POLICY

To provide a hazard free workplace and have a Benzene Protection Program to ensure the safety and health of all Midland Engineering Co., Inc. employees performing job tasks in which a potential lead exposure could occur.

Compliance with this program is mandatory and is applicable to all Midland Engineering Co., Inc. employees who work in an environment where benzene is present in any amount. Failure to comply will result in disciplinary action and/or is grounds for termination.

METHODS OF COMPLIANCE

The nature of job activities sometimes involves working with in environments where there is a potential for benzene exposure. Prior to commencing work on a job site where potential benzene exposure is identified as a hazard, a pre-job investigation should be conducted and personnel should move to an area with fresh air. The Benzene Protection Program incorporates the entire OSHA Benzene standard, Title 29 CFR 1926.1128, which simply references 29 CFR 1910.1028, by:

- Ensuring that no employees are exposed to benzene at concentrations greater than 1 ppm over an eight 8-hour time weight average (TWA) or the short-term exposure limit (STEL) of 5 ppm for 15 minutes.

- Knowing when respirators are used to limit employee exposure as required by paragraph (c) of Section 1910.1028, and all requirements of paragraphs (g) of Section1910.1028, have been met, employee exposure may be considered to be at the level provided by the protection factor of the respirator for those periods the respirator is worn. Those periods may be averaged with exposure levels during periods when respirators are not worn to determine the employee's daily TWA exposure.

During work activities, the site manager or supervisor will periodically inspect the area to maintain the effectiveness of the benzene protection program. If the inspection reveals a change in the work environment that could increase potential benzene exposure, all employees will evacuate the area and a follow-up benzene assessment will be completed and the necessary additional precautions will be implemented before work activities resume.

DEFINITIONS

Action level - means an airborne concentration of benzene of 0.5 ppm calculated as an 8-hour time-weighted average.

Authorized person - means any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as a designated representative of employees for the purpose of exercising the right to observe monitoring and measuring procedures under paragraph (l) of this section, or any other person authorized by the Act or regulations issued under the Act.

Benzene - (C(6)H(6)) (CAS Registry No. 71-43-2) means liquefied or gaseous benzene. It includes benzene contained in liquid mixtures and the benzene vapors released by these liquids. It does not include trace amounts of unreacted benzene contained in solid materials.

Bulk wholesale storage facility - means a bulk terminal or bulk plant where fuel is stored prior to its delivery to wholesale customers.

Container - means any barrel, bottle, can, cylinder, drum, reaction vessel, storage tank, or the like, but does not include piping systems.

Day - means any part of a calendar day.

Director - means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Emergency - means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which may or does result in an unexpected significant release of benzene.

Employee exposure - means exposure to airborne benzene which would occur if the employee were not using respiratory protective equipment.

Regulated area - means any area where airborne concentrations of benzene exceed or can reasonably be expected to exceed, the permissible exposure limits, either the 8-hour time weighted average exposure of 1 ppm or the short-term exposure limit of 5 ppm for 15 minutes.

Vapor control system - means any equipment used for containing the total vapors displaced during the loading of gasoline, motor fuel or other fuel tank trucks and the displacing of these vapors through a vapor processing system or balancing the vapor with the storage tank. This equipment also includes systems containing the vapors displaced from the storage tank during the unloading of the tank truck which balance the vapors back to the tank truck.

Physical and Chemical Characteristics

Benzene is a clear, colorless liquid with a distinctive sweet odor. Its boiling point is 176 degrees F and its flash point is 12 degrees F. The flammable limits in air are 1.3% for the low end and 7.5% for the high end. Benzene is a flammable liquid. Its vapors can form explosive mixtures. All ignition sources must be controlled when Benzene is used, handled, or stored. Where liquid or vapor may be released, such areas shall be considered as hazardous locations.

Benzene vapors are heavier than air; thus the vapors may travel along the ground and be ignited by open flames or sparks at locations remote from the site at which Benzene is handled.

Benzene is classified as a 1 B flammable liquid for the purpose of conforming to the requirements of 29 CFR 1910.106. A concentration exceeding 3,250 ppm is considered a potential fire explosion hazard. Locations where Benzene may be present in quantities sufficient to produce explosive or ignitable mixtures are considered Class I Group D for the purposes of conforming to the requirements of 29 CFR 1910.309.

Health Effects

Benzene is primarily an inhalation hazard. Systemic absorption may cause depression of the hematopoietic system, pancytopenia, aplastic anemia, and leukemia. Inhalation of high concentrations can affect central nervous system function. Aspiration of small amounts of liquid Benzene immediately causes pulmonary edema and hemorrhage of pulmonary tissue. There is some absorption through the skin.

Absorption may be more rapid in the case of abraded skin, and Benzene may be more readily absorbed if it is present in a mixture or as a contaminant in solvents that are readily absorbed. The defatting action of Benzene may produce primary irritation due to repeated or prolonged contact with the skin. A high concentration is irritating to the eyes and the mucous membranes of the nose, and respiratory tract.

Direct skin contact with Benzene may cause erythema. Repeated or prolonged contact may result in drying, scaling dermatitis, or development of secondary skin infections. In addition, there is Benzene absorption through the skin. Local effects of Benzene vapor or liquid on the eye are slight. Only at very high concentrations is there any smarting sensation in the eye. Inhalation of high concentrations of Benzene may have an initial stimulatory effect on the central nervous system characterized by exhilaration, nervous excitation, and/or giddiness, followed by a period of depression, drowsiness, or fatigue.

A sensation of tightness in the chest accompanied by breathlessness may occur and ultimately the victim may lose consciousness. Tremors, convulsions and death may follow from respiratory paralysis or circulatory collapse in a few minutes to several hours following severe exposures.

The detrimental effect on the blood-forming system of prolonged exposure to small quantities of Benzene vapor is of extreme importance. The hematopoietic system is the chief target for Benzene's toxic effects that are manifested by alterations in the levels of formed elements in the peripheral blood. These effects have occurred at concentrations of Benzene that may not cause irritation of mucous membranes, or any unpleasant sensory effects. Early signs and symptoms of Benzene morbidity are varied, often not readily noticed and non-specific. Subjective complaints of headache, dizziness, and loss of appetite may precede or follow clinical signs. Rapid pulse and low blood pressure, in addition to a physical appearance of anemia, may accompany a subjective complaint of shortness of breath and excessive tiredness. Bleeding from the nose, gums, or mucous membranes, and the development of purpuric spots (small bruises) may occur as the condition progresses. Clinical evidence of leukopenia, anemia, and thrombocytopenia, singly or in combination, has been frequently reported among the first signs.

Bone marrow may appear normal, aplastic, or hyperplastic, and may not, in all situations, correlate with peripheral blood forming tissues. Because of variations in the susceptibility to Benzene morbidity, there is no "typical" blood picture. The onset of effects of prolonged Benzene exposure may be delayed for many months or years after the actual exposure has ceased and identification or correlation with Benzene exposure must be sought out in the occupational history.

Regulatory Limits:

The permissible exposure limits for Benzene are as follows:

- Airborne: The maximum time-weighted average (TWA) exposure limit is 1 part of Benzene vapor per million parts of air (1 ppm) for an 8-hour workday and the maximum short-term exposure limit (STEL) is 5 ppm for any 15-minute period

- Dermal: Eye contact shall be prevented and skin contact with liquid Benzene shall be limited.

Working Safely with Benzene

- Order only the amount needed for your work. Excessive chemicals produce increased risk to the work place.

- Store Benzene in a vented flammable storage cabinet.

- Smoking, open flames and ignition sources are prohibited in areas where benzene is used or in a release area.

- Fire extinguishers will be readily available for use where benzene is used or stored.

- Exposure to benzene in work areas will be avoided to prevent adverse health effects.

- Established engineering controls, personal protective equipment, and work practices used to reduce benzene exposure will be included in site-specific plans for preventing exposure to benzene.

- Employees should be aware of clients' contingency plans and provisions. Employees must be informed where benzene is used in the host facility and aware of additional plant safety rules.

- Before you are about to use Benzene, don personal protective equipment, laboratory coat, and proper resistant gloves and safety glasses.

- Remove container from storage and bring to operating fume hood. Place container on tray in hood. Keep bottle at least six inches from front of hood.

- Bring hood sash down to 12" opening.

- Open bottle and remove quantity needed either with an automatic pipetor or by pouring into a measure cylinder.

- Dilute by adding stock to the dilutent, avoid spilling.

- If you detect a Benzene odor, work further in the hood and reduce the sash opening.

- After you remove the needed amount, return stock solution to the flammable storage cabinet.

- Dispose of waste Benzene into a labeled sealed bottle. The label must read:
    - WASTE CHEMICAL: Benzene
    - Date First Collected: _____

- For a small spill <50 ml, using the appropriate protective equipment, absorb the spill material with absorbent pad. Place in plastic bag. WASH area with soap and water.

- For body contamination, see Emergency Procedures below.

Personal Protective Equipment

The follow protective equipment is required when working with Benzene:

Respiratory Protection - Respirators are required for those operations in which engineering controls or work practice controls are not feasible to reduce exposure to the permissible level. However, where employers can document that Benzene is present in the workplace less than 30 days a year, respirators may be used in lieu of engineering controls. If respirators are worn, they must have joint Mine Safety and Health Administration and the National Institute for Occupational Safety and Health (NIOSH) seal of approval, and cartridge or canisters must be replaced before the end of their service life, or the end of the shift, whichever occurs first. If you experience difficulty breathing while wearing a respirator, you may request a positive pressure respirator from your employer. You must be medically screened, fit tested and thoroughly trained to use the assigned respirator, and your employer will provide the training.

Protective Clothing - You must wear appropriate protective clothing (such as boots, gloves, sleeves, aprons, etc.) over any parts of your body that could be exposed to liquid Benzene. In a laboratory setting a laboratory coat and gloves are a must when handling Benzene.

Eye and Face Protection - You must wear splash-proof safety goggles if it is possible that Benzene may get into your eyes. In addition, you must wear a face shield if your face could be splashed with Benzene liquid.

Exposure Monitoring

Employees might be exposed to Benzene during their job functions such as: (1) Petroleum refining sites (2) Tank gauging (tanks at producing, pipeline & refining operations) (3) Field maintenance. Determinations of employee exposure shall be made from breathing zone air samples that are representative of each employee's average exposure to airborne Benzene. Representative 8-hour TWA employee exposures shall be determined on the basis of one sample or samples representing the full shift exposure for each job classification in each work area. Employees are monitored initially and periodically thereafter depending on whether the exposure exceeds the TWA.

Medical Surveillance

The employer shall make available a medical surveillance program for employees who are or may be exposed to Benzene at or above the action level of 0.5 ppm calculated as an hour time-weighted average for 30 or more days per year.

The employer shall provide for an initial physical exam of the employee by a physician that will consist of a detailed occupational history that includes:

- Past work exposure to Benzene or any other hematological toxins,
- A family history of blood dyscrasias including hematological neoplasms;
- A history of blood dyscrasias including genetic hemoglobin abnormalities, bleeding abnormalities, abnormal function of formed blood elements;
- A history of renal or liver dysfunction;
- A history of medicinal drugs routinely taken;
- A history of previous exposure to ionizing radiation
- Exposure to marrow toxins outside of the current work situation.

Regulated Areas

Employers shall establish regulated areas wherever the airborne concentration of Benzene exceeds or can reasonably be expected to exceed the permissible exposure limits, either the 8-hour time weighted average exposure of 1 ppm or the short-term exposure limit of 5 ppm for 15 minutes. Access to regulated areas shall be posted and limited to authorized persons.

Communication to Employees

The employer shall post signs at entrances to regulated areas. The sign shall bear the following legend:

- Danger
- Benzene
- Cancer Hazard
- Flammable – No Smoking
- Authorized Personnel Only
- Respirator Required

Employer shall ensure that labels or other appropriate forms of warning are provided for containers of Benzene within the workplace. The Employer shall obtain material safety data sheets (MSDS) for Benzene. The employer shall provide the employee with information and training at the time of their initial assignment to a work area where Benzene is present and annually after that.

Record keeping

The employer shall establish and maintain records regarding employee's exposure, monitoring and sampling, exposure levels, and respiratory devices to be worn. The employer must keep records for at least 30 years.

Applicability

This procedure applies to all occupational exposure to Benzene.

Emergency Procedures

In a medical emergency call 911. Employees should be aware of clients' emergency plans and provisions. Employees must be informed where benzene is used in the host facility and aware of additional plant safety rules.

- **Inhalation:** If inhaled, move to fresh air. If not breathing give artificial respiration. If breathing difficultly, give oxygen.
- **Skin Contact:** In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.
- **Eye Contact:** If in contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating eyelids with fingers. Call a physician.
- **Ingestion:** If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.