	J. J. White, Inc. Training Toolbox Talk	Doc Type:	TBT - Training
		Issue Date	Week 3 – 1/14/2019
Benzene		Revision Date:	1/7/2019
		Revision No.	0
		Next Review Date:	1/1/2020
Preparation: V.P. HSE	Authority: President	Issuing Dept.: Safety	Page: Page 1 of 2

What is Benzene?

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities. Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and other synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include emissions from volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

What is the Hazard?


Benzene is primarily an inhalation hazard. Inhalation of high concentrations can affect central nervous system function. Benzene is harmful, especially to the tissues that form blood cells. Brief exposure of 5-10 minutes to benzene in air at very high levels can cause death. Exposure to benzene happens mostly from breathing contaminated air from industry, automobile exhaust, tobacco smoke, or gasoline fumes.

Where is the Hazard?

- Benzene is formed from both natural processes and human activities.
- Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.
- Some industries use benzene to make other chemicals that are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of lubricants, rubbers, dyes, detergents, drugs, and pesticides.

What Protections Exist in the Standards?

- Employees are capable of working in an atmosphere that contains benzene (or other chemical hazards) without risking their health. OSHA enforces two **permissible exposure limits (PEL)** for benzene allowing staff to work without the use of a respirator: time weighted average (TWA) of 1 part per million (ppm) over 8-hours per day, 40-hours per week; and a short-term exposure limit (STEL) of 5 ppm limiting exposure of 15-minutes. There is also a PEL referred to as “immediately dangerous to life and health (IDLH)” which has a limit of 500 ppm (NIOSH). IDLH atmospheres require the use of a self-contained breathing apparatus (SCBA) or supplied-air with escape pack.
- Employers must use proper engineering controls and work practices to the extent feasible. Where feasible engineering controls and work practices do not ensure worker protection at the exposure limits, employers must reduce the exposures to the lowest level achievable and then supplement with proper personal protective equipment and clothing to prevent eye contact and limit dermal exposure to liquid benzene. A combination of the three controls can be used to reduce the risk as much as possible.
 - To emphasize the Hazard Control Hierarchy, first implement **engineering controls**, such as ventilation or containment, to eliminate or reduce benzene levels to the lowest level possible.

	J. J. White, Inc. Training Toolbox Talk		Doc Type:	TBT - Training
			Issue Date	Week 3 - 1/14/2019
Benzene			Revision Date:	1/7/2019
			Revision No.	0
			Next Review Date:	1/1/2020
Preparation: V.P. HSE	Authority: President	Issuing Dept.: Safety	Page:	Page 2 of 2

- Second, **administrative controls** can be used to limit employee exposures. An example of administrative controls is to reformulate the TWA PEL. Benzene's TWA is 1 ppm for 8-hours for a total of 8 ppm for the day (1 ppm x 8 hours = 8 ppm). Employees can enter higher benzene levels (e.g. 4 ppm) for a shorter duration (2 hours; 8 ppm/2 hours = 4 ppm) as long as they do not exceed other PELs (4 ppm is less than the STEL of 5 ppm).
- Third, employees are to wear **personal protective equipment (PPE)**. PPE is the last resort, because if it fails the employee is still exposed to the hazard and, therefore, is at risk.
- **Medical surveillance** shall be provided for employees who are or may be exposed to benzene at or above the PELs 10 or more days per year; and 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 the company.

Summary

The best defense is a good offense: if the team can delay the task in order to work under safer conditions, then do so. In addition, the necessary types of controls are site-specific and must be included in the site-specific health and safety plan. Such risk assessments must be determined on a project and site basis. Solutions containing benzene must be used in a well-ventilated work area and must also be correctly labeled. Samples believed to contain benzene are to be stored at room temperature away from heat and incompatible materials. For employees who are working with benzene, eyewash stations and/or safety showers are to be within the immediate work area. Gloves, goggles, and Tyvek must be worn as well. Additional PPE may be required depending on the procedure. Employees cannot take benzene for granted because of its everyday use or presence. Complacency is a characteristic that cannot be allowed to exist when dealing with hazardous materials like benzene. Circumventing procedures puts you and your co-workers at risk. As with other hazardous materials, familiarize yourself with benzene, and read and understand the Safety Data Sheet (SDS) prior to exposure. It's important that employees go home in the same condition they came to work, healthy.

