

OPERATIONS SPECIFIC

DEALING WITH FIELD BLENDS

What are Field Blends

Field blends of hazardous chemicals are sometimes necessary to:

- » Prepare drilling mud;
- » Prepare mixtures to be used in well treatment or servicing operations;
- » Prepare production fluids for shipping; and
- » Treat or recycle waste materials.

The hazards that these field blends present to workers depend very much on the composition of the mixture, the mixture's physical and chemical properties (e.g., flash point) and the way the blended materials are handled or used. Usually the result of the blending process is a known mixture with known properties that can be controlled using specific procedures and equipment

Where is it Found

All gas and oil wells are intended to produce hydrocarbon fluids. Onsite separators divide the mixture coming to surface into produced water, raw natural gas, natural gas condensate, and crude oil. The hydrocarbons are then shipped for further processing and the produced water may be treated onsite or shipped elsewhere for processing. When they are mixed together or with other treatment chemicals onsite they are commonly called field blends.

The Risks**Health Effects**

The effects on your health depend on the chemical composition of the particular field blend. In general, the hazard associated with a fluid increases with the percentage of aromatic hydrocarbons (such as benzene, toluene, ethyl benzene and xylene (BETX)) and hydrogen sulfide. Natural gas condensates often have a high fraction of aromatic hydrocarbons. Raw natural gas from sour wells will have high concentrations of hydrogen sulfide. Even in sweet wells hydrogen sulphide gas may have been dissolved in the water or other production fluids underground and become free when it is brought to surface.

The most commonly observed health effects in workers are skin irritation and contact dermatitis (redness and swelling of skin tissue).

Workers exposed to oil mist for prolonged and repeated periods may suffer from cough and phlegm and may have an increased risk of lung fibrosis (scarring and thickening of lung tissue). Breathing in of high concentrations of hydrocarbon vapor may result in headache, nausea, dizziness, a feeling of tiredness, lack of coordination, and problems with attention and memory. Long-term exposure to benzene can result in serious blood disorders such as anemia (a low blood count that can make you tired and short of breath) and leukemia (a form of cancer). Hydrogen sulphide is both an irritant (a material that causes redness and swelling) and a chemical asphyxiant (a material that prevents oxygen from getting to the brain). High concentrations can cause shock, seizures, inability to breathe, extremely rapid unconsciousness, coma and death. Effects can occur within a few breaths, and possibly a single breath.

Most hydrocarbons are flammable and many float on water; producing a risk of fire or explosion.

Primary Routes of Exposure

Contaminants in produced fluids can be absorbed into your body:

- » if you breathe in air containing vapor; or gases;
- » through your skin; and
- » if you swallow material containing the contaminant.

Actions**Steps to Evaluate Risk**

The risk to worker health increases with quantity and type chemicals in the field blend, the length of time exposed and the amount of worker contact with the material. The first step is to determine the composition of the field blend you will be working with. If you are producing a known mixture ask your employer to provide the safety data sheet that describes the components of the mixture, the hazards they pose to workers and the appropriate ways to control the hazards.

The Controlling Chemical Hazards Guideline is designed to help you use this basic information to define the procedures and control approaches you need to follow to protect worker health and safety. Go to www.enform.ca to gain assistance with controlling chemical exposures to the chemicals found in the field blends you are working with. In addition to the health risk

there is a potential fire and explosion risk when working with any flammable materials (GS Flashpoints and GS Flammable Materials).

If you do not have a safety data available or you do not have the composition of the blend, extra analysis is required to evaluate the risk. You will need the help of an occupational hygienist (GS Dealing with Unknown Fluids).

Procedures

- » Monitor for hydrogen sulfide and flammable vapors (LEL/H₂S meters) if either is suspected in the field blend you are working with (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 blends that contain hydrocarbons (GS Gloves and GS Skin Contact).

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 if no local exhaust ventilation or enclosed process unless occupational hygiene monitoring demonstrates dust, mist or vapor concentrations do not exceed 50% of occupational exposure limit.

Information Training and Supervision

Employer responsibilities:

- » Provide information on the specific produced fluids that will be present at the workplace (i.e., Safety Data Sheets, previous analysis of fluids from the same or similar production fields)
- » Use the Controlling Chemical Hazards Guideline to define the required chemical management process for the work you wish completed.
- » Provide clean facilities: a washroom, showers, storage for clean and contaminated work clothing and a refreshment area.

Supervisor responsibilities:

- » Provide the required Guidance Sheets for proper chemical management.
- » Organize the work to limit the time workers are exposed to field blends.
- » Educating workers about the hazards of the produced water they will be working with and on the chemical management process.
- » Implementing good hygiene practices and storage policies regarding hazardous materials.
- » Ensuring that unprotected workers are not in areas where uncontained field blends are present.
- » Implementing spill response policies including the use of appropriate protective equipment and clothing.

Worker responsibilities:

- » Workers must participate in training and monitoring programs in the workplace.
- » Workers must not eat, drink or use tobacco products in areas where contaminated produced water is present. The hands and face should be washed before eating, drinking or smoking.
- » Workers must use and maintain all controls and equipment used to reduce exposure properly.
- » Workers must clean up of spills quickly and properly, using appropriate protective equipment and clothing.

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.
- Avoid getting liquids containing hydrocarbons on your skin.
- Use the personal protective equipment provided, i.e., SCBA, gloves, masks, goggles (GS PPE).
- Gloves should be made from materials which resist penetration by hydrocarbons. Natural rubber gloves should not be worn as rubber absorbs many hydrocarbons (GS Gloves).
- Report to your employer or safety representative any damaged or leaking equipment or protective equipment.