



CLOSURE PLAN CONTENTS AND TECHNICAL REVIEW

3.17 - PERSONAL PROTECTIVE EQUIPMENT (WORKER HEALTH AND SAFETY)

The purpose of this portion of the closure plan is to establish requirements for protecting the health and safety of personnel during all closure activities. The owner or operator should prepare the Health and Safety Plan as a part of the Closure Plan. The Health and Safety Plan should be implemented by the owner or operator, contractors, and sub-contractors during partial and final closures. At a minimum, this plan should address the following:

- ! Hazard identification,
- ! Hazard evaluation,
- ! Personal protective equipment,
- ! Environmental monitoring,
- ! Site work zones,
- ! Decontamination of workers, and
- ! Emergency procedures.

1. Hazard Identification - The Health and Safety Plan should identify site features which may cause substantial injury or serious chronic illness to personnel if an exposure should occur. Potential pathways of injury/stress from physical, chemical, and biological hazards should be considered. These hazards may be caused by confined spaces, moving equipment, dust, fumes, gases, noise, heat stress, flammable, corrosives, carcinogens, insect bites, bacteria.

2. Hazard Evaluation - Hazard evaluation is a process of determining the impact on personnel or public health during closure implementation. Once the presence of chemicals or hazard agents have been identified, the associated hazards can be evaluated. The degree of hazard is due to a substance's inherent characteristics combined with the risk of exposure. Hazard evaluation is usually done by referring to stand reference sources for data and guidelines on permissible levels of exposure.

3. Personal Protective Equipment - The Health and Safety Plan should describe the personal protective equipment (PPE) worn during closure implementation. The purpose of PPE is to shield or isolate individuals from the chemical, physical, and biological hazards that may be encountered at a hazardous waste site. PPE should be selected based upon standard criteria and procedures found in the "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities", NIOSH, OSHA, USCG, and EPA, October 1985.

No single combination of PPE is capable of protecting against all hazards. Thus PPE should be used in conjunction with other protective methods. The use of PPE can itself create significant worker hazards, such as heat stress, physical and psychological stress, and impaired vision, mobility, and communication. In general, the greater the level of PPE protection, the greater the associated risks.

4. Environmental Monitoring - An ongoing monitoring program should be implemented to ensure safe operation at a site. Atmospheric monitoring of chemical hazards should be conducted using a combination of stationary sampling equipment, personal monitoring devices, and periodic area monitoring with direct-reading instruments. Where necessary, routes of exposure other than inhalation should be monitored. For example, skin swipe tests may be used to determine the effectiveness of personal protective clothing. Monitoring also includes continual evaluation of any changes in site conditions or work activities that could affect worker safety. When a significant change occurs, the hazards should be reassessed.

5. Site Work Zones - To reduce the accidental spread of hazardous substances by workers from the contaminated area to the clean area, the Health and Safety Plan should delineate zones at the facility where different types of closure activities will occur. The flow of personnel among the zones should be controlled. The establishment of

work zones ensures that: personnel are properly protected against the hazards present where they are working, work activities and contamination are confined to the appropriate areas, and personnel can be located and evacuated in an emergency.

The hazardous waste facility undergoing closure should be divided into at least three different zones as follow:

- ! Exclusion Zone - The waste management unit or contaminated area,
- ! Contamination Reduction Zone - The area where decontamination takes place, and
- ! Support Zone - The uncontaminated area where workers should not be exposed to hazardous conditions.

Delineation of these three zones should be based on sampling and monitoring results, and on an evaluation of potential routes and amount of contaminant dispersion in the event of a release. Movement of personnel and equipment among these zones should be minimized and restricted to prevent cross-contamination from contaminated areas to clean areas.

6. Decontamination of workers - The Health and Safety Plan should establish procedures for decontaminating personal protective equipment. Decontamination procedures must provide an organized process by which levels of contamination are reduced. The decontamination process should consist of a series of procedures performed in a specific sequence. For example, outer, more heavily contaminated item (e.g., outer boots and gloves) should be decontaminated and removed first, followed by decontamination and removal of inner, less contaminated items (e.g., jackets and pants). Each procedure should be performed at a separate station in order to prevent cross-contamination. Arrangements must be made for the proper disposal of contaminated material, solutions, and equipment.

7. Emergency Procedures - The Health and Safety Plan should address procedures for responding to emergency which require immediate actions to prevent additional problems or harm to site personnel. In general, all closure activities present a degree of risk to the worker. Unpredictable events such as fire, chemical exposure, physical injury may occur and should be anticipated. The emergency procedures should include the following:

- a. List the names and emergency function of onsite personnel responsible for emergency actions along with the special training they have.
- b. Indicate the location of nearest telephone.
- c. Provide alternative means for emergency communications.
- d. List the emergency services organizations that may be needed, including names, telephone numbers, and locations. Arrangements for using emergency organizations should be made before closure implementation. Emergency organizations include fire departments, police departments, hospitals, explosive experts, local hazardous material response units, etc.
- e. Address and define procedures for the rapid evacuation of worker. Clear, audible warnings signals should be established; well-marked emergency exits located throughout the site, and internal and external communications plans should be developed.
- f. Provide a complete list of emergency equipment. This list should include emergency equipment available onsite, as well as all available medical, rescue, transport, fire-fighting, and mitigative equipment.
- g. Determine location, direction, and phone number of the nearest medical or emergency care facility. Determine their capability to handle chemical exposure specific to the facility.
- h. Establish procedures in cooperation with local and state officials for evacuating residents who live near the facility (if there is a likelihood of the closure activities affecting nearby residents).

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List of Examples:

List of Attachments:

List of References:

List of Appendices: