HSE
Health and Safety Executive

OCE9

Offshore COSHH essentials

Use of drilling muds (shale shaker and mud pit areas)

Control approach 2

Engineering control

This information will help offshore dutyholders (owners, operators and contractors) to comply with the Control of Substances Hazardous to Health Regulations 2002 (COSHH), as amended, to protect workers' health.

This guidance consolidates good control practice and reinforces existing knowledge with additional information.

It will help you carry out COSHH assessments, review existing assessments, deliver training and in supervising activities involving substances hazardous to health.

It is aimed at staff whose responsibilities include the management of substances hazardous to health on offshore installations (eg occupational health specialists, COSHH assessors, supervisors etc). It is also useful for trade union and employee safety representatives.

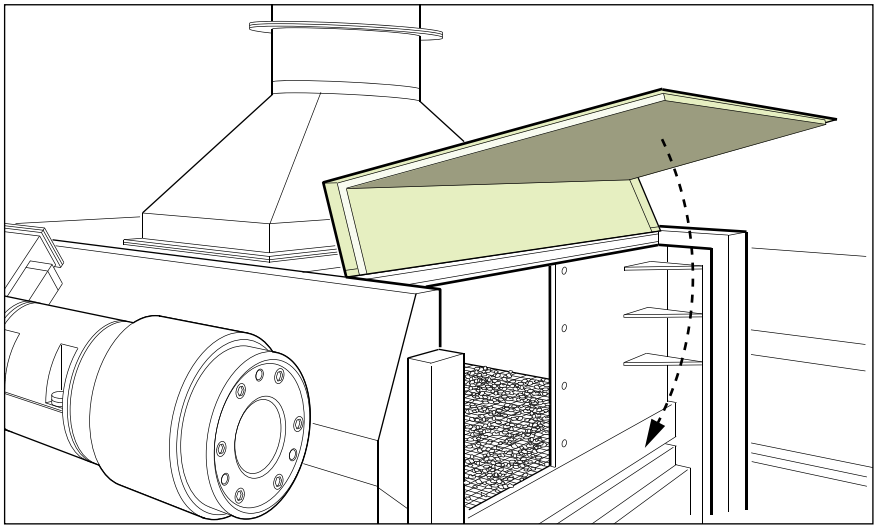
Following this guidance is not compulsory and you are free to take other action. But if you do follow this guidance, you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance as illustrating good practice.

Also see essential information on the back of the sheet.

What this sheet covers

This sheet describes good practice for control of exposure to drilling muds (liquids, mists and vapours) in shale shaker and mud pit areas. It includes mud handling, sampling and cleaning activities. It covers the key points you need to follow to help reduce exposure to an acceptable level, as part of your COSHH assessment.

This sheet does not cover mud making.



Hazard

- ✓ Drilling muds contain a wide range of substances including base fluids (eg mineral oils/calcium chloride), weighting agents (eg barite), viscosifers (eg bentonite), surfactants (eg imidazolines) and biocides (eg glutaraldehyde).
- ✓ Muds can also contain contaminants from formations (eg oil, condensate and H_2S).
- ✓ Hot muds will generate mists and vapours.
- ✓ Health effects include dermatitis, respiratory irritation, narcosis and cancer.
- ✓ H_2S is a very toxic gas, it can irritate the eyes, and throat and can cause unconsciousness and death (see OCE6).
- ✓ Good practice benchmark values for total oil vapour is 50 mg/m^3 and oil mist is 1 mg/m^3 (Norwegian limits).
- ✓ Individual substances should comply with their workplace exposure limits (WELs) if available, or other relevant exposure standard.

Access

- ✓ Restrict access to authorised personnel.
- ✓ Impose confined space entry procedures for entry into a mud pit.
- ✓ Keep access doors closed.

Equipment and procedures

Substitution

- ✓ Use water-based muds where possible: otherwise use low toxicity base oil.

Control equipment

- ✓ Cover mud troughs, sand traps etc fully to minimise vapour release.
- ✓ Provide enough fresh air to dilute and remove air contaminants, eg above 15 air changes per hour with a through draught.
- ✓ Provide fixed alarms for hydrocarbons and H_2S.

Shaker room

- ✓ As far as possible, enclose the shaker in an LEV enclosure.
- ✓ Where open, fit canopy hoods with plastic strips to maximise enclosure.
- ✓ The enclosure should have an inward air speed of at least 0.5 metres/second through gaps, to prevent mist escaping.
- ✓ When retrofitting LEV, install a full enclosure.

Cabin

- ✓ Provide a cabin in the shaker room to protect workers from hazardous substances and noise.
- ✓ Filter inlet air: a pre-filter and HEPA filter – type H11 for respirable dust below 1 mg/m^3, or type H12 or H13 for higher concentrations.
- ✓ Maintain an over-pressure around 10 Pa to minimise air ingress. Fit a gauge to show this is working correctly and a filter failure alarm.
- ✓ The cabin should have self-closing doors, flaps to relieve excess pressure, and a sticky dust mat.

Mud pit room

- ✓ Cover mud pits and sampling hatches.
- ✓ Only open hatch lids when sampling then close them.
- ✓ Extraction of mud pits should have an inward air speed of at least 0.5 metres/second.

Sampling mud and cuttings

- ✓ Ensure that samplers follow the rules for access to the areas.
- ✓ Provide a tool to remove mud from the pit or cuttings from the screen.
- ✓ Drain the cuttings – return the fluid to the system.
- ✓ Provide closeable containers for transfer to the laboratory.

All extraction

- ✓ Fit an airflow indicator to show that extraction is working properly.
- ✓ Discharge extracted air to a safe place.

Processing cuttings

✓ Enclose the transfer of cuttings between the shaker and the cleaning unit.
✓ Provide an enclosed and extracted cleaning unit.

Personal protective equipment (PPE) – see OCM3

✓ Ensure that all items of PPE are compatible.

Respiratory protective equipment (RPE) – see OCM4

✓ RPE will be needed for cleaning (eg shaker screens) activities.
✓ Provide CE-marked RPE for vapour with an assigned protection factor of at least 10 for cleaning and for emergencies.

Other protective equipment

✓ Provide a 'slicker suit' and a visor for low-pressure cleaning.
✓ Provide clean chemical-resistant gloves, eg nitrile, and new gloves when these are damaged.

Maintenance, examination and testing

Checking and maintenance

✓ Check for signs of damage at the start of every shift.
✓ At least once a week, check that airflow indicators work properly.
✓ Change inlet air HEPA filters as advised by the manufacturer.
✓ Check shale shaker seals and mountings and the enclosure integrity.
✓ Keep this information in your testing logbook.

Examination and testing

✓ Extraction systems require statutory 'thorough examination and testing' (TExT).
✓ Get a competent ventilation engineer to perform the TExT at least once every 14 months (see HSE publication HSG258).
✓ Carry out all actions arising from the TExT.

RPE

✓ Examine and test RPE thoroughly at least monthly and infrequently used RPE at least three monthly. Replace worn parts.

Records

✓ Keep records of all examinations and tests for at least five years.

Exposure monitoring

✓ Prove that you are using the right level and type of RPE – use monitoring records or carry out personal air monitoring

Cleaning and housekeeping

✓ Clean the cabin once a week. Use a Class H vacuum cleaner or wet cleaning methods.
✓ Provide a full set of PPE for low-pressure washing and shaker screen cleaning: RPE, slicker suit, gloves, boots, visor and goggles.

Caution: Do not use a brush or compressed air for cleaning. Never use compressed air to remove dust from clothing.

Employee checklist

- ☐ **Is the equipment in good condition and working properly?**
- ☐ **Is the extraction working?**
- ☐ **Is your respirator working properly? Check it every time.**
- ☐ **Look for signs of leaks, wear and damage before every job.**
- ☐ **Look for signs of wear and damage to equipment.**
- ☐ **If you find any problem, get it fixed. Don't just carry on working.**
- ☐ **Co-operate with health surveillance.**
- ☐ **Use, look after and store your PPE in accordance with instructions.**
- ☐ **Wash hands before eating, drinking or using the lavatory.**

✓ Label bags of dirty clothing to warn the laundry about the hazard.

Waste

✓ Residues are 'hazardous waste'. Label containers clearly – include a UN number where appropriate. Store and dispose of waste safely.

Personal decontamination and skin care

✓ Provide warm water, mild skin cleansers, nailbrushes, and soft paper, fabric towels or hot air for drying. Avoid abrasive cleansers.
✓ Instruct workers in how to clean their skin effectively.
✓ Tell workers to wash hands before every break.
✓ Provide pre-work skin creams, which will make it easier to wash dirt from the skin, and after-work creams to replace skin oils.

Caution: 'Barrier creams' or 'liquid gloves' do not provide a full barrier.

Health surveillance

✓ Conduct low-level health surveillance for dermatitis involving skin checks by suitably trained responsible person.

Training and supervision

✓ Provide supervision – ensure that safe work procedures are followed.
✓ Tell workers, including maintenance workers, what the hazards and risks are.
✓ Explain the early signs of dermatitis.
✓ Training includes toolbox talks on:
- how to use equipment properly;
- how to check that extraction is working properly;
- how to use RPE and check that it is working;
- how to clean up spills correctly; and
- what to do if something goes wrong.

✓ Involve managers and supervisors in health and safety training.

Essential information

OCE0 *Advice for managers*
OCM1 *Confined spaces*
OCM2 *Local exhaust ventilation (LEV)*
OCM3 *Personal protective equipment (PPE)*
OCM4 *Respiratory protective equipment (RPE)*
OCM7 *Health surveillance*
OCE16 *Bulk sampling*
OCE26 *Drilling waste treatment*

Other hazards

- Noise
- Musculoskeletal disorders – manual handling awkward heavy items in restricted places
- Hydrogen sulphide (H_2S)
- Substances harmful to the marine environment

Further information

Petroleum Industry Training Service Non Water-based Drilling and Completion Fluids Industry Recommended Practice IRP Vol.14 2002

Drilling fluids and health risk management: a guide for drilling personnel, managers and health professionals on the oil and gas industry OGP/IPIECA 2009

Respiratory protective equipment at work: A practical guide HSG53 (Third edition) HSE Books 2005
ISBN 978 0 7176 2904 6
www.hse.gov.uk/pubns/books/hsg53.htm

Controlling airborne contaminants at work: A guide to local exhaust ventilation (LEV) HSG258 HSE Books 2008
ISBN 978 0 7176 6298 2
www.hse.gov.uk/pubns/books/hsg258.htm

Workplace exposure limits EH40
www.hse.gov.uk/coshh/table1.pdf

You can find the full Offshore COSHH essentials series at www.hse.gov.uk/coshh/index.htm

This guidance was developed by representatives from the UK offshore oil and gas industry and trade unions, with HSE.

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