, or spillage shall be emptied into a sound container using a device classified for the material being transferred.

(x) A ground-penetrating system or other type of detection system or device shall be used to estimate the location and depth of buried drums or containers.

(xi) Soil or covering material shall be removed with caution to prevent drum or container rupture.

(xii) Fire extinguishing equipment meeting the requirements of 29 CFR Part 1910, Subpart L, shall be on hand and ready for use to control incipient fires.

(2) *Opening drums and containers.* The following procedures shall be followed in areas where drums or containers are being opened:

(i) Where an airline respirator system is used, connections to the source of air supply shall be protected from contamination and the entire system shall be protected from physical damage.

(ii) Employees not actually involved in opening drums or containers shall be kept a safe distance from the drums or containers being opened.

(iii) If employees must work near or adjacent to drums or containers being opened, a suitable shield that does not interfere with the work operation shall

be placed between the employee and the drums or containers being opened to protect the employee in case of accidental explosion.

(iv) Controls for drum or container opening equipment, monitoring equipment, and fire suppression equipment shall be located behind the explosion-resistant barrier.

(v) When there is a reasonable possibility of flammable atmospheres being present, material handling equipment and hand tools shall be of the type to prevent sources of ignition.

(vi) Drums and containers shall be opened in such a manner that excess interior pressure will be safely relieved. If pressure can not be relieved from a remote location, appropriate shielding shall be placed between the employee and the drums or containers to reduce the risk of employee injury.

(vii) Employees shall not stand upon or work from drums or containers.

(3) *Material handling equipment.* Material handling equipment used to transfer drums and containers shall be selected, positioned and operated to minimize sources of ignition related to the equipment from igniting vapors released from ruptured drums or containers.

(4) *Radioactive wastes.* Drums and containers containing radioactive wastes shall not be handled until such time as their hazard to employees is properly assessed.

(5) *Shock sensitive wastes.* As a minimum, the following special precautions shall be taken when drums and containers containing or suspected of containing shock-sensitive wastes are handled:

(i) All non-essential employees shall be evacuated from the area of transfer.

(ii) Material handling equipment shall be provided with explosive containment devices or protective shields to protect equipment operators from exploding containers.

(iii) An employee alarm system capable of being perceived above surrounding light and noise conditions shall be used to signal the commencement and completion of explosive waste handling activities.

(iv) Continuous communications (i.e., portable radios, hand signals, telephones, as appropriate) shall be maintained between the employee-in-charge of the immediate handling area and both the site safety and health supervisor and the command post until such time as the handling operation is completed. Communication equipment or methods that could cause shock sensitive materials to explode shall not be used.

(v) Drums and containers under pressure, as evidenced by bulging or swelling, shall not be moved until such time as the cause for excess pressure is determined and appropriate containment procedures have been implemented to protect employees from explosive relief of the drum.

(vi) Drums and containers containing packaged laboratory wastes shall be considered to contain shock-sensitive or explosive materials until they have been characterized.

Caution: Shipping of shock sensitive wastes may be prohibited under U.S. Department of Transportation regulations. Employers and their shippers should refer to 49 CFR 173.21 and 173.50.

(6) *Laboratory waste packs.* In addition to the requirements of paragraph (j)(5) of this section, the following precautions shall be taken, as a minimum, in handling laboratory waste packs (lab packs):

(i) Lab packs shall be opened only when necessary and then only by an individual knowledgeable in the inspection, classification, and segregation of the containers within the pack according to the hazards of the wastes.

(ii) If crystalline material is noted or any container, the contents shall be handled as a shock-sensitive waste until the contents are identified.

(7) *Sampling of drum and container contents.* Sampling of containers and drums shall be done in accordance with a sampling procedure which is part of the site safety and health plan—developed for and available to employees and others at the specific worksite.

(8) *Shipping and transport.* (i) Drums and containers shall be identified and classified prior to packaging for shipment.

(ii) Drum or container staging areas shall be kept to the minimum number necessary to identify and classify materials safely and prepare them for transport.

(iii) Staging areas shall be provided with adequate access and egress routes.

(iv) Bulking of hazardous wastes shall be permitted only after a thorough characterization of the materials has been completed.

(9) *Tank and vault procedures.* (i) Tanks and vaults containing hazardous substances shall be handled in a manner similar to that for drums and containers, taking into consideration the size of the tank or vault.

(ii) Appropriate tank or vault entry procedures as described in the employer's safety and health plan shall

be followed whenever employees must enter a tank or vault.

(k) *Decontamination*—(1) *General*. Procedures for all phases of decontamination shall be developed and implemented in accordance with this paragraph.

(2) *Decontamination procedures*. (i) A decontamination procedure shall be developed, communicated to employees and implemented before any employees or equipment may enter areas on site where potential for exposure to hazardous substances exists.

(ii) Standard operating procedures shall be developed to minimize employee contact with hazardous substances or with equipment that has contacted hazardous substances.

(iii) All employees leaving a contaminated area shall be appropriately decontaminated; all contaminated clothing and equipment leaving a contaminated area shall be appropriately disposed of or decontaminated.

(iv) Decontamination procedures shall be monitored by the site safety and health supervisor to determine their effectiveness. When such procedures are found to be ineffective, appropriate steps shall be taken to correct any deficiencies.

(3) *Location*. Decontamination shall be performed in geographical areas that will minimize the exposure of uncontaminated employees or equipment to contaminated employees or equipment.

(4) *Equipment and solvents*. All equipment and solvents used for decontamination shall be decontaminated or disposed of properly.

(5) *Personal protective clothing and equipment*. (i) Protective clothing and equipment shall be decontaminated, cleaned, laundered, maintained or replaced as needed to maintain their effectiveness.

(ii) Employees whose non-impermeable clothing becomes wetted with hazardous substances shall immediately remove that clothing and proceed to shower. The clothing shall be disposed of or decontaminated before it is removed from the work zone.

(6) *Unauthorized employees*. Unauthorized employees shall not remove protective clothing or equipment from change rooms.

(7) *Commercial laundries or cleaning establishments*. Commercial laundries or cleaning establishments that decontaminate protective clothing or equipment shall be informed of the potentially harmful effects of exposures to hazardous substances.

(8) *Showers and change rooms*. Where the decontamination procedure

indicates a need for regular showers and change rooms outside of a contaminated area, they shall be provided and meet the requirements of 29 CFR 1910.141. If temperature conditions prevent the effective use of water, then other effective means for cleansing shall be provided and used.

(l) *Emergency response by employees at uncontrolled hazardous waste sites*—

(1) *Emergency response plan*. (i) An emergency response plan shall be developed and implemented by all employers within the scope of this section to handle anticipated emergencies prior to the commencement of hazardous waste operations. The plan shall be in writing and available for inspection and copying by employees, their representatives, OSHA personnel and other governmental agencies with relevant responsibilities.

(ii) Employers who will evacuate their employees from the workplace when an emergency occurs, and who do not permit any of their employees to assist in handling the emergency, are exempt from the requirements of this paragraph if they provide an emergency action plan complying with section 1910.38(a) of this part.

(2) *Elements of an emergency response plan*. The employer shall develop an emergency response plan for emergencies which shall address, as a minimum, the following:

(i) Pre-emergency planning.

(ii) Personnel roles, lines of authority, and communication.

(iii) Emergency recognition and prevention.

(iv) Safe distances and places of refuge.

(v) Site security and control.

(vi) Evacuation routes and procedures.

(vii) Decontamination procedures which are not covered by the site safety and health plan.

(viii) Emergency medical treatment and first aid.

(ix) Emergency alerting and response procedures.

(x) Critique of response and follow-up.

(xi) PPE and emergency equipment.

(3) *Procedures for handling emergency incidents*. (i) In addition to the elements for the emergency response plan required in paragraph (1)(2) of this section, the following elements shall be included for emergency response plans:

(A) Site topography, layout, and prevailing weather conditions.

(B) Procedures for reporting incidents to local, state, and federal governmental agencies.

(ii) The emergency response plan shall be a separate section of the Site Safety and Health Plan.

(iii) The emergency response plan shall be compatible and integrated with the disaster, fire and/or emergency response plans of local, state, and federal agencies.

(iv) The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations.

(v) The site emergency response plan shall be reviewed periodically and, as necessary, be amended to keep it current with new or changing site conditions or information.

(vi) An employee alarm system shall be installed in accordance with 29 CFR 1910.165 to notify employees of an emergency situation: to stop work activities if necessary; to lower background noise in order to speed communication; and to begin emergency procedures.

(vii) Based upon the information available at time of the emergency, the employer shall evaluate the incident and the site response capabilities and proceed with the appropriate steps to implement the site emergency response plan.

(m) *Illumination*. Areas accessible to employees shall be lighted to not less than the minimum illumination intensities listed in the following Table H-120.1 while any work is in progress:

TABLE H-120.1.—Minimum Illumination Intensities in Foot-Candles

Foot-candles	Area or operations
5	General site areas.
3	Excavation and waste areas, accessways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoors: Warehouses, corridors, hallways, and entryways.
5	Tunnels, shafts, and general underground work areas. (Exception: Minimum of 10 foot-candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Mine Safety and Health Administration approved cap lights shall be acceptable for use in the tunnel heading.)
10	General shops (e.g., mechanical and electrical equipment rooms, active storerooms, barracks or living quarters, locker or dressing rooms, dining areas, and indoor toilets and workrooms.)
30	First aid stations, infirmaries, and offices.

(n) *Sanitation at temporary workplaces*—(1) *Potable water*. (i) An adequate supply of potable water shall be provided on the site.

(ii) Portable containers used to dispense drinking water shall be

capable of being tightly closed, and equipped with a tap. Water shall not be dipped from containers.

(iii) Any container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose.

(iv) Where single service cups (to be used but once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

(2) *Nonpotable water.* (i) Outlets for nonpotable water, such as water for firefighting purposes, shall be identified to indicate clearly that the water is unsafe and is not to be used for drinking, washing, or cooking purposes.

(ii) There shall be no cross-connection, open or potential, between a system furnishing potable water and a system furnishing nonpotable water.

(3) *Toilet facilities.* (i) Toilets shall be provided for employees according to the following Table H-120.2.

TABLE H-120.2—TOILET FACILITIES

Number of employees	Minimum number of facilities
20 or fewer	One.
More than 20, fewer than 200	One toilet seat and one urinal per 40 employees.
More than 200	One toilet seat and one urinal per 50 employees.

(ii) Under temporary field conditions, provisions shall be made to assure that at least one toilet facility is available.

(iii) Hazardous waste sites not provided with a sanitary sewer shall be provided with the following toilet facilities unless prohibited by local codes:

- (A) Chemical toilets;
- (B) Recirculating toilets;
- (C) Combustion toilets; or
- (D) Flush toilets.

(iv) The requirements of this paragraph for sanitation facilities shall not apply to mobile crews having transportation readily available to nearby toilet facilities.

(v) Doors entering toilet facilities shall be provided with entrance locks controlled from inside the facility.

(4) *Food handling.* All food service facilities and operations for employees shall meet the applicable laws, ordinances, and regulations of the jurisdictions in which they are located.

(5) *Temporary sleeping quarters.* When temporary sleeping quarters are provided, they shall be heated, ventilated, and lighted.

(6) *Washing facilities.* The employer shall provide adequate washing

facilities for employees engaged in operations where hazardous substances may be harmful to employees. Such facilities shall be in near proximity to the worksite; in areas where exposures are below permissible exposure limits and published exposure levels and which are under the controls of the employer; and shall be so equipped as to enable employees to remove hazardous substances from themselves.

(7) *Showers and change rooms.* When hazardous waste clean-up or removal operations commence on a site and the duration of the work will require six months or greater time to complete, the employer shall provide showers and change rooms for all employees exposed to hazardous substances and health hazards involved in hazardous waste clean-up or removal operations.

(i) Showers shall be provided and shall meet the requirements of 29 CFR 1910.141(d)(3).

(ii) Change rooms shall be provided and shall meet the requirements of 29 CFR 1910.141(e). Change rooms shall consist of two separate change areas separated by the shower area required in paragraph (n)(7)(i) of this section. One change area, with an exit leading off the worksite, shall provide employees with a clean area where they can remove, store, and put on street clothing. The second area, with an exit to the worksite, shall provide employees with an area where they can put on, remove and store work clothing and personal protective equipment.

(iii) Showers and change rooms shall be located in areas where exposures are below the permissible exposure limits and published exposure levels. If this cannot be accomplished, then a ventilation system shall be provided that will supply air that is below the permissible exposure limits and published exposure levels.

(iv) Employers shall assure that employees shower at the end of their work shift and when leaving the hazardous waste site.

(e) *New technology programs.* (1) The employer shall develop and implement procedures for the introduction of effective new technologies and equipment developed for the improved protection of employees working with hazardous waste clean-up operations, and the same shall be implemented as part of the site safety and health program to assure that employee protection is being maintained.

(2) New technologies, equipment or control measures available to the industry, such as the use of foams, absorbents, adsorbents, neutralizers, or other means to suppress the level of air contaminants while excavating the site

or for spill control, shall be evaluated by employers or their representatives. Such an evaluation shall be done to determine the effectiveness of the new methods, materials, or equipment before implementing their use on a large scale for enhancing employee protection. Information and data from manufacturers or suppliers may be used as part of the employer's evaluation effort. Such evaluations shall be made available to OSHA upon request.

(p) *Certain Operations Conducted Under the Resource Conservation and Recovery Act of 1976 (RCRA).* Employers conducting operations at treatment, storage, and disposal (TSD) facilities specified in paragraph (a)(1)(iv) of this section not exempted by paragraph (a)(2)(iii) of this section shall provide and implement the programs specified in this paragraph.

(1) *Safety and health program.* The employer shall develop and implement a written safety and health program for employees involved in hazardous waste operations that shall be available for inspection by employees, their representatives and OSHA personnel. The program shall be designed to identify, evaluate and control safety and health hazards in their facilities for the purpose of employee protection, to provide for emergency response meeting the requirements of paragraph (p)(8) of this section and to address as appropriate site analysis, engineering controls, maximum exposure limits, hazardous waste handling procedures and uses of new technologies.

(2) *Hazard communication program.* The employer shall implement a hazard communication program meeting the requirements of 29 CFR 1910.1200 as part of the employer's safety and program.

*Note to 1910.120.—*The exemption for hazardous waste provided in § 1910.1200 is applicable to this section.

(3) *Medical surveillance program.* The employer shall develop and implement a medical surveillance program meeting the requirements of paragraph (f) of this section.

(4) *Decontamination program.* The employer shall develop and implement a decontamination procedure meeting the requirements of paragraph (k) of this section.

(5) *New technology program.* The employer shall develop and implement procedures meeting the requirements of paragraph (o) of this section for introducing new and innovative equipment into the workplace.

(6) *Material handling program.* When employees will be handling drums or containers, the employer shall develop

and implement procedures meeting the requirements of paragraphs (j)(1) (ii) through (viii) and (xi) of this section, as well as (j)(3) and (j)(8) of this section prior to starting such work.

(7) *Training program*—(i) *New employees.* The employer shall develop and implement a training program, which is part of the employer's safety and health program, for employees involved with hazardous waste operations to enable employees to perform their assigned duties and functions in a safe and healthful manner so as not to endanger themselves or other employees. The initial training shall be for 24 hours and refresher training shall be for eight hours annually. Employees who have received the initial training required by this paragraph shall be given a written certificate attesting that they have successfully completed the necessary training.

(ii) *Current employees.* Employers who can show by an employee's previous work experience and/or training that the employee has had training equivalent to the initial training required by this paragraph, shall be considered as meeting the initial training requirements of this paragraph as to that employee. Equivalent training includes the training that existing employees might have already received from actual site work experience. Current employees shall receive eight hours of refresher training annually.

(iii) *Trainers.* Trainers who teach initial training shall have satisfactorily completed a training course for teaching the subjects they are expected to teach or they shall have the academic credentials and instruction experience necessary to demonstrate a good command of the subject matter of the courses and competent instructional skills.

(8) *Emergency response program*—(i) *Emergency response plan.* An emergency response plan shall be developed and implemented by all employers. Such plans need not duplicate any of the subjects fully addressed in the employer's contingency planning required by permits, such as those issued by the U.S. Environmental Protection Agency, provided that the contingency plan is made part of the emergency response plan. The emergency response plan shall be a written portion of the employers safety and health program required in paragraph (p)(1) of this section. Employers who will evacuate their employees from the worksite location when an emergency occurs and who do not permit any of their employees to assist in handling the emergency are

exempt from the requirements of paragraph (p)(8) if they provide an emergency action plan complying with § 1910.38(a) of this part.

(ii) *Elements of an emergency response plan.* The employer shall develop an emergency response plan for emergencies which shall address, as a minimum, the following areas to the extent that they are not addressed in any specific program required in this paragraph:

- (A) Pre-emergency planning and coordination with outside parties.
- (B) Personnel roles, lines of authority, and communication.
- (C) Emergency recognition and prevention.
- (D) Safe distances and places of refuge.
- (E) Site security and control.
- (F) Evacuation routes and procedures.
- (G) Decontamination procedures.
- (H) Emergency medical treatment and first aid.

- (I) Emergency alerting and response procedures.
- (J) Critique of response and follow-up.
- (K) PPE and emergency equipment.

(iii) *Training.* (A) Training for emergency response employees shall be completed before they are called upon to perform in real emergencies. Such training shall include the elements of the emergency response plan, standard operating procedures the employer has established for the job, the personal protective equipment to be worn and procedures for handling emergency incidents.

Exception #1: An employer need not train all employees to the degree specified if the employer divides the work force in a manner such that a sufficient number of employees who have responsibility to control emergencies have the training specified, and all other employees, who may first respond to an emergency incident, have sufficient awareness training to recognize that an emergency response situation exists and that they are instructed in that case to summon the fully trained employees and not attempt control activities for which they are not trained.

Exception #2: An employer need not train all employees to the degree specified if arrangements have been made in advance for an outside fully-trained emergency response team to respond in a reasonable period and all employees, who may come to the incident first, have sufficient awareness training to recognize that an emergency response situation exists and they have been instructed to call the designated outside fully-trained emergency response team for assistance.

(B) Employee members of TSD facility emergency response organizations shall be trained to a level of competence in the recognition of health and safety

hazards to protect themselves and other employees. This would include training in the methods used to minimize the risk from safety and health hazards; in the safe use of control equipment; in the selection and use of appropriate personal protective equipment; in the safe operating procedures to be used at the incident scene; in the techniques of coordination with other employees to minimize risks; in the appropriate response to over exposure from health hazards or injury to themselves and other employees; and in the recognition of subsequent symptoms which may result from over exposures.

(C) The employer shall certify that each covered employee has attended and successfully completed the training required in paragraph (p)(8)(iii) of this section, or shall certify the employee's competency at least yearly. The method used to demonstrate competency for certification of training shall be recorded and maintained by the employer.

(iv) *Procedures for handling emergency incidents.* (A) In addition to the elements for the emergency response plan required in paragraph (p)(8)(ii) of this section, the following elements shall be included for emergency response plans to the extent that they do not repeat any information already contained in the emergency response plan:

- (1) Site topography, layout, and prevailing weather conditions.
- (2) Procedures for reporting incidents to local, state, and federal governmental agencies.

(B) The emergency response plan shall be compatible and integrated with the disaster, fire and/or emergency response plans of local, state, and federal agencies.

(C) The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations.

(D) The site emergency response plan shall be reviewed periodically and, as necessary, be amended to keep it current with new or changing site conditions or information.

(E) An employee alarm system shall be installed in accordance with 29 CFR 1910.165 to notify employees of an emergency situation; to stop work activities if necessary; to lower background noise in order to speed communication; and to begin emergency procedures.

(F) Based upon the information available at time of the emergency, the employer shall evaluate the incident and the site response capabilities and proceed with the appropriate steps to

implement the site emergency response plan.

(q) *Emergency response to hazardous substance releases.* This paragraph covers employers whose employees are engaged in emergency response no matter where it occurs except that it does not cover employees engaged in operations specified in paragraphs (a)(1)(i) through (a)(1)(iv) of this section. Those emergency response organizations who have developed and implemented programs equivalent to this paragraph for handling releases of hazardous substances pursuant to section 303 of the Superfund Amendments and Reauthorization Act of 1986 (Emergency Planning and Community Right-to-Know Act of 1986, 42 U.S.C. 11003) shall be deemed to have met the requirements of this paragraph.

(1) *Emergency response plan.* An emergency response plan shall be developed and implemented to handle anticipated emergencies prior to the commencement of emergency response operations. The plan shall be in writing and available for inspection and copying by employees, their representatives and OSHA personnel. Employers who will evacuate their employees from the workplace when an emergency occurs, and who do not permit any of their employees to assist in handling the emergency, are exempt from the requirements of this paragraph if they provide an emergency action plan in accordance with § 1910.38(a) of this part.

(2) *Elements of an emergency response plan.* The employer shall develop an emergency response plan for emergencies which shall address, as a minimum, the following to the extent that they are not addressed elsewhere:

- (i) Pre-emergency planning and coordination with outside parties.
- (ii) Personnel roles, lines of authority, training, and communication.
- (iii) Emergency recognition and prevention.
- (iv) Safe distances and places of refuge.
- (v) Site security and control.
- (vi) Evacuation routes and procedures.
- (vii) Decontamination.
- (viii) Emergency medical treatment and first aid.
- (ix) Emergency alerting and response procedures.
- (x) Critique of response and follow-up.
- (xi) PPE and emergency equipment.
- (xii) Emergency response

organizations may use the local emergency response plan or the state emergency response plan or both, as part of their emergency response plan to avoid duplication. Those items of the emergency response plan that are being

properly addressed by the SARA Title III plans may be substituted into their emergency plan or otherwise kept together for the employer and employee's use.

(3) *Procedures for handling emergency response.* (i) The senior emergency response official responding to an emergency shall become the individual in charge of a site-specific Incident Command System (ICS). All emergency responders and their communications shall be coordinated and controlled through the individual in charge of the ICS assisted by the senior official present for each employer.

Note to (q)(3)(i).—The "senior official" at an emergency response is the most senior official on the site who has the responsibility for controlling the operations at the site. Initially it is the senior officer on the first-due piece of responding emergency apparatus to arrive on the incident scene. As more senior officers arrive (i.e., battalion chief, fire chief, state law enforcement official, site coordinator, etc.) the position is passed up the line of authority which has been previously established.

(ii) The individual in charge of the ICS shall identify, to the extent possible, all hazardous substances or conditions present and shall address as appropriate site analysis, use of engineering controls, maximum exposure limits, hazardous substance handling procedures, and use of any new technologies.

(iii) Based on the hazardous substances and/or conditions present, the individual in charge of the ICS shall implement appropriate emergency operations, and assure that the personal protective equipment worn is appropriate for the hazards to be encountered. However, personal protective equipment shall meet, at a minimum, the criteria contained in 29 CFR 1910.156(e) when worn while performing fire fighting operations beyond the incipient stage for any incident or site.

(iv) Employees engaged in emergency response and exposed to hazardous substances presenting an inhalation hazard or potential inhalation hazard shall wear positive pressure self-contained breathing apparatus while engaged in emergency response, until such time that the individual in charge of the ICS determines through the use of air monitoring that a decreased level of respiratory protection will not result in hazardous exposures to employees.

(v) The individual in charge of the ICS shall limit the number of emergency response personnel at the emergency site, in those areas of potential or actual exposure to incident or site hazards, to those who are actively performing

emergency operations. However, operations in hazardous areas shall be performed using the buddy system in groups of two or more.

(vi) Back-up personnel shall stand by with equipment ready to provide assistance or rescue. Advance first aid support personnel, as a minimum, shall also stand by with medical equipment and transportation capability.

(vii) The individual in charge of the ICS shall designate a safety official, who is knowledgeable in the operations being implemented at the emergency response site, with specific responsibility to identify and evaluate hazards and to provide direction with respect to the safety of operations for the emergency at hand.

(viii) When activities are judged by the safety official to be an IDLH condition and/or to involve an imminent danger condition, the safety official shall have the authority to alter, suspend, or terminate those activities. The safety official shall immediately inform the individual in charge of the ICS of any actions needed to be taken to correct these hazards at an emergency scene.

(ix) After emergency operations have terminated, the individual in charge of the ICS shall implement appropriate decontamination procedures.

(x) When deemed necessary for meeting the tasks at hand, approved self-contained compressed air breathing apparatus may be used with approved cylinders from other approved self-contained compressed air breathing apparatus provided that such cylinders are of the same capacity and pressure rating. All compressed air cylinders used with self-contained breathing apparatus shall meet U.S. Department of Transportation and National Institute for Occupational Safety and Health criteria.

(4) *Skilled support personnel.* Personnel, not necessarily an employer's own employees, who are skilled in the operation of certain equipment, such as mechanized earth moving or digging equipment or crane and hoisting equipment, and who are needed temporarily to perform immediate emergency support work that cannot reasonably be performed in a timely fashion by an employer's own employees, and who will be or may be exposed to the hazards at an emergency response scene, are not required to meet the training required in this paragraph for the employer's regular employees. However, these personnel shall be given an initial briefing at the site prior to their participation in any emergency response. The initial briefing shall

include instruction in the wearing of appropriate personal protective equipment, what chemical hazards are involved, and what duties are to be performed. All other appropriate safety and health precautions provided to the employer's own employees shall be used to assure the safety and health of these personnel.

(5) *Specialist employees.* Employees who, in the course of their regular job duties, work with and are trained in the hazards of specific hazardous substances, and who will be called upon to provide technical advice or assistance at a hazardous substance release incident to the individual in charge, shall receive training or demonstrate competency in the area of their specialization annually.

(6) *Training.* Training shall be based on the duties and function to be performed by each responder of an emergency response organization. The skill and knowledge levels required for all new responders, those hired after the effective date of this standard, shall be conveyed to them through training before they are permitted to take part in actual emergency operations on an incident. Employees who participate, or are expected to participate, in emergency response, shall be given training in accordance with the following paragraphs:

(i) *First responder awareness level.* First responders at the awareness level are individuals who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the proper authorities of the release. They would take no further action beyond notifying the authorities of the release. First responders at the awareness level shall have sufficient training or have had sufficient experience to objectively demonstrate competency in the following areas:

(A) An understanding of what hazardous materials are, and the risks associated with them in an incident.

(B) An understanding of the potential outcomes associated with an emergency created when hazardous materials are present.

(C) The ability to recognize the presence of hazardous materials in an emergency.

(D) The ability to identify the hazardous materials, if possible.

(E) An understanding of the role of the first responder awareness individual in the employer's emergency response plan including site security and control and the U.S. Department of Transportation's Emergency Response Guidebook.

(F) The ability to realize the need for additional resources, and to make appropriate notifications to the communication center.

(ii) *First responder operations level.* First responders at the operations level are individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures. First responders at the operational level shall have received at least eight hours of training or have had sufficient experience to objectively demonstrate competency in the following areas in addition to those listed for the awareness level and the employer shall so certify:

(A) Knowledge of the basic hazard and risk assessment techniques.

(B) Know how to select and use proper personal protective equipment provided to the first responder operational level.

(C) An understanding of basic hazardous materials terms.

(D) Know how to perform basic control, containment and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.

(E) Know how to implement basic decontamination procedures.

(F) An understanding of the relevant standard operating procedures and termination procedures.

(iii) *Hazardous materials technician.* Hazardous materials technicians are individuals who respond to releases or potential releases for the purpose of stopping the release. They assume a more aggressive role than a first responder at the operations level in that they will approach the point of release in order to plug, patch or otherwise stop the release of a hazardous substance. Hazardous materials technicians shall have received at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and the employer shall so certify:

(A) Know how to implement the employer's emergency response plan.

(B) Know the classification, identification and verification of known and unknown materials by using field survey instruments and equipment.

(C) Be able to function within an assigned role in the Incident Command System.

(D) Know how to select and use proper specialized chemical personal protective equipment provided to the hazardous materials technician.

(E) Understand hazard and risk assessment techniques.

(F) Be able to perform advance control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with the unit.

(G) Understand and implement decontamination procedures.

(H) Understand termination procedures.

(I) Understand basic chemical and toxicological terminology and behavior.

(iv) *Hazardous materials specialist.* Hazardous materials specialists are individuals who respond with and provide support to hazardous materials technicians. Their duties parallel those of the hazardous materials technician, however, those duties require a more directed or specific knowledge of the various substances they may be called upon to contain. The hazardous materials specialist would also act as the site liaison with Federal, state, local and other government authorities in regards to site activities. Hazardous materials specialists shall have received at least 24 hours of training equal to the technician level and in addition have competency in the following areas and the employer shall so certify:

(A) Know how to implement the local emergency response plan.

(B) Understand classification, identification and verification of known and unknown materials by using advanced survey instruments and equipment.

(C) Know of the state emergency response plan.

(D) Be able to select and use proper specialized chemical personal protective equipment provided to the hazardous materials specialist.

(E) Understand in-depth hazard and risk techniques.

(F) Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available.

(G) Be able to determine and implement decontamination procedures.

(H) Have the ability to develop a site safety and control plan.

(I) Understand chemical, radiological and toxicological terminology and behavior.

(v) *On scene incident commander.* Incident commanders, who will assume control of the incident scene beyond the

first responder awareness level, shall receive at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and the employer shall so certify:

(A) Know and be able to implement the employer's incident command system.

(B) Know how to implement the employer's emergency response plan.

(C) Know and understand the hazards and risks associated with employees working in chemical protective clothing.

(D) Know how to implement the local emergency response plan.

(E) Know of the state emergency response plan and of the Federal Regional Response Team.

(F) Know and understand the importance of decontamination procedures.

(7) *Trainers.* Trainers who teach any of the above training subjects shall have satisfactorily completed a training course for teaching the subjects they are expected to teach, such as the courses offered by the U.S. Fire Academy, or they shall have the training and/or academic credentials and instructional experience necessary to demonstrate competent instructional skills and a good command of the subject matter of the courses they are to teach.

(8) *Refresher training.* (i) Those employees who are trained in accordance with paragraph (q)(6) of this section shall receive annual refresher training of sufficient content and duration to maintain their competencies, or shall demonstrate competency in those areas at least yearly.

(ii) A statement shall be made of the training or competency, and if a statement of competency is made, the employer shall keep a record of the methodology used to demonstrate competency.

(9) *Medical surveillance and consultation.* (i) Members of an organized and designated HAZMAT team and hazardous materials specialists shall receive a baseline physical examination and be provided with medical surveillance as required in paragraph (f) of this section.

(ii) Any emergency response employees who exhibits signs or symptoms which may have resulted from exposure to hazardous substances during the course of an emergency incident, either immediately or subsequently, shall be provided with medical consultation as required in paragraph (f)(3)(ii) of this section.

(10) *Chemical protective clothing.* Chemical protective clothing and equipment to be used by organized and designated HAZMAT team members, or

to be used by hazardous materials specialists, shall meet the requirements of paragraphs (g) (3) through (5) of this section.

(11) *Post-emergency response operations.* Upon completion of the emergency response, if it is determined that it is necessary to remove hazardous substances, health hazards, and materials contaminated with them (such as contaminated soil or other elements of the natural environment) from the site of the incident, the employer conducting the clean-up shall comply with one of the following:

(i) Meet all of the requirements of paragraphs (b) through (c) of this section; or

(ii) Where the clean-up is done on plant property using plant or workplace employees, such employees shall have completed the training requirements of the following: 29 CFR 1910.38(a); 1910.134; 1910.1200, and other appropriate safety and health training made necessary by the tasks that they are expected to be performed such as personal protective equipment and decontamination procedures. All equipment to be used in the performance of the clean-up work shall be in serviceable condition and shall have been inspected prior to use.

APPENDICES TO § 1910.120—HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE

Note: The following appendices serve as non-mandatory guidelines to assist employees and employers in complying with the appropriate requirements of this section. However paragraph 1910.120(g) makes mandatory in certain circumstances the use of Level A and Level B PPE protection.

Appendix A—Personal Protective Equipment Test Methods

This appendix sets forth the non-mandatory examples of tests which may be used to evaluate compliance with § 1910.120 (g)(4) (ii) and (iii). Other tests and other challenge agents may be used to evaluate compliance.

A. Totally-encapsulating chemical protective suit pressure test

1.0—Scope

1.1 This practice measures the ability of a gas tight totally-encapsulating chemical protective suit material, seams, and closures to maintain a fixed positive pressure. The results of this practice allow the gas tight integrity of a totally-encapsulating chemical protective suit to be evaluated.

1.2 Resistance of the suit materials to permeation, penetration, and degradation by specific hazardous substances is not determined by this test method.

2.0—Definition of terms

2.1 "Totally-encapsulated chemical protective suit (TECP suit)" means a full body garment which is constructed of protective clothing materials: covers the wearer's torso, head, arms, legs and

respirator; may cover the wearer's hands a feet with tightly attached gloves and boots; completely encloses the wearer and respirator by itself or in combination with the wearer's gloves and boots.

2.2 "Protective clothing material" means any material or combination of materials used in an item of clothing for the purpose of isolating parts of the body from direct contact with a potentially hazardous liquid or gaseous chemicals.

2.3 "Gas tight" means, for the purpose of this test method, the limited flow of a gas under pressure from the inside of a TECP suit to atmosphere at a prescribed pressure and time interval.

3.0—Summary of test method

3.1 The TECP suit is visually inspected and modified for the test. The test apparatus is attached to the suit to permit inflation to the pre-test suit expansion pressure for removal of suit wrinkles and creases. The pressure is lowered to the test pressure and monitored for three minutes. If the pressure drop is excessive, the TECP suit fails the test and is removed from service. The test is repeated after leak location and repair.

4.0—Required Supplies

4.1 Source of compressed air.

4.2 Test apparatus for suit testing, including a pressure measurement device with a sensitivity of at least 1/4 inch water gauge.

4.3 Vent valve closure plugs or sealing tape.

4.4 Soapy water solution and soft brush.

4.5 Stop watch or appropriate timing device.

5.0—Safety Precautions

5.1 Care shall be taken to provide the correct pressure safety devices required for the source of compressed air used.

6.0—Test Procedure

6.1 Prior to each test, the tester shall perform a visual inspection of the suit. Check the suit for seam integrity by visually examining the seams and gently pulling on the seams. Ensure that all air supply lines, fittings, visors, zippers, and valves are secure and show no signs of deterioration.

6.1.1 Seal off the vent valves along with any other normal inlet or exhaust points (such as umbilical air line fittings or face piece opening) with tape or other appropriate means (caps, plugs, fixture, etc.). Care should be exercised in the sealing process not to damage any of the suit components.

6.1.2 Close all closure assemblies.

6.1.3 Prepare the suit for inflation by providing an improvised connection point on the suit for connecting an airline. Attach the pressure test apparatus to the suit to permit suit inflation from a compressed air source equipped with a pressure indicating regulator. The leak tightness of the pressure test apparatus should be tested before and after each test by closing off the end of the tubing attached to the suit and assuring a pressure of three inches water gauge for three minutes can be maintained. If a component is removed for the test, that component shall be replaced and a second test conducted with another component removed to permit a complete test of the ensemble.

6.1.4 The pre-test expansion pressure (A), and the suit test pressure (B) shall be supplied by the suit manufacturer, but in no

case shall they be less than: (A)=three inches water gauge; and (B)=two inches water gauge. The ending suit pressure (C) shall be no less than 80 percent of the test pressure (B); i.e., the pressure drop shall not exceed 20 percent of the test pressure (B).

6.1.5 Inflate the suit until the pressure inside is equal to pressure (A), the pre-test expansion suit pressure. Allow at least one minute to fill out the wrinkles in the suit. Release sufficient air to reduce the suit pressure to pressure (B), the suit test pressure. Begin timing. At the end of three minutes, record the suit pressure as pressure (C), the ending suit pressure. The difference between the suit test pressure and the ending suit test pressure (B-C) shall be defined as the suit pressure drop.

6.1.6 If the suit pressure drop is more than 20 percent of the suit test pressure (B) during the three-minute test period, the suit fails the test and shall be removed from service.

7.0—Retest Procedure

7.1 If the suit fails the test check for leaks by inflating the suit to pressure (A) and brushing or wiping the entire suit (including seams, closures, lens gaskets, glove-to-sleeve joints, etc.) with a mild soap and water solution. Observe the suit for the formation of soap bubbles, which is an indication of a leak. Repair all identified leaks.

7.2 Retest the TECP suit as outlined in Test procedure 6.0.

8.0—Report

8.1 Each TECP suit tested by this practice shall have the following information recorded:

8.1.1 Unique identification number, identifying brand name, date of purchase, material of construction, and unique fit features, e.g., special breathing apparatus.

8.1.2 The actual values for test pressures (A), (B), and (C) shall be recorded along with the specific observation times. If the ending pressure (C) is less than 80 percent of the test pressure (B), the suit shall be identified as failing the test. When possible, the specific leak location shall be identified in the test records. Retest pressure data shall be recorded as an additional test.

8.1.3 The source of the test apparatus used shall be identified and the sensitivity of the pressure gauge shall be recorded.

8.1.4 Records shall be kept for each pressure test even if repairs are being made at the test location.

Caution

Visually inspect all parts of the suit to be sure they are positioned correctly and secured tightly before putting the suit back into service. Special care should be taken to examine each exhaust valve to make sure it is not blocked.

Care should also be exercised to assure that the inside and outside of the suit is completely dry before it is put into storage.

B. Totally-encapsulating chemical protective suit qualitative leak test

1.0—Scope

1.1 This practice semi-qualitatively tests gas tight totally-encapsulating chemical protective suit integrity by detecting inward leakage of ammonia vapor. Since no modifications are made to the suit to carry

out this test, the results from this practice provide a realistic test for the integrity of the entire suit.

1.2 Resistance of the suit materials to permeation, penetration, and degradation is not determined by this test method. ASTM test methods are available to test suit materials for these characteristics and the tests are usually conducted by the manufacturers of the suits.

2.0—Definition of terms

2.1 "Totally-encapsulating chemical protective suit (TECP suit)" means a full body garment which is constructed of protective clothing materials; covers the wearer's torso, head, arms, legs and respirator; may cover the wearer's hands and feet with tightly attached gloves and boots; completely encloses the wearer and respirator by itself or in combination with the wearer's gloves, and boots.

2.2 "Protective clothing material" means any material or combination of materials used in an item of clothing for the purpose of isolating parts of the body from direct contact with a potentially hazardous liquid or gaseous chemicals.

2.3 "Gas tight" means, for the purpose of this test method, the limited flow of gas under pressure from the inside of a TECP suit to atmosphere at a prescribed pressure and time interval.

2.4 "Intrusion Coefficient" means a number expressing the level of protection provided by a gas tight totally-encapsulating chemical protective suit. The intrusion coefficient is calculated by dividing the test room challenge agent concentration by the concentration of challenge agent found inside the suit. The accuracy of the intrusion coefficient is dependent on the challenge agent monitoring methods. The larger the intrusion coefficient the greater the protection provided by the TECP suit.

3.0—Summary of recommended practice

3.1 The volume of concentrated aqueous ammonia solution (ammonia hydroxide NH_4OH) required to generate the test atmosphere is determined using the directions outlined in 6.1. The suit is donned by a person wearing the appropriate respiratory equipment (either a positive pressure self-contained breathing apparatus or a positive pressure supplied air respirator) and worn inside the enclosed test room. The concentrated aqueous ammonia solution is taken by the suited individual into the test room and poured into an open plastic pan. A two-minute evaporation period is observed before the test room concentration is measured, using a high range ammonia length of stain detector tube. When the ammonia vapor reaches a concentration of between 1000 and 1200 ppm, the suited individual starts a standardized exercise protocol to stress and flex the suit. After this protocol is completed, the test room concentration is measured again. The suited individual exits the test room and his stand-by person measures the ammonia concentration inside the suit using a low range ammonia length of stain detector tube or other more sensitive ammonia detector. A stand-by person is required to observe the test individual during the test procedure; aid the person in donning and doffing the TECP suit; and monitor the

suit interior. The intrusion coefficient of the suit can be calculated by dividing the average test area concentration by the interior suit concentration. A colorimetric ammonia indicator strip of bromophenol blue or equivalent is placed on the inside of the suit face piece lens so that the suited individual is able to detect a color change and know if the suit has a significant leak. If a color change is observed the individual shall leave the test room immediately.

4.0—Required supplies

4.1 A supply of concentrated aqueous (58 percent ammonium hydroxide by weight).

4.2 A supply of bromophenol/blue indicating paper or equivalent, sensitive to 5-10 ppm ammonia or greater over a two-minute period of exposure. [pH 3.0 (yellow) to pH 4.8 (blue)]

4.3 A supply of high range (0.5-10 volume percent) and low range (5-700 ppm) detector tubes for ammonia and the corresponding sampling pump. More sensitive ammonia detectors can be substituted for the low range detector tubes to improve the sensitivity of this practice.

4.4 A shallow plastic pan (PVC) at least 12"x14" and a half pint plastic container (PVC) with tightly closing lid.

4.5 A graduated cylinder or other volumetric measuring device of at least 50 milliliters in volume with an accuracy of at least ± 1 milliliters.

5.0—Safety precautions

5.1 Concentrated aqueous ammonium hydroxide, NH_4OH , is a corrosive volatile liquid requiring eye, skin, and respiratory protection. The person conducting the test shall review the MSDS for aqueous ammonia.

5.2 Since the established permissible exposure limit for ammonia is 50 ppm, only persons wearing a positive pressure self-contained breathing apparatus or a positive pressure supplied air respirator shall be in the chamber. Normally only the person wearing the totally-encapsulating suit will be inside the chamber. A stand-by person shall have a positive pressure self-contained breathing apparatus, or a positive pressure supplied air respirator available to enter the test area should the suited individual need assistance.

5.3 A method to monitor the suited individual must be used during this test. Visual contact is the simplest but other methods using communication devices are acceptable.

5.4 The test room shall be large enough to allow the exercise protocol to be carried out and then to be ventilated to allow for easy exhaust of the ammonia test atmosphere after the test(s) are completed.

5.5 Individuals shall be medically screened for the use of respiratory protection and checked for allergies to ammonia before participating in this test procedure.

6.0—Test procedure

6.1.1 Measure the test area to the nearest foot and calculate its volume in cubic feet. Multiply the test area volume by 0.2 milliliters of concentrated aqueous ammonia solution per cubic foot of test area volume to determine the approximate volume of

concentrated aqueous ammonia¹ required to generate 1000 ppm in the test area.

6.1.2 Measure this volume from the supply of concentrated aqueous ammonia and place it into a closed plastic container.

6.1.3 Place the container, several high range ammonia detector tubes, and the pump in the clean test pan and locate it near the test area entry door so that the suited individual has easy access to these supplies.

6.2.1 In a non-contaminated atmosphere, open a pre-sealed ammonia indicator strip and fasten one end of the strip to the inside of the suit face shield lens where it can be seen by the wearer. Moisten the indicator strip with distilled water. Care shall be taken not to contaminate the detector part of the indicator paper by touching it. A small piece of masking tape or equivalent should be used to attach the indicator strip to the interior of the suit face shield.

6.2.2 If problems are encountered with this method of attachment, the indicator strip can be attached to the outside of the respirator face piece lens being used during the test.

6.3 Don the respiratory protective device normally used with the suit, and then don the TECP suit to be tested. Check to be sure all openings which are intended to be sealed (zippers, gloves, etc.) are completely sealed. DO NOT, however, plug off any venting valves.

6.4 Step into the enclosed test room such as a closet, bathroom, or test booth, equipped with an exhaust fan. No air should be exhausted from the chamber during the test because this will dilute the ammonia challenge concentrations.

6.5 Open the container with the pre-measured volume of concentrated aqueous ammonia within the enclosed test room, and pour the liquid into the empty plastic test pan. Wait two minutes to allow for adequate volatilization of the concentrated aqueous ammonia. A small mixing fan can be used near the evaporation pan to increase the evaporation rate of the ammonia solution.

6.6 After two minutes a determination of the ammonia concentration within the chamber should be made using the high range colorimetric detector tube. A concentration of 1000 ppm ammonia or greater shall be generated before the exercises are started.

6.7 To test the integrity of the suit the following four minute exercise protocol should be followed:

6.7.1 Raising the arms above the head with at least 15 raising motions completed in one minute.

6.7.2 Walking in place for one minute with at least 15 raising motions of each leg in a one-minute period.

6.7.3 Touching the toes with a least 10 complete motions of the arms from above the head to touching of the toes in a one-minute period.

6.7.4 Knee bends with at least 10 complete standing and squatting motions in a one-minute period.

6.8 If at any time during the test the colorimetric indicating paper should change colors, the test should be stopped and sections 6.10 and 6.12 initiated (See §4.2).

6.9 After completion of the test exercise, the test area concentration should be

measured again using the high range colorimetric detector tube.

6.10 Exit the test area.

6.11 The opening created by the suit zipper or other appropriate suit penetration should be used to determine the ammonia concentration in the suit with the low range length of stain detector tube or other ammonia monitor. The internal TECP suit air should be sampled far enough from the enclosed test area to prevent a false ammonia reading.

6.12 After completion of the measurement of the suit interior ammonia concentration the test is concluded and the suit is doffed and the respirator removed.

6.13 The ventilating fan for the test room should be turned on and allowed to run for enough time to remove the ammonia gas. The fan shall be vented to the outside of the building.

6.14 Any detectable ammonia in the suit interior (five ppm ammonia (NH₃) or more for the length of stain detector tube) indicates that the suit has failed the test. When other ammonia detectors are used a lower level of detection is possible, and it should be specified as the pass/fail criteria.

6.15 By following this test method, an intrusion coefficient of approximately 200 or more can be measured with the suit in a completely operational condition. If the intrusion coefficient is 200 or more, then the suit is suitable for emergency response and field use.

7.0—Retest procedures

7.1 If the suit fails this test, check for leaks by following the pressure test in test A above.

7.2 Retest the TECP suit as outlined in the test procedure 6.0.

8.0—Report

8.1 Each gas tight totally-encapsulating chemical protective suit tested by this practice shall have the following information recorded.

8.1.1 Unique identification number, identifying brand name, date of purchase, material of construction, and unique suit features; e.g., special breathing apparatus.

8.1.2 General description of test room used for test.

8.1.3 Brand name and purchase date of ammonia detector strips and color change data.

8.1.4 Brand name, sampling range, and expiration date of the length of stain ammonia detector tubes. The brand name and model of the sampling pump should also be recorded. If another type of ammonia detector is used, it should be identified along with its minimum detection limit for ammonia.

8.1.5 Actual test results shall list the two test area concentrations, their average, the interior suit concentration, and the calculated intrusion coefficient. Retest data shall be recorded as an additional test.

8.2 The evaluation of the data shall be specified as "suit passed" or "suit failed," and the date of the test. Any detectable ammonia (five ppm or greater for the length of stain detector tube) in the suit interior indicates the suit has failed this test. When other ammonia detectors are used, a lower

level of detection is possible and it should be specified as the pass/fail criteria.

Caution

Visually inspect all parts of the suit to be sure they are positioned correctly and secured tightly before putting the suit back into service. Special care should be taken to examine each exhaust valve to make sure it is not blocked.

Care should also be exercised to assure that the inside and outside of the suit is completely dry before it is put into storage.

Appendix B—General Description and Discussion of the Levels of Protection and Protective Gear

This appendix sets forth information about personal protective equipment (PPE) protection levels which may be used to assist employers in complying with the PPE requirements of this section.

As required by the standard, PPE must be selected which will protect employees from the specific hazards which they are likely to encounter during their work on-site.

Selection of the appropriate PPE is a complex process which should take into consideration a variety of factors. Key factors involved in this process are identification of the hazards, or suspected hazards; their routes of potential hazard to employees (inhalation, skin absorption, ingestion, and eye or skin contact); and the performance of the PPE materials (and seams) in providing a barrier to these hazards. The amount of protection provided by PPE is material-hazard specific. That is, protective equipment materials will protect well against some hazardous substances and poorly, or not at all, against others. In many instances, protective equipment materials cannot be found which will provide continuous protection from the particular hazardous substance. In these cases the breakthrough time of the protective material should exceed the work durations, or the exposure after breakthrough may not pose a hazardous level.

Other factors in this selection process to be considered are matching the PPE to the employee's work requirements and task-specific conditions. The durability of PPE materials, such as tear strength and seam strength, should be considered in relation to the employee's tasks. The effects of PPE in relation to heat stress and task duration are a factor in selecting and using PPE. In some cases layers of PPE may be necessary to provide sufficient protection, or to protect expensive PPE inner garments, suits or equipment.

The more that is known about the hazards at the site, the easier the job of PPE selection becomes. As more information about the hazards and conditions at the site becomes available, the site supervisor can make decisions to up-grade or down-grade the level of PPE protection to match the tasks at hand.

The following are guidelines which an employer can use to begin the selection of the appropriate PPE. As noted above, the site information may suggest the use of combinations of PPE selected from the different protection levels (i.e., A, B, C, or D) as being more suitable to the hazards of the

work. It should be cautioned that the listing below does not fully address the performance of the specific PPE material in relation to the specific hazards at the job site, and that PPE selection, evaluation and re-selection is an ongoing process until sufficient information about the hazards and PPE performance is obtained.

Part A. Personal protective equipment is divided into four categories based on the degree of protection afforded. (See Part B of this appendix for further explanation of Levels A, B, C, and D hazards.)

I. Level A—To be selected when the greatest level of skin, respiratory, and eye protection is required.

The following constitute Level A equipment; it may be used as appropriate:

1. 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).

2. Totally-encapsulating chemical-protective suit.

3. Coveralls.¹

4. Long underwear.¹

5. Gloves, outer, chemical-resistant.

6. Gloves, inner, chemical-resistant.

7. Boots, chemical-resistant, steel toe and shank.

8. Hard hat (under suit).¹

9. Disposable protective suit, gloves and boots (depending on suit construction, may be worn over totally-encapsulating suit).

II. Level B—The highest level of respiratory protection is necessary but a lesser level of skin protection is needed.

The following constitute Level B equipment; it may be used as appropriate.

1. Positive pressure, full-facepiece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved).

2. Hooded chemical-resistant clothing (coveralls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant coveralls).

3. Coveralls.¹

4. Gloves, outer, chemical-resistant.

5. Gloves, inner, chemical-resistant.

6. Boots, outer, chemical-resistant steel toe and shank.

7. Boot-covers, outer, chemical-resistant (disposable).¹

8. Hard hat.¹

9. [Reserved]

10. Face shield.¹

III. Level C—The concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air purifying respirators are met.

The following constitute Level C equipment; it may be used as appropriate.

1. Full-face or half-mask, air purifying respirators (NIOSH approved).

2. Hooded chemical-resistant clothing (coveralls; two-piece chemical-splash suit; disposable chemical-resistant coveralls).

3. Coveralls.¹

4. Gloves, outer, chemical-resistant.

5. Gloves, inner, chemical-resistant.

6. Boots (outer), chemical-resistant steel toe and shank.¹

7. Boot-covers, outer, chemical-resistant (disposable).¹

8. Hard hat.¹

9. Escape mask.¹

10. Face shield.¹

IV. Level D—A work uniform affording minimal protection, used for nuisance contamination only.

The following constitute Level D equipment; it may be used as appropriate:

1. Coveralls.

2. Gloves.¹

3. Boots/shoes, chemical-resistant steel toe and shank.

4. Boots, outer, chemical-resistant (disposable).¹

5. Safety glasses or chemical splash goggles.¹

6. Hard hat.¹

7. Escape mask.¹

8. Face shield.¹

Part B. The types of hazards for which levels A, B, C, and D protection are appropriate are described below:

I. Level A—Level A protection should be used when:

1. The hazardous substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either the measured (or potential for) high concentration of atmospheric vapors, gases, or particulates; or the site operations and work functions involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through the skin;

2. Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible; or

3. Operations are being conducted in confined, poorly ventilated areas, and the absence of conditions requiring Level A have not yet been determined.

II. Level B—Level B protection should be used when:

1. The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection;

2. The atmosphere contains less than 19.5 percent oxygen; or

3. The presence of incompletely identified vapors or gases is indicated by a direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin.

Note: This involves atmospheres with IDLH concentrations of specific substances that present severe inhalation hazards and that do not represent a severe skin hazard; or that do not meet the criteria for use of air-purifying respirators.

III. Level C—Level C protection should be used when:

1. The atmospheric contaminants, liquid splashes, or other direct contact will not

adversely affect or be absorbed through any exposed skin;

2. The types of air contaminants have been identified, concentrations measured, and an air-purifying respirator is available that can remove the contaminants; and

3. All criteria for the use of air-purifying respirators are met.

IV. Level D—Level D protection should be used when:

1. The atmosphere contains no known hazard; and

2. Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

Note: As stated before, combinations of personal protective equipment other than those described for Levels A, B, C, and D protection may be more appropriate and may be used to provide the proper level of protection.

As an aid in selecting suitable chemical protective clothing, it should be noted that the National Fire Protection Association is developing standards on chemical protective clothing. These standards are currently undergoing public review prior to adoption, including:

NFPA 1991—Standard on Vapor-Protective Suits for Hazardous Chemical Emergencies (EPA Level A Protective Clothing)

NFPA 1991—Standard on Liquid Splash-Protective Suits for Hazardous Chemical Emergencies (EPA Level B Protective Clothing)

NFPA 1993—Standard on Liquid Splash-Protective Suits for Non-emergency, Non-flammable Hazardous Chemical Situations (EPA Level B Protective Clothing)

These standards would apply documentation and performance requirements to the manufacture of chemical protective suits. Chemical protective suits meeting these requirements would be labelled as compliant with the appropriate standard. When these standards are adopted by the National Fire Protection Association, it is recommended that chemical protective suits which meet these standards be used.

Appendix C—Compliance Guidelines

1. Occupational Safety and Health Program. Each hazardous waste site clean-up effort will require an occupational safety and health program headed by the site coordinator or the employer's representative. The purpose of the program will be the protection of employees at the site and will be an extension of the employer's overall safety and health program. The program will need to be developed before work begins on the site and implemented as work proceeds as stated in paragraph (b). The program is to facilitate coordination and communication of safety and health issues among personnel responsible for the various activities which will take place at the site. It will provide the overall means for planning and implementing the needed safety and health training and job orientation of employees who will be working at the site. The program will provide the means for identifying and controlling worksite hazards and the means for

¹ Optional, as applicable.

monitoring program effectiveness. The program will need to cover the responsibilities and authority of the site coordinator or the employer's manager on the site for the safety and health of employees at the site, and the relationships with contractors or support services as to what each employer's safety and health responsibilities are for their employees on the site. Each contractor on the site needs to have its own safety and health program so structured that it will smoothly interface with the program of the site coordinator or principal contractor.

Also those employers involved with treating, storing or disposal of hazardous waste as covered in paragraph (p) must have implemented a safety and health program for their employees. This program is to include the hazard communication program required in paragraph (p)(1) and the training required in paragraphs (p)(7) and (p)(8) as parts of the employers comprehensive overall safety and health program. This program is to be in writing.

Each site or workplace safety and health program will need to include the following: (1) Policy statements of the line of authority and accountability for implementing the program, the objectives of the program and the role of the site safety and health supervisor or manager and staff; (2) means or methods for the development of procedures for identifying and controlling workplace hazards at the site; (3) means or methods for the development and communication to employees of the various plans, work rules, standard operating procedures and practices that pertain to individual employees and supervisors; (4) means for the training of supervisors and employees to develop the needed skills and knowledge to perform their work in a safe and healthful manner; (5) means to anticipate and prepare for emergency situations; and (6) means for obtaining information feedback to aid in evaluating the program and for improving the effectiveness of the program. The management and employees should be trying continually to improve the effectiveness of the program thereby enhancing the protection being afforded those working on the site.

Accidents on the site or workplace should be investigated to provide information on how such occurrences can be avoided in the future. When injuries or illnesses occur on the site or workplace, they will need to be investigated to determine what needs to be done to prevent this incident from occurring again. Such information will need to be used as feedback on the effectiveness of the program and the information turned into positive steps to prevent any recurrence. Receipt of employee suggestions or complaints relating to safety and health issues involved with site or workplace activities is also a feedback mechanism that can be used effectively to improve the program and may serve in part as an evaluative tool(s).

For the development and implementation of the program to be the most effective, professional safety and health personnel should be used. Certified Safety Professionals, Board Certified Industrial Hygienists or Registered Professional Safety

Engineers are good examples of professional stature for safety and health managers who will administer the employer's program.

2. Training. The training programs for employees subject to the requirements of paragraph (e) of this standard should address: the safety and health hazards employees should expect to find on hazardous waste clean-up sites; what control measures or techniques are effective for those hazards; what monitoring procedures are effective in characterizing exposure levels; what makes an effective employer's safety and health program; what a site safety and health plan should include; hands on training with personal protective equipment and clothing they may be expected to use; the contents of the OSHA standard relevant to the employee's duties and function; and employee's responsibilities under OSHA and other regulations. Supervisors will need training in their responsibilities under the safety and health program and its subject areas such as the spill containment program, the personal protective equipment program, the medical surveillance program, the emergency response plan and other areas.

The training programs for employees subject to the requirements of paragraph (p) of this standard should address: the employers safety and health program elements impacting employees; the hazard communication program; the medical surveillance program; the hazards and the controls for such hazards that employees need to know for their job duties and functions. All require annual refresher training.

The training programs for employees covered by the requirements of paragraph (q) of this standard should address those competencies required for the various levels of response such as: the hazards associated with hazardous substances; hazard identification and awareness; notification of appropriate persons; the need for and use of personal protective equipment including respirators; the decontamination procedures to be used; preplanning activities for hazardous substance incidents including the emergency response plan; company standard operating procedures for hazardous substance emergency responses; the use of the incident command system and other subjects. Hands-on training should be stressed whenever possible. Critiques done after an incident which include an evaluation of what worked and what did not and how could the incident be better handled the next time may be counted as training time.

For hazardous materials specialists (usually members of hazardous materials teams), the training should address the care, use and/or testing of chemical protective clothing including totally encapsulating suits, the medical surveillance program, the standard operating procedures for the hazardous materials team including the use of plugging and patching equipment and other subject areas.

Officers and leaders who may be expected to be in charge at an incident should be fully knowledgeable of their company's incident command system. They should know where and how to obtain additional assistance and be familiar with the local district's emergency

response plan and the state emergency response plan.

Specialist employees such as technical experts, medical experts or environmental experts that work with hazardous materials in their regular jobs, who may be sent to the incident scene by the shipper, manufacturer or governmental agency to advise and assist the person in charge of the incident should have training on an annual basis. Their training should include the care and use of personal protective equipment including respirators; knowledge of the incident command system and how they are to relate to it; and those areas needed to keep them current in their respective field as it relates to safety and health involving specific hazardous substances.

Those skilled support personnel, such as employees who work for public works departments or equipment operators who operate bulldozers, sand trucks, backhoes, etc., who may be called to the incident scene to provide emergency support assistance, should have at least a safety and health briefing before entering the area of potential or actual exposure. These skilled support personnel, who have not been a part of the emergency response plan and do not meet the training requirements, should be made aware of the hazards they face and should be provided all necessary protective clothing and equipment required for their tasks.

3. Decontamination. Decontamination procedures should be tailored to the specific hazards of the site, and may vary in complexity and number of steps, depending on the level of hazard and the employee's exposure to the hazard. Decontamination procedures and PPE decontamination methods will vary depending upon the specific substance, since one procedure or method may not work for all substances. Evaluation of decontamination methods and procedures should be performed, as necessary, to assure that employees are not exposed to hazards by re-using PPE. References in Appendix F may be used for guidance in establishing an effective decontamination program. In addition, the U.S. Coast Guard's Manual, "Policy Guidance for Response to Hazardous Chemical Releases," U.S. Department of Transportation, Washington, DC (COMDTINST M16485.30) is a good reference for establishing an effective decontamination program.

4. Emergency response plans. States, along with designated districts within the states, will be developing or have developed local emergency response plans. These state and district plans should be utilized in the emergency response plans called for in the standard. Each employer should assure that its emergency response plan is compatible with the local plan. The major reference being used to aid in developing the state and local district plans is the *Hazardous Materials Emergency Planning Guide*, NRT-1. The current *Emergency Response Guidebook* from the U.S. Department of Transportation, CMAA's CHEMTREC and the Fire Service Emergency Management Handbook may also be used as resources.

Employers involved with treatment, storage, and disposal facilities for hazardous waste, which have the required contingency plan called for by their permit, would not need to duplicate the same planning elements. Those items of the emergency response plan that are properly addressed in the contingency plan may be substituted into the emergency response plan required in 1910.120 or otherwise kept together for employer and employee use.

5. Personal protective equipment programs. The purpose of personal protective clothing and equipment (PPE) is to shield or isolate individuals from the chemical, physical, and biologic hazards that may be encountered at a hazardous substance site.

As discussed in Appendix B, no single combination of protective equipment and clothing is capable of protecting against all hazards. Thus PPE should be used in conjunction with other protective methods and its effectiveness evaluated periodically.

The use of PPE can itself create significant worker hazards, such as heat stress, physical and psychological stress, and impaired vision, mobility, and communication. For any given situation, equipment and clothing should be selected that provide an adequate level of protection. However, over-protection, as well as under-protection, can be hazardous and should be avoided where possible.

Two basic objectives of any PPE program should be to protect the wearer from safety and health hazards, and to prevent injury to the wearer from incorrect use and/or malfunction of the PPE. To accomplish these goals, a comprehensive PPE program should include hazard identification, medical monitoring, environmental surveillance, selection, use, maintenance, and decontamination of PPE and its associated training.

The written PPE program should include policy statements, procedures, and guidelines. Copies should be made available to all employees, and a reference copy should be made available at the worksite. Technical data on equipment, maintenance manuals, relevant regulations, and other essential information should also be collected and maintained.

6. Incident command system (ICS). Paragraph 1910.120(q)(3)(ii) requires the implementation of an ICS. The ICS is an organized approach to effectively control and manage operations at an emergency incident. The individual in charge of the ICS is the senior official responding to the incident. The ICS is not much different than the "command post" approach used for many years by the fire service. During large complex fires involving several companies and many pieces of apparatus, a command post would be established. This enabled one individual to be in charge of managing the incident, rather than having several officers from different companies making separate, and sometimes conflicting, decisions. The individual in charge of the command post would delegate responsibility for performing various tasks to subordinate officers. Additionally, all communications were routed through the command post to reduce the number of radio transmissions and eliminate confusion.

However, strategy, tactics, and all decisions were made by one individual.

The ICS is a very similar system, except it is implemented for emergency response to all incidents, both large and small, that involve hazardous substances.

For a small incident, the individual in charge of the ICS may perform many tasks of the ICS. There may not be any, or little, delegation of tasks to subordinates. For example, in response to a small incident, the individual in charge of the ICS, in addition to normal command activities, may become the safety officer and may designate only one employee (with proper equipment) as a back-up to provide assistance if needed. OSHA does recommend, however, that at least two employees be designated as back-up personnel since the assistance needed may include rescue.

To illustrate the operation of the ICS, the following scenario might develop during a small incident, such as an overturned tank truck with a small leak of flammable liquid.

The first responding senior officer would implement and take command of the ICS. That person would size-up the incident and determine if additional personnel and apparatus were necessary; would determine what actions to take to control the leak; and determine the proper level of personal protective equipment. If additional assistance is not needed, the individual in charge of the ICS would implement actions to stop and control the leak using the fewest number of personnel that can effectively accomplish the tasks. The individual in charge of the ICS then would designate himself as the safety officer and two other employees as a back-up in case rescue may become necessary. In this scenario, decontamination procedures would not be necessary.

A large complex incident may require many employees and difficult, time-consuming efforts to control. In these situations, the individual in charge of the ICS will want to delegate different tasks to subordinates in order to maintain a span of control that will keep the number of subordinates that are reporting to a manageable level.

Delegation of task at large incidents may be by location, where the incident scene is divided into sectors, and subordinate officers coordinate activities within the sector that they have been assigned.

Delegation of tasks can also be by function. Some of the functions that the individual in charge of the ICS may want to delegate at a large incident are: medical services; evacuation; water supply; resources (equipment, apparatus); media relations; safety; and, site control (integrate activities with police for crowd and traffic control). Also for a large incident, the individual in charge of the ICS will designate several employees as back-up personnel and a number of safety officers to monitor conditions and recommend safety precautions.

Therefore, no matter what size or complexity an incident may be, by implementing an ICS there will be one individual in charge who makes the decisions and gives directions; and, all actions, and communications are coordinated through one

central point of command. Such a system should reduce confusion, improve safety, organize and coordinate actions, and should facilitate effective management of the incident.

7. Site Safety and Control Plans. The safety and security of response personnel and others in the area of an emergency response incident site should be of primary concern to the incident commander. The use of a site safety and control plan could greatly assist those in charge of assuring the safety and health of employees on the site.

A comprehensive site safety and control plan should include the following: summary analysis of hazards on the site and a risk analysis of those hazards; site map or sketch; site work zones (clean zone, transition or decontamination zone, work or hot zone); use of the buddy system; site communications; command post or command center; standard operating procedures and safe work practices; medical assistance and triage area; hazard monitoring plan (air contamination monitoring, etc.); decontamination procedures and areas; and other relevant areas. This plan should be a part of the employer's emergency response plan or an extension of it to the specific site.

8. Medical surveillance programs. Workers handling hazardous substances may be exposed to toxic chemicals, safety hazards, biologic hazards, and radiation. Therefore, a medical surveillance program is essential to assess and monitor workers' health and fitness for employment in hazardous waste operations and during the course of work; to provide emergency and other treatment as needed; and to keep accurate records for future reference.

The *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* developed by the National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA), the U.S. Coast Guard (USCG), and the Environmental Protection Agency (EPA) October 1985 provides an excellent example of the types of medical testing that should be done as part of a medical surveillance program.

Appendix D—References

The following references may be consulted for further information on the subject of this standard:

1. OSHA Instruction DFO CPL 2-70—January 28, 1988. *Special Emphasis Program: Hazardous Waste Sites.*
2. OSHA Instruction DFO CPL 2-237A—January 28, 1988. *Technical Assistance and Guidelines for Superfund and Other Hazardous Waste Site Activities.*
3. OSHA Instruction DTS CPL 2-74—January 28, 1988. *Hazardous Waste Activity Form, OSHA 173.*
4. *Hazardous Waste Inspections Reference Manual.* U.S. Department of Labor, Occupational Safety and Health Administration, 1988.
5. *Memorandum of Understanding Among the National Institute for Occupational Safety and Health, the Occupational Safety and Health Administration, the United States Coast Guard, and the United States Environmental Protection Agency, Guidance for Worker Protection During Hazardous*

Waste Site Investigations and Clean-up and Hazardous Substance Emergencies. December 12, 1980.

6. *National Priorities List*, 1st Edition, October 1984: U.S. Environmental Protection Agency. Revised periodically.

7. *The Decontamination of Response Personnel*, Field Standard Operating Procedures (F.S.O.P.) 7: U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Hazardous Response Support Division, December 1984.

8. *Preparation of a Site Safety Plan*, Field Standard Operating Procedures (F.S.O.P.) 9: U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Hazardous Response Support Division, April 1985.

9. *Standard Operating Safety Guidelines*: U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Hazardous Response Support Division, Environmental Response Team: November 1984.

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16. *Report to the Congress on Hazardous Materials Training, Planning and Preparedness*, Federal Emergency Management Agency, Washington, DC, July 1988.

17. *Workbook for Fire Command*, Alan V. Brunacini and J. David Beageron, National

Fire Protection Association, Batterymarch Park, Quincy, MA 02269, 1985.

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19. *Incident Command System*, Fire Protection Publications, Oklahoma State University, Stillwater, OK 74078, 1983.

20. *Site Emergency Response Planning*, Chemical Manufacturers Association, Washington, DC 20037, 1986.

21. *Hazardous Materials Emergency Planning Guide*, NRT-1, Environmental Protection Agency, Washington, DC, March 1987.

22. *Community Teamwork: Working Together to Promote Hazardous Materials Transportation Safety*, U.S. Department of Transportation, Washington, DC, May 1983.

23. *Disaster Planning Guide for Business and Industry*, Federal Emergency Management Agency, Publication No. FEMA 141, August 1987.

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