



HEALTH AND SAFETY PROGRAM 407 – BIOLOGICAL HAZARDS CONTROL PROGRAM

1.0 PURPOSE

Westlake, Plaquemine Operations, has developed this program to minimize potential illnesses resulting from contact with biological agents, and enhance employee protection. The Biological Hazards Control Program establishes criteria to enhance employee awareness and training on the subjects of biological hazards (biohazards).

Biohazards can be transmitted to employees through inhalation, injection, ingestion, or contact with the skin. Contact with biohazards can be minimized using a combination of engineering and work practice controls, personal protective equipment (PPE), training, medical surveillance, signs and labels.

2.0 SCOPE

This program applies to all Westlake, Plaquemine Operations' employees.

3.0 DEFINITIONS

Biohazard Control--Any set of equipment, personal protective equipment, and procedures utilized to prevent or minimize the contact of employees and their environment to biohazardous agents or materials.

Biological Hazards (Biohazards)--Biological agents or substances present in or arising from the work environment that present or may present a hazard to the health or well being of the worker or community. Potential biological agents or substances which could be biohazards include, but are not limited to, infectious or parasitic agents; infectious microorganisms such as some fungi; yeasts and algae; plants and plant products; and animals and animal products which may cause occupational disease.

Biological Hazardous Waste--Any substance of human or animal origin, other than food wastes, which are to be disposed of, and could harbor or transmit pathogenic organisms including, but not limited to, pathological specimens such as tissues, blood elements, excreta, secretions, and related substances. This category includes sanitary sewer wastes and dead animals.

Decontamination--The process of removing or neutralizing biological agents that have accumulated on personnel, equipment, and other working surfaces.

Etiological Agent--A viable microorganism or its toxin, which causes or may cause human disease.



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Exotoxin--A toxin produced and delivered by a microorganism into the surrounding environment.

Legionnaires' Disease--An acute respiratory infection caused by the bacterium *Legionella pneumophila*. This bacterium led to the 1976 outbreak of respiratory illness among persons attending a convention of the American Legion at the Bellevue Stratford Hotel in Philadelphia (182 cases and 29 deaths were attributed to the bacteria in the cooling tower).

Pathogens--Microorganisms that can cause disease in other organisms or in humans, animals and plants. These include bacteria, viruses, or parasites and are found in sewage, in runoff from animal farms or rural areas populated with domestic and/or wild animals, and in water used for swimming. Fish and shellfish contaminated by pathogens, or the contaminated water itself, can cause serious illnesses.

Personal Protective Equipment (PPE)--Garments and/or devices worn by an employee to provide protection against various potential hazards. Examples of PPE include, but are not limited to; safety glasses, full-face shields, impervious gloves or clothing, and respiratory protection.

Zoonosis--Diseases that are biologically adapted to and normally found in animals, but which under some conditions also infect humans (ex. rabies).

4.0 RESPONSIBILITIES

4.1 Health and Safety

- 4.1.1 Conduct initial Hazard Communication Safety Orientation training which includes biohazards.
- 4.1.2 Investigate all biohazard-related incidents and complaints as promptly as possible.
- 4.1.3 Recommend appropriate levels of personal protective equipment (PPE) and proper work practice procedures for employees who may potentially contact biohazards (see Westlake, Plaquemine Operations, Personal Protective Equipment Program).



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4.2 H&S Medical:

- 4.2.1 Conduct medical surveillance of employees at risk and/or required to potentially contact biohazards according to Westlake, Plaquemine Operation's Employee Workplace Monitoring and Medical Record Program.
- 4.2.2 Immunize employees with an effective vaccine (if available) when work requires contact with a known pathogen or biohazard.
- 4.2.3 Provide interim examinations to any employee who suspects a biohazard-related accident or illness.
- 4.2.4 Ensure that employee monitoring results are maintained within the employee's medical records.
- 4.2.5 Maintain completed biohazard-related accident or illness records in the employee's medical record.

4.3 Department Supervision

- 4.3.1 Learn, understand, and follow Westlake, Plaquemine Operation's Biological Hazard Control Program.
- 4.3.2 Identify and permanently post all areas, equipment and locations that contain or have the potential to contain biohazards.
- 4.3.3 Ensure that each employee and contractor assigned job tasks are trained in the recognition of potential biohazard agents and proper work procedures complying with Biological Hazard Control Program requirements.
- 4.3.4 Ensure employees, at risk to potential contact to known biohazards, participate in H&S Medical Surveillance Program.
- 4.3.5 When a safe work permit is issued to work on sanitary sewer equipment, the word "Biohazard" must be easily identifiable on the permit.
- 4.3.6 Enforce the correct selection and use of PPE in areas for which they are responsible.
- 4.3.7 Notify H&S of any condition or action that may create a biohazard



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or potential contact to biohazards in their area of responsibility.

4.3.8 Notify H&S of any incidents involving biohazard-related accidents or illnesses.

4.4 Employees:

4.4.1 Learn, understand, and follow Westlake, Plaquemine Operation's Biological Hazards Control Program.

4.4.2 Familiarize themselves with potential biohazards in their work area.

4.4.3 Participate in H&S Medical Surveillance Program as required.

4.4.4 Report unlabeled known or suspected biohazard containing equipment or areas to Department Supervision.

4.4.5 Follow all job instructions and procedures for work activities involving potential contact to biohazards.

4.4.6 Use only properly selected PPE for the prescribed work.

4.4.7 Notify Department Supervision immediately of any biohazard-related accidents or illnesses.

4.5 Contractors:

4.5.1 Contractors operating at Westlake, Plaquemine Operations, that may be involved in biohazard-related activities are required to comply with all provisions of the Biological Hazard Control Program.

4.5.2 Contractors will be trained and follow the Westlake, Plaquemine Operation's Biohazard Control Program.

4.5.3 Contractors will keep the training records for review by Westlake, Plaquemine Operation's H&S department.



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5.0 PROCEDURE

5.1 Biological Hazard Identification

While contact to biohazards may seem obvious in work activities such as nursing or emergency response, many other Westlake, Plaquemine Operation's job tasks may pose a threat to employees due to possible contact to infectious agents. The identification and classification of biohazards are important tools that H&S, Department Supervision, and employees must use to decide on the appropriate safe work practices to prevent infection.

Two points to remember are:

Any accident involving biohazardous materials can result in infection; and

When working with biological agents or suspect materials, it must be assumed that the material presents a biohazard.

5.1.1 Bacterial Agents

Bacteria are simple, one-celled organisms that are visible only under the microscope.

5.1.1.1 Bacterial infections can be caused by neglected minor wounds and abrasions. These infections are frequently caused by mixed bacterial infections, but *staphylococci* and *streptococci* account for the majority.

5.1.1.2 Food poisoning can be caused by employee contamination of otherwise pure food. The primary types of contamination are from the Salmonella group.

5.1.1.3 Tetanus infections can be caused by the entrance of *Clostridium tetani* tetanus bacillus in a wound.

5.1.1.4 Tetanus bacillus is commonly found in soil and animal feces containing bacillus.

5.1.2 Rickettsial and Chlamydial Agents



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5.1.2.1 Rickettsial are associated with and transmitted to man through blood sucking insects such as fleas, ticks, and lice.

5.1.2.2 Rickettsial is responsible for such diseases as Rocky Mountain spotted fever.

5.1.2.3 Chlamydia's primary source of human infection is from infected birds.

5.1.2.4 Chlamydia are usually transmitted through the air and invade the body through the respiratory system.

5.1.3 Viral Agents

5.1.3.1 Smallest organism known to man.

5.1.3.2 Potential sources include sewage treatment lines and handling of dead animals.

5.1.3.3 Virus include the hepatitis A virus found in raw sewage, and rabies found in wild animals.

5.1.4 Fungal Agents

5.1.4.1 Fungal diseases can be roughly classified by:

5.1.4.2 Systemic (in the blood stream);

5.1.4.3 Subcutaneous (under the skin);

5.1.4.4 Superficial (above the skin); or

5.1.4.5 Hypersensitivity effects.

5.1.4.6 Hypersensitivity reactions are due to fungal antigens inhaled with dust during agricultural or other activities. These usually involve inflammation of the lungs with asthma like symptoms.

5.1.4.7 Fungal diseases include "athletes foot" from poor shower room disinfection practices.



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5.1.5 Legionella

Organisms of the *Legionella* genus (legionnaire's disease) are normally found in natural fresh water, potable water, as well as in closed-circuit systems, such as cooling tower water, evaporative condensers and air handling systems. However, if the following four conditions are present, there is a potential for pathogenic levels of *Legionella* bacteria:

- 5.1.5.1 Moisture;
- 5.1.5.2 Temperature (50°- 140°F);
- 5.1.5.3 Oxygen; and
- 5.1.5.4 A source of nourishment (algae/slime).
- 5.1.5.5 Legionnaire's disease can spread through the air.
- 5.1.5.6 Symptoms and effects include:
- 5.1.5.7 Non-productive coughing (no sputum);
- 5.1.5.8 Rapidly rising fever;
- 5.1.5.9 Onset of chills; and
- 5.1.5.10 Fever (102°-105°F).

5.2 Workplace Evaluations

- 5.2.1 H&S will conduct surveys to identify areas of operations which are potential sources of biohazards.
- 5.2.2 Identified biological agents will be evaluated to determine the degree of hazard present.
- 5.2.3 If areas, equipment, or locations contain potential biohazards, signs and tags must be posted.
- 5.2.4 All survey results will be maintained in a legible, identifiable and retrievable form.

5.3 Biological Hazard Communication

The biohazard warning is used to signify the actual or potential presence of biohazards. Biological hazard warning signs and/or tags must be posted on equipment and/or areas of the plant so employees are aware of the presence of biohazards, whether or not there is an exposure potential. (See example of Biological Hazard Symbol - Appendix A.)



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5.3.1 Signs

- 5.3.1.1 All biohazards signs must have rounded corners and be free from sharp edges, burrs, splinters, or other sharp projections. The ends or heads of bolts or fastening devices must be located in such a manner that they do not constitute a hazard.
- 5.3.1.2 The wording of the biohazard warning sign must be easily read and concise.
- 5.3.1.3 Biohazard warning signs must meet all specifications of OSHA's 29 CFR 1910.145 (e) and (f) "Specifications for Accident Prevention Signs and Tags."

5.3.2 Tags

- 5.3.2.1 Tags must contain the word "Biohazard" along with the biohazard symbol.
- 5.3.2.2 The word "Biohazard" must be readable at a minimum distance of 5 feet or such greater distance as warranted by the hazard.
- 5.3.2.3 Biohazard warning tags must be affixed as close as safely possible to the respective hazard by wire or adhesive to prevent their loss or unintentional removal.

5.4 Work Practice Controls

Westlake, Plaquemine Operations will ensure that appropriate engineering and work practice controls, personal protective equipment (PPE), and administrative controls will be utilized to correct or control identified biohazards.

- Specific job instructions and safe work permits must be reviewed by all personnel involved with biohazard-related work activities.
- Employees must wear appropriate PPE for work activities involving potential contact to biohazards (see Westlake, Plaquemine Operations' Personal Protective Equipment Program).
- Equipment containing known biohazards must be decontaminated



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as much as feasible before work activities begin.

5.4.1 Sanitary Sewer System

5.4.1.1 All feeder pumps and sewer treatment lines will be considered to contain potential biohazards and posted appropriately.

5.4.1.2 Process Cooling Towers

5.4.1.3 Procedures used to control bacterial growth will involve a proper maintenance program including:

- 5.4.1.3.1 Repair of damaged components;
- 5.4.1.3.2 Routine cleaning; and
- 5.4.1.3.3 Disinfection.

5.4.1.4 Disinfection will be accomplished by continuous use of chlorine with a free residual of chlorine between 0.2 ppm and 0.5 ppm and a periodic biocide treatment.

5.4.1.5 Inside inaccessible surfaces of exterior walls must be properly cleaned of algae or slime accumulations utilizing accepted preventative maintenance procedures.

5.4.2 Air Handling Units -- Condensate Drain Pans

The typical condensate drain pan represents that portion of the air-handling unit that offers the greatest potential for bacteria accumulation.

5.4.2.1 Drain pans must be cleaned and checked for proper gravity drainage of fluid to prevent stagnation and buildup of algae/slime/bacteria.

5.4.2.2 Any algae or slime found to exist must be removed by cleaning and disinfecting.

5.4.2.3 Additional system equipment must be examined for potential bacterial buildup including:

- 5.4.2.3.1 Evaporative condensers; and
- 5.4.2.3.2 Humidifiers.



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5.4.3 Emergency Eyewash/Shower Stations

5.4.3.1 Emergency eyewash/shower stations must be flushed routinely to prevent the accumulation of bacteria in the water. Refer to HSP-320 Safety Shower and Eye Washes for inspection and maintenance information.

5.5 Wildlife

5.5.1 Rabid Animals

Rabies vaccines for pets have virtually eliminated the threat in domesticated animals. Recently however, there has been an alarming upsurge in the number of reported cases of rabies in wild animals. Rabies can infect any warm-blooded animal, from raccoons to bats. Skunks are the most common carriers of rabies.

5.5.1.1 Personnel should be alert for wild animals that show a lack of fear or certain aggressiveness.

5.5.1.2 Other characteristics of rabies or rabid animals are:

- 5.5.1.2.1 Drooping head;
- 5.5.1.2.2 A peculiar trotting gate; or
- 5.5.1.2.3 Any other unusual behavior.

5.5.1.3 H&S should be notified immediately if any wild animal is suspected of having rabies in the plant premises.

5.5.2 Birds

Birds are known to carry infectious agents that can be passed along to human beings. An example is the disease psittacosis, which is generally transmitted by the infected bird shedding organisms through its fecal material.

5.5.2.1 Employees should regularly clean locations of congregating, nesting birds in the plant premises.

5.5.2.2 Removal of large accumulations of bird fecal material must be performed with proper PPE considerations.



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5.5.3 Plants

Infectious agents associated with plants are generally found as part of the plant itself. Some plants, such as poison oak and ivy produce chemicals on their leaves or stems. When rubbed against human skin, these chemicals will cause an itching burning rash.

5.5.3.1 Infectious plant agents can be passed to other employees by coming in direct contact with the skin of the infected person.

5.5.3.2 Special handling precautions for clothing that comes in contact with these infectious plants must be considered.

6.0 TRAINING

6.1 H&S provides employees awareness level training for biohazards during initial employee training.

6.2 Employees will receive training in the following:

6.2.1 The reason for the Biological Hazard Control Program;

6.2.2 The existence and location of known biohazards;

6.2.3 Biological hazard identification;

6.2.4 Methods and observations that may be used to detect the presence of Biohazards;

6.2.5 The meaning of Biological Hazard Warning Signs and Tags and the special precautions necessary; and

6.2.6 Measures employees can take to protect themselves from biohazards, including specific procedures that H&S has implemented to protect employees from contact with biohazards:

6.2.6.1 Use of appropriate work practices;

6.2.6.2 Use of appropriate PPE; and

6.2.6.3 Medical Surveillance program.

6.3 Retraining will be conducted whenever a periodic inspection reveals that employees are not fully aware of, or are not following established



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procedures, or if regulatory requirements change.

7.0 RECORDKEEPING

- 7.1 H&S will maintain employee training records.
- 7.2 H&S will establish and maintain for each employee an accurate record of any measurements taken to monitor employee exposure, and any medical consultation and examinations including tests or written opinions required. Records will be maintained for the duration of employment plus 30 years (see Westlake, Plaquemine Operations' Employee Workplace Monitoring and Medical Records Program).
- 7.3 Biohazard-related accidents or illness records will be written and retained in the employee's permanent medical file for the length of employment plus 30 years.
- 7.4 H&S maintains copies of all biohazard-monitoring surveys.

8.0 AUDITS

- 8.1 H&S will ensure that Westlake, Plaquemine Operations' Biological Hazard Control Program will be audited periodically. The purpose is to assess compliance, ensure that all persons who need to be monitored are included, and to evaluate program effectiveness.
- 8.2 The audit will evaluate:
 - 8.2.1 The current Biological Hazard Control Program;
 - 8.2.2 Employee training records;
 - 8.2.3 Employee awareness;
 - 8.2.4 Employee work practice procedures involving known biohazard-related tasks; and
 - 8.2.5 Contractor awareness.
- 8.3 Following the audit, the Biological Hazard Control Program will be revised to include any necessary changes. Audit results will be documented.
- 8.4 All employees will be informed of any changes made to the program.
- 8.5 Department Managers will be informed of audit results. After being



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informed of the audit results:

8.5.1 Each Department will develop corrective action plans and schedules to address any deficiencies documented during audits; and

8.5.2 Corrective action plans will be submitted to H&S.

8.6 In the event of a biohazard-related accident or illness, an Incident Investigation will be conducted following procedures outlined in Westlake, Plaquemine Operations' Emergency Response Program.

9.0 REFERENCES

American Industrial Hygiene Association (AIHA) Biohazards Committee, (1985) "Biohazards Reference Manual," AIHA, Fairfax, VA.

American National Standards Institute (June 1991) "Criteria for Safety Symbols," ANSI Z535.3-1991, New York, NY.

American National Standards Institute (June 1991) "Safety Color Code," ANSI Z535.1-1991, New York, NY.

Occupational Health and Safety Administration's 29 CFR 1910.145 (September 19, 1986) "Specifications for Accident Prevention Signs and Tags."

Salvato, Jr., Joseph A. "Environmental Engineering and Sanitation," (1992) 4th ed., Wiley-Interstate, New York, N.Y.

10.0 APPENDICES

Appendix A - Biological Hazards Symbol



Appendix A Biological Hazards Symbol



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Revision History

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**Westlake
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