



DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS
DIRECTOR'S OFFICE
OCCUPATIONAL HEALTH STANDARDS

Filed with the Secretary of State on October 15, 1991 (as amended February 7, 2000)
These rules take effect 15 days after filing with the Secretary of State

(By authority conferred on the director of the department of consumer and industry services by section 24 of 1974 PA 154, MCL 408.1024, and Executive Reorganization Order Nos. 1996-1 and 1996-2, MCL 330.3101 and 445.2001)

R 325.52102, R 325.52103, R 325.52113, R 325.52114, R 325.52118, R 325.52125, R 325.52129, R 325.52130, R 325.52131, R 325.52135, and R 325.52137 of the Michigan Administrative Code are amended as follows:

**PART 432. HAZARDOUS WASTE OPERATIONS AND
EMERGENCY RESPONSE**

TABLE OF CONTENTS

	Page #		Page #
R 325.52101 Scope.....	2	R 325.52126 Illumination of work areas.....	13
R 325.52102 Application.....	2	R 325.52127 Sanitation.....	14
R 325.52103 Definitions.....	2	R 325.52128 New technology programs.....	14
R 325.52104 Safety and health program.....	5	R 325.52129 Operations at treatment, storage, and disposal (TSD) facilities; establishment of written safety and health program, hazard communication program, medical surveillance program, decontamination procedures, procedures for introduction of new and innovative equipment, procedures for handling drums or containers, training program, and emergency response program.....	15
R 325.52105 Site excavation.....	6	R 325.52130 Emergency response to hazardous substances releases; emergency response plan.....	16
R 325.52106 Contractors and subcontractors; notification by employer of procedures and hazards.....	6	R 325.52131 Emergency response procedures.....	17
R 325.52107 Site characterization and analysis.....	6	R 325.52132 Emergency response personnel.....	18
R 325.52108 Site control.....	7	R 325.52133 Emergency response training.....	18
R 325.52109 Training generally.....	7	R 325.52134 Emergency response medical surveillance; chemical protective clothing.....	19
R 325.52110 Initial training.....	7	R 325.52135 Postemergency response operations.....	19
R 325.52111 Training qualifications and certification.....	8	R 325.52136 Appendices.....	20
R 325.52112 Refresher and equivalent training.....	8	R 325.52137 Availability of rules and appendices; permission to copy.....	20
R 325.52113 Medical surveillance.....	8	APPENDIX A—PERSONAL PROTECTIVE EQUIPMENT TEST METHODS.....	20
R 325.52114 Medical examinations, consultations, and procedures to be performed by or under supervision of physician; content of examinations and consultations; copies of rules and information to be provided by employer.....	9	APPENDIX B—GENERAL DESCRIPTION AND DISCUSSION OF THE LEVELS OF PROTECTION AND PROTECTIVE GEAR.....	23
R 325.52115 Physician's written opinion; employer duty to obtain; content; prohibited disclosures.....	9	APPENDIX C—COMPLIANCE GUIDELINES.....	24
R 325.52116 Medical surveillance recordkeeping.....	9	APPENDIX D—REFERENCES.....	27
R 325.52117 Control of hazards.....	9	APPENDIX E—TRAINING CURRICULUM GUIDELINES...28	
R 325.52118 Personal protective equipment (PPE).....	10		
R 325.52119 Workplace monitoring.....	10		
R 325.52120 Hazard information program.....	11		
R 325.52121 Handling, labeling, and disposing of hazardous substances, drums, and containers.....	11		
R 325.52122 Shipping and transport of drums and containers of hazardous substances.....	12		
R 325.52123 Tank and vault operations.....	12		
R 325.52124 Decontamination.....	12		
R 325.52125 Emergency operations at hazardous waste sites.....	13		

R 325.52101 Scope.

Rule 1. These rules prescribe the requirements for safety and health programs, training, medical surveillance, control methods, sanitation, and personal protective equipment for employees who are involved in hazardous waste operations and response to chemical emergencies.

R 325.52102 Application.

Rule 2. (1) These rules apply to all of the following operations when employees are exposed, or have a reasonable possibility of exposure, to safety or health hazards:

- (a) Cleanup operations which are required by a governmental body, whether a federal, state, local, or other body, which involve hazardous substances, and which are conducted at uncontrolled hazardous waste sites. Such sites include any of the following:
 - (i) Sites on the environmental protection agency's (EPA) national priority site list (NPL).
 - (ii) Sites on state priority site lists.
 - (iii) Sites recommended for the EPA NPL.
 - (iv) Sites which are government-identified and are undergoing initial investigation conducted before the presence or absence of hazardous substances has been determined.
 - (b) Corrective actions that involve cleanup operations at sites covered by the provisions of the resource conservation and recovery act of 1976 (RCRA), as amended, 42 U.S.C. §6901 et seq.
 - (c) Voluntary cleanup operations at sites recognized by federal, state, local, or other governmental bodies as uncontrolled hazardous waste sites.
 - (d) Operations which involve hazardous wastes and which are conducted at treatment, storage, and disposal (TSD) facilities regulated by the provisions of 40 C.F.R. parts 264 and 265 pursuant to RCRA, by agencies under agreement with EPA to implement RCRA regulations, or by the provisions of sections 5, 11, 13, 13a, 15a, 19, 22a, 30, 30a, 32a, 32b, and 32c of Act No. 641 of the Public Acts of 1978, as amended, being §§299.405, 299.411, 299.413, 299.413a, 299.415a, 299.419, 299.422a, 299.430, 299.430a, 299.432a, 299.432b, and 299.432c of the Michigan Compiled Laws.
 - (e) An emergency response operation that involves the release of, or a substantial threat of the release of, hazardous substances, without regard to the location of the hazard.
- (2)** All of the requirements of the Michigan occupational health and safety act (MIOSHA) occupational health rules and occupational safety rules for both general industry and construction apply, pursuant to their terms, to operations specified in subrule (1) of this rule, whether mentioned in these rules or not. Where there is a conflict or overlap between these and other rules, the requirement that is more protective of employee health and safety shall apply without regard to O.H. rule 1106(3)(a).
- (3)** All of these rules, except for R 325.52129 to R 325.52135, apply to hazardous substance cleanup

operations covered by the provisions of subrule (1)(a), (b), and (c) of this rule.

- (4)** Only the provisions of R 325.52129 apply to operations at TSD facilities covered by the provisions of subrule (1)(d) of this rule. All of the following provisions apply to this subrule:
- (a) All of the provisions of R 325.52129 apply to any TSD operation which is regulated by the provisions of 40 C.F.R. parts 264 and 265 or by Michigan law authorized under RCRA and which is required to have a permit or interim status from EPA pursuant to the provisions of 40 C.F.R. §270.1 or from a Michigan agency pursuant to the provisions of RCRA.
 - (b) Employers who are not required to have a permit or interim status because they are conditionally exempt small quantity generators under the provisions of 40 C.F.R. §261.5 or are generators who qualify under the provisions of 40 C.F.R. §262.34 for exemptions from regulation under the provision of 40 C.F.R. parts 264, 265, and 270 need not comply with the provisions of subrules R 325.52129 (1) to (8). Excepted employers who are required by the EPA or a Michigan agency to have their employees engage in emergency response or who direct their employees to engage in emergency response shall comply with the provisions of R 325.52129(9). Excepted employers who are not required to have employees engage in emergency response, who direct their employees to evacuate in the case of emergencies, and who meet the requirements of R 325.52129 (9)(a) and (b) are exempt from the rest of the provisions of R 325.52129.
 - (c) If an area is used primarily for treatment, storage, or disposal, any emergency response operation in that area shall be in compliance with the requirements of R 325.52129(9). In other areas that are not used primarily for treatment, storage, or disposal, any emergency response operation shall be in compliance with the requirements of R 325.52130 to R 325.52135. Compliance with the requirements of R 325.52130 to R 325.52135 shall be deemed to be in compliance with the requirements of R 325.52129(9).
- (5)** An emergency response operation which involves the release of, or a substantial threat of a release of, hazardous substances and which is not covered by subrule (1)(a) to (d) of this rule shall be in compliance with only the requirements of R 325.52130 to R 325.52135.

R 325.52103 Definitions.

Rule 3.(1) As used in these rules:

- (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 a least 1 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) **"Cleanup 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 and the environment.
- (c) **“Decontamination”** means the removal of hazardous substances from employees and their equipment to the extent necessary to prevent the occurrence of foreseeable adverse health effects.
- (d) **“Emergency response”** or **“responding to emergencies”** means a response effort by employees from outside the immediate release area or by other designated responders, for example, mutual-aid groups or local fire departments, 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 these rules. Responses to releases of hazardous substances where there is no potential safety or health hazards, such as, fire, explosion, or chemical exposure, are not considered to be emergency responses.
- (e) **“Facility”** means any of the following:
- (i) A building.
 - (ii) A structure.
 - (iii) An installation.
 - (iv) Equipment.
 - (v) A pipe or pipeline, including a pipe into a sewer or publicly owned treatment works.
 - (vi) A well.
 - (vii) A pit.
 - (viii) A pond.
 - (ix) A lagoon.
 - (x) An impoundment.
 - (xi) A ditch.
 - (xii) A storage container.
 - (xiii) A motor vehicle.
 - (xiv) Rolling stock.
 - (xv) Aircraft.
 - (xvi) A site or area where a hazardous substance has been deposited, stored, disposed of, placed, or otherwise caused to be located.
 - (xvii) Facility does not mean any consumer product in consumer use or any waterborne vessel.
- (f) **“Hazardous material response (HAZMAT) team”** means an organized group of employees which is designated by the employer and which is expected to perform work to handle and control actual or potential leaks or spills of hazardous substances that may require coming into close proximity to the substance. The team members perform responses to releases or potential releases of hazardous substances to control or stabilize a release or potential release. 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.
- (g) **“Hazardous substance”** means any of the following substances, exposure to which results or may result in adverse effects on the health and safety of employees:
- (i) Any substance defined under section 101(14) of the comprehensive environmental response, compensation, and liability act, 42 U.S.C. §9601(14).
 - (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 any of the following in such persons or their offspring:
 - (A) Death.
 - (B) Disease.
 - (C) Behavioral abnormalities.
 - (D) Cancer.
 - (E) Genetic mutation.
 - (F) Physiological malfunctions, including malfunctions in reproduction.
 - (G) Physical deformations in such persons or their offspring.
 - (iii) Any substance that is listed by the United States department of transportation as a hazardous material under the provisions of 49 C.F.R. §172.101 and appendices, which are adopted herein by reference. The provisions of 49 C.F.R. §172.101 and appendices are available from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402, at a cost at the time of adoption of these rules of \$27.00, or from the Michigan Department of Consumer and Industry Services, Standards Division, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan 48909, at a cost at the time of adoption of these rules of \$10.00
 - (iv) Hazardous waste.
- (h) **“Hazardous waste”** means either of the following:
- (i) A waste or combination of wastes as defined in the provisions of 40 C.F.R. §261.3, which are adopted herein by reference. The provisions of 40 C.F.R. 261.3 are available from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402, at a cost at the time of adoption of these rules of \$22.00, or from the Michigan Department of Consumer and Industry Services, Standards Division, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan 48909, at a cost at the time of adoption of these rules of \$2.00.
 - (ii) Those substances defined as hazardous waste in the provisions of 49 C.F.R. §171.8, which are adopted herein by reference. The provisions of 49 C.F.R. §171.8 are available from the

Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402, at a cost at the time of adoption of these rules of \$27.00, or from the Michigan Department of Consumer and Industry Services, Standards Division, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan 48909, at a cost at the time of adoption of these rules of \$1.00.

- (i) **“Hazardous waste operation”** means any operation to which these rules apply according with the provisions of R 325.52102.
- (j) **“Hazardous waste site”** or **“site”** means any facility or location at which hazardous waste operations take place and to which these rules apply.
- (k) **“Health hazard”** means a stress due to a physical condition, chemical exposure, or a pathogen for which there is statistically significant evidence, based on at least 1 study conducted in accordance with established scientific principles, that acute or chronic health effects may occur in exposed employees. The term “health hazard” includes all of the following:
 - (i) Chemicals which are carcinogens.
 - (ii) Toxic or highly toxic agents.
 - (iii) Reproductive toxins.
 - (iv) Irritants.
 - (v) Corrosives.
 - (vi) Sensitizers.
 - (vii) Hepatotoxins.
 - (viii) Nephrotoxins.
 - (ix) Neurotoxins.
 - (x) Agents which act on the hematopoietic system.
 - (xi) Agents which damage the lungs, skin, eyes, or mucous membranes.
 - (xii) High or low body temperatures.
 - (xiii) High noise levels.
 - (xiv) Ionizing or nonionizing radiation.

Further definition of terms used in this subdivision can be found in appendix A to 29 C.F.R. §1910.1200, which was incorporated by reference in section 14a of Act No. 154 of the Public Acts of 1974, as amended, being §408.1014a of the Michigan Compiled Laws.

- (l) **“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, would cause irreversible or delayed adverse health effects, or would interfere with an person’s ability to escape from a dangerous atmosphere.
- (m) **“Oxygen deficiency”** means that concentration of oxygen, by volume, in the atmosphere below which airsupplying respiratory protection shall be provided. An oxygen deficiency exists in atmospheres were the percentage of oxygen, by volume, is less than 19.5%.
- (n) **“Permissible exposure limit”** or **“PEL”** means the inhalation or dermal permissible exposure limits of chemical substances specified or referenced in the air contaminants standard tables G-1-A, G-2, and G-3 of R 325.51108.

- (o) **“Postemergency response”** means that portion of an emergency response which is performed after the immediate threat of a release has been stabilized or eliminated and cleanup of the site has begun. If postemergency response is performed by an employer’s own employees as a continuation of initial emergency response, it is considered to be part of the initial response and not postemergency response. However, if a group of an employer’s own employees that is separate from the group that provides the initial response performs the cleanup operation, the separate group of employees is considered to be performing postemergency response and is subject to the provisions of R 325.52135.
- (p) **“Published exposure level”** means the exposure limits specified in the publication entitled “NIOSH Recommendations for Occupational Health Standards,” 1986, which are adopted in these rules by reference, or, if no limit is specified, the threshold limit values published by the American conference of governmental industrial hygienist (ACGIH) in the publication entitled “Threshold Limit Values and Biological Exposure Indices for 1990-1991,” 1990, which are adopted in these rules by reference. These 2 documents may be inspected at the Lansing office of the department. The NIOSH publication may be obtained from the National Institute for Occupational Safety and Health, Publications Dissemination Division, Cincinnati, Ohio 45226, or from the Michigan Department of Consumer and Industry Services, Standards Division, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan 48909, at no cost. The ACGIH publication is available from the American Conference of Governmental Industrial Hygienist, 6500 Glenway Avenue, Bldg. D-7, Cincinnati, Ohio 45211- 4438, or from the Michigan Department of Consumer and Industry Services, Standards Division, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan 48909. The cost at the time of adoption of these rules is \$6.00.
- (q) **“Qualified person”** means a person who has specific training, knowledge, and experience in the area for which the person has responsibility and the authority to control operations.
- (r) **“Site safety and health supervisor”** or **“official”** means an individual who is located on a hazardous waste site, who is responsible to the employer, and who has the authority and knowledge necessary to implement the site safety and health plan and verify compliance with applicable safety and health requirements.
- (s) **“Small quantity generator”** means a generator of hazardous waste who, in any calendar month, generates not more than 1,000 kilograms (2,205 pounds) of hazardous waste.
- (t) **“Uncontrolled hazardous waste site”** means an area where an accumulation of hazardous wastes creates a threat to the health and

safety of individuals or the environment, or both. Such sites can be on public lands or on privately owned property. Normal operations at TSD sites are not included in this definition.

R 325.52104 Safety and health program.

- Rule 4. (1)** An employer shall develop and implement a written safety and health program for its employees who are involved in hazardous waste operations. The program shall be designed to identify, evaluate, and control safety and health hazards and provide for emergency responses for hazardous waste operations.
- (2) A safety and health program that is developed and implemented to meet other federal, state, or local regulations is acceptable to meet the requirements of subrule (1) of this rule if the program includes, or is modified to include, the topics required by this rule.
- (3) The written safety and health program shall include all of the following topics:
- (a) An organizational structure.
 - (b) A comprehensive work plan.
 - (c) A site-specific safety and health plan which need not repeat the standard operating procedures required by subdivision (f) of this subrule.
 - (d) The safety and health training program.
 - (e) The medical surveillance program.
 - (f) The employer's standard operating procedures for safety and health.
 - (g) Any necessary interface between the general program and site-specific activities.
- (4) All of the following provisions apply to the organizational structure section of the program:
- (a) The organizational structure section shall establish the specific chain of command and specify the overall responsibilities of supervisors and employees. It shall provide for all of the following:
 - (i) A general supervisor who has the responsibility and authority to direct all hazardous waste operations.
 - (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 section shall be reviewed and updated as necessary to reflect the current status of waste site operations.
 - (c) The original organizational structure section and any changes shall be made available to all affected employees.
- (5) The comprehensive work plan section of the program shall address the tasks and objectives of site operations and the logistics and resources required to accomplish those tasks and objectives and shall provide for all of the following:
- (a) Address anticipated cleanup activities, as well as normal operating procedures.
 - (b) Define work tasks and objectives and identify the methods for accomplishing those tasks and objectives.
 - (c) Establish personnel requirements for implementing the plan.
 - (d) Provide for the implementation of the training required in the provisions of R 325.52109 to R 325.52112.
 - (e) Provide for the implementation of the required informational programs required in the provisions of R 325.52120.
 - (f) Provide for the implementation of the medical surveillance program described in the provisions of R 325.52113 to R 325.52116.
- (6) The site-specific safety and health plan section of the safety and health program shall be available on the site for inspection by employees, their designated representatives, and Michigan occupational safety and health program (MIOSHA) personnel. The plan section shall address the safety and health hazards of each phase of site operation and include the requirements and procedures for employee protection. The site-specific safety and health plan shall provide for all of the following:
- (a) The names of key personnel and alternates who are responsible for site safety and health, including a site safety and health supervisor.
 - (b) A safety and health risk or hazard analysis for each site task and operation found in the work plan.
 - (c) Employee training assignments to assure compliance with the provisions of R 325.52109 to R 325.52112.
 - (d) 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 the provisions of R 325.52118.
 - (e) Medical surveillance requirements in accordance with the program in the provisions of R 325.52113 to R 325.52116.
 - (f) The frequency and types of air monitoring and personal monitoring and the environmental sampling techniques and instrumentation to be used, including the methods and schedule of maintenance and calibration of monitoring and sampling equipment.
 - (g) Site control procedures in accordance with the site control program required in the provisions of R 325.52108.
 - (h) Decontamination procedures in accordance with the provisions of R 325.52124.
 - (i) An emergency response plan that meets the requirements of R 325.52125 for safe and effective response to emergencies, including the necessary personal protective equipment and other equipment.
 - (j) Confined space entry procedures.
 - (k) A spill containment program which meets the requirements of R 325.52121(2)(g) shall be included where appropriate.
 - (l) Preentry briefings to be held before 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 from site characterization and analysis work required pursuant to the

provisions of R 325.52107 shall be used to prepare and update the site safety and health plan and preentry briefings.

- (m) Inspections conducted by the site safety and health supervisor, or designee, 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.
- (7) The written safety and health program required by this rule shall be made available to employees and their representatives, to contractors and subcontractors involved in the hazardous waste operation, and to Michigan occupational safety and health program (MIOSHA) personnel.

R 325.52105 Site excavation.

Rule 5. Site excavations that are created during initial site preparation or during hazardous waste operations shall be shored or sloped to prevent accidental collapse and shall be conducted in accordance with the provisions of R 408.40901 et seq. of the Michigan Administrative Code (construction safety rules).

R 325.52106 Contractors and subcontractors; notification by employer of procedures and hazards.

Rule 6. An employer who retains contractor or subcontractor services for work in hazardous waste operations shall, before commencement of those services, inform the 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.

R 325.52107 Site characterization and analysis.

Rule 7.(1) Hazardous waste sites shall be evaluated in accordance with the provisions of this rule to identify specific site hazards and to determine the appropriate safety and health control procedures needed to protect employees from the identified hazards.

- (2) A preliminary evaluation of the site's characteristics shall be performed before site entry by a qualified person to aid in the selection of appropriate employee protection methods. Immediately after initial site entry, a more detailed evaluation of the site's characteristics shall be performed by a qualified person to further identify hazards and to further aid in the selection of appropriate engineering controls and personal protective equipment for the tasks to be performed.
- (3) 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 conditions include the following:
 - (a) Potential confined space entry.
 - (b) Potential explosive or fire situations.
 - (c) Visible vapor clouds.
 - (d) Areas where biological indicators, such as dead animals or vegetation, are located.

- (4) All of the following information, to the extent available, shall be obtained by the employer before allowing employees to enter a site:
 - (a) The location and approximate size of the site.
 - (b) A description of the response activity or job task to be performed.
 - (c) The planned duration of employee activity.
 - (d) Site topography.
 - (e) Site accessibility by air and roads.
 - (f) Pathways for hazardous substance dispersion.
 - (g) The status and capabilities of emergency response teams that would provide assistance to on-site employees at the time of an emergency.
 - (h) The hazardous substances that are expected at the site and their health hazards and chemical and physical properties.
- (5) Personal protective equipment (PPE) shall be provided and used during initial site entry in accordance with all of the following requirements:
 - (a) Based upon the results of the preliminary site evaluation, PPE 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 and safety hazards shall be selected and used during initial site entry.
 - (b) If positive-pressure, self-contained breathing apparatus is not used as part of the initial entry ensemble, an escape, self-contained breathing apparatus with not less than a 5-minute supply of air shall be carried by employees or kept available at their immediate work stations.
 - (c) If the preliminary site evaluation does not produce sufficient information to identify the hazards or suspected hazards of the site, then both of the following shall be used:
 - (i) PPE that provides protection to level B shall be provided as a minimum protection (See R 325.52137 for availability of appendix B to these rules pertaining to level B protective equipment).
 - (ii) Direct reading instruments shall be used as appropriate for identifying IDLH conditions.
 - (d) PPE which is appropriate to protect employees from identified site hazards shall be selected and used in accordance with the provisions of R 325.52118.
- (6) All of 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 such conditions:
 - (a) Monitoring for hazardous levels of ionizing radiation with direct-reading instruments.
 - (b) Monitoring the air with appropriate direct-reading test equipment for IDLH and other conditions that may cause death or serious harm, such as combustible or explosive atmospheres, oxygen deficiency, or toxic substances.
 - (c) Visually observe for signs of actual or potential IDLH or other dangerous conditions.
- (7) Once the presence and concentrations of specific hazardous substances and health hazards have been established, the risks associated with these

substances and hazards 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 incorporated pursuant to the provisions of section 14a of Act No. 154 of the Public Acts of 1974, as amended, being §408.1014a of the Michigan Compiled Laws, training required by that standard need not be duplicated. All of the following risks shall be considered:

- (a) Exposures greater than a permissible exposure limit or a published exposure level.
 - (b) IDLH concentrations.
 - (c) Potential skin absorption and irritation sources.
 - (d) Potential eye irritation sources.
 - (e) Explosion sensitivity and flammability ranges.
- (8) Any information concerning the chemical, physical, and toxicological properties of each substance known or expected to be present on-site that is available to the employer and relevant to the duties of an employee shall be made available to all affected employees before the commencement of their work activities.
- (9) An ongoing air monitoring program that is in compliance with the provisions of R 325.52119 shall be implemented after site characterization has determined that the site is safe for the start-up of operations.

R 325.52108 Site control.

- Rule 8. (1)** Appropriate site control procedures to control employee exposure to hazardous substances shall be implemented before cleanup work begins.
- (2) The site control procedures required as an element of the site-specific safety and health plan for protecting employees shall be developed during the planning stages of a hazardous waste operation and modified as necessary when new information becomes available.
- (3) The site control procedures shall include all of the following:
- (a) A site map.
 - (b) Site work zones.
 - (c) A buddy system.
 - (d) Site communications, including emergency alerting.
 - (e) Standard operating procedures or safe work practices.
 - (f) Identification of the nearest medical assistance.

R 325.52109 Training generally.

- Rule 9. (1)** All employees, supervisors, and management personnel who work at a hazardous waste site where cleanup operations are underway shall be trained and have supervised on-the-job field experience as required by this rule, R 325.52110, and R 325.52111 before they are permitted to engage in hazardous waste operations that could expose them to hazardous substances or safety or health hazards. All personnel shall also receive refresher training as required pursuant to the provisions of R 325.52112.
- (2) Employees and supervisors shall not be permitted to participate in field activities until they have been trained at the level required by their job functions and responsibilities.

- (3) Training shall cover all of the following topics:
- (a) The names of personnel and alternates who are 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 which will minimize the risks of hazards.
 - (e) The safe use of engineering controls and equipment on the site.
 - (f) Medical surveillance requirements, including the recognition of symptoms and signs which might indicate overexposure to hazards.
 - (g) The contents of the site-specific safety and health plan required pursuant to the provisions of R 325.52104(6)(h) to (k).
- (4) Employees who may respond to emergency situations at hazardous waste sites shall be trained in the proper response procedures for, and protection from, hazardous exposures.

R 325.52110 Initial training.

- Rule 10. (1)** General site workers and supervisory personnel who are assigned to tasks that involve exposure or potential exposure to hazardous substances, health hazards, or safety hazards shall receive the training specified in both of the following provisions:
- (a) Forty hours of training conducted away from the hazardous waste site.
 - (b) Three days of field experience under the direct supervision of a trained and experienced supervisor.
- (2) Workers who are on a site only occasionally for a specific and limited task and who are unlikely to be exposed above permissible and published exposure limits shall receive the training specified in both of the following provisions:
- (a) Twenty-four hours of off-site training.
 - (b) One day of field experience under the direct supervision of a trained and experienced supervisor.
- (3) Regular site workers who work in areas which have been monitored and fully characterized as indicating that exposures are below permissible exposure limits and published exposure levels, in areas where respirators are not required, or in areas where the site characterization indicates that health hazards do not exist or that the possibility of an emergency developing does not exist shall receive the training specified in both of the following provisions:
- (a) Twenty-four hours of off-site training.
 - (b) One day of field experience under the direct supervision of a trained and experienced supervisor.
- (4) Workers who have received 24 hours of training, who are covered by the provisions of subrules (2) and (3) of this rule, and who become general site workers or who are required to wear respirators shall receive an additional 16 hours of training and 2 days of supervised field experience to equal the requirements of subrule (1) of this rule.
- (5) Management and supervisory personnel who work on-site shall receive the same amount of training and supervised field experience as their subordinates as specified in subrules (1), (2), and (3) of this rule, plus, at the time of job assignment,

not less than 8 additional hours of specialized training on appropriate topics, such as the following:

- (a) Employer's safety and health program.
- (b) Employee training programs.
- (c) Personal protective equipment program.
- (d) Spill containment.
- (e) Health hazard monitoring procedures and techniques.

R 325.52111 Training qualifications and certification.

Rule 11. (1) 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 teach or shall possess the academic credentials and instructional experience necessary for teaching the subjects. Instructions shall demonstrate competent instructional skills and knowledge of the applicable subject matter.

- (2) Employees and supervisors who have received and successfully completed the training and field experience specified in R 325.52109 and R 325.52110 shall be certified by their instructors or training supervisors as having successfully completed the necessary training. A written certificate shall be given to each person who is certified. Any person who has not been certified or who does not meet the requirements of R 325.52112(2) shall be prohibited from engaging in hazardous waste operations.

R 325.52112 Refresher and equivalent training.

Rule 12. (1) All employees who are required to be trained pursuant to the provisions of R 325.52109(1) shall also receive 8 hours of refresher training annually on the topics specified in R 325.52109(3) and R 325.52110(5). Refresher training also shall include a critique of the past year's incidents that can serve as training examples for future work situations.

- (2) An employer who can show, by documentation or certification, that an employee's work experience or training has resulted in training equivalent to the training required by the provisions of R 325.52109 and R 325.52110 shall not be required to provide the initial training requirements specified in R 325.52110 to such employee. However, certified employees or employees with equivalent training who are 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.

R 325.52113 Medical surveillance.

Rule 13. (1) Employers that are engaged in the operations described in R 325.52102(1)(a) to (c) and employers with a hazardous material response (HAZMAT) team shall establish a medical surveillance program, in accordance with the provisions of this rule, for all of the following employees:

- (a) All employees who are or may be exposed, for 30 days or more a year, to hazardous substances or health hazards at or above

permissible exposure limits (PEL) or, if there is no PEL, above the published exposure levels for these substances without regard to the use of respirators.

- (b) All employees who wear a respirator for 30 or more days a year or as required by the respiratory protection standard, R 325.60051 et seq. of the Michigan Administrative Code.
- (c) All employees who are injured, become ill, or develop signs or symptoms due to the possible overexposure to hazardous substances or health hazards from an emergency response or hazardous waste operation.
 - (d) All employees on a HAZMAT team.
- (2) Medical examinations and consultations shall be made available by the employer at no cost to the employee, without a loss of pay, and at a reasonable time and place for each employee covered by the provisions of subrule (1) of this rule pursuant to the following provisions, as applicable:
 - (a) For employees who are covered under the provisions of subrule (1)(a),(b), and (d) of this rule, the following schedule applies:
 - (i) Before assignment to hazardous waste or emergency response operations.
 - (ii) At least once every 12 months for each covered employee, unless the responsible physician believes a longer interval is appropriate. The interval shall not be more than 2 years.
 - (iii) At termination of employment or reassignment to an area where the employee will not be covered, unless the employee has had an examination within the last 6 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 who are covered under the provisions of subrule (1)(c) of this rule and for all employees, including those of employees who are covered by the provisions of R 325.52102(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 been 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, the following schedule applies:
 - (i) As soon as possible after 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.

R 325.52114 Medical examinations, consultations, and procedures to be performed by or under supervision of physician; content of examinations and consultations; copies of rules and information to be provided by employer.

- Rule 14 (1)** All medical examinations, consultations, and procedures shall be performed by or under the supervision of a licensed physician, preferably a physician who is knowledgeable in occupational medicine.
- (2)** Medical examinations required by the provisions of R 325.52113(2) shall include a medical and work history or updated history if one is in the employee's file, with a special emphasis on the symptoms related to the handling of hazardous substances and health hazards and on fitness for duty, including the ability to wear any required personal protective equipment (PPE) under conditions that may be expected at the work site.
- (3)** The content of medical examinations or consultations pursuant to the provisions of R 325.52113(2) shall be determined by the attending physician. (See R 325.52137 for availability of appendix D, reference no. 10)
- (4)** An employer shall provide a copy of these rules and appendices to the attending physician and all of the following information for each employee who is to be examined:
- A description of an employee's duties as they relate to the employee's exposures.
 - The employee's exposure levels or anticipated exposure levels.
 - A description of any personal protective equipment used or to be used.
 - Information from previous medical examinations of the employee which is not readily available to the examining physician.
 - Information required pursuant to the provisions of the respiratory protection standard, R 325.60051 et seq. of the Michigan Administrative Code.

R 325.52115 Physician's written opinion; employer duty to obtain; content; prohibited disclosures.

- Rule 15. (1)** An employer shall obtain, and furnish an employee with, a copy of the attending physician's written opinion following each examination or consultation required pursuant to the provisions of R 325.52113.
- (2)** The physician's written opinion shall contain all of the following information:
- 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.
 - The physician's recommended limitations upon the employee's assigned work.
 - The results of the medical examination and tests if requested by the employee.
 - 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.

- (3)** The written opinion provided to the employer and the employee shall not reveal specific findings or diagnoses unrelated to the occupational environment.

R 325.52116 Medical surveillance recordkeeping.

- Rule 16. (1)** An accurate record of the medical surveillance required pursuant to the provisions of R 325.52113 shall be retained and provided to others in accordance with the provisions of R 325.3451 et seq. of the Michigan Administrative Code.
- (2)** The medical records required pursuant to the provisions of R 325.52115 and this rule shall include all of the following information:
- The name and social security number of the employee.
 - A physician's written opinions, recommended limitations, and results of examinations and tests.
 - Any employee medical complaints related to exposure to hazardous substances.
 - A copy of the information provided to the examining physician by the employer, except for the copy of these rules and appendices.

R 325.52117 Control of hazards.

- Rule 17. (1)** Engineering controls, work practices, personal protective equipment, or a combination of these shall be implemented in accordance with the provisions of this rule to protect employees from exposure to hazardous substances and safety and health hazards.
- (2)** Engineering controls, such as pressurized control cabs on mobile equipment or remotely operated material handling equipment, and work practices, such as removing nonessential personnel from areas of high risk, shall be used to reduce and maintain employee exposures to or below permissible exposure limits, except to the extent that such controls and practices are not feasible.
- (3)** If engineering controls and work practices are not feasible or not required, any reasonable and appropriate combination of controls, practices, and personal protective equipment (PPE) shall be used to reduce and maintain employee exposures to or below the permissible exposure limits or dose limits for substances with a permissible exposure limit.
- (4)** An employer shall not use a schedule of employee rotation as a means to comply 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.
- (5)** An employer shall comply with all of the applicable provisions of O.H. rules 2410 to 3240 and R 325.60101 et seq. of the Michigan Administrative Code.
- (6)** Any reasonable and appropriate combination of engineering controls, work practices, and PPE shall be used to reduce and maintain employee exposure to or below published exposure levels for hazardous substances and health hazards without exposure or dose-regulating rules. The employer shall use material safety data sheets (MSDS) and other published literature as a guide in making a

determination as to the level of appropriate protection.

R 325.52118 Personal protective equipment (PPE).

Rule 18. (1) Personal protective equipment (PPE) shall be selected and used to protect employees from the hazards and potential hazards they are likely to encounter as identified during the site characterization and analysis.

- (2) 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.
- (3) Positive-pressure, self-contained breathing apparatus or positive-pressure, air line respirators that are equipped with an escape air supply shall be used when chemical exposure levels will create a substantial possibility of immediate death or immediate serious illness or injury or will impair the ability to escape.
- (4) 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 or immediate serious illness or injury or may impair the ability to escape.
- (5) 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 R 325.52137 for availability of appendix B pertaining to selecting PPE ensembles.) 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.
- (6) Personal protective equipment shall be selected, provided at no cost to the employee, and used in accordance with the requirements of the personal protective equipment standard, R 325.60001 et seq.; the respiratory protection standard, R 325.60051 et seq.; general industry safety standard Part 33. personal protective equipment, R 408.13301 et seq.; and construction safety standard Part 6. personal protective equipment, R 408.40601 et seq. of the Michigan Administrative Code.
- (7) All of the following provisions pertain to the use of totally-encapsulating chemical protective suits.
 - (a) Totally-encapsulating suits shall be selected to protect employees from the particular hazards which are identified during site characterization and analysis.
 - (b) Totally-encapsulating suits shall be capable of maintaining a positive air pressure. Appendix A, referenced in R 325.53137, shall be consulted for a test method to evaluate this air pressure requirement.
 - (c) Totally-encapsulating suits shall be capable of preventing inward test gas leakage of more than 0.5%. See appendix A for a test method.
- (8) An employer shall establish a written personal protective equipment (PPE) program which is part of

the safety and health program required by the provisions of R 325.52104 or R 325.52129. This program is also a part of the site-specific safety and health plan specified in R 325.52104. The personal protective equipment program shall address all of the following elements if applicable:

- (a) PPE selection based on site hazards.
- (b) PPE use and limitations.
- (c) Work 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 before and after use.
- (i) PPE proper use.
- (j) Evaluation of the effectiveness of the PPE program.
- (k) Limitations during temperature extremes and other appropriate medical considerations.

Manufacturer instructions relating to the subjects specified in subdivisions (d) to (h) of this subrule may be incorporated into the PPE program.

R 325.52119 Workplace monitoring.

- Rule 19. (1)** Monitoring shall be performed in accordance with the provisions of this rule where there may be employee exposure to hazardous concentrations of hazardous substances. Monitoring shall be performed to assure the proper selection of engineering controls, work practices, and personal protective equipment so that employees are not exposed to levels of hazardous substances which are greater than permissible exposure limits.
- (2) 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 that is needed on-site.
 - (3) Upon initial workplace entry, representative air monitoring shall be conducted to identify all of the following:
 - (a) Any IDLH condition.
 - (b) Exposure above established permissible exposure limits.
 - (c) Exposure above a radioactive material's dose limits.
 - (d) Other dangerous conditions, such as the presence of flammable atmospheres or oxygen-deficient environments.
 - (4) Periodic monitoring shall be conducted when the possibility of an IDLH condition or flammable atmosphere has developed or when there is an indication that exposures may have risen above permissible exposure limits or published exposure levels since prior monitoring. All of the following are situations where the possibility that exposures have risen shall be considered:
 - (a) Work begins on a different area of the site.
 - (b) Contaminants other than those previously identified are being handled.
 - (c) A different type of operation is initiated, for example, drum opening as opposed to exploratory well drilling.
 - (d) Employees are handling leaking drums or containers or working in areas with obvious liquid contamination, for example, a spill or lagoon.

- (e) A sufficient reasonable interval has passed so that exposures may have significantly increased.
- (5) After hazardous waste cleanup operations commence, an employer shall monitor those employees likely to have the highest potential exposures to those 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 exposure. If the employees likely to have the highest exposure are exposed above permissible exposure limits or published exposure levels, monitoring shall continue to determine all employees likely to be above those levels. An employer may utilize a representative sampling approach by documenting that the employees and chemicals were chosen for monitoring based on the preceding criteria of this subrule. The monitoring of employees who are engaged in site characterization operations covered by the provisions of R 325.52107 is not required.

R 325.52120 Hazard information program.

Rule 20. An employer shall develop and implement a program, which is part of the employer's safety and health program required by the provisions of R 325.52104, to inform employees, contractors, and subcontractors and their representatives who are 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 who work outside of the operations area of a site are not covered by this rule.

R 325.52121 Handling, labeling, and disposing of hazardous substances, drums, and containers.

- Rule 21. (1)** Hazardous substances and contaminated soils, liquids, and other residues shall be handled, labeled, transported, and disposed of in accordance with the provisions of this rule, R 325.52122, and R 325.52123.
- (2) All of the following provisions pertain to the use, handling, or movement of drums and other containers of hazardous substances.
- (a) Drums and containers that are used during cleanup shall be appropriate for the wastes that they contain and the handling that is anticipated.
 - (b) When practical, drums and containers shall be inspected and their integrity shall be assured before being moved. Drums or containers that cannot be inspected before being moved because of storage conditions, for example, drums or containers that are buried, stacked behind other drums, or stacked several tiers high in a pile, shall be moved to an accessible location and inspected before further handling.
 - (c) Unlabeled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled.
 - (d) The movement of drums and containers shall be minimized by preplanning and organization of site operations.
 - (e) Before moving drums or containers, all employees who are exposed to the transfer

- operation shall be warned of the potential hazards associated with the contents of the drum or containers.
- (f) United States department of transportation-specified salvage drums or containers and suitable quantities of proper absorbents shall be kept available and used in areas where spills, leaks, or ruptures may occur.
 - (g) Where spills of a hazardous substance from drums or containers may occur, a spill containment program which is part of the employer's safety and health program that is required pursuant to the provisions of R 325.52104 shall be implemented to contain and isolate the entire volume of the hazardous substance being transferred.
 - (h) Drums and containers that cannot be moved without rupture, leakage, or spillage shall be emptied into a sound container using equipment which is appropriate for the circumstances involved in the transfer of hazardous materials.
 - (i) 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.
 - (j) Soil or covering material shall be removed with caution to prevent drum or container rupture.
 - (k) Fire extinguishing equipment that meets the requirements of R 408.10801 et seq. of the Michigan Administrative Code shall be on hand and ready for use to control incipient fires.
 - (l) Material handling equipment that is used to transfer drums and containers shall be selected, positioned, and operated to minimize sources of ignition related to the equipment from igniting gases or vapors released from drums or containers.
 - (m) Drums and containers of radioactive wastes shall not be handled until their hazard to employees is properly assessed.
- (3) All of the following procedures shall be used in areas where drums or containers are being opened:
- (a) Where an air line respirator system is used, connections to the breathing air cylinders shall be protected from contamination and the entire system shall be protected from physical damage.
 - (b) Employees who are not actually involved in opening drums or containers shall be kept a safe distance from the operation.
 - (c) If employees are required to 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 employees and the drums or containers being opened to protect the employees in case of explosion.
 - (d) Controls for drum or container opening equipment, monitoring equipment, and fire suppression equipment shall be located behind an explosion-resistant barrier.
 - (e) When there is a reasonable possibility of flammable gases or vapors being present, material handling equipment and hand tools shall be types that will not produce sources of ignition.

- (f) Drums and containers shall be opened in a manner that will safely relieve interior pressure. 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.
- (4)** All of the following provisions apply to the handling or shipping of shock-sensitive wastes:
- (a) The shipping of shock-sensitive wastes may be prohibited under United States department of transportation regulations. Employers and their shippers shall refer to the provisions of 49 C.F.R. §§173.21 and 173.50.
 - (b) All nonessential employees shall be evacuated from the area of transfer.
 - (c) Material-handling equipment shall be provided with explosion containment devices or protective shields to protect equipment operators from exploding containers.
 - (d) An alarm system that can be perceived by employees above surrounding light and noise conditions shall be used to signal the commencement and completion of explosive waste-handling activities.
 - (e) Continuous communications through appropriate means shall be maintained between the employee who is in charge of the immediate handling area and the site safety and health supervisor 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.
 - (f) Drums and containers that are under pressure, as evidenced by bulging or swelling, shall not be moved until such time as the cause of the internal pressure is determined and appropriate containment procedures have been implemented to protect employees from explosion due to relieving the pressure of the drum or container.
- (5)** In addition to the requirements of subrule (4) of this rule, all of the following precautions shall be taken when handling laboratory waste packs (lab packs):
- (a) Lab packs shall be opened only when necessary and then only by an individual who is knowledgeable about the inspection, classification, and segregation of the containers within the pack according to the hazards of the waste.
 - (b) If crystalline material is noted on the outside of any container, the contents shall be handled as a shock-sensitive waste until the contents are identified.
 - (c) Drums and containers of packaged laboratory wastes shall be considered to contain shock-sensitive or explosive materials unless known not to contain such materials.
- (6)** 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.

R 325.52122 Shipping and transport of drums and containers of hazardous substances.

Rule 22. All of the following provisions apply to shipping and transporting drums and containers of hazardous substances:

- (a) Drums and containers shall be identified, classified, and labeled before packaging for shipment.
- (b) Drum or container staging areas shall be kept to the minimum number necessary to safely identify and classify materials and prepare them for transport.
- (c) Staging areas shall have adequate access and egress routes.
- (d) Bulking of hazardous waste is permitted only after a thorough characterization of the waste has been completed.

R 325.52123 Tank and vault operations.

Rule 23. (1) Tanks and vaults that contain a hazardous substance shall be handled in a manner similar to that for drums and containers by following the applicable provisions of R 325.52121.

- (2)** Appropriate tank or vault entry (confined space entry) procedures which are in compliance with the provisions of O.H. rules 3301 and 3302 and which are addressed in the site safety and health plan covered by the provisions of R 325.52104(6) shall be followed in all cases where employees enter tanks, vaults, or other confined spaces.

R 325.52124 Decontamination.

Rule 24. (1) Procedures for all phases of decontamination shall be developed and implemented in accordance with this rule.

- (2)** All of the following provisions apply to 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 the 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 who leave a contaminated area shall be appropriately decontaminated and all contaminated clothing and equipment that leaves 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.
 - (e) Decontamination shall be performed in geographical areas that will minimize the exposure of uncontaminated employees or equipment to contaminated employees or equipment.
 - (f) All equipment and solvents that are used for decontamination shall be decontaminated or disposed of properly.
 - (g) Protective clothing and equipment shall be decontaminated, cleaned, laundered, maintained, or replaced as needed to maintain

the effectiveness of the clothing and equipment.

- (h) Employees whose nonimpermeable clothing becomes wetted with hazardous substances shall immediately remove that clothing and proceed to a shower. The clothing shall be disposed of or decontaminated before it is removed from the work zone.
 - (i) Unauthorized employees shall not remove protective clothing or equipment from change rooms.
 - (j) Commercial laundries or cleaning establishments that decontaminate protective clothing or equipment shall be informed of the potentially harmful effects of exposure to hazardous substances.
- (3) Where the decontamination procedure indicates a need for regular showers and change rooms outside of a contaminated area, such showers and change rooms shall be provided and shall be in compliance with the requirements of O.H. rule 4201
- (4). If temperature conditions prevent the effective use of water, other effective means for cleansing shall be provided and used.

R 325.52125 Emergency operations at hazardous waste sites.

Rule 25. (1) An emergency response plan shall be developed and implemented by all employees within the scope of R 325.52102(1)(a) and (b) to handle anticipated emergencies before start-up of hazardous waste operations. The plan shall be in writing and available for inspection and copying by employees, their representatives, Michigan occupational safety and health program personnel, and other federal and state government personnel with relevant responsibilities. An employer who will evacuate its employees from the danger area when an emergency occurs and who does not permit any of its employees to respond to assist in handling the emergency is exempt from the requirements of this rule if the employer provides an emergency action plan that is in compliance with the provisions of general industry safety standard Part 6. Fire Exits, R 408.10601 et seq. and construction safety standard Part 18 Fire Protection and Prevention, R 408.41801 et seq. of the Michigan Administrative Code. The provisions of these standards may be inspected and copies obtained at the Lansing office of the Michigan Department of Consumer and Industry Services, Standards Division, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan 48909, at no cost.

- (2) The emergency response plan shall address all of the following topics:
- (a) Preemergency planning.
 - (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.
 - (i) Emergency alerting and response procedures.
 - (j) A critique of response and follow-up.
 - (k) PPE and emergency equipment.

- (3) In addition to the topics for the emergency response plan specified in subrule (2) of this rule, both of the following elements shall be included in an emergency response plan for a hazardous waste cleanup site:
 - (a) Site topography, layout, and prevailing weather conditions.
 - (b) Procedures for reporting incidents to local, state, and federal governmental agencies.
- (4) The emergency response plan shall be a separate section of the site-specific safety and health plan and shall be compatible and integrated with disaster, fire, or emergency response plans of local, state, and federal agencies.
- (5) The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations and shall be reviewed periodically and amended, as necessary, to keep it current with new or changing site conditions or information.
- (6) An employee alarm system shall be installed in accordance with the provisions of general industry safety standard Part 6. fire exits, R 408.10601 et seq. of the Michigan Administrative Code, to notify employees of an emergency situation, to stop work activities if necessary, to lower background noise in order to enhance communication, and to begin emergency procedures. The provisions of this standard may be inspected and copies obtained at the Lansing office of the Michigan Department of Consumer and Industry Services, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan 48909, at no cost.
- (7) Based upon the information available at time of an emergency, an employer shall evaluate the incident and site response capabilities and proceed with the appropriate steps to implement the site emergency response plan.

R 325.52126 Illumination of work areas.

Rule 26. (1) Work areas shall be lighted to not less than the minimum illumination intensities listed in table 1 while any work is in progress. Approved wiring and electrical equipment, as specified in the provisions of R 408.41701 et seq. of the Michigan Administrative Code, shall be used.

- (2) Table 1 reads as follows:

**Table 1
Minimum Illumination Intensities in
Footcandles**

Area or operations	Footcandles
General site areas	5
Excavation and waste areas, accessways,	3
active storage areas, loading platforms, refueling, and field maintenance areas.	
Indoors: warehouses, corridors, hallways.....	5
and exitways.	
Tunnels, shafts, and general underground work	5
areas; exception: a minimum of 10 footcandles is required at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of mines-approved cap lights are acceptable for use in the tunnel heading.	

General shops, such as mechanical.....10
 and electrical equipment rooms, active storerooms,
 barracks or living quarters, locker or dressing rooms,
 dining areas, and indoor toilets and workrooms.

First aid stations, infirmaries, and offices30

R 325.52127 Sanitation.

Rule 27.(1) All of the following provisions apply to potable water:

- (a) An adequate supply of potable water shall be provided on the site.
 - (b) Portable containers that are used to dispense drinking water shall be capable of being tightly closed and shall be equipped with a tap. Water shall not be dipped from containers.
 - (c) Any container that is used to distribute drinking water shall be clearly marked as to its contents and shall not be used for any other purpose.
 - (d) Where single-service cups are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.
- (2)** Both of the following provisions apply to nonpotable water:
- (a) Outlets for nonpotable water, such as water for industrial or 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 not be a cross-connection, open or potential, between a potable water system and a nonpotable water system.
- (3)** All of the following provisions apply to toilet facilities.
- (a) Toilets shall be provided for employees according to the provisions of the following table:

**Table 2
 Toilet Facilities**

Number of employees	Minimum number of facilities
20 or less	One.
More than 20, less than 200	One toilet seat and 1 urinal per 40 employees.
200 or more	One toilet seat and 1 urinal per 50 employees.

- (b) Under temporary field conditions, at least 1 toilet facility shall be available.
- (c) Hazardous waste sites that are not provided with a sanitary sewer shall be provided with any of the following toilet facilities, unless prohibited by local codes:
 - (i) Chemical toilets.
 - (ii) Recirculating toilets.
 - (iii) Combustion toilets.
 - (iv) Flush toilets.
- (d) The requirements of this subrule shall not apply to mobile crews that have transportation readily available to nearby toilet facilities.

- (e) Doors to toilet facilities shall be provided with locks that are controlled from inside.
- (4)** All employee food service facilities and operations shall meet the applicable laws, ordinances, and regulations of the jurisdictions in which they are located.
- (5)** When temporary sleeping quarters are provided, they shall be heated, ventilated, and lighted.
- (6)** An employer shall provide adequate washing facilities for employees who are engaged in operations where hazardous substances may be harmful to employees. Such facilities shall be near the worksite, in areas which are under the control of the employer, and where exposures are below permissible exposure limits. Such facilities shall be equipped to enable employees to remove hazardous substances from themselves.
- (7)** When hazardous waste cleanup or removal operations commence on a site and the duration of the work will require 6 or more months, an employer shall provide showers and change rooms for employees who are exposed to hazardous substances and health hazards involved in hazardous waste cleanup or removal operations. Showers shall be provided and shall meet the requirements of O.H. rule 4201(4)(c). Change rooms shall be provided and shall meet the requirements of O.H. rule 4201(5). Change rooms shall consist of 2 separate change areas separated by the shower area required by the provisions of this subrule. 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. Showers and change rooms shall be located in areas where exposures are below the permissible exposure limits. If this cannot be accomplished, then a ventilation system shall be provided that will supply air that is below the permissible exposure limits. Employers shall assure that employees shower at the end of their workshifts and when leaving the hazardous waste site.

R 325.52128 New technology programs.

- Rule 28. (1)** An employer shall develop and implement procedures for the introduction of effective new technologies and equipment developed for the improved protection of employees who work with hazardous waste cleanup operations. Such new technologies 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 that are available to the industry, such as the use of foams, absorbents, sorbents, 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 to determine their effectiveness before using them on a large scale. Such evaluations shall be made available to the Michigan occupational safety and health program (MIOSHA) upon request. Manufacturers' and suppliers' information and data may be used as part of this evaluation.

R 325.52129 Operations at treatment, storage, and disposal (TSD) facilities; establishment of written safety and health program, hazard communication program, medical surveillance program, decontamination procedures, procedures for introduction of new and innovative equipment, procedures for handling drums or containers, training program, and emergency response program.

Rule 29. (1) All provisions of this rule apply to employers who conduct operations at treatment, storage, and disposal (TSD) facilities specified in R 325.52102(1)(d), except for employers that may be exempted in accordance with the provisions of R 325.52102(4)(a) to (c).

(2) An employer shall develop and implement a written safety and health program for employees who are involved in hazardous waste operations. This written program shall be available for inspection by employees, employees' representatives, and Michigan occupational safety and health program (MIOSHA) personnel. The program shall be designed to identify, evaluate, and control safety and health hazards in the employer's facilities for the purpose of employee protection and shall provide for emergency response that is in compliance with the requirements of this rule. The program shall address, as appropriate, all of the following areas:

- (a) Site analysis.
- (b) Engineering controls.
- (c) Maximum exposure limits.
- (d) Hazardous waste handling procedures.
- (e) Uses of new technologies.

(3) An employer shall implement a hazard communication program that is in compliance with the requirements of sections 14a to 14k of Act No. 154 of the Public Acts of 1974, as amended, being §§408.1014a to 408.1014k of the Michigan Compiled Laws.

(4) An employer shall develop and implement a medical surveillance program in accordance with the provisions of R 325.52113 to R 325.52116.

(5) An employer shall develop and implement decontamination procedures in accordance with the provisions of R 325.52124.

(6) An employer shall develop and implement procedures for the introduction of new and innovative equipment into the workplace in accordance with the provisions of R 325.52128.

(7) An employer shall develop and implement procedures for handling drums or containers in accordance with the provisions of R 325.52121 (2)(a) to (g) and R 325.52122 before starting work that involves the handling of drums or containers.

(8) An employer shall develop and implement, in accordance with all of the following provisions, a training program, which is part of the employers health and safety program, for employees who are exposed to health hazards or hazardous substances of TSD operations to enable the employees to perform their assigned duties and functions in a safe and healthy manner so as not to endanger themselves or other employees:

- (a) The initial training program of new employees shall be a program of 24 hours of training. A certificate of such training shall be issued to

each employee who successfully completes this training.

(b) Initial training need not be provided for current employees for whom it can be shown that their previous work experience or training is equivalent to the training requirement of subdivision (a) of this subrule.

(c) All employees shall be given 8 hours of refresher training annually.

(d) Trainers who provide the initial training specified in subdivision (a) of this subrule shall have satisfactorily completed a program for teaching the subjects they teach or shall have academic credentials and instruction experience to demonstrate a satisfactory degree of competency in the subjects they teach.

(9) An employer shall develop and implement an emergency response program in accordance with all of the following provisions:

(a) An emergency response plan shall be developed and implemented. The emergency response plan 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, if the contingency plan is made part of the emergency response plan. The emergency response plan shall be a written portion of the safety and health program required by subrule (2) of this rule.

(b) An employer who will evacuate its employees from the worksite when an emergency occurs and who does not permit any of its employees to assist in handling the emergency is exempt from the requirements of this subrule if the employer provides an emergency action plan in accordance with the provisions of general industry safety standard Part 6. fire exits, R 408.10601 et seq. and construction safety standard Part 18. fire protection and prevention, R 408.41801 et seq. of the Michigan Administrative Code as required in R 325.52125(1).

(c) The emergency response plan shall address all of the following topics to the extent that they are not addressed in any specific program required in this rule:

- (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.
- (ix) Emergency alerting and response procedures.
- (x) Critique of response and follow-up.
- (xi) PPE and emergency equipment.

(d) An employer shall provide and complete training for emergency response employees before they become involved in actual

emergency operations. Such training shall include all of the following:

- (i) Elements of the emergency response plan.
- (ii) Standard operating procedures for emergency response operations.
- (iii) Personal protective equipment available and use and limitations of each.
- (iv) Procedures for handling emergency incidents.
- (v) Both exceptions to the training requirements of this subdivision are as follows:
 - (A) An employer need not train all employees to the degree specified if the employer divides the work force so that a sufficient number of employees who are responsible for controlling emergencies have the training specified and so that all other employees who might initially 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.
 - (B) 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 might initially respond to the incident 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.
- (vi) 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 includes training in all of the following areas:
 - (A) The methods used to minimize the risk from safety and health hazards.
 - (B) The safe use of control equipment.
 - (C) Selection and use of appropriate PPE.
 - (D) Safe operating procedures to be used at the incident scene.
 - (E) Techniques of coordination with other employees to minimize risks.
 - (F) Appropriate response to overexposure to health hazards or injury to themselves or others.
 - (G) Recognition of subsequent symptoms which may result from overexposure.
- (vii) An employer shall certify that each covered employee has attended and successfully completed the training required in this subdivision 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.

- (e) All of the following provisions pertain to the procedures for handling emergency incidents:
 - (i) In addition to the elements for the emergency response plan required by subdivision (c) of this subrule, the following elements shall be included in 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.
 - (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 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 the provisions of general industry safety standard Part 6. fire exits, R 408.10601 et seq. of the Michigan Administrative Code, to notify employees of an emergency situation, to stop work activities if necessary, to lower background noise to aid communication, and to begin emergency procedures.
 - (vi) Based upon the information available at the time of the emergency, an employer shall evaluate the incident and the site response capabilities and proceed with the appropriate steps to implement the site emergency response plan.

R 325.52130 Emergency response to hazardous substances releases; emergency response plan.

- Rule 30. (1)** This rule and R 325.52131 to R 325.52135 apply to employers whose employees are engaged in emergency response wherever it occurs, except in operations specified in the provisions of R 325.52102(1)(a) to (d).
- (2)** Emergency response organizations that have developed and implemented programs equivalent to the requirements of this rule and R 325.52131 to R 325.52135 for handling releases of hazardous substances pursuant to the provisions of section 303 of the 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 rule and R 325.52131 to R 325.52135.
 - (3)** An emergency response plan shall be developed and implemented to handle anticipated emergencies before the commencement of emergency response operations. The plan shall be in writing and available for inspection and copying by employees,

their representatives, and Michigan occupational safety and health program (MIOSHA) personnel. An employer who will evacuate its employees from the danger area when an emergency occurs and who does not permit any of its employees to assist in handling the emergency is exempt from the requirements of this subrule and subrule (4) of this rule if the employer provides an emergency action plan in accordance with the provisions of general industry safety standard Part 6. fire exits, R 408.10601 et seq. and construction safety standard Part 18. fire protection and prevention, R 408.41801 et seq. of the Michigan Administrative Code.

- (4) An employer shall develop an emergency response plan which shall address all of 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.
 - (i) Emergency alerting and response procedures.
 - (j) Critique of response and follow-up.
 - (k) PPE and emergency equipment.
- (5) 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 properly addressed by the local and state emergency plans may be substituted into an employer's emergency plan or otherwise kept together for use by employers and employees use.

R 325.52131 Emergency response procedures.

- Rule 31. (1)** The senior emergency response official who responds 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, and shall be assisted by the senior official present for each employer.
- (2) The senior official at an emergency response is the most senior official on the site who is responsible for controlling the operation at the site. Initially, it is the senior officer on the first piece of responding emergency apparatus to arrive on the incident scene who is the senior official. As more senior officers arrive, such as the battalion chief, fire chief, state law enforcement official, or site coordinator, the position of senior official is passed up the line of authority which has been previously established.
 - (3) The individual in charge of the ICS shall identify, to the extent possible, all hazardous substances or conditions present and shall address, as appropriate, all of the following:
 - (a) Site analysis.
 - (b) Use of engineering controls.
 - (c) Maximum exposure limits.
 - (d) Hazardous substance handling procedures.
 - (e) The use of any new technologies.

- (4) Based on the hazardous substances 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 the criteria contained in the occupational safety standards for general industry, Part 73, Fire Brigades, being R 408.17301 et seq. of the Michigan Administrative Code, when worn while performing fire fighting operations beyond the incipient stage for any incident.
- (5) Employees who are engaged in emergency response and who are exposed to hazardous substances that present an inhalation hazard or potential inhalation hazard shall wear positive-pressure, self-contained breathing apparatus while engaged in emergency response and 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.
- (6) 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 2 or more.
- (7) Back-up personnel shall stand by with equipment ready to provide assistance or rescue. Qualified emergency medical service personnel shall also stand by with medical equipment and transportation capability.
- (8) 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 for identifying and evaluating hazards and for providing direction with respect to the safety of operations for the emergency.
- (9) When activities are judged by the safety official to be an IDLH or 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 taken to correct these hazards at an emergency scene.
- (10) After emergency operations have terminated, the individual in charge of the ICS shall implement appropriate decontamination procedures.
- (11) Approved self-contained, compressed air breathing apparatus may, if necessary, be used with approved cylinders from other approved self-contained, compressed air breathing apparatus if such cylinders are of the same capacity and pressure rating. All compressed air cylinders that are used with self-contained breathing apparatus shall meet the criteria of the United States department of transportation and national institute for occupational safety and health, which are adopted in these rules by reference. The criteria are set forth in the provisions of 42 C.F.R. Part 84 and 49 C.F.R. Parts 173 and 178, which may be inspected at the Lansing office of the department of consumer and industry services and may be purchased from the Superintendent of Documents, Government Printing

Office, Washington, DC 20402, or from the Michigan Department of Consumer and Industry Services, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan 48909, at a cost at the time of adoption of these rules of \$20.00 for copies of 30 C.F.R. part 84 and at a cost at the time of adoption of these rules of \$24.00 for copies of 49 C.F.R. parts 173 and 178.

R 325.52132 Emergency response personnel.

Rule 32. (1) Skilled support personnel who are skilled in the operation of certain equipment, such as mechanized earth-moving or digging equipment or crane and hoisting equipment, 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 receive the training required in the provisions of R 325.52133 for the employer's regular employees. However, these personnel shall be given an initial briefing at the site before participating 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. The personnel referred to in this subrule need not be an employer's own employees. 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.

- (2) Specialist 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 annually or annually demonstrate competency in the area of their specialization.

R 325.52133 Emergency response training.

Rule 33. (1) Employees who participate or are expected to participate in emergency response shall be trained in accordance with the requirements of this rule. 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 these rules, shall be conveyed to them through training before they are permitted to take part in actual emergency operations on an incident.

- (2) 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 all of the following areas:
- (a) Understanding what hazardous substances are and the risks associated with them in an incident.

- (b) Understanding the potential outcomes associated with an emergency created when hazardous substances are present.
- (c) The ability to recognize the presence of hazardous substances in an emergency.
- (d) The ability to identify the hazardous substances in an emergency, if possible.
- (e) Understanding the role of the first responder awareness individual as specified in the employer's emergency response plan, including site security and control, and as specified in the United States 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.

- (3) 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. These individuals 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 not less than 8 hours of training or have had sufficient experience to objectively demonstrate competency in all of the following areas in addition to those listed for the awareness level in subrule (2) of this rule:

- (a) Knowledge of the basic hazard and risk assessment techniques.
- (b) Knowing how to select and use proper personal protective equipment provided to the first responder operational level.
- (c) Understanding basic hazardous materials terms.
- (d) Knowing how to perform basic control, containment, and confinement operations within the capabilities of the resources and personal protective equipment available to their unit.
- (e) Knowing how to implement basic decontamination procedures.
- (f) Understanding the relevant standard operating procedures and termination procedures.

The employer shall certify demonstrated competency in the areas specified in this subrule.

- (4) 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 not less than 24 hours of training equal to the first responder operations level of subrule (3) of this rule and, in addition, be competent in all of the following areas:
- (a) Knowing how to implement the employer's emergency response plan.
- (b) Knowing the classification, identification, and verification of known and unknown materials

- by using field survey instruments and equipment.
- (c) Being able to function within an assigned role in the incident command system.
 - (d) Knowing how to select and use proper specialized chemical personal protective equipment provided to the hazardous materials technician.
 - (e) Understanding hazard and risk assessment techniques.
 - (f) Being able to perform advance control, containment, and confinement operations within the capabilities of the resources and personal protective equipment available to the unit.
 - (g) Understanding and implementing decontamination procedures.
 - (h) Understanding termination procedures.
 - (i) Understanding basic chemical and toxicological terminology and behavior.
- The employer shall certify competency in the areas specified in this subrule.
- (5)** 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 concerning site activities. Hazardous materials specialists shall have received not less than 24 hours of training equal to the technician level of subrule (4) of this rule and, in addition, be competent in all of the following areas:
- (a) Knowing how to implement the local emergency response plan.
 - (b) Understanding the classification, identification, and verification of known and unknown materials by using advanced survey instruments and equipment.
 - (c) Being aware of the state emergency response plan.
 - (d) Being able to select and use proper specialized chemical personal protective equipment provided to the hazardous materials specialist.
 - (e) Understanding in-depth hazard and risk techniques.
 - (f) Being able to perform specialized control, containment, and confinement operations within the capabilities of the resources and personal protective equipment available.
 - (g) Being able to determine and implement decontamination procedures.
 - (h) Having the ability to develop a site safety and control plan.
 - (i) Understanding chemical, radiological, and toxicological terminology and behavior.
- (6)** On scene incident commanders who will assume control of the incident scene beyond the first responder awareness level shall receive not less than 24 hours of training equal to the first responder operations level of subrule (3) of this rule and, in addition, be competent in all of the following areas:
- (a) Knowing and being able to implement the employer's incident command system.
 - (b) Knowing how to implement the employer's emergency response plan.
 - (c) Knowing and understanding the hazards and risks associated with employees who work in chemical protective clothing.
 - (d) Knowing how to implement the local emergency response plan.
 - (e) Being aware of the state emergency response plan and the federal regional response team.
 - (f) Knowing and understanding the importance of decontamination procedures.
- An employer shall certify competency in the areas specified in this subrule.
- (7)** Trainers who teach any of the training subjects specified in subrules (1) to (6) of this rule 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 or academic credentials and instructional experience necessary to demonstrate competent instructional skills and a satisfactory command of the subject matter of the courses they are to teach.
- (8)** Both of the following provisions pertain to refresher training:
- (a) Those employees who are trained in accordance with the provisions of this rule shall receive annual refresher training of sufficient content and duration to remain competent with respect to their duties and functions 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, an employer shall keep a record of the methodology used to demonstrate competency.
- R 325.52134 Emergency response medical surveillance; chemical protective clothing.**
- Rule 34. (1)** 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 pursuant to the provisions of R 325.52113 to R 325.52116 of these rules.
- (2)** Any emergency response employee who exhibits signs or symptoms which may have resulted from exposure to hazardous substances during the course of an emergency incident shall be provided with medical consultation as required pursuant to the provisions of R 325.52113(2)(b).
- (3)** Chemical protective clothing and equipment to be used by organized and designated HAZMAT team members or to be used by hazardous materials specialists shall be in compliance with the requirements of R 325.52118.
- R 325.52135 Postemergency response operations.**
- Rule 35. (1)** 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 who conducts the cleanup shall comply with either of the following provisions:

- (a) Meet all of the requirements of R 325.52104 to R 325.52128.
- (b) Where the cleanup is done on plant property using plant or workplace employees, such employees shall have completed the training requirements of all of the following:
 - (i) The provisions of general industry safety standard Part 6. fire exits, R 408.10601 et seq. and construction safety standard Part 18. fire protection and prevention, R 408.41801 et seq. of the Michigan Administrative Code as required in R 325.52125(1).
 - (ii) The provisions of 29 C.F.R. §1910.1200(h).
 - (iii) The provisions of the respiratory protection standard, R 325.60051 et seq. of the Michigan Administrative Code.
 - (iv) Other appropriate safety and health training appropriate to the tasks.
- (2) All equipment that is to be used in the cleanup of the site of an incident shall be in serviceable condition and shall have been inspected before use.

R 325.52136 Appendices.

Rule 36. Appendices A, B, C, and D to these rules are informational only and are not intended to create any additional obligations or requirements not otherwise imposed or to detract from any established obligations or requirements. They are identical to appendices A, B, C, and D to 29 C.F.R. §1910.120 from which these rules were derived.

R 325.52137 Availability of rules and appendices; permission to copy.

- Rule 37. (1)** Copies of these rules and related appendices are available, at no cost, from the Michigan Department of Consumer and Industry Services, Standards Division, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan 48909.
- (2)** Permission to copy any of these documents in full is granted by the director of the department of consumer and industry services.

APPENDICES TO MIOSHA STANDARD FOR HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE (R 325.52101-R 325.52137)

The following appendices serve as non-mandatory guidelines to assist employers and employees in complying with the provisions of the standard. However, Rule 18 of the standard requires the use of level A and level B personal protective equipment protection in certain circumstances.

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 Rule 18(7)(b) and (c). 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 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 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, visor, 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-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 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 a 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 NH₄OH) 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 ammonium hydroxide (58% 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 4.6 (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":14":1" and 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 35 ppm as a 15 minute STEL, 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-encapsulated 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 ammonia 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 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.

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 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.

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 at 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 section 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 (NH_3) 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 these rules.

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 onsite.

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.

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 selection 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 reselection 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 (overalls and long-sleeved jacket; coveralls; one or two-piece chemicalsplash suit; disposable chemical-resistant overalls).
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 (overalls; twopiece chemical-splash suit; disposable chemical-resistant overalls).
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*.

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 airpurifying 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 NFPA 1992—Standard on Liquid Splash-Protective Suits for Hazardous Chemicals Emergencies (EPA Level B Protective Clothing).

As an aid in selecting suitable chemical protective clothing, it should be noted that the National Fire Protection Association has developed standards on chemical protective clothing. The standards that have been adopted include:

NFPA 1991—Standard on Vapor-Protective Suits for Hazardous Chemical Emergencies (EPA Level A Protective Clothing)

NFPA 1992—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 apply documentation and performance requirements to the manufacture of chemical protective suits. Chemical protective suits meeting these requirements are labelled as compliant with the appropriate standard. It is recommended that chemical protective suits which meet these standards be used.

.Optional, as applicable.

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 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 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 Rule 29 must have implemented a safety and health program for their employees. This program is to include the hazard communication program required in Rule 29(3) and the training required in Rule 29(8) and (9) 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 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).

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 Rule 29 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 of employees covered by the requirements of Rules 30-35 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, and 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.

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 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 D 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 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 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, NTR-1. The current Emergency Response Guidebook from the U.S. 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 Rule 30 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). Rule 31(1) 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 sizeup 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 contaminate 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. 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.

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°F so the resulting substance may be handled as a nonhazardous waste material if it meets the U.S. Environmental Protection Agency's 40 CFR part 261 requirements (See particularly 261.21).

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).

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 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 Investigation 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.

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, DC, 1987.

16. Report to the Congress on Hazardous Materials Training, Planning and Preparedness, Federal Emergency Management Agency, Washington, DC, 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. [55 F.R. 14074, April 13, 1990]

19. Incident Command System, Fire Protection Publications, Oklahoma State University, Stillwater, OK 74078, 1985.

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.

(The Office of Management and Budget has approved the information collection requirements in this section under control number 1218-0139)

APPENDIX E—TRAINING CURRICULUM GUIDELINES

The following non-mandatory general criteria may be used for assistance in developing site-specific training curriculum used to meet the training requirements of 29 CFR 1910.120(e); 29 CFR 1910.120(p)(7), (p)(8)(iii); and 29 CFR 1910.120(q)(6), (q)(7), and (q)(8). These are generic guidelines and they are not presented as a complete training curriculum for any specific employer. Site-specific training programs must be developed on the basis of a needs assessment of the hazardous waste site, RCRA/TSDF, or emergency response operation in accordance with 29 CFR 1910.120.

It is noted that the legal requirements are set forth in the regulatory text of Sec. 1910.120. The guidance set forth here presents a highly effective program that in the areas covered would meet or exceed the regulatory requirements. In addition, other approaches could meet the regulatory requirements.

Suggested General Criteria Definitions:

“Competent” means possessing the skills, knowledge, experience, and judgment to perform assigned tasks or activities satisfactorily as determined by the employer.

“Demonstration” means the showing by actual use of equipment or procedures.

“Hands-on training” means training in a simulated work environment that permits each student to have experience performing tasks, making decisions, or using equipment appropriate to the job assignment for which the training is being conducted.

“Initial training” means training required prior to beginning work.

“Lecture” means an interactive discourse with a class lead by an instructor.

“Proficient” means meeting a stated level of achievement.

“Site-specific” means individual training directed to the operations of a specific job site.

“Training hours” means the number of hours devoted to lecture, learning activities, small group work sessions, demonstration, evaluations, or hands-on experience.

Suggested core criteria:

1. Training facility. The training facility should have available sufficient resources, equipment, and site locations to perform didactic and hands-on training when appropriate. Training facilities should have sufficient organization, support staff, and services to conduct training in each of the courses offered.

2. Training Director. Each training program should be under the direction of a training director who is responsible for the program. The Training Director should have a minimum of two years of employee education experience.

3. Instructors. Instructors should be deemed competent on the basis of previous documented experience in their area of instruction, successful completion of a “train-the-trainer” program specific to the topics they will teach, and an evaluation of instructional competence by the Training Director.

Instructors should be required to maintain professional competency by participating in continuing education or professional development programs or by completing

successfully an annual refresher course and having an annual review by the Training Director.

The annual review by the Training Director should include observation of an instructor's delivery, a review of those observations with the trainer, and an analysis of any instructor or class evaluations completed by the students during the previous year.

4. Course materials. The Training Director should approve all course materials to be used by the training provider. Course materials should be reviewed and updated at least annually. Materials and equipment should be in good working order and maintained properly. All written and audio-visual materials in training curricula should be peer reviewed by technically competent outside reviewers or by a standing advisory committee.

Reviews should possess expertise in the following disciplines were applicable: occupational health, industrial hygiene and safety, chemical/environmental engineering, employee education, or emergency response. One or more of the peer reviewers should be a employee experienced in the work activities to which the training is directed.

5. Students. The program for accepting students should include:

a. Assurance that the student is or will be involved in work where chemical exposures are likely and that the student possesses the skills necessary to perform the work.

b. A policy on the necessary medical clearance.

6. Ratios. Student-instructor ratios should not exceed 30 students per instructor. Hands-on activity requiring the use of personal protective equipment should have the following student-instructor ratios. For Level C or Level D personal protective equipment the ratio should be 10 students per instructor. For Level A or Level B personal protective equipment the ratio should be 5 students per instructor.

7. Proficiency assessment. Proficiency should be evaluated and documented by the use of a written assessment and a skill demonstration selected and developed by the Training Director and training staff. The assessment and demonstration should evaluate the knowledge and individual skills developed in the course of training. The level of minimum achievement necessary for proficiency shall be specified in writing by the Training Director.

If a written test is used, there should be a minimum of 50 questions. If a written test is used in combination with a skills demonstration, a minimum of 25 questions should be used. If a skills demonstration is used, the tasks chosen and the means to rate successful completion should be fully documented by the Training Director.

The content of the written test or of the skill demonstration shall be relevant to the objectives of the course. The written test and skill demonstration should be updated as necessary to reflect changes in the curriculum and any update should be approved by the Training Director.

The proficiency assessment methods, regardless of the approach or combination of approaches used, should be justified, documented and approved by the Training Director.

The proficiency of those taking the additional courses for supervisors should be evaluated and documented by using proficiency assessment methods acceptable to the Training Director. These proficiency assessment methods must reflect the additional responsibilities borne by supervisory personnel in hazardous waste operations or emergency response.

8. Course certificate. Written documentation should be provided to each student who satisfactorily completes the training course. The documentation should include:

a. Student's name.

b. Course title.

c. Course date.

d. Statement that the student has successfully completed the course.

e. Name and address of the training provider.

f. An individual identification number for the certificate.

g. List of the levels of personal protective equipment used by the student to complete the course.

This documentation may include a certificate and an appropriate wallet-sized laminated card with a photograph of the student and the above information. When such course certificate cards are used, the individual identification number for the training certificate should be shown on the card.

9. Recordkeeping. Training providers should maintain records listing the dates courses were presented, the names of the individual course attenders, the names of those students successfully completing each course, and the number of training certificates issued to each successful student. These records should be maintained for a minimum of five years after the date an individual participated in a training program offered by the training provider. These records should be available and provided upon the student's request or as mandated by law.

10. Program quality control. The Training Director should conduct or direct an annual written audit of the training program. Program modifications to address deficiencies, if any, should be documented, approved, and implemented by the training provider. The audit and the program modification documents should be maintained at the training facility.

Suggested Program Quality Control Criteria

Factors listed here are suggested criteria for determining the quality and appropriateness of employee health and safety training for hazardous waste operations and emergency response.

A. Training Plan.

Adequacy and appropriateness of the training program's curriculum development, instructor training, distribution of course materials, and direct student training should be considered, including

1. The duration of training, course content, and course schedules/agendas;

2. The different training requirements of the various target populations, as specified in the appropriate generic training curriculum;

3. The process for the development of curriculum, which includes appropriate technical input, outside review, evaluation, program pretesting.

4. The adequate and appropriate inclusion of hands-on, demonstration, and instruction methods;

5. Adequate monitoring of student safety, progress, and performance during the training.

B. Program management, Training Director, staff, and consultants.

Adequacy and appropriateness of staff performance and delivering an effective training program should be considered, including

1. Demonstration of the training director's leadership in assuring quality of health and safety training.

2. Demonstration of the competency of the staff to meet the demands of delivering high quality hazardous waste employee health and safety training.

3. Organization charts establishing clear lines of authority.

4. Clearly defined staff duties including the relationship of the training staff to the overall program.

5. Evidence that the training organizational structure suits the needs of the training program.

6. Appropriateness and adequacy of the training methods used by the instructors.

7. Sufficiency of the time committed by the training director and staff to the training program.

8. Adequacy of the ratio of training staff to students.

9. Availability and commitment of the training program of adequate human and equipment resources in the areas of

a. Health effects,

b. Safety,

c. Personal protective equipment (PPE),

d. Operational procedures,

e. Employee protection practices/procedures.

10. Appropriateness of management controls.

11. Adequacy of the organization and appropriate resources assigned to assure appropriate training.

12. In the case of multiple-site training programs, adequacy of satellite centers management.

C. Training facilities and resources.

Adequacy and appropriateness of the facilities and resources for supporting the training program should be considered, including,

1. Space and equipment to conduct the training.

2. Facilities for representative hands-on training.

3. In the case of multiple-site programs, equipment and facilities at the satellite centers.

4. Adequacy and appropriateness of the quality control and evaluations program to account for instructor performance.

5. Adequacy and appropriateness of the quality control and evaluation program to ensure appropriate course evaluation, feedback, updating, and corrective action.

6. Adequacy and appropriateness of disciplines and expertise being used within the quality control and evaluation program.

7. Adequacy and appropriateness of the role of student evaluations to provide feedback for training program improvement.

D. Quality control and evaluation.

Adequacy and appropriateness of quality control and evaluation plans for training programs should be considered, including:

1. A balanced advisory committee and/or competent outside reviewers to give overall policy guidance;

2. Clear and adequate definition of the composition and active programmatic role of the advisory committee or outside reviewers.

3. Adequacy of the minutes or reports of the advisory committee or outside reviewers' meetings or written communication.

4. Adequacy and appropriateness of the quality control and evaluations program to account for instructor performance.

5. Adequacy and appropriateness of the quality control and evaluation program to ensure appropriate course evaluation, feedback, updating, and corrective action.

6. Adequacy and appropriateness of disciplines and expertise being used within the quality control and evaluation program.

7. Adequacy and appropriateness of the role of student evaluations to provide feedback for training program improvement.

E. Students

Adequacy and appropriateness of the program for accepting students should be considered, including

1. Assurance that the student already possess the necessary skills for their job, including necessary documentation.

2. Appropriateness of methods the program uses to ensure that recruits are capable of satisfactorily completing training.

3. Review and compliance with any medical clearance policy.

F. Institutional Environment and Administrative Support

The adequacy and appropriateness of the institutional environment and administrative support system for the training program should be considered, including

1. Adequacy of the institutional commitment to the employee training program.

2. Adequacy and appropriateness of the administrative structure and administrative support.

G. Summary of Evaluation Questions

Key questions for evaluating the quality and appropriateness of an overall training program should include the following:

1. Are the program objectives clearly stated?

2. Is the program accomplishing its objectives?

3. Are appropriate facilities and staff available?

4. Is there an appropriate mix of classroom, demonstration, and hands-on training?

5. Is the program providing quality employee health and safety training that fully meets the intent of regulatory requirements?

6. What are the program's main strengths?

7. What are the program's main weaknesses?

8. What is recommended to improve the program?

9. Are instructors instructing according to their training outlines?

10. Is the evaluation tool current and appropriate for the program content?

11. Is the course material current and relevant to the target group?

Suggested Training Curriculum Guidelines

The following training curriculum guidelines are for those operations specifically identified in 29 CFR 1910.120 as requiring training. Issues such as qualifications of instructors, training certification, and similar criteria appropriate to all categories of operations addressed in 1910.120 have been covered in the preceding section and are not re-addressed in each of the generic guidelines. Basic core requirements for training programs that are addressed include

1. General Hazardous Waste Operations

2. RCRA operations—Treatment, storage, and disposal facilities.

3. Emergency Response.

A. General Hazardous Waste Operations and Sitespecific Training

1. Off-site training. Training course content for hazardous waste operations, required by 29 CFR 1910.120(e), should include the following topics or procedures:

a. Regulatory knowledge.

(1) An review of 29 CFR 1910.120 and the core elements of an occupational safety and health program.

(2) The content of a medical surveillance program as outlined in 29 CFR 1910.120(f).

(3) The content of an effective site safety and health plan consistent with the requirements of 29 CFR 1910.120(b)(4)(ii).

(4) Emergency response plan and procedures as outlined in 29 CFR 1910.38 and 29 CFR 1910.120(l).

- (5) Adequate illumination.
- (6) Sanitation recommendation and equipment.
- (7) Review and explanation of OSHA's hazard communication standard (29 CFR 1910.1200) and lockout-tag-out standard (29 CFR 1910.147).
- (8) Review of other applicable standards including but not limited to those in the construction standards (29 CFR Part 1926).
- (9) Rights and responsibilities of employers and employees under applicable OSHA and EPA laws.
 - b. Technical knowledge.
 - (1) Type of potential exposures to chemical, biological, and radiological hazards; types of human responses to these hazards and recognition of those responses; principles of toxicology and information about acute and chronic hazards; health and safety considerations of new technology.
 - (2) Fundamentals of chemical hazards including but not limited to vapor pressure, boiling points, flash points, pH, other physical and chemical properties.
 - (3) Fire and explosion hazards of chemicals.
 - (4) General safety hazards such as but not limited to electrical hazards, powered equipment hazards, motor vehicle hazards, walking-working surface hazards, excavation hazards, and hazards associated with working in hot and cold temperature extremes.
 - (5) Review and knowledge of confined space entry procedures in 29 CFR 1910.146.
 - (6) Work practices to minimize employee risk from site hazards.
 - (7) Safe use of engineering controls, equipment, and any new relevant safety technology or safety procedures.
 - (8) Review and demonstration of competency with air sampling and monitoring equipment that may be used in a site monitoring program.
 - (9) Container sampling procedures and safeguarding; general drum and container handling procedures including special requirement for laboratory waste packs, shock sensitive wastes, and radioactive wastes.
 - (10) The elements of a spill control program.
 - (11) Proper use and limitations of material handling equipment.
 - (12) Procedures for safe and healthful preparation of containers for shipping and transport.
 - (13) Methods of communication including those used while wearing respiratory protection.
 - c. Technical skills.
 - (1) Selection, use maintenance, and limitations of personal protective equipment including the components and procedures for carrying out a respirator program to comply with 29 CFR 1910.134.
 - (2) Instruction in decontamination programs including personnel, equipment, and hardware; hands-on training including level A, B, and C ensembles and appropriate decontamination lines; field activities including the donning and doffing of protective equipment to a level commensurate with the employee's anticipated job function and responsibility and to the degree required by potential hazards.
 - (3) Sources for additional hazard information; exercises using relevant manuals and hazard coding systems.
 - d. Additional suggested items.
 - (1) A laminated, dated card or certificate with photo, denoting limitations and level of protection for which the employee is trained should be issued to those students successfully completing a course.
 - (2) Attendance should be required at all training modules, with successful completion of exercises and a final written or oral examination with at least 50 questions.

- (3) A minimum of one-third of the program should be devoted to hands-on exercises.
- (4) A curriculum should be established for the 8-hour refresher training required by 29 CFR 1910.120(e)(8), with delivery of such courses directed toward those areas of previous training that need improvement or reemphasis.
- (5) A curriculum should be established for the required 8-hour training for supervisors. Demonstrated competency in the skills and knowledge provided in a 40-hour course should be a prerequisite for supervisor training.
 - 2. Refresher training.
 - The 8-hour annual refresher training required in 29 CFR 1910.120(e)(8) should be conducted by qualified training providers. Refresher training should include at a minimum the following topics and procedures:
 - (a) Review of and retraining on relevant topics covered in the 40-hour program, as appropriate, using reports by the students on their work experiences.
 - (b) Update on developments with respect to material covered in the 40-hour course.
 - (c) Review of changes to pertinent provisions of EPA or OSHA standards or laws.
 - (d) Introduction of additional subject areas as appropriate.
 - (e) Hands-on review of new or altered PPE or decontamination equipment or procedures. Review of new developments in personal protective equipment.
 - (f) Review of newly developed air and contaminant monitoring equipment.
 - 3. On-site training.
 - a. The employer should provide employees engaged in hazardous waste site activities with information and training prior to initial assignment into their work area, as follows:
 - (1) The requirements of the hazard communication program including the location and availability of the written program, required lists of hazardous chemicals, and material safety data sheets.
 - (2) Activities and locations in their work area where hazardous substance may be present.
 - (3) Methods and observations that may be used to detect the present or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearances, or other evidence (sight, sound or smell) of hazardous chemicals being released, and applicable alarms from monitoring devices that record chemical releases.
 - (4) The physical and health hazards of substances known or potentially present in the work area.
 - (5) The measures employees can take to help protect themselves from work-site hazards, including specific procedures the employer has implemented.
 - (6) An explanation of the labeling system and material safety data sheets and how employees can obtain and use appropriate hazard information.
 - (7) The elements of the confined space program including special PPE, permits, monitoring requirements, communication procedures, emergency response, and applicable lock-out procedures.
 - b. The employer should provide hazardous waste employees information and training and should provide a review and access to the site safety and plan as follows:
 - (1) Names of personnel and alternate responsible for site safety and health.
 - (2) Safety and health hazards present on the site.
 - (3) Selection, use, maintenance, and limitations of personal protective equipment specific to the site.

(4) Work practices by which the employee can minimize risks from hazards.

(5) Safe use of engineering controls and equipment available on site.

(6) Safe decontamination procedures established to minimize employee contact with hazardous substances, including:

- (A) Employee decontamination,
- (B) Clothing decontamination, and
- (C) Equipment decontamination.

(7) Elements of the site emergency response plan, including:

- (A) Pre-emergency planning.
- (B) Personnel roles and 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 not covered by the site safety and health plan.
- (H) Emergency medical treatment and first aid.
- (I) Emergency equipment and procedures for handling emergency incidents.

c. The employer should provide hazardous waste employees information and training on personal protective equipment used at the site, such as the following:

- (1) PPE to be used based upon known or anticipated site hazards.
- (2) PPE limitations of materials and construction; limitations during temperature extremes, heat stress, and other appropriate medical considerations; use and limitations of respirator equipment as well as documentation procedures as outlined in 29 CFR 1910.134.
- (3) PPE inspection procedures prior to, during, and after use.
- (4) PPE donning and doffing procedures.
- (5) PPE decontamination and disposal procedures.
- (6) PPE maintenance and storage.
- (7) Task duration as related to PPE limitations.

d. The employer should instruct the employee about the site medical surveillance program relative to the particular site, including

- (1) Specific medical surveillance programs that have been adapted for the site.
- (2) Specific signs and symptoms related to exposure to hazardous materials on the site.
- (3) The frequency and extent of periodic medical examinations that will be used on the site.
- (4) Maintenance and availability of records.
- (5) Personnel to be contacted and procedures to be followed when signs and symptoms of exposures are recognized.

e. The employees will review and discuss the site safety plan as part of the training program. The location of the site safety plan and all written programs should be discussed with employees including a discussion of the mechanisms for access, review, and references described.

B. RCRA Operations Training for Treatment, Storage and Disposal Facilities.

1. As a minimum, the training course required in 29 CFR 1910.120 (p) should include the following topics: (a) Review of the applicable paragraphs of 29 CFR 1910.120 and the elements of the employer's occupational safety and health plan.

(b) Review of relevant hazards such as, but not limited to, chemical, biological, and radiological exposures; fire and explosion hazards; thermal extremes; and physical hazards.

(c) General safety hazards including those associated with electrical hazards, powered equipment hazards, lockout-tag-out procedures, motor vehicle hazards and walkingworking surface hazards.

(d) Confined-space hazards and procedures.

(e) Work practices to minimize employee risk from workplace hazards.

(f) Emergency response plan and procedures including first aid meeting the requirements of paragraph (p)(8).

(g) A review of procedures to minimize exposure to hazardous waste and various type of waste streams, including the materials handling program and spill containment program.

(h) A review of hazard communication programs meeting the requirements of 29 CFR 1910.1200.

(i) A review of medical surveillance programs meeting the requirements of 29 CFR 1910.120(p)(3) including the recognition of signs and symptoms of overexposure to hazardous substance including known synergistic interactions.

(j) A review of decontamination programs and procedures meeting the requirements of 29 CFR 1910.120(p)(4).

(k) A review of an employer's requirements to implement a training program and its elements.

(l) A review of the criteria and programs for proper selection and use of personal protective equipment, including respirators.

(m) A review of the applicable appendices to 29 CFR 1910.120.

(n) Principles of toxicology and biological monitoring as they pertain to occupational health.

(o) Rights and responsibilities of employees and employers under applicable OSHA and EPA laws.

(p) Hands-on exercises and demonstrations of competency with equipment to illustrate the basic equipment principles that may be used during the performance of work duties, including the donning and doffing of PPE.

(q) Sources of reference, efficient use of relevant manuals, and knowledge of hazard coding systems to include information contained in hazardous waste manifests.

(r) At least 8 hours of hands-on training.

(s) Training in the job skills required for an employee's job function and responsibility before they are permitted to participate in or supervise field activities.

2. The individual employer should provide hazardous waste employees with information and training prior to an employee's initial assignment into a work area. The training and information should cover the following topics:

(a) The Emergency response plan and procedures including first aid.

(b) A review of the employer's hazardous waste handling procedures including the materials handling program and elements of the spill containment program, location of spill response kits or equipment, and the names of those trained to respond to releases.

(c) The hazardous communication program meeting the requirements of 29 CFR 1910.1200.

(d) A review of the employer's medical surveillance program including the recognition of signs and symptoms of exposure to relevant hazardous substance including known synergistic interactions.

(e) A review of the employer's decontamination program and procedures.

(f) An review of the employer's training program and the parties responsible for that program.

(g) A review of the employer's personal protective equipment program including the proper selection and use of PPE based upon specific site hazards.

(h) All relevant site-specific procedures addressing potential safety and health hazards. This may include, as appropriate, biological and radiological exposures, fire and explosion hazards, thermal hazards, and physical hazards such as electrical hazards, powered equipment hazards, lock-out tag-out hazards, motor vehicle hazards, and walking-working surface hazards.

(i) Safe use engineering controls and equipment on site.

(j) Names of personnel and alternates responsible for safety and health.

C. Emergency response training.

Federal OSHA standards in 29 CFR 1910.120(q) are directed toward private sector emergency responders. Therefore, the guidelines provided in this portion of the appendix are directed toward that employee population. However, they also impact indirectly through State OSHA or USEPA regulations some public sector emergency responders. Therefore, the guidelines provided in this portion of the appendix may be applied to both employee populations.

States with OSHA state plans must cover their employees with regulations at least as effective as the Federal OSHA standards. Public employees in states without approved state OSHA programs covering hazardous waste operations and emergency response are covered by the U.S. EPA under 40 CFR 311, a regulation virtually identical to Sec. 1910.120.

Since this is a non-mandatory appendix and therefore not an enforceable standard, OSHA recommends that those employers, employees or volunteers in public sector emergency response organizations outside Federal OSHA jurisdiction consider the following criteria in developing their own training programs. A unified approach to training at the community level between emergency response organizations covered by Federal OSHA and those not covered directly by Federal OSHA can help ensure an effective community response to the release or potential release of hazardous substances in the community.

a. General considerations.

Emergency response organizations are required to consider the topics listed in Sec. 1910.120(q)(6). Emergency response organizations may use some or all of the following topics to supplement those mandatory topics when developing their response training programs. Many of the topics would require an interaction between the response provider and the individuals responsible for the site where the response would be expected.

(1) Hazard recognition, including:

(A) Nature of hazardous substances present,

(B) Practical applications of hazard recognition, including presentations on biology, chemistry, and physics.

(2) Principles of toxicology, biological monitoring, and risk assessment.

(3) Safe work practices and general site safety.

(4) Engineering controls and hazardous waste operations.

(5) Site safety plans and standard operating procedures.

(6) Decontamination procedures and practices.

(7) Emergency procedures, first aid, and self-rescue.

(8) Safe use of field equipment.

(9) Storage, handling, use and transportation of hazardous substances.

(10) Use, care, and limitations of personal protective equipment.

(11) Safe sampling techniques.

(12) Rights and responsibilities of employees under OSHA and other related laws concerning right-to-know, safety and health, compensations and liability.

(13) Medical monitoring requirements.

(14) Community relations.

b. Suggested criteria for specific courses.

(1) First responder awareness level.

(A) Review of and demonstration of competency in performing the applicable skills of 29 CFR 1910.120(q).

(B) Hands-on experience with the U.S. Department of Transportation's Emergency Response Guidebook (ERG) and familiarization with OSHA standard 29 CFR 1910.1201.

(C) Review of the principles and practices for analyzing an incident to determine both the hazardous substances present and the basic hazard and response information for each hazardous substance present.

(D) Review of procedures for implementing actions consistent with the local emergency response plan, the organization's standard operating procedures, and the current edition of DOT's ERG including emergency notification procedures and follow-up communications.

(E) Review of the expected hazards including fire and explosions hazards, confined space hazards, electrical hazards, powered equipment hazards, motor vehicle hazards, and walking-working surface hazards.

(F) Awareness and knowledge of the competencies for the First Responder at the Awareness Level covered in the National Fire Protection Association's Standard No. 472, Professional Competence of Responders to Hazardous Materials Incidents.

(2) First responder operations level.

(A) Review of and demonstration of competency in performing the applicable skills of 29 CFR 1910.120(q).

(B) Hands-on experience with the U.S. Department of Transportation's Emergency Response Guidebook (ERG), manufacturer material safety data sheets, CHEMTREC/CANUTEC, shipper or manufacturer contacts, and other relevant sources of information addressing hazardous substance releases. Familiarization with OSHA standard 29 CFR 1910.1201.

(C) Review of the principles and practices for analyzing an incident to determine the hazardous substances present, the likely behavior of the hazardous substance and its container, the types of hazardous substance transportation containers and vehicles, the types and selection of the appropriate defensive strategy for containing the release.

(D) Review of procedures for implementing continuing response actions consistent with the local emergency response plan, the organization's standard operating procedures, and the current edition of DOT's ERG including extended emergency notification procedures and follow-up communications.

(E) Review of the principles and practice for proper selection and use of personal protective equipment.

(F) Review of the principles and practice of personnel and equipment decontamination.

(G) Review of the expected hazards including fire and explosions hazards, confined space hazards, electrical hazards, powered equipment hazards, motor vehicle hazards, and walking-working surface hazards.

(H) Awareness and knowledge of the competencies for the First Responder at the Operations Level covered in the National Fire Protection Association's Standard No. 472, Professional Competence of Responders to Hazardous Materials Incidents.

(3) Hazardous materials technician.

(A) Review of and demonstration of competency in performing the applicable skills of 29 CFR 1910.120(q).

(B) Hands-on experience with written and electronic information relative to response decision making including but not limited to the U.S. Department of Transportation's Emergency Response Guidebook (ERG), manufacturer material safety data sheets, CHEMTREC/CANUTEC, shipper or manufacturer contacts, computer data bases and response models, and other relevant sources of information addressing hazardous substance releases. Familiarization with OSHA standard 29 CFR 1910.1201.

(C) Review of the principles and practices for analyzing an incident to determine the hazardous substances present, their physical and chemical properties, the likely behavior of the hazardous substance and its container, the types of hazardous substance transportation containers and vehicles involved in the release, the appropriate strategy for approaching release sites and containing the release. (D) Review of procedures for implementing continuing response actions consistent with the local emergency response plan, the organization's standard operating procedures, and the current edition of DOT's ERG including extended emergency notification procedures and follow-up communications.

(E) Review of the principles and practice for proper selection and use of personal protective equipment.

(F) Review of the principles and practices of establishing exposure zones, proper decontamination and medical surveillance stations and procedures.

(G) Review of the expected hazards including fire and explosions hazards, confined space hazards, electrical hazards, powered equipment hazards, motor vehicle hazards, and walking-working surface hazards.

(H) Awareness and knowledge of the competencies for the Hazardous Materials Technician covered in the National Fire Protection Association's Standard No. 472, Professional Competence of Responders to Hazardous Materials Incidents.

(4) Hazardous materials specialist.

(A) Review of and demonstration of competency in performing the applicable skills of 29 CFR 1910.120(q).

(B) Hands-on experience with retrieval and use of written and electronic information relative to response decision making including but not limited to the U.S. Department of Transportation's Emergency Response Guidebook (ERG), manufacturer material safety data sheets, CHEMTREC/ CANUTEC, shipper or manufacturer contacts, computer data bases and response models, and other relevant sources of information addressing hazardous substance releases. Familiarization with OSHA standard 29 CFR 1910.1201.

(C) Review of the principles and practices for analyzing an incident to determine the hazardous substances present, their physical and chemical properties, and the likely behavior of the hazardous substance and its container, vessel, or vehicle.

(D) Review of the principles and practices for identification of the types of hazardous substance transportation containers, vessels and vehicles involved in the release; selecting and using the various types of

equipment available for plugging or patching transportation containers, vessels or vehicles; organizing and directing the use of multiple teams of hazardous material technicians and selecting the appropriate strategy for approaching release sites and containing or stopping the release.

(E) Review of procedures for implementing continuing response actions consistent with the local emergency response plan, the organization's standard operating procedures, including knowledge of the available public and private response resources, establishment of an incident command post, direction of hazardous material technician teams, and extended emergency notification procedures and follow-up communications.

(F) Review of the principles and practice for proper selection and use of personal protective equipment.

(G) Review of the principles and practices of establishing exposure zones and proper decontamination, monitoring and medical surveillance stations and procedures.

(H) Review of the expected hazards including fire and explosions hazards, confined space hazards, electrical hazards, powered equipment hazards, motor vehicle hazards, and walking-working surface hazards.

(I) Awareness and knowledge of the competencies for the Off-site Specialist Employee covered in the National Fire Protection Association's Standard No. 472, Professional Competence of Responders to Hazardous Materials Incidents.

(5) Incident commander.

The incident commander is the individual who, at any one time, is responsible for and in control of the response effort. This individual is the person responsible for the direction and coordination of the response effort. An incident commander's position should be occupied by the most senior, appropriately trained individual present at the response site. Yet, as necessary and appropriate by the level of response provided, the position may be occupied by many individuals during a particular response as the need for greater authority, responsibility, or training increases. It is possible for the first responder at the awareness level to assume the duties of incident commander until a more senior and appropriately trained individual arrives at the response site.

Therefore, any emergency responder expected to perform as an incident commander should be trained to fulfill the obligations of the position at the level of response they will be providing including the following:

(A) Ability to analyze a hazardous substance incident to determine the magnitude of the response problem.

(B) Ability to plan and implement an appropriate response plan within the capabilities of available personnel and equipment.

(C) Ability to implement a response to favorably change the outcome of the incident in a manner consistent with the local emergency response plan and the organization's standard operating procedures.

(D) Ability to evaluate the progress of the emergency response to ensure that the response objectives are being met safely, effectively, and efficiently.

(E) Ability to adjust the response plan to the conditions of the response and to notify higher levels of response when required by the changes to the response plan.



Michigan Occupational Safety and Health Administration
PO Box 30643
Lansing, Michigan 48909-8143
Ph: 517.322.1845

The Department of Licensing and Regulatory Affairs will not discriminate against any individual or group because of race, sex, religion, age, national origin, color, marital status, disability, or political beliefs. Auxiliary aids, services and other reasonable accommodations are available upon request to individuals with disabilities.