



Controlling exposures to drilling fluids

Health and safety has been a priority for the oil and gas industry for many years. However, occupational hygiene exposures are often not properly assessed to determine the true risk to workers. WorkSafeBC initiated a program in early 2009 to build awareness of the potential for high-level chemical exposures to workers on drilling rigs.

As a result, drilling companies began assessing hazards and risks, implementing risk controls, and developing exposure control plans (ECPs) for their facilities. During this process, common questions were raised regarding the format, content, and requirements for developing ECPs. This bulletin provides answers to these questions and a link to a template for use in the preparation of your own plan(s).

What is an exposure control plan (ECP)?

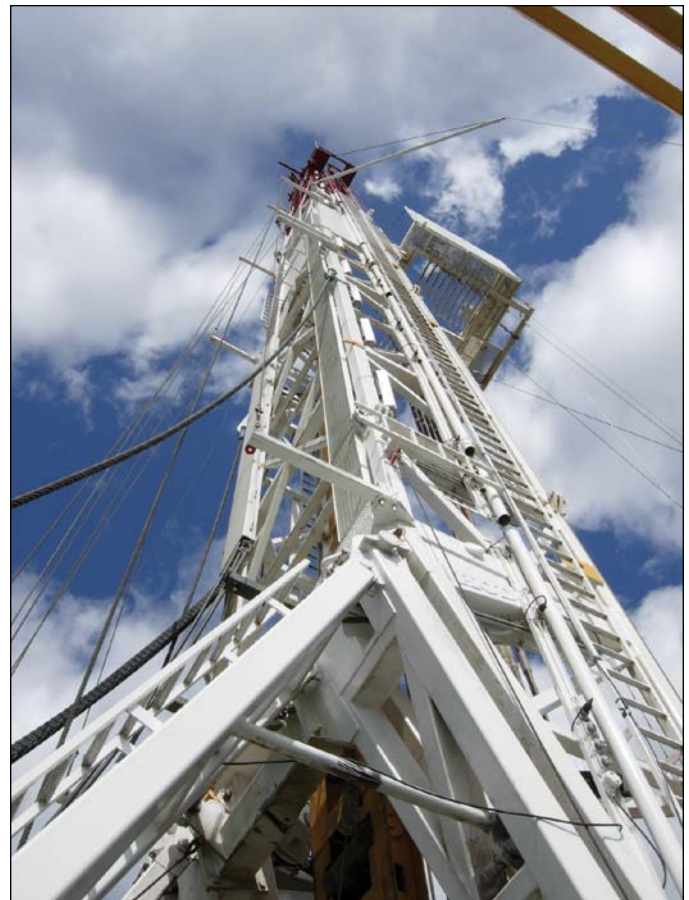
Written exposure control plans explain the work procedures and other controls that will be used to reduce workers' risk of exposure to drilling fluids. Exposure control plans must detail steps to eliminate risk or to control and reduce risk using the following hierarchy:

- Substituting with safer materials, where feasible
- Using engineering controls
- Using administrative controls, or
- Using personal protective equipment (PPE)

If substitution and controls are not feasible, personal protective equipment should be considered as a last resort.

Exposure control plans must include the following elements:

- Statement of purpose
- Responsibilities of employers, supervisors, and workers
- Risk identification and assessment
- Risk controls
- Worker education and training
- Written safe work procedures
- Hygiene facilities and decontamination procedures
- Documentation



Health monitoring may be required depending on the nature of the chemicals that are added to the drilling fluid.

The most important sections are the ones covering risk assessment and risk controls. Risk assessments should be conducted by a person qualified to perform the work (see next section) and might include site plans or schematics of the drilling rig to identify high risk areas.

Through Enform, the oil producers, rig employers, and regulatory authorities have developed an exposure control plan template for drilling rigs. The template can be found at:

http://enform.ca/publications/guidelinesandbestpractices/managing_chemical_hazards/ecp_oil_based_drilling_fluids.aspx

Who is responsible for any workplace monitoring and the development of an exposure control plan?

The owner/producer of a workplace has a responsibility to maintain that property in a manner that ensures the health and safety of workers. Section 119 of the *Workers Compensation Act* (WCA) stipulates that the owner/producer must provide the employers the information necessary to identify and control hazards to the health and safety of workers on the worksite.

The prime contractor of a multiple-employer workplace must, under WCA sections 118(2)(a) and (b),

- Ensure that the health and safety requirements at the workplace, including site orientation, are coordinated and communicated to all employers.
- Do everything that is reasonably practicable to establish and maintain a system or process that will ensure compliance with the Occupational Health and Safety Regulation (“the Regulation”) by all employers on the site. This would include the development of safe work procedures and exposure control plans.

As the owner/producer is the prime contractor at the drill site, the owner/producer would be responsible for all of the above.

The employer/contractor must ensure that

- An assessment of the risk of overexposure is conducted (see section 5.48 of the Regulation)
- All routes of exposure (e.g., inhalation, ingestion, and skin contact) are taken into account (see section 5.53)
- Sampling/monitoring is carried out (see section 5.53)
- An exposure control plan is developed (see section 5.54)

The *Workers Compensation Act* mandates that every employer must

- Remedy any workplace conditions that are hazardous to the health or safety of the employer’s workers

- Ensure that workers are made aware of all known or reasonably foreseeable health or safety hazards to which they are likely to be exposed by their work
- Ensure the health and safety of any other workers present at a workplace at which that employer’s work is being carried out, including service contractors (see WCA section 115(1)(a)(ii))
- Establish occupational health and safety policies and programs (including the development of exposure control plans)
- Provide and maintain in good condition protective equipment, devices, and clothing
- Provide to the employer’s workers the information, instruction, training, and supervision necessary to ensure the health and safety of those workers in carrying out their duties
- Consult and cooperate with the joint committees and worker health and safety representatives

Will a collaborative approach between the owner/producer and the employer/contractor expedite the development and quality of an ECP?

Although the Regulation places the onus on the employer/contractor to establish the ECP, some assistance will be required in the development of the document.

- Section 23.4 of the Regulation emphasizes the owner/producer responsibilities to coordinate and provide up-to-date information in the preparation of the plan. This will include details on the chemical makeup of the drilling mud, service contractors coming on site, and potential hazards that might be present.
- Section 23.5 of the Regulation defines the employer/contractor responsibilities to identify and implement safe work procedures for the identified hazards.

Some owner/producers have chosen to take the lead in ECP development through their in-house industrial hygienists and have worked closely with the employer/contractors to develop good ECPs. In other cases, the employer/contractors have developed their own ECPs (which have improved through using the ECP template) for their drilling sites.

Input from all parties—owner/producer, employer/contractor, and service contractors (where practicable)—will ensure a complete and well-detailed ECP for the site. This will remove any confusion and gaps created by multiple ECPs for each of the employers.

Who can do the site sampling and write an exposure control plan?

What knowledge, skills, and abilities are needed?

Exposure control plans should be written by a person (in-house or an outside consultant) who has education and training in the field of occupational health and safety, and experience with specific work tasks related to drilling fluids. This individual may have an occupational health and safety certification (e.g., CIH, ROH, CSP, or CRSP) or significant experience with health and safety in the oil and gas industry.



The person who develops the exposure control plan should be able to

- Conduct a hazard assessment (to identify areas of potential exposure to drilling fluids)
- Conduct a risk assessment (to determine if a worker could be exposed to drilling fluids and how likely he/she is to be injured)
- Collect samples and use monitoring equipment (to determine the actual contaminant concentrations)
- Understand the requirements of the Regulation

Regardless of who actually writes the exposure control plan, a supervisor or worker familiar with the individual drilling rig and rig location should be consulted regarding areas of potential exposure and the controls that might be used to control that exposure. Controls used on one rig might not be the most appropriate or practicable on another rig.

An initial risk assessment will determine if the exposure control plan template will be adequate to address invert exposure on the site, or if additional monitoring might be required (e.g., where the rig configuration is unusual, the rig is enclosed, or the site configuration could introduce additional operational hazards).

Does exposure sampling and evaluation of one drilling rig need to be repeated on other rigs?

Exposure sampling identifies areas where workers could be exposed to elevated concentrations of contaminants. With regard to drilling fluids, sampling conducted on a number of rigs in B.C. and Alberta has already identified areas where high exposures are likely, including areas around the shakers and, in some instances, above the mud tanks.

However, depending on the configuration and location of each rig, there may be other areas where elevated exposures are possible. These areas should be identified through a risk assessment when the rig is initially set up. For example, some drilling rigs (see image below) are completely enclosed. Although this may help maintain worker comfort, especially in cold northern climates, the lack of natural ventilation can dramatically increase worker exposure to oil mists and other airborne contaminants.

Baseline sampling would not be required, provided that the risks identified are similar to those in the ECP template available on the Enform web site. The ECP template was developed based on sampling that was previously conducted on a number of drilling rigs. The template aims to address exposure situations on a typical drill rig.



Exposure sampling should not have to be repeated on different rigs, provided that the configuration of each rig is similar and any “unusual” hazards (from drilling fluids) are not present. Additional sampling may be required if the drilling contractor is not following an industry standard exposure control plan, the drilling rig configuration is unusual (e.g., enclosed), or additional risk areas have been identified.

Does an ECP that has been developed for one drilling rig need to be re-written for all other drilling rigs?

An exposure control plan for one drilling rig can be used for other rigs, provided that the configuration of each rig and the high exposure areas are similar. According to the Regulation, a reassessment must be conducted when there is a change in work conditions that may increase the exposure, such as a change in production rate, process, or equipment. These changes should be identified during a risk assessment when the rig is set up.

What are some of the control measures that could be included in an ECP?

Measures to control the exposure of workers to drilling fluids can be a combination of

- **Substitution**—should be considered if drilling fluids less harmful to workers are available; however, substitution may introduce other exposures and will not eliminate hazards from chemicals added to the fluids
- **Engineering controls**—such as physical barriers between workers and high exposure areas, and local exhaust ventilation on shakers
- **Administrative controls**—including minimizing the time workers are in high exposure areas
- **Personal protective equipment**—such as respirators worn by workers collecting mud samples from the shaker or mixing chemicals into the mud, and hygiene facilities such as wash stations in the dog house that the crew can use before eating

Under sections 5.55(3)(a), (b), and (c) of the Regulation, the use of personal protective equipment as the primary means to control exposure is permitted only when

- (a) Substitution, or engineering or administrative controls are not practicable, or
- (b) Additional protection is required because engineering or administrative controls are insufficient to reduce exposure below the applicable exposure limits, or
- (c) The exposure results from temporary or emergency conditions only

When should the ECP be reviewed?

The exposure control plan must be reviewed and updated as necessary (e.g., when there are changes to work procedures, rig configuration, drilling fluids, etc.) by the employer, in consultation with the joint committee and the owner/producer.

The review should

- Include any updated information on the health effects of drilling fluids
- Determine if any new substitute drilling fluids (or additives) are available that are less hazardous to workers
- Evaluate new control technologies (e.g., local exhaust options for shakers and mud tanks)
- Evaluate new personal protective equipment (e.g., respirator) options, and
- Determine if additional site sampling or monitoring is required (e.g., if a change in the process or rig configuration has introduced a new hazard)

Does the ECP for the rig have to be on site? And if so, what additional evidence may be required to show that proper monitoring was conducted on the rig?

The exposure control plan must be on site, as it outlines the controls that must be put in place on that worksite to protect workers from exposure to drilling fluids. The ECP must be available for review by a WorkSafeBC officer and can be in hard copy or electronic form.

Monitoring data does not have to be on site, but it must be available to be sent to a WorkSafeBC officer upon request.



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