

Manual Section 3	Issue Date 11/21/13	Revision Date 01/01/24	Policy Number LLCP-022
	Benzene		

PURPOSE

The purpose of this program is to define work practices, administrative procedures and engineering controls to reduce employee exposure to or below the PEL of benzene. This plan shall be implemented and kept current by the Corporate HSE department as required to reflect the most recent exposure monitoring data.

SCOPE

All LLC Companies including, Blanchard Industrial, LLC, GIS Engineering, LLC, Grand Isle Shipyard, Inc., and GWIS, Mack Steel, NuWave, Sun Industries, Valvemax, Discovery Industries, Inc.; hereafter identified as “Company”.

PROCESS

During the course of work, employees may be exposed to benzene in various locations or operations – petroleum refining sites, tank gauging (tanks at producing, pipeline & refining operations), and field maintenance. Benzene is a known carcinogen (cancer causing agent) and is flammable, so proper protection must be provided. Benzene is primarily an inhalation hazard. Respiratory protection should be used if the presence of benzene is suspected. As with any respirator use, a written respiratory protection plan must be in place, in accordance with CFR 1910.134 (b), (d), (e), and (f).

The Corporate HSE department will develop and implement a schedule for developing project/task specific benzene control procedures prior to the start of activities that may include exposure to benzene. The Company will be made aware of an owner’s contingency plan provisions and all employees must be informed where benzene is used in the host facility and be aware of additional plant safety rules.

DEFINITIONS

Action Level – An airborne concentration of benzene of 0.5 ppm calculated as an 8-hour time-weighted average.

Benzene – Benzene is an aromatic hydrocarbon that occurs naturally in petroleum crude oils and natural gas condensates. The amount present is usually the greatest in the lighter crude oils and condensates. Benzene also may be found in cleaning fluids, where it is used as an additive. Benzene is an organic solvent and can cause the acute (short-term) effects common in some volatile solvents such as headache, dizziness and/or respiratory irritation. These effects usually occur at exposure levels of 25 parts per million (ppm) to 100 ppm. Since these effects are acute, they are usually reversed by removal of the exposed person to a safe breathing area. Benzene usually remains in the body less than six to nine hours and is oxidized and excreted from the body naturally.

Employee Exposure – Exposure to airborne benzene that would occur if the employee were not using respiratory protective equipment.

Health Effects – Short-term exposure causes depression of the central nervous system (CNS), marked by drowsiness, dizziness, being irritable, being euphoric, headache, nausea, loss of coordination, confusion and unconsciousness. No effects are expected at 25 ppm. Exposure from 50 to 150 ppm produces headache and tiredness. Eye and skin irritation, nose and throat irritation have also been reported following short-term exposure.

KEY RESPONSIBILITIES

Asset Manager or Designee

- Ensure personnel are aware of work that has the potential of exposure to benzene.
- Ensure individuals responsible for monitoring areas of exposure are properly trained to ensure that affected personnel understand the risks associated with benzene exposure and the protective systems available.
- Ensure personnel receive documented medical surveillance exams.
- Ensure that emergency exams are performed in an overexposure or if suspected overexposure occurs.

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Supervisors

- Ensure employees have the appropriate personal protective equipment (PPE) and are properly trained in its use and care.
- Ensure employees comply with the benzene control program.

HSE Director

- In coordination with the Asset Manager, develop and implement project/task specific benzene control procedures prior to the start of activities that may include exposure to benzene.
- Coordinate monitoring activities, ensuring monitoring equipment is in proper working order and, as necessary, modifying the benzene control procedures to reflect exposure monitoring data.
- Maintain the benzene control program, notify management of any regulatory changes and ensure compliance with regulatory, client and corporate requirements.
- Coordinate training activities.
- Coordinate the medical surveillance program, including maintenance of medical records and administration of exams.
- Ensure, that due to the flammability of benzene, fire extinguishers shall always be readily available.

Employees

- Comply with the benzene control program.
- Know where benzene can be found at our Company and client facilities and follow any additional plant safety rules required by the client.
- Eliminate or minimize exposure to materials that contain benzene, i.e., crude oil, condensate and natural gas liquids (NGLs).
- Comply with the medical surveillance program and attend examinations as required.
- Maintain respiratory protection equipment in good working order and notify the supervisor or safety representative of any problems prior to starting work.
- Review material safety data sheets or consult with the supervisor to identify any container with benzene containing material.
- Do not smoke in prohibited areas where benzene is present.
- Report exposures resulting in any symptoms immediately.

PROCEDURE

Minimizing Exposure

Minimizing the risk of exposure by inhalation of hydrocarbon vapors and skin contact can be accomplished through:

- Allowing any initial hydrocarbon vapors released to properly vent when opening vessels (i.e. floatation cells/water treatment skids and process filter changes).
- The flushing and purging of any equipment and vessels prior to being opened,
- The use of Hierarchy of Controls such as eliminate the hazard and eliminate associated risk, using engineering controls, isolating the hazard, applying administrative controls, and lastly, use of Personal Protective Equipment.

Exposure Monitoring

- Worker exposure determinations are made from personal breathing zone air samples that are representative of the employee's normal workday. This also includes short duration tasks and comparing against the Short Term Exposure Limit (STEL).
- Periodic exposure monitoring shall be conducted for work operations in which gas or liquids containing benzene at 0.1% by volume (1000 ppm) or more are present.
- Area or personal monitoring may be performed after certain spills, ruptures, leaks, or other breakdowns occur and have been cleaned-up to ensure that exposures have returned to the level that existed prior to the incident.

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Permissible Exposure Limits

The time-weighted average limit (TWA) for benzene is:

- 8-hour TWA – 1 ppm.
- 12-hour TWA – 0.67 ppm.
- The short-term exposure limit (STEL) for benzene is 5 ppm.

Regulated Areas

Regulated areas shall be established wherever airborne concentrations of benzene exceeds or can reasonably be expected to exceed either the time weighted averages (TWA) of 1 ppm or the STEL of 5 ppm.

Company supervision will control access to regulated areas and limit access to authorized personnel.

The following signage shall be posted in all regulated areas when the potential exists for benzene vapors to be in excess of the PEL:

- DANGER – BENZENE REGULATED AREA
- CANCER CAUSING AGENT
- FLAMMABLE – NO SMOKING
- AUTHORIZED PERSONNEL ONLY
- RESPIRATOR REQUIRED

Methods of Compliance

The benzene control program shall be written and implemented to comply with OSHA regulation 29 CFR 1910.1028 (Benzene).

The Company shall establish and implement a written program to reduce employee exposure to or below the PEL, primarily by means of engineering and work practice controls to ensure compliance with the benzene control program and federal and state requirements.

The program shall be made available to the Assistant Secretary, the Director, affected employees and their designated representatives.

Exposure Monitoring

Exposure monitoring shall be performed for the 8-hour and 12-hour TWAs or for the 15 minute STEL exposure when:

- Regulated areas are established.
- An emergency occurs that could require a regulated area.
- A change in the production, process, control equipment, personnel or work practices may result in new or additional exposure to benzene.
- Cleanup of a spill, leak repair, or rupture occurs.
- If the monitoring required reveals employee exposure at or above the action level, but at or below the TWA, we shall repeat the monitoring for each employee at least every year.
- If the initial monitoring reveals employee exposure to be below the action level, we may discontinue the monitoring.
- If the monitoring reveals that employee exposures, as indicated by at least two consecutive measurements taken at least 7 days apart, are below the action level, we may discontinue monitoring.
- Direct reading detection instruments will be used where benzene vapors may be present in work areas not previously monitored.
- Personal monitoring will be performed by use of vapor monitoring badges following manufacturer requirements. All samples shall be analyzed at an American Industrial Hygiene Association (AIHA) certified laboratory.

Medical Surveillance

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- Baseline and annual medical exams shall be provided to employees that may work or are anticipated to participate in operations more than 10 times per year or may work in areas where benzene exposures may exceed the PEL over 30 days per year.
- The Company shall make available a medical surveillance program for employees who are or may be exposed to benzene at or above the action level 30 or more days per year; for employees who are or may be exposed to benzene at or above the PELs 10 or more days per year; for employees who have been exposed to more than 10 ppm of benzene for 30 or more days in a year prior to the effective date of the standard when employed by their current employer.
- Notification of monitoring results shall be provided to employees in writing within 15 working days of receipt of results.

Personal Protective Equipment

- PPE will be selected on the basis of its ability to prevent absorption, inhalation and ingestion.
- PPE will reflect the needs of the employee based on work conditions, amount and duration of exposure and other known environmental factors but shall contain as a minimum; boots, proper eye protection, gloves, sleeves, aprons and others as determined.
- PPE shall be provided and worn when appropriate to prevent eye contact and limit dermal exposure to liquid benzene.
- PPE shall be provided and worn when appropriate to prevent eye contact and limit dermal exposure to liquid benzene. PPE must meet the requirements of 29 CFR 1910.133 and provided at no cost to the employees.

When air-purifying respirators are used, cartridges should be replaced at the end of their service life or at the beginning of each shift. End of service life may be determined by using end of life indicators, by increased breathing effort, or by detection of the odor of benzene (chemical vapor breakthrough). Employees who are wearing respirators shall be allowed to wash their faces and respirators as often as necessary so as to prevent skin irritation.

If full-face respirators are not worn, chemical resistant goggles, along with a face shield should be used to prevent eye contact with liquid benzene. Chemical resistant gloves, aprons and proper footwear should also be used.

Respiratory Protection

A respiratory protection program shall be established in accordance with 29 CFR 1910.134. Respiratory protection is required:

- During the time period necessary to implement engineering controls or work practices.
- When engineering and work practices are not feasible.
- In emergencies.

Approved respirators shall be selected according to airborne concentrations of benzene or condition of use.

- 0 to 0.67 ppm – no respirator required.
- 0.67 to 6.7 ppm – half mask respirator with OV cartridges.
- 6.7 to 33 ppm – full face respirator with OV cartridges.
- Greater than 33 ppm – full face mask with positive pressure respirator (SCBA or Air line with escape pack)

Recordkeeping

- Medical surveillance records shall be maintained for 30 years after termination of employment.
- Exposure monitoring records shall be maintained for 30 years after completion of the project.
- Exposure and medical monitoring records shall be made available to affected employees or their representatives and to OSHA upon request.

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Communication of Benzene Hazards

- Signs and labels shall be posted at entrances of regulated areas.
- The benzene control program shall be updated by the Corporate HSE Director.
- Project site specific contingency and emergency procedures shall be updated by the Corporate HSE Director and made available to project staff prior to beginning work at the specific site.

Effects of Overexposure

Benzene is a hazard through inhalation, absorption through the skin and eyes, and through ingestion.

Short-term or acute exposure may cause breathlessness, irritability, giddiness; possible irritation to the eyes, nose, and respiratory tract. Individuals may develop headaches, feel intoxicated, dizzy or nauseated. Severe overexposure may lead to convulsions or loss of consciousness.

Long-term or chronic exposure may lead to blood disorders ranging from anemia to leukemia. These disorders can occur without symptoms.

First Aid and Emergency Procedures

- Swallowing: If benzene has been swallowed and the person is conscious, **DO NOT INDUCE VOMITING**. Call for medical help immediately
- Eye and face exposure: Wash eyes and face immediately with large amounts of fresh water. If vision seems to be affected or irritation persists, see a doctor as soon as possible.
- Skin exposure: Remove contaminated clothing and wash exposed skin with large amounts of water and soap immediately. Wash clothing before wearing again.
- Inhalation: If anyone inhales large amounts of benzene, move them to fresh air at once. If breathing has stopped, apply artificial respiration. Seek medical assistance as soon as possible.
- **NEVER ENTER ANY AREA, WHERE THE CONCENTRATION OF BENZENE IS HIGH, WITHOUT PROPER SAFETY EQUIPMENT AND AT LEAST ONE OTHER PERSON WITH A LIFELINE.**

Fire, Explosion Hazard

Benzene is highly flammable. Vapors may form explosive mixtures. Carbon dioxide, dry chemical, or foam should be used to fight fires involving benzene. Fine water spray may be used to cool fire-exposed containers. Do not use a steady stream of water as this will spread the fire. All ignition sources must be controlled. Benzene vapors are heavier than air and may travel along the ground.

High heat sources may lead to instability during storage. Benzene should **not** be stored near oxidizing materials.