



January 2012

BENZENE

HSE **LIFE** **UNI** **O**

THE INTERNATIONAL OIL&GAS INDUSTRY STANDARD FOR PROFESSIONALS

Work safely – or don't work at all

Strict procedures apply to all work on installations and systems. One of the main risks is the release of hazardous substances. Always read the permit to work carefully, and check that the prescribed safety measures are in place. Take all necessary precautions for the job you are doing.

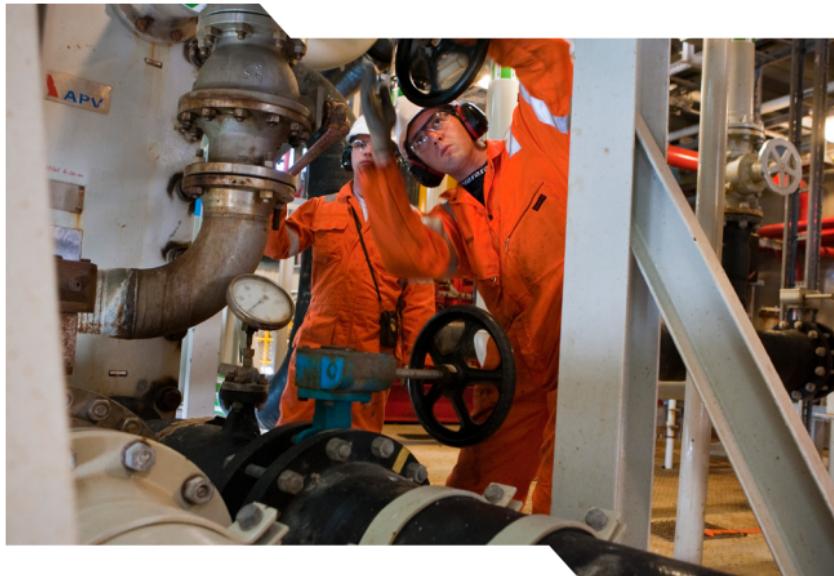
At all times, stay alert to increased concentrations of hazardous substances. If you are in any doubt, ask! Or stop working.

Speaking one and the same clear language in Safety, Health and Environment and harmonization of regulations by focusing primarily on agreements between Companies and Contractors.

That's the goal the HSElife UNIO associated members pursue.

BENZENE

During production, natural gas condensate is separated from the gas and stored. One of the substances it contains is **benzene**, which can cause cancer. Because of this, avoid any contact with benzene.



PROPERTIES OF BENZENE

- Evaporates fast (volatile)
- Vapour is heavier than air
- Highly flammable
- Reacts fiercely with acids
- Explosive
- Has a strong degreasing effect on the skin

*NB. The smell of benzene does not betray its acute danger to human health. To stay safe, **always take measurements!***



BENZENE: THE RISKS

- Irritates the eyes, skin and airways.
- Carcinogenic.
- In very high concentrations, causes unconsciousness
- Harmful to the environment
- Flammable and explosive

EFFECTS OF CONTACT

Inhalation

Irritation, headache, nausea, dizziness, unconsciousness, pneumonia

Skin (contact)

Redness, rough skin, itching, headache, dizziness

Eye (contact)

Redness, pain

Swallowing

Irritation of the lips, mouth and throat (burning sensation)

Prolonged contact

Eczema, cracked skin, anaemia, leukaemia, damage to DNA

WHAT TO DO IN THE EVENT OF CONTACT

Inhalation

Bring the victim out into the fresh air. Allow him to rest.

Skin contact

Remove contaminated clothing. Make clothing wet (prevent burning). Wash skin with plenty of soap and water.

Eye contact

Rinse with plenty of water. Remove contact lenses, if worn (if possible).

Swallowing

Rinse mouth.

Do not induce vomiting.

Serious exposure

Notify the doctor immediately.

WHEN MIGHT BENZENE BE RELEASED?

- When cleaning barrels, tanks and system components.
- When draining tanks and pipes.
- When taking measurements or samples.
- When cleaning or changing filters (e.g. glycol).
- During soil surveys and decontamination.
- When clearing up pollutants.
- When disconnecting or clearing away hoses.
- When there is insufficient ventilation or during blow-off.
- When taking off or disposing of contaminated PPE.

NB. Inadequate workplace ventilation or air extraction increases the risk of exposure!



PREPARING FOR WORK

- Familiarise yourself with the risks associated with the work in question.
- Discuss these risks in detail.
- Take all necessary precautionary measures.
- Use the appropriate items of personal safety equipment.
- See to it that the area is well ventilated, or install extra air extraction equipment.



PREVENTING EXPOSURE BEFORE YOU START WORK

Before the job begins, have measurements taken by an authorized gas tester who is an expert on benzene. Position any vacuum unit as far as possible from the work area.

PREVENTING EXPOSURE AT WORK

- Use the PPE correctly
- Take measurements frequently
- Record the results on the permit to work *)
- Always work with the wind at your back
- If benzene could escape from the system, use drip trays
- Make sure that there is adequate ventilation
- If a vacuum unit is being used, place this as far as possible from people
- Immediately cordon off any contaminated areas with hazard tape

- Carry out extra checks in the area around the vacuum unit

**) NB. If concentrations exceed the permitted level, always inform the health and safety service (arbodienst). It is required by law to register all such incidents.*

WHAT TO DO IN THE EVENT OF A SPILL

- Take care: benzene is dangerously flammable and explosive
- Stop work immediately
- Evacuate the danger zone
- Notify the site manager or supervisor



WHAT PPE TO USE

< 1 ppm - Basic PPE (overalls and eye protection)

$\geq 1 \leq 10$ ppm - Basic PPE
- Full-face mask with ABEK HgP3 filter
- Impermeable clothing, safety gloves
(nitrile/Viton), safety boots (PU)

> 10 ppm - Basic PPE
- Independent respiratory protection
- Impermeable disposable overalls
- Impermeable clothing, safety gloves
(nitrile/Viton), safety boots (PU)

Threshold limit value (TLV) of benzene: 1 ppm *

Action value of benzene at Shell: 0.5 ppm

***) NB. Some companies use different values.**

AVOIDING CONTACT OR EXPOSURE AT WORK

- Use the correct personal protective equipment in the prescribed way
- Always carry clean filters for full-face masks
- Always use the correct filter canister or compressed air
- Clean full-face masks thoroughly after use
- Collect filter canisters after use and dispose of them as chemical waste
- Take care when removing and disposing of PPE (personal hygiene). Do so only in designated areas



ALWAYS ASSUME CONTACT OR EXPOSURE WHEN...

- Protective clothing is torn
- PPE is used too late, or not at all
- PPE provides insufficient protection
- ...

IF CONTACT OR EXPOSURE OCCURS OR IS SUSPECTED...

- Notify the site manager
- Have a urine sample taken
- Contact the health and safety service (arbodienst) or company doctor
- If there are medical symptoms, contact a GP
- Retain permits to work and measurements taken

PERSONAL HYGIENE

Always wash your hands...

- Before eating, drinking or smoking
- Before using the toilet
- Before leaving the site
- After removing contaminated clothing in a designated area



QUESTIONS? NEED MORE INFORMATION?

Feel free to contact the site manager or supervisor at any time.

The member parties of HSElife UNIO are:

SHELL/NAM	Chevron
TAQA Energy	GDF SUEZ
Centrica Energy Upstream	Vermilion Energy
Oranje-Nassau Energie	Dana Petroleum
CASOS	TOTAL

LMRA Last Minute Risk Analysis

ASK YOURSELF THE FOLLOWING QUESTIONS:

- Do I know what I need to do?
- Is the workplace safe?
- Are all safety procedures explained to me?
- Am I familiar with the hazards of my work (assignment)?
- Do I have proper safety equipment (PPE)?
- Do I have the right tools?
- Are my tools certified?
- Have I done everything possible to minimise the risk?
- If anything goes wrong, do I know what I'm supposed to do?

All **YES**: start (or continue) the activity.

If **NO** or in doubt: go to your supervisor and discuss the situation.
