

OPERATIONS SPECIFIC

CUTTING; HANDLING & TREATMENT

Hazards

The direct handling and treatment of cuttings increases the chance of exposure to vapors and mists from the drilling fluids they were collected from and to dust from dry cuttings. Skin absorption through direct contact with drilling fluids may also occur. The health effects of a particular mud system vary depending on the chemicals in the initial fluid and the degree it gets contaminated with production fluids. The more hazardous muds have higher percentages of aromatic hydrocarbons which can vary from <0.5 % to 35%. Older oil-based mud systems used diesel as their main component and had higher fractions of aromatic hydrocarbons including benzene, toluene, ethyl benzene and xylene (BETX). All drilling muds, even more modern drilling fluids, can become contaminated with hydrocarbons and hydrogen sulphide down hole; increasing their toxicity. Higher risk of exposure to chemicals while handling cuttings is most likely:

- » during skip filling operations;
- » while transporting cuttings;
- » while taking cutting samples; and
- » when treating cutting samples during analysis (see Appendix A for more details).

In addition to the chemical hazards, the risk fire and explosion will increase with the flammability of the fluids used or produced and the risk of slips and falls increase when surfaces get covered in drilling mud or other fluids.

Access

Only allow access to the area by authorized staff that have been trained and equipped to work safely.

Equipment & Procedures

- » Select the least hazardous drilling mud system required to complete the work. Ensure it has:
 - a flash point of 61o C or higher and
 - few volatile and toxic components (selecting a water based fluid or hydrocarbon based one with an aniline point greater than 65 o C will help ensure few aromatic hydrocarbons).
- » If using flammable drilling fluids monitor mud operating temperature to ensure it stays 10 o C below flash point of fluids used.
- » Consider the potential for drilling mud to be contaminated with production fluids. If the formation or reservoir has a history of producing hydrogen sulfide or volatile natural gas condensates, small amounts of contamination can quickly produce high concentrations in air above unenclosed or unventilated shale shakers.
- » 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 closable containers for transfer to the laboratory.
- » Enclose the transfer of cuttings between the shaker and the cleaning unit.
- » Work areas used for washing, drying, thermal processing or examining cuttings and mud samples must be well ventilated; local exhaust ventilation is recommended.
- » Maintain equipment regularly to eliminate leaks and clean spills promptly to reduce worker exposure to the mud.
- » Ventilation fans should be used when necessary to prevent the build-up of hydrocarbon vapors in enclosed or semi-enclosed areas. Fan motors should be explosion-proof, and fan blades should be made of a non-sparking material.

Personal Protective Equipment

Respiratory Protective Equipment:

- » Self-Contained Breathing Air: To be used when H₂S may exceed 10 ppm (GS H₂S and GS Respiratory Protective Equipment).
- » NIOSH approved P-95 (or P-99 or P-100) with combination organic vapor cartridge required for oil based mud systems if observed oil mist is present or if handling dry cutting samples without adequate local exhaust ventilation.

Other Personal Protective Equipment:

- » Personal H₂S Monitor: To be worn at all times (including truck drivers) (GS H₂S Gas Monitors).
- » Fire Retardant Coveralls: To be worn at all times (GS Flame Resistant Clothing).
- » Chemical resistant gloves, clothing, boots and eye protection (goggles) are required if direct contact with drilling fluids or cutting samples that contain hydrocarbons (GS Skin Contact).

Cleaning & Housekeeping

- » Keep all work areas neat and free from debris.
- » Clean up chemical spills promptly (GS Spill Response).

Information Training and Supervision

Employer responsibilities:

- » Gather and provide safety data sheets on the chemicals that will be present at the workplace.
- » Use the Controlling Chemical Hazards Guideline to define the procedures and control approaches you need to follow to protect worker health and safety for the work you wish completed.

Supervisor responsibilities:

- » Ensure the availability of the required Guidance Sheets for proper chemical management.
- » Ensure the availability and use of appropriate protective equipment.
- » Complete and review with workers the chemical management process and the applicable Safety Data Sheets.
- » Review safe work procedures with workers before they start work.

Worker responsibilities:

- » Wear appropriate personal protective equipment.
- » Follow safe work procedures.
- » Ensure spills and leaks are quickly cleaned up.
- » Wash contaminated clothing before reuse.

PRECAUTIONS YOU SHOULD TAKE

- Ask your employer about the risks, what precautions to take and what to do in an emergency.
- Follow the safe working procedures laid down by your employer.
- Read and understand safety data sheets for all chemicals you will be working with.
- Use the personal protective equipment provided, i.e., respiratory protection and impervious clothing.
- Don't enter any area that may contain H₂S before it has been tested.
- Report to your employer or safety representative any damaged or defective ventilation systems or protective equipment.

Appendix 1 Deck Operations potential exposure to chemicals (excerpt from IPIECA Drilling fluids and health risk management)

General influencing factors: ambient temperature; indoors or outdoors; space and layout of the work area; general or local exhaust ventilation; Health and safety culture of the workforce, e.g. PPE discipline.

Task	Purpose	Exposure duration	Type of exposure	Influencing factors
Cuttings handling	<ul style="list-style-type: none"> Cuttings containment systems, cuttings conveyance 	<ul style="list-style-type: none"> Continuous 	<ul style="list-style-type: none"> Skin contact with contaminated surfaces Splashes Inhalation and skin contact from vapour/ mist 	<ul style="list-style-type: none"> Temperature Volume and characteristics of material Design and operating methods of conveyance equipment
	<ul style="list-style-type: none"> Cuttings skip filling operations and skip storage 	<ul style="list-style-type: none"> Continuous during drilling 	<ul style="list-style-type: none"> Skin contact with contaminated surfaces Potential for splashes Inhalation and skin contact from vapour/ mist 	<ul style="list-style-type: none"> Design and operating methods of skip filling equipment Ergonomics Space and layout of the work area Volume and characteristics of material
Cuttings treatment	<ul style="list-style-type: none"> Cuttings slurrification and re-injection, including sampling and analysis 	<ul style="list-style-type: none"> Continuous during drilling and re-injection operations 	<ul style="list-style-type: none"> Potential for splashes Inhalation and skin contact from vapour/ mist 	<ul style="list-style-type: none"> Temperature Volume and characteristics of the slurry Equipment design
	<ul style="list-style-type: none"> Thermal processing of cuttings 	<ul style="list-style-type: none"> Continuous during treatment 	<ul style="list-style-type: none"> Inhalation from emissions Dust inhalation from treated cuttings 	<ul style="list-style-type: none"> Temperature Design and operating methods of the treatment equipment Space and layout of the workplace