



CONTROLLING BENZENE EXPOSURE

Toolbox Talk



AGENDA

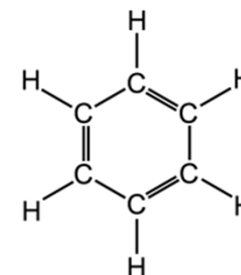
- What is Benzene?
- How Could Benzene Affect Me?
- Where is Benzene Found?
- Where Might I be Exposed to Benzene?
- How do I Control Exposure?



WHAT IS BENZENE?

- » Benzene:
 - A 6 carbon-ringed hydrocarbon
 - Flammable
 - Highly toxic
 - Low Occupational Exposure Limits (OEL)*
 - Easily becomes airborne

- » Why talk about it?
 - Because you can be overexposed when under 10% of the Lower Explosive Limit (LEL)



(1) <http://onlinelibrary.wiley.com/doi/10.1002/ajh.20934/pdf> * See slide notes

HOW COULD BENZENE AFFECT ME?

- » Benzene causes cancer and various blood disorders
 - Leukemia (acute myeloid leukemia)
 - Typically associated with on-going exposures especially those that are high dose rate
 - Cancer ranges from 2 to 50 years of exposure with an average around 10 years⁽¹⁾

- » Benzene can get into your body via:
 - Ingestion or injection
 - Skin absorption
 - Inhalation

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WHERE IS BENZENE FOUND?

- » Naturally occurring
 - Crude oil, condensate, etc.

- » Found in process intermediates
 - Chemical scrubbers (glycol, amine, etc.)
 - Drilling fluids

- » Found in wastes
 - Sludge, produced water, etc.

- » Fugitive emissions
 - Still column vents, scrubber vents, blow downs

- » Check your Safety Data Sheet (SDS)

WHERE MIGHT I BE EXPOSED?

- » When handling or working near products that contain benzene such as opening closed systems during the following tasks:
 - Tank gauging and thieving
 - Tank cleaning
 - Tank inspection*
 - Pump maintenance
 - Y-strainer cleanouts
 - Basket strainer cleanouts
 - Separator cleanouts
 - Filter changes
 - Orifice plate changes
 - Sending and retrieving pigs
 - Glycol accumulator skimming
 - Liquid and gas sampling

* See slide notes

WHERE MIGHT I BE EXPOSED?

- » When working near fugitive emissions from:
 - Production and flow back tanks
 - Truck vent line ports
 - Dehydrator still column vents
 - Scrubber exhaust ports
 - Blow down vents
 - Etc.

HAZARD ASSESSMENT

- » Conduct a hazard assessment
 - Consider exposure factors:*
 - Percentage of benzene
 - Volume of liquid
 - Environment (outdoors vs indoors)
 - Exposure time
 - Surface area
 - Temperature (liquid and ambient)
 - Agitation
- No LEL does not mean no benzene!



Sources: <http://www.raesystems.com/products/ultrarae-3000> and http://www.draeger.com/sites/enus_us/Pages/Chemical-Industry/Draeger-Chip-Measurement-System.aspx * See slide notes

HOW TO CONTROL EXPOSURE?

- » Avoid bringing products to site that contain benzene (substitution)
- » Engineer out liquids exposure
 - Purging (required for more than just H₂S)
 - Mechanical ventilation during confined space occupancy*
- » Administrative
 - Procedures, signage, time and distance
- » PPE
 - 4-head gas monitor (LEL, O₂, H₂S, CO)*
 - ½ mask organic vapour respirator and gloves (nitrile)*



Source: <http://www.honeywellanalytics.com/en/products/GasAlertQuattro>, * See slide notes

HOW MIGHT THIS IMPACT US?

- » Have we conducted benzene exposure assessments?
- » Do we know when, where and what controls are required?
- » How confident are we that everyone is protected?

ADDITIONAL INFORMATION

- » Energy Safety Canada, [Controlling Chemical Hazards Guideline](#)
- » Alberta Labour, Workplace Health and Safety, [Benzene at the Work Site Bulletin](#), August 2010

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