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**OIL AND GAS WASTE REGULATION – USERS GUIDE**

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**Ministry of Environment  
Environmental Protection Division**

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## 1.0 INTRODUCTION

The Oil and Gas Waste Regulation (OGWR) authorizes waste discharges to the environment from upstream oil and gas facilities. This authorization reduces or eliminates the need for site specific waste discharge approvals or permits for facilities to which the OGWR applies. The OGWR applies to most upstream oil and gas facilities, except for larger facilities such as sour gas plants or large compressor stations. Depending on the particular waste, other regulations also apply.

The OGWR includes requirements for the quality of discharges, discharge procedures, ambient air quality resulting from these discharges, submission of information and fees to the Ministry of Environment (MoE), and compliance with other regulations and guidance. If these requirements are not met, then there is no authorization under the OGWR.

Oil and gas activities are "prescribed" in the Waste Discharge Regulation (WDR), and therefore require some form of authorization under EMA to discharge wastes to the environment. The OGWR grants authorization to discharge specific wastes to the environment from specified oil and gas operations. If discharge of a particular waste is not specifically authorized by OGWR, another form of discharge authorization is required. Other forms of authorization include permits or approvals issued under EMA, regulations under EMA, or compliance with a Code of Practice of another regulation under EMA.

Operators of facilities are responsible for compliance with the OGWR. The term "operator" has the same definition in the OGWR and in the Drilling and Production Regulation (DPR):

"operator" means the owner responsible to the commission for the drilling, completion, production and abandonment of a well or test hole or his general construction, operation and reclamation of any production facility or plant covered by this regulation;

The purpose of this User's Guide is to help operators to better understand the OGWR, such that compliance will be improved. The guide explains the facilities that the OGWR applies to, the specific discharges that it authorizes, and how the OGWR requirements can be met. Other regulations that apply to oil and gas industry wastes, and the roles of the MoE and the Oil and Gas Commission (OGC) are also described.

This guide is not intended to replace the OGWR. Should any discrepancy arise between this guide and the OGWR, the OGWR shall take precedence.

## 2.0 FACILITIES REGULATED BY THE OGWR

Facilities to which the OGWR potentially applies are identified in Section 1 of the OGWR. These facilities are regulated by the OGWR unless they are excluded due to discharge mass, engine power, or location, as detailed in Section 2(1) of the OGWR. Generally speaking, the OGWR applies to most upstream oil and gas facilities, except for large sour gas plants or compressor stations. If the OGWR applies to a facility, and that facility complies with OGWR requirements, then discharge authorization exists under OGWR.

Facilities to which the OGWR may apply are identified in Section 1 of the OGWR.

**“facility”** means one or more of the following situated at a single location and used for the production, processing or transportation of oil or natural gas:

- a compressor
- a drilling rig site
- an oil pump
- a processing plant
- a battery
- a collection of one or more pieces of equipment

**“equipment”** means an air compressor, air conditioner, analyzer, compressor, dehydrator, drilling rig, driver, electricity generator, fan, flare stack, incinerator, laboratory, line heater, meter, oil pump, pig, pig receiver, pipeline, portable pump, tank, treater, utility heater, well equipment or well head separator.

Section 2(1) of the OGWR identifies thresholds for sulphur and VOC discharges, and engine power, beyond which the OGWR does not apply.

Sulphur Discharge: The discharge limit for sulphur beyond which the OGWR does not apply is 30 tonnes of sulphur over a 15 day period. Section 2(4) of the OGWR allows the following operations to maintain OGWR discharge authorization even when more than 30 tonnes of sulphur is discharged in a 15 day period:

- well test flaring
- underground injection of acid gas, produced water or completion fluids
- venting of natural gas used as motive force for a pump or equipment maintenance

VOC Discharge: The discharge limit for VOCs beyond which the OGWR does not apply is 4 tonnes in a 15 day period.

Engine (driver) Power: The driver (engine) power beyond which the OGWR does not apply is 3000kW. The 3000kW is the cumulative rated power of compressor drivers, or electricity generator drivers, or oil pump drivers. To calculate whether the 3000kW value is exceeded, the operator should add up the rated power of compressor drivers, the rated power of electricity generator drivers, and the rated power of oil pump drivers. If the total for any type of driver exceeds 3000kW limit, then the OGWR does not apply to the facility.

Section 2(1) excludes facilities that are located in or on a tidal body of salt water, and these facilities are therefore not authorized for discharge by OGWR.

### 3.0 REGULATION AND AUTHORIZATION OF WASTE DISCHARGES

This section identifies legislation and regulations, other than the OGWR, that also regulate waste discharges to the environment from the upstream oil and gas industry.

The [Environmental Management Act](#) (EMA) prohibits the discharge of waste from prescribed industries, trades, businesses, operations, and activities unless the discharge is authorized. Acceptable forms of authorization include regulations, codes of practice, orders, or permits and approvals issued pursuant to EMA. Unauthorized discharges are a violation of the EMA, and may be subject to enforcement action, such as fines and legal prosecution.

EMA expressly prohibits the discharge of waste to the environment in a manner that causes pollution. The [Waste Discharge Regulation](#) (WDR) defines prescribed industries, trades, businesses, operations, and activities. The upstream oil and gas industry and the pipeline industry are both 'captured' as prescribed activities in the WDR. This means that, for the vast majority of activities associated with oil and gas operations in British Columbia, some form of authorization under EMA is required to discharge wastes.

The [Hazardous Waste Regulation](#) (HWR) defines 'hazardous waste' and places controls and restrictions on handling, storing, transporting and disposing of hazardous waste. Authorizations under the OGWR are subject to the provisions of the HWR (Section 2(2)). Hazardous waste from the upstream oil and gas industry may include, but is not limited to, invert drill cuttings, and pigging effluent and solids. It is the operator's responsibility to characterize wastes accurately and to handle the waste in accordance with the regulations.

Particular hazardous wastes are exempted in the OGWR from the provisions of the HWR. Sections 7(1) and 7(5) of the OGWR provide exemptions for:

- discharge of produced water or recovered fluids from a well completion or workover to an underground formation (section 7(1) OGWR)
- discharge of acid gas to an underground formation (section 7(5) OGWR)

The [Contaminated Sites Regulation](#) (CSR) defines contaminated sites and contains standards for contaminants in soil, sediment and water. If these standards are exceeded, the resulting site will be classified as a contaminated site. The discharge of water-based drilling waste must be managed in accordance with the B.C. Oil and Gas Handbook, which requires that the final concentration of substances in the soil-water mixture comply with all relevant standards as set out in the Contaminated Sites Regulation.

Drilling and production operations are regulated by the [Drilling and Production Regulation](#) (DPR) under the [Petroleum and Natural Gas Act](#) (PNGA). The B.C. Oil and Gas Commission (OGC) administers the PNGA and the DPR.

[Spill Reporting Regulation](#): The OGWR does not authorize discharges to the environment from spills. The Spill Reporting Regulation defines 'spill' by the type and quantity of release, and defines which spills must be reported to the government. Reportable spills (releases) must be reported to the Provincial Emergency Program (PEP) at 1-800-663-3456. PEP informs both the Ministry of Environment and the B.C. Oil Gas Commission of the spill.

The OGWR requires that drilling waste and waste cement be managed in accordance with the [B.C. Oil and Gas Handbook](#), which describes procedures for sump construction, assessment of the suitability of disposal sites, disposal methods, sampling procedures and analytical methods, loading criteria and post-disposal soil criteria. The B.C. Oil and Gas Handbook requires that substances in the soil-water mixture comply with all relevant standards in the Contaminated Sites Regulation.

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## 4.0 ROLES OF MINISTRY OF ENVIRONMENT AND OIL AND GAS COMMISSION

The MoE and the OGC are involved with the regulation and administration of waste discharges authorized under the OGWR. The OGC does not have delegated authority with respect to the OGWR; however, they have related authorities and responsibilities under the *Petroleum and Natural Gas Act (PNGA)*, and the OGC and MoE have agreements in place to promote the OGC as the "single window" of contact for the oil and gas industry.

**Ministry of Environment:** Under OGWR, the director can issue pollution prevention orders, receive and require information, accept and approve methods, and specify conditions for well test flaring. The director in turn delegates some of these powers, duties and functions to ministry staff. For the purposes of the OGWR, the director is typically the Manager of Regional Operations for the Omineca and Peace Regions, located in the Prince George MoE office. The OGC does not have delegated authority as a director under the OGWR.

MoE staff designated as "officers" under EMA, including Conservation Officers, have the authority to investigate noncompliance with OGWR. For the Peace Region, where British Columbia's conventional oil and gas industry is primarily located, MoE staff are located in the Fort St. John and Prince George MoE offices. Conservation Officers have offices located in Dawson Creek, Chetwynd, Fort Nelson, Fort St. John and Prince George. Ministry office contact information can be found on the ministry [Regions](#) web page.

**B.C. Oil and Gas Commission:** The OGC does not have specified authority nor delegated authority to administer the OGWR. However, the OGC is the primary contact for the upstream oil and gas industry, having statutory authority for development and operation of facilities and equipment under the *Petroleum and Natural Gas Act*. MoE must be contacted when a director's decision is required by the OGWR. However, for routine operations, well test flaring notifications to the MoE director and disposal of water-base drilling wastes, the OGC is the primary contact agency. OGC inspectors maintain a field presence in the industry through regular inspections of facilities and equipment.

The [Oil and Gas Commission Act](#) (OGCA) mandates the OGC to regulate oil and gas and pipeline activities in British Columbia. The OGCA gives the OGC statutory decision making authority and responsibilities under specified enactments, including EMA. The OGC has statutory authority to process applications for and to issue and cancel waste discharge approvals, permits and amendments pursuant to S. 14, 15, 16, 17 and 20 of EMA, for petroleum and natural gas activities and pipelines.

The OGC has a mandate to manage spills of oil and salt water at oil and gas operations through the PNGA (sec 107 & 108); DPR, sec 71(6)) and the *Pipeline Act*. MoE has a much broader mandate for spill management through the Spill Reporting Regulation. To administer spills efficiently, the OGC and MoE have agreements in place recognizing the statutory authorities, so that the OGC manages only on-lease spills of hydrocarbon and salt water. The MoE manages all other spills.

## 5.0 DRILLING

The Oil and Gas Waste Regulation (OGWR) applies to routine air emissions from drilling rig sites and specific discharges of liquid and solid drilling wastes.

A “**drilling rig site**” as defined in the OGWR means the land on which a drilling rig operates or has operated and includes remote drilling waste sumps and other facilities associated with drilling rigs.

A typical drilling rig site will include:

- drilling rig
- mud tanks
- fluid tanks
- electricity generator
- drilling sumps
- flare pit
- office trailers
- miscellaneous mobile equipment

### 5.1 Definitions

Section 1 of the OGWR lists definitions that are applicable to the interpretation of the regulation. Several OGWR definitions relevant to the drilling component of the industry are listed here.

“**drilling rig**” means a device used to drill or service wells

“**electricity generator**” means a device that converts mechanical power from a driver into electricity

“**objectionable odour**” means a substance that is introduced into the air and that causes or is capable of causing physical discomfort to a person

“**tank**” means a container used to store oil, natural gas, produced water, or other fluids associated with drilling and production of oil or natural gas, including containers mounted on vehicles.

### 5.2 Air Emissions

The OGWR authorizes air emissions from 'drilling rig sites', including emissions from tanks, motors and engines (drivers), as well as from routine flaring associated with drilling operations (such as occurs during underbalanced drilling). Emission of air contaminants from blow-outs is not authorized – blow-out situations are considered to be spills. The Petroleum and Natural Gas Act and its Drilling and Production Regulation also give the OGC authority over air emissions. The authorization granted by the OGWR to discharge air contaminants from drilling operations in no way relieves operators from the need to comply with standards and restrictions imposed by any other legislation.

As for all facilities regulated by the OGWR, ambient ground level concentrations of H<sub>2</sub>S cannot exceed 10 ppb at the perimeter of the property.

### 5.2.1 Tanks

Vapour emissions from open mud tanks, fluid tanks, mobile tank trucks, mobile vacuum tank trucks, and other tanks associated with the drilling rig site are authorized by Section 5 of the OGWR for discharge to the air if:

- the concentration of H<sub>2</sub>S does not exceed 10 ppb at the perimeter of the property where the drilling rig is located (OGWR s. 3)
- where storage tanks are located, there are no objectionable odours at the perimeter of the property (OGWR s. 5(2))
- during transportation of tanks, the H<sub>2</sub>S does not exceed 10 ppm at the point of discharge (OGWR s. 5(3))
- during transportation of tanks, there are no objectionable odours (OGWR s. 5(3)(b))

### 5.2.2 Electricity Generators – Nox Emission Standards

All drivers at drilling sites that have rated power of 100 kW or more must meet the Schedule 1 NO<sub>x</sub> emission standards of the OGWR. If generator driver capacity exceeds 3000kW, a permit or approval under EMA is required. OGC should be contacted regarding permits or approvals.

### 5.3 Effluent Discharges

The OGWR authorizes the discharge of liquid drilling wastes and surface runoff from drilling rig sites. Drilling wastes are described in Section 5.5 of this guide. Sewage discharge is not authorized by the OGWR.

Water that has been utilized for equipment washing may contain hydrocarbons, degreasers, detergents, and other compounds that make it unsuitable for discharge. The OGWR does not authorize the discharge of waste water from equipment cleaning. Wash water must be handled separately from the normal accumulated runoff water and kept separate from drilling wastes and must be disposed at an authorized disposal facility.

#### 5.3.1 Surface Runoff

Accumulated surface runoff water, originating from snow melt, rainfall, and surface water running onto a drilling rig site, is authorized by OGWR for discharge to if it meets S. 2(e) and (3) of the OGWR. These sections contain values for the quality of the water, discharge procedures and documentation requirements. Details are provided in Appendix B.

### 5.4 Solid Waste Discharges

Section 7(2) of the OGWR authorizes discharge to the environment of the following wastes if managed in accordance with the B.C. Oil and Gas Handbook:

- freshwater drilling muds,
- drill cuttings,
- waste cement that flows back from a well bore as part of completion, workover or abandonment operations.

All other types of solid wastes, such as domestic and industrial refuse, require another form of authorization, such as a permit or approval, if they are to be discharged to the environment.

Some industrial refuse, such as oily rags and used filters, may be hazardous waste and must be managed in accordance with the Hazardous Waste Regulation (HWR). Commonly, waste management companies are contracted to manage solid wastes resulting from drilling operations.

The requirements for drilling waste and waste cement disposal are summarized below.

**Table 1.0: Drilling Waste and Waste Cement Discharge Requirements**

<b>Water-Based Drilling Muds and Cuttings</b>	<b>OGWR Reference</b>
<ul style="list-style-type: none"> <li>• construct and decommission sump in accordance with B.C. Oil and Gas Handbook</li> </ul>	7(2)(a)(iii)
<ul style="list-style-type: none"> <li>• manage in accordance with B.C. Oil and Gas Handbook</li> </ul>	7(2)(a)(iv)
<ul style="list-style-type: none"> <li>• if on Agricultural land, comply with requirements of <i>Agricultural Land Commission Act</i></li> </ul>	7(2)(a)(v)
<b>Non Aqueous-Based Drill Cuttings</b>	
<ul style="list-style-type: none"> <li>• notify director prior to discharge</li> </ul>	7(2)(b)(i)
<ul style="list-style-type: none"> <li>• comply with director's requirements</li> </ul>	7(2)(b)(i)
<ul style="list-style-type: none"> <li>• if on Agricultural land, comply with requirements of <i>Agricultural Land Commission Act</i></li> </ul>	7(2)(b)(ii)
<b>Waste Cement</b>	
<ul style="list-style-type: none"> <li>• manage in accordance with B.C. Oil and Gas Handbook</li> </ul>	7(2)(d)

Additional information regarding drilling waste is provided below.

## 5.5 Drilling Waste

Drilling waste authorized for discharged under the OGWR includes:

- water-based drilling muds and drill cuttings (eg. gel-chem)
- drill cuttings generated from the use of non-aqueous drilling muds (eg. Invert, oil based and synthetic muds)

### 5.5.1 Water-Based Mud Systems

Detailed requirements for the disposal of water-based muds and associated cuttings appear in the B.C. Oil and Gas Handbook. Full compliance with the Handbook is required to have authorization to discharge drilling waste under the OGWR. The Petroleum and Natural Gas Act (PNGA), Drilling and Production Regulation (DPR) also include requirements for drilling waste disposal, subject to authority of the OGC. Compliance with both of these pieces of legislation is required for disposal of drilling waste to land.

To simplify administration for industry, routine water-based mud and cutting disposal is administered by the OGC, with no day-to-day involvement of the MoE. To promote consistency in environmental management, MoE may be consulted on a referral basis, especially for unusual operations, or where new types of muds or disposal techniques are being considered. Both MoE and OGC may be involved in auditing disposal operations.

The [B.C. Oil and Gas Handbook](#) details the requirements for sumps, suitability of disposal sites, disposal methods, sampling procedures and analytical methods, toxicity assessment, loading criteria, and post-disposal soil criteria. The Handbook was most recently updated in August 2006.

Operators should be aware that discharges can inadvertently cause an exceedence of applicable [Contaminated Site Regulation](#) standards. Disposal of drilling waste in such a manner that the final waste-soil mix exceeds applicable land use standards is prohibited in the Oil and Gas Handbook, and is therefore prohibited by the OGWR. Should applicable land use standards be exceeded, the effect is not only to have created a contaminated site, but also to have lost the authorization to discharge drilling waste, placing the disposal in violation of EMA. Remediation to meet the CSR standards would be required for a Certificate of Compliance. The presence of contamination would also impact the issuance of a Certificate of Restoration (under the PNGA).

### **5.5.2 Non-Aqueous Mud Systems**

Non-aqueous mud systems include the more commonly used hydrocarbon base fluids such as invert muds, and also synthetic systems and more novel systems such as some foam fluids. Non-aqueous drilling fluids are typically expensive and are re-used as much as possible. The OGWR does not authorize disposal of non-aqueous fluids to the environment. An EMA permit or approval is required for authorization to dispose of the waste non-aqueous muds to the environment. Drill cuttings from non-aqueous systems, however, may be disposed to the environment under authority of the OGWR, providing that certain conditions are met.

For drill cuttings from non-aqueous drilling mud, discharge to land requires prior written notification to the MoE director and must be carried out in accordance with the MoE director's requirements. Contact with MoE should be made as early as possible, preferably while planning the drilling program.

Cuttings from hydrocarbon based fluids are usually classified as hazardous waste in British Columbia and must be managed in accordance with the Hazardous Waste Regulation. Contact the MoE office in Fort St. John for more information. On-site land treatment of cuttings, once a popular method of disposal, has generally proved unsatisfactory, and most hydrocarbon-contaminated cuttings are removed from site by waste management contractors for treatment or disposal at commercial facilities.

For onsite treatment of drill cuttings from non-aqueous based muds, an Operational Plan as well as a Closure Plan prepared by a Qualified Professional acceptable to the director of the EMA, is required under the Hazardous Waste Regulation. Refer to the [MoE Hazardous Waste Regulation Section 4 Operational Plan Guideline](#) or contact the Fort St. John MoE office for further information on hazardous waste land treatment facility requirements.

For other types of non-aqueous mud systems that are not classified as hazardous waste, disposal requirements will depend on the chemical properties, acute toxicity characteristics, and potential for biodegradation and bioaccumulation of the chosen fluid. Contact should be made as early as possible with MoE, in case laboratory assessments are required to assess suitability of the contaminated cuttings for land disposal.

## 6.0 WELL COMPLETION and WORKOVERS

The Oil and Gas Waste Regulation (OGWR) authorizes waste discharges from well completion and workover activities, such as air emissions from flare stacks and incinerators, discharge to land of well completion and workover solids, and underground injection of produced water and workover and completion fluids.

**“Well completion and workover”** is defined in the OGWR as “activities where fluids or solids are injected into a well for the purpose of maintaining or increasing the flow of oil or gas from the well, and the fluids or solids may subsequently be recovered”.

Well completion and workover includes specific operations to enable, maintain or enhance production and may include activities such as:

- installation of casing, tubing and downhole equipment
- perforation of the zone of interest
- repair of a damaged formation
- formation stimulation through acid treatment or hydraulic fracturing
- downhole equipment repair
- removal of scale or paraffin from tubing or casing

### 6.1 Definitions

**“drilling rig”** means a device used to drill or service wells

**“drilling rig site”** means the land on which a drilling rig operates or has operated and includes remote drilling waste sumps and other facilities associated with the drilling rigs

**“flare stack”** means a pipe in which waste gases are combusted at the tip and **“flaring”** has the corresponding meaning

**“incinerator”** means a device designed to combust vapours containing hydrocarbons, or compounds containing sulphur, where combustion occurs in a chamber inside the device

**“tank”** means a container used to store oil, natural gas, produced water, or other fluids associated with drilling and production of oil or natural gas, including containers mounted on vehicles

**“well completion or workover solids”** means recovered solids from a well completion or workover.

### 6.2 Air Emissions

The OGWR authorizes air discharges from equipment required to perform well completions and workovers, including service rigs, tanks, motors, generators, flare stacks and incinerators. Additional requirements to protect air quality and health and safety may be imposed by the OGC under authority of the P&NGAct, D&PReg.

### 6.2.1 Tanks

Vapour emissions from fluid tanks, mobile tank trucks, mobile vacuum tank trucks, and other tanks associated with the well completion and workover activities are authorized by Section 5 of the OGWR for discharge to the air if:

- the concentration of H<sub>2</sub>S does not exceed 10 ppb at the perimeter of the facility property (OGWR s. 3(1));
- where storage tanks are located, there are no objectionable odours at the perimeter of the property;
- during transportation of tanks, the H<sub>2</sub>S does not exceed 10 ppm at the point of discharge;
- during transportation of tanks, there are no objectionable odours.

For additional information, see Section 9 of this guide.

### 6.2.2 Electricity Generators – Emission of NO<sub>x</sub>

Discharge of air contaminants from electricity generators is authorized if the cumulative rated power of all electricity generator drivers on site is less than or equal to 3000 kW (approximately 4020 hp), and the OGWR Schedule 1 NO<sub>x</sub> Emissions Standards are met. The Schedule 1 standards are applicable to drivers of 100 kilowatts (~ 134 hp) or greater, if the drivers are operated for at least 200 hours per calendar year. Generators that are utilized as standby units will usually operate for less than 200 hours per year and the Schedule 1 standards therefore will not apply.

#### OGWR Schedule 1 Nitrogen Oxide Emission Standards

Fuel Used to Power Driver	Maximum NO <sub>x</sub> Emissions (NO <sub>x</sub> as NO <sub>2</sub> , grams per kilowatt hour)
Natural gas	2.7
Natural gas / liquid fuel combination	6.7
Liquid fuel	10.7

### 6.2.3 Flaring

Air emissions from operational flaring associated with well completion and workover activities are authorized if the emissions occur for less than 24 **consecutive** hours. A MoE director may authorize emissions to exceed 24 consecutive hours. Air emissions from flare stacks during well (production) testing are discussed in Section 7 of this User's Guide.

Emergency releases, such as blow-outs, are not authorized under the OGWR, and releases are subject to the Spill Reporting Regulation.

As for all facilities regulated by the OGWR, ambient ground level concentrations of H<sub>2</sub>S cannot exceed 10 ppb at the perimeter of the property (OGWR s. 3(1)).

### 6.3 Effluent Discharges

Liquids authorized for discharge from well completion and workover operations include produced water, recovered well completion and workover fluids, and surface runoff.

### 6.3.1 Well Completion and Workover Fluids and Produced Water

Section 7(1) of OGWR authorizes discharge to an underground formation the following:

- well completion fluids
- workover fluids
- produced water from a well completion or workover

The OGWR authorization requires that these discharges be conducted in accordance with Section 94 of the [Drilling and Production Regulation](#).

A variety of fluids and additives may be associated with well completion and workover activities depending on the nature of work being undertaken. Common fluids include acids, water and oil based muds, produced water and crude oil. Base fluids may have a variety of chemical additives such as inhibitors, flocculants, pH control, scale removers and lost circulation materials depending on the operation.

Section 7(1) of the OGWR also provides exemption from specific sections of the Hazardous Waste Regulation for injection of well workover and completion liquids and produced water. These exemptions acknowledge that some workover or completion waste liquids may be dilute hazardous wastes, but that underground injection provides a safe and practical disposal option. It is expected that every effort is made recover hydrocarbon from injected fluids, and to recover and re-use fluids wherever possible.

### 6.3.2 Surface Runoff

Section 7(2)(e) of the OGWR authorizes discharge to land of surface runoff water from well completion and workover sites, in the same manner as for all sites regulated by OGWR. See Appendix B for details.

## 6.4 Solid Waste Discharges

Section 7(2)(c) of the OGWR authorizes discharge to land of well completion and workover solids, such as produced sand, if managed in accordance with the B.C. Oil and Gas Handbook. These solids need to be assessed to determine whether they are hazardous waste or contain radioisotopes, since this will affect waste management requirements.

Cement discharge to land is authorized for discharge to land under Section 7(2)(d) of the OGWR, if managed in accordance with the B.C. Oil and Gas Handbook.

### 6.4.1 Non-hazardous Waste

Non-hazardous waste may be disposed similarly to drilling waste solids, in compliance with the B.C. Oil and Gas Handbook (OGWR Section 7(2)(c)). If alternative disposal methods are to be used (i.e. methods not described in the Oil and Gas Handbook), then an EMA Approval must be obtained for the disposal. Application for an Approval must be made to the OGC.

### **6.4.2 Hazardous Waste**

Hazardous waste must be handled, stored, transported, and disposed of in accordance with the HWR. The [Hazardous Waste Legislation User's Guide](#) may be referenced for further information.

### **6.4.3 Radioisotopes**

Radioisotopes used to trace workovers may contaminate produced solids. These isotopes are used under licence from the Canadian Nuclear Safety Commission and disposal of the isotopes is not provincially regulated. Disposal of licensed materials must be in full compliance with federal licence requirements. Provincial waste disposal requirements apply to the non-isotope wastes commingled with the radiotracers. If the non-isotope wastes are non-hazardous, then the OGWR may provide authorization to dispose of the produced solids, through requirements described in the Oil and Gas Handbook. If the non-isotope wastes are hazardous waste (e.g. oil was used as the frac fluid), then the HWR applies.

In cases where there are apparent incompatible disposal requirements between the federal license and provincial requirements, contact MoE to discuss disposal and handling options. Past experience indicates that the area most likely to create conflict is when radiotracers are used for fracturing operations where the fluid is hydrocarbon, and the produced solids become hazardous waste. Efficient treatment of produced solids to remove the hydrocarbon component may result in solids that are not hazardous waste.

### **6.4.4 Waste Cement**

Waste cement disposal is authorized under the OGWR if managed and disposed of in accordance with the B.C. Oil and Gas Handbook. Alternative disposal procedures require an EMA approval from the OGC.

## 7.0 WELL TESTING

Well testing, or production testing, involves the discharge of air contaminants, including sulphur dioxide, through flaring or incineration of natural gas.

“**Well testing**” is defined in the OGWR as “combusting natural gas produced from a well for the purpose of determining production and reserve characteristics of the well, or the oil or gas reservoir into which the well is drilled”.

Permission to conduct well tests is granted by the OGC pursuant to the P&NG Act. Authorization through EMA is required to discharge air contaminants from well tests. OGWR sections 4(j), and 6(d)) authorize the discharge of air contaminants from well testing, if the discharge complies with the requirements of the regulation.

The OGWR distinguishes between "clean-up" or completion flaring, and well testing, on the basis of the purpose of the flaring.

- Flaring associated with well completions and well workovers is authorized under Section 4(l) of the OGWR, and described in section 6 of this Guide. If a distinction cannot be made between the end of completion flaring and the beginning of a well test, then the entire volume of flaring must be attributed to "well testing" for the purposes of authorization, registration and fee payment under the OGWR.
- Drill stem testing is, in effect, a "well test" but, for the purposes of authorization under EMA, the Ministry considers drill stem testing to be part of drilling activities and the discharge of air contaminants from drill stem testing to be authorized under section 4(f).

Well test flaring requirements are outlined in the [OGC Interim Guideline OGC 00-01 Natural Gas Flaring During Well Testing](#).

### 7.1 Definitions

“**facility**” means one or more of the following situated at a single location and used for the production, processing or transportation of oil or natural gas:

- (a) a compressor;
- (b) a drilling rig site;
- (c) an oil pump;
- (d) a processing plant;
- (e) a collection of one or more pieces of equipment;
- (f) a battery;

“**flare stack**” means a pipe in which waste gases are combusted at the tip, and “**flaring**” has the corresponding meaning

“**high sulphur gas**” means natural gas that contains more than 1% by volume hydrogen sulphide

“**incinerator**” means a device designed to combust vapours containing hydrocarbons, or compounds containing sulphur, where the combustion occurs in a chamber inside the device

“**low sulphur gas**” means natural gas that contains not more than 1% by volume hydrogen sulphide

“**well**” means a hole in the ground, other than a water source well,  
(a) made or being made by drilling, boring or in any other manner from which petroleum or natural gas is obtainable, or to obtain petroleum or natural gas or to explore for, develop or use a storage reservoir for the storage of petroleum or natural gas,  
(b) used, drilled or being drilled to inject natural gas, air, water or another substance into an underground formation in connection with the production of petroleum or natural gas, or  
(c) used, drilled or being drilled to obtain geological or geophysical information respecting petroleum or natural gas.

## 7.2 Air Emissions from Well Tests

As for all sites regulated by the OGWR, the maximum 1 hour ground level concentration of H<sub>2</sub>S at the perimeter of the property (lease) must not exceed 10 ppb (OGWR s. 3(1)). Tanks used in well test operations must comply with OGWR section 5 requirements (described in section 9 of this guide). Although the OGWR excludes operations that discharge more than 30 tonnes of sulphur per 15 day period, OGWR Section 2(4)) exempts well testing from this restriction. Specific requirements for well tests are described below.

### 7.2.1 Natural Gas containing less than 5% hydrogen sulphide

OGWR section 4(j) authorizes the discharge of air contaminants from flare stacks or incinerators used for well testing, if:

- the natural gas being combusted is low sulphur gas (defined in the OGWR as less than or equal to 1% hydrogen sulphide), or
- the natural gas being combusted contains between 1% and 5% hydrogen sulphide and discharges a minimum of 12 metres above grade

There are no registration requirements or associated fees under the OGWR, however, an [Application for Flaring Approval](#) form must be submitted to the OGC, in order to obtain approval to conduct the test.

The OGWR allows for a director to accept a discharge height below 12m. Due to potential environmental impacts, a director is unlikely to accept discharge heights of less than 12m for flare stacks. Furthermore, stack heights less than 12m may not be sufficient for engineering or safety considerations, and the OGC may impose other or more stringent requirements.

### 7.2.2 Natural Gas containing 5% or more of hydrogen sulphide

OGWR section 6(1)(d) authorizes the discharge of air contaminants from a facility used for well testing if:

1. the H<sub>2</sub>S content of the gas is 5% or greater
2. the combusted gas is discharged through a flare stack at least 12 meters in height, or is combusted in an incinerator

3. an environmental impact assessment procedure is completed to the satisfaction of the director
4. the director is notified in writing at least 5 days prior to the test, of the:
  - location of the test
  - proposed stack height
  - expected volume of gas to be flared
  - expected H<sub>2</sub>S content of gas
  - results of the "environmental impact assessment"

*This requirement is satisfied by submission to the OGC of the [Well Test Flaring Application](#) form, accompanied by the environmental impact assessment.*

5. the well test is conducted in accordance with conditions specified by the director  
*The approval letter from the OGC will contain the MoE director's requirements.*
6. the director is notified within 30 days of the test of:

- the location of the test
- actual stack height
- actual volume of gas flared
- actual volume of H<sub>2</sub>S flared
- the total mass of sulphur combusted, expressed as sulphur dioxide

*This requirement is satisfied by submission of the [Data Confirmation Form](#) to the ministry. The OGC and the MoE must each be notified in writing if a well test is cancelled after the application for flaring approval has been accepted and signed by the OGC.*

The "environmental impact assessment procedure" is a term introduced in the 2005 amendment to the OGWR. It means the tiered impact assessment process described by the [OGC Interim Guideline, Natural Gas Flaring During Well Testing \(OGC 00-01\)](#). The Interim Guideline is dated February 18, 2000 and is not current with respect to names of agencies and legislation, and more importantly, refers to an outdated version of dispersion modeling guidelines in B.C.. Guidance for air dispersion modeling should be taken from: [Guidelines for Air Quality Dispersion Modeling in British Columbia](#) (October 2006)

### 7.2.3 Registration and Fees

Registration and fees are required for well tests when the gas contains at least 5% H<sub>2</sub>S.

The ministry registration process is tied in with the OGC process for approving well tests – both are initiated with the submission of a [Well Test Flaring Application](#) form to the OGC. The OGC requires that this form be submitted prior to all flaring (independent of hydrogen sulphide concentration of natural gas combusted). When the natural gas contains at least 5% H<sub>2</sub>S, the application must be accompanied by an Environmental Impact Assessment (EIA), and the OGC forwards a copy of the form and the EIA to the ministry.

The EIA is typically comprised primarily of air dispersion modelling for sulphur dioxide emissions from the well test. The ministry reviews the EIA, and identifies any conditions or restrictions under which the well test may be conducted (OGWR 6(1)(d)(v)). The OGC incorporates these conditions into the approval letter sent to the operator. MoE registration is initiated based on the information contained on the Well Test Flaring form. The basic steps in the well approval and registration process are shown below.

## **Well Test Approval and Registration Process**

### **Prior to Flaring:**

- operator submits a completed *Application for Flaring Approval* form to the OGC – Fort St. John, at least 5 working days prior to the proposed flaring (includes EIA – air dispersion modelling).
- The OGC forwards a copy to the MoE, along with the accompanying EIA (air dispersion modelling)
- MoE reviews application and EIA
- MoE advises the OGC regarding conditions for the well test
- OGC issues approval to the operator with conditions
- MoE issues registration letter (may occur after flaring)

### **During Flaring:**

- If continuous monitoring is required, a MoE meteorologist may monitor the data, which can lead to additional requirements or shutting down of the well test

### **After Flaring:**

- Operator submits a completed Data Confirmation form to the ministry – Fort St. John, within 30 days of the end of flaring
- MoE assesses fees based on information in the [Data Confirmation Form](#). Fees will be based on *Application for Flaring Approval* numbers if the Data Confirmation Form is not provided to MoE's Fort St. John office within 30 days of the end of the well test. Failure to submit this information qualifies as an offence under Section 19(1)(a) of the OGWR.
- Ministry sends out invoice

## **7.3 Effluent Discharges**

Surface runoff is the only liquid that the OGWR authorizes for discharge from well testing sites. operations. Surface runoff from well testing sites must be managed in the same way as surface runoff from any of the sites regulated by the OGWR. Requirements are described in detail in the Appendix B of this guide.

Industrial liquid wastes such as wash water from equipment cleaning, hydrocarbon contaminated liquids (such as knockout liquids) or spilled liquids are not authorized for discharge to the environment by the OGWR. Liquid wastes that are hazardous wastes (such as waste oil) must be managed in accordance with the Hazardous Waste Regulation and *EMA*. Sewage discharge is not authorized by the OGWR.

## **7.4 Solid Waste Discharges**

The OGWR does not authorize any discharges of solid waste from well test operations. Solid wastes, including filters, rags, absorbent pads, sludges, barrels, plastic oil containers, and camp waste, must be managed in accordance with *EMA*. Filters, sludges, rags, and absorbent pads may be hazardous waste and must be handled, stored, transported, and disposed of in accordance with the HWR. Containers that once held lubricating oil should be drained and recycled under the [B.C. Used Oil Management Association](#) process.

## 8.0 PIPELINES

The OGWR regulates specific waste discharges associated with pipelines, including:

- drilling waste associated with directional drilling for pipeline construction (OGWR 7(2)(a)(ii))
- water and water/chemical mixes utilized for hydrostatic testing of new or existing lines (OGWR 7(2)(e))
- air emissions from fuel combustion in line heaters (OGWR 4(e), 6(1)(b)), from compressor or pumping stations associated with pipelines (OGWR 4(b-e), 6(1(a))), and from routine operations and maintenance of the pipeline, including flare pit or flare stack discharges.
- air emissions from pig senders and receivers (OGWR 4(h))
- effluent and solid wastes from pigging operations (OGWR 7(4))

A “**pipeline**” is defined in the OGWR as “a pipeline used to convey oil or natural gas”. The [Petroleum and Natural Gas Act](#) definition of “pipeline” includes pipelines that convey produced water, in addition to oil or natural gas.

### 8.1 Definitions

“**flare pit**” means an earthen containment area in which waste gases and liquids are combusted

“**flare stack**” means a pipe in which waste gases are combusted at the tip

“**high sulphur gas**” means natural gas that contains more than 1% by volume H<sub>2</sub>S

“**hydrostatic pipeline testing**” means the practice of filling a pipeline with water, or a mixture of water and ethylene glycol or methanol, for the purpose of testing the structural integrity of the pipeline under pressure

“**line heater**” means a device that is used primarily to heat natural gas or oil flowing in a pipeline

“**low sulphur gas**” means natural gas that contains not more than 1% by volume H<sub>2</sub>S

“**pig**” means a plug-like device that passes through a pipeline for the purpose of cleaning or inspecting the pipeline

“**pig receiver**” means a device, attached to a pipeline, that is used to remove a pig from a pipeline

“**pig sender**” means a device, attached to a pipeline, that is used to insert a pig into a pipeline

## 8.2 Air Emissions

Pipeline maintenance and operational activities may discharge contaminants to air. OGWR Section 4 authorizes the discharge of air contaminants from these operations, if the OGWR requirements are met.

Air emissions from pipeline related activities are generally authorized without imposition of specific discharge standards. The general condition that applies to all activities is that the one hour average ambient ground level concentration of hydrogen sulphide at the perimeter of the property does not exceed 10 parts per billion by volume.

Compressor stations, oil pumping stations and electricity generators are subject to NOx emissions standards and may be required to register with the MoE. Very large line heaters burning sour fuel gas may also be required to register with MoE (see 8.22 below).

Emergency releases from pipeline ruptures, for example, are not "routine operations and maintenance", and are therefore not authorized by the OGWR. Pipeline failures are "spills" and are subject to the Spill Reporting Regulation.

### 8.2.1 Pigging Units

Depressurizing and opening pig senders and receivers will release air contaminants, including raw gas, odorous hydrocarbons and H<sub>2</sub>S if present. The discharge of contaminants is authorized by the OGWR if the concentration of H<sub>2</sub>S does not exceed 10 ppb at the perimeter of the property where the pigging unit is located.

### 8.2.2 Line Heaters

Line heaters burning natural gas to heat gas or oil in a pipeline will discharge contaminants to the air including carbon dioxide and sulphur dioxide. There are two categories of authorization for line heater discharges. The first category is a simple authorization through OGWR Section 4(e), and includes:

- Line heaters burning natural gas that is "low sulphur gas" ( $\leq 1\%$  H<sub>2</sub>S); and
- Line heaters burning natural gas that is "high sulphur gas" ( $> 1\%$  H<sub>2</sub>S) if the line heater is rated at less than 150 kilowatts.

The second category of authorization is through OGWR Section 6(b), and applies to:

- Line heaters burning natural gas that is "high sulphur gas" ( $> 1\%$  H<sub>2</sub>S) if the line heater is rated at  $\geq 150$  kilowatts.

For this second category, the operator of the line heater must register the discharge by completing a [Facilities Registration Report](#) form and submitting it to the MoE Fort St. John office within 60 days of the startup date.

### 8.2.3 Maintenance Operations

Regular maintenance of pipelines may result in the discharge of air contaminants from blowing down the line. The discharge of natural gas to the atmosphere is authorized by Section 4(g) of the OGWR if:

- natural gas contains less than 230 milligrams of total sulphur per cubic metre, or

- natural gas contains at least 230 milligrams or more of total sulphur per cubic metre **and** is combusted in a flare stack or equivalent (a flare pit is not considered equivalent).

The sulphur specification for this discharge requirement was chosen because it is the sales gas sulphur specification used by Spectra Energy, and provides a simple way to distinguish between sales gas and unprocessed gas that may contain sufficient H<sub>2</sub>S to be dangerous. Methane is, however, approximately 20 times more potent as a greenhouse gas than CO<sub>2</sub>, and reduction of methane venting is an important component of greenhouse gas management strategies.

### 8.3 Effluent Discharges

Section 7(2)(e) of the OGWR authorizes discharge to land of hydrotest water and precipitation that accumulates in flare pits.

The OGWR does not authorize discharge of pigging effluent, or liquids such as blowdown liquids to flare pits. These liquids must be contained and disposed at appropriate facilities. The P&NGAct, D&PReg contains provisions for temporary emergency storage of liquids; consult the OGC for further information.

#### 8.3.1 Pigging Units

Sending a pig through a pipeline for maintenance or inspectional purposes produces liquid effluent and/or sludge at the pig receiver. The OGWR prohibits the discharge of pigging effluent and solid waste to the environment, therefore this material must be collected and disposed of in a manner approved under *EMA*. Acceptable disposal options include processing the material for hydrocarbon recovery, or disposal at a commercial facility that has a site specific authorization, such as a permit. If pigging waste is hazardous waste, it must be managed (stored, transported, and disposed) in full compliance with the [Hazardous Waste Regulation](#) (HWR).

#### 8.3.2 Hydrostatic Testing of Pipelines

Prior to commissioning a pipeline, it is necessary to pressure test the line to ensure its integrity. Hydrostatic testing is often conducted using fresh water. During winter months, additives such as methanol may be used to prevent freezing in the line.

To prevent water used for hydrostatic testing from becoming inadvertently contaminated, care should be taken to ensure that pumps, tank trucks, vacuum trucks, and other equipment that may come in contact with the water are clean. In addition, a [Water Act](#) approval may be required for water use from surface water supplies. Recycling or reuse of water is recommended where possible. Methanol/water mixtures can be rented from suppliers and returned, eliminating the need for discharge or disposal of the fluid.

It is the waste owners' (operators') responsibility to determine if other contaminants are present in the effluent that make it unsuitable for release to the land surface, or if any contaminant is present in quantities or concentrations that are inappropriate for release, regardless of whether or not that contaminant is regulated by the OGWR. The discharge should be made in such a

way that it does not cause pollution or exceedance of substance standards in the [Contaminated Sites Regulation](#).

The OGWR does not authorize the release of hydrotest water to surface water bodies or surface water courses.

Section 7(2)(e) of the OGWR authorizes hydrostatic test fluid discharge to land if the requirements outlined below are met.

### **Discharge of Hydrotest Water to Land**

#### **Before Discharge**

1. analyze water to ensure that these parameters are not exceeded

<b>PARAMETER</b>	<b>VALUE</b>
Chlorides (as Cl)	500 mg/L
Hydrocarbons	No visible sheen
Electrical Conductivity	2 dS/m

A Microtox bioassay is required if the water used for testing contains methanol, ethylene glycol, or other additives. The Microtox bioassay results must have an EC(50)15 of 75% or greater.

2. obtain written consent of land owner (if discharging onto private land)

#### **During Discharge**

3. record volumes of water discharged
4. ensure that no erosion or other movement of soil or debris occurs
5. discharge at a controlled rate to ensure that water does not pool on the ground
6. do not discharge into any stream or water body, or where discharge can run into any stream or water body
7. discharge onto stable slope

#### **After Discharge**

8. maintain records of discharge for five years
9. allow officer to inspect records if requested (do not submit to MoE unless requested to do so)

### 8.3.3 Precipitation Accumulated in Flare Pits

Section 7(2)(e) of the OGWR authorizes discharge to land of precipitation that accumulates in flare pits if the conditions outlined below are met:

#### Discharge of Flare Pit Precipitation to Land

##### Before Discharge

1. laboratory analysis of the water to ensure that these parameters are not exceeded (field analytical methods are not acceptable)

<b>PARAMETER</b>	<b>VALUE</b>
Chlorides (as Cl)	500 mg/L
The sum of:	
• Volatile hydrocarbons in water by GC/FID and	
• Extractable Petroleum Hydrocarbons in water, by GC / FID	15 mg/L
Electrical Conductivity	2 dS/m
pH	6.5 – 8.5

2. record results of analysis
3. obtain written consent of land owner (if discharging onto private land)

##### During Discharge

4. record volume of water discharged
5. ensure there is no erosion or movement of soil, rocks, snow, ice, mud or debris
6. discharge at a rate at which there is no accumulation of effluent on the surface
7. do not discharge into any stream or water body, or where discharge can run into any stream or water body
8. discharge onto a stable slope

##### After Discharge

9. maintain records of discharge for five years
10. allow officer to inspect records if requested (do not submit to MoE unless requested to do so)

The operator should also ensure that discharge will not result in concentrations in the soil that exceed [Contaminated Sites Regulation](#) standards.

## 8.4 Solid Wastes

Drilling waste from directional drilling for pipeline construction is authorized by the OGWR for discharge to the environment. All other solid wastes generated by pipeline operations, such as flare pit sludges, and oily rags, must be disposed at appropriate facilities under other forms of authorization.

### 8.4.1 Directional Drilling Operations for Pipelines

Directional drilling (or HDD – horizontal directional drilling) for stream, road, and other pipeline crossings is becoming a standard practice for reducing impact and surface disturbance. Section 7(2) of the OGWR authorizes discharge of water-based drilling muds, and drill cuttings from directional drilling operations to land. The OGWR authorization requires that the construction

and decommissioning of the drilling sump, and the management of the drilling mud and cuttings, be in accordance with the [B.C. Oil and Gas Handbook, Chapter 10](#).

If the discharge of HDD cuttings or mud occurs on land within the Agricultural Land Reserve, the conditions of a section 26 [Agricultural Land Commission Act](#) delegation must be met. This allows the Agricultural Land Commission to delegate its powers under section 25 to the OGC to authorize a non-farm use (waste disposal) on agricultural land.

A risk associated with directional drilling is the escape of drilling mud into the environment as a result of a spill, tunnel collapse or the rupture of mud to the surface, commonly known as a "frac-out". If a frac out occurs during a directional drilling procedure, the release is considered to be a spill, and the discharge is not authorized by the OGWR.

#### **8.4.2 Flare Pit Sludges**

The OGWR does not authorize the discharge of sludges that build up in the bottom of flare pits. Since flare pit solids have the potential to be hazardous wastes and to exceed the CSR standards, both the HWR and the CSR should be consulted regarding management of these wastes.

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## 9.0 TANK STORAGE AND TRANSPORT OF PRODUCTION LIQUIDS

Section 5 of the Oil and Gas Waste Regulation (OGWR) authorizes vapour emissions from tanks, provided that the resulting hydrogen sulphide concentrations and odours meet OGWR requirements. The OGWR does not authorize any liquid discharges from tanks. The OGC, through the authority of the P&NG Act, may impose additional requirements for restricting or managing air discharges from tanks.

**“Tank”** is defined in the OGWR as “a container used to store oil, natural gas, produced water, or other fluids associated with drilling and production of oil or natural gas, including containers mounted on vehicles”.

Temporary and permanent storage tanks including pop tanks, larger tanks, vacuum trucks, and tank trucks, are included in this section. Tanks with liquids stored in them, as well as empty tanks that have not been cleaned, produce vapour emissions. Air contaminants may be discharged to the atmosphere from tank hatches, valves, pipe flanges, and vents during storage and transportation of tanks. The OGWR places the onus on both the operator of a facility and the driver or owner of a truck when transportation is involved, to ensure that vapour discharges from tanks meet the regulatory requirements.

### 9.1 Definitions

**“objectionable odour”** means a substance that is introduced into the air and that causes or is capable of causing material physical discomfort to a person

**“oil”** means crude petroleum and all other liquid hydrocarbons

**“operator”** means the owner responsible to the commission for the drilling, completion, production and abandonment of a well or test hole or the general construction, operation and reclamation of any production facility or plant covered by the [Drilling and Production Regulation](#)

**“produced water”** means water or brine that is brought to the surface with the natural gas or oil from a well but excludes workover or completion liquids

**“production liquid”** means any liquid produced from a well, including oil, water, and workover or completion liquids.

### 9.2 Filling, Cleaning or Storage of Tanks

Vapours emitted during filling, cleaning or storage of a tank must not:

- expose a person to objectionable odours at the perimeter of the property (Section 5(2) of the OGWR), or
- cause the concentration of H<sub>2</sub>S to exceed 10 ppb (1 hour average) at the perimeter of the property where the tank is located (Section 3(1) of the OGWR).

Determining the point at which an odour is objectionable is not quantitative. The OGWR and EMA definitions recognize that odour perception is subjective - people have varying degrees of sensitivity, dependant upon genetic and health issues.

H<sub>2</sub>S is measured as the one hour average ambient ground level concentration. This is a general requirement for all facilities, and is not unique to tanks. In order to measure ambient air at the 10ppb level, continuous air monitoring is required.

Discharges that cause levels of H<sub>2</sub>S to exceed 10 ppb or that cause objectionable odours are not authorized by OGWR and are therefore a violation of *EMA*.

Tanks used for storing liquids that contain H<sub>2</sub>S or other substances that may produce odours should have vapour control devices installed. Tank vents may be tied-in to a vapour recovery system that collects and treats the vapours prior to discharge, by combustion or scrubbing.

### 9.3 Tank Transportation

Air contaminants may be discharged during transportation of fluids associated with the production of oil or natural gas. Agitation of the fluid, temperature changes, and pressure changes in the tanks while moving causes release of dissolved and entrained gases, which are often odorous. Control of these emissions is required by OGWR. It is the responsibility of both the oil and gas operator and the truck driver or owner to ensure that these discharges meet the following OGWR requirements:

- H<sub>2</sub>S concentration from the tank vent cannot exceed **10 ppm** at the point of discharge,
- discharges from the tank must not expose a person to objectionable odours.

The OGWR does not specify the location of the person who may be affected, which means, for example, that tank trucks driving on the road cannot cause objectionable odours for people in other vehicles on the road.

## 10.0 PRODUCTION FACILITIES and PROCESSING PLANTS

The Oil and Gas Waste Regulation (OGWR) authorizes specific waste discharges from production facilities and processing plants, such as air emissions from combustion of natural gas, acid gas injection into underground formations, underground injection of produced water and release of collected surface runoff.

'Production facilities' are not specifically identified in the OGWR, although they are captured under definitions of "equipment" and "facility", including the following:

- dehydrators
- compressors
- treaters
- electricity generators
- separators
- flare pits or flare stacks
- tanks
- well head equipment
- batteries
- line heaters
- oil pumps

A **"processing plant"** is defined in the OGWR as a facility that extracts hydrogen sulphide, carbon dioxide, helium, ethane or natural gas liquids from natural gas.

The definition of a processing plant applies regardless of size, capturing even the smallest fuel gas sweetening units.

### 10.1 Definitions

**"acid gas"** means a mixture of gases, composed primarily of hydrogen sulphide and carbon dioxide, which is removed from natural gas

**"battery"** means a facility at which the liquids obtained from one or more wells are stored before those liquids are processed for market or delivered to market or are otherwise disposed of, and may include equipment or other devices for separating the liquids into oil, natural gas and water

**"compressor"** means a device used to maintain or increase the pressure of the natural gas in a pipeline

**"dehydrator"** means a device designed and used to remove water from natural gas

**"driver"** means a gas turbine or internal combustion engine used to power a compressor, electricity generator or oil pump;

**"electricity generator"** means a device that converts mechanical power from a driver into electricity;

**"flare pit"** means an earthen containment area in which waste gases and liquids are combusted

**"flare stack"** means a pipe in which waste gases are combusted at the tip and **"flaring"** has the corresponding meaning

**"high sulphur gas"** means natural gas that contains more than 1% by volume hydrogen sulphide

**"line heater"** means a device that is used primarily to heat natural gas or oil flowing in a pipeline

**"low sulphur gas"** means natural gas that contains not more than 1% by volume hydrogen sulphide

**"NOx"** means oxides of nitrogen expressed as nitrogen dioxide equivalent

**"objectionable odour"** means a substance that is introduced into the air and that causes or is capable of causing material physical discomfort to a person

**"oil pump"** means a device that increases the pressure of flowing oil, but does not include oil pumps located in an oil refinery or used to pump refined oil products

**"operator"** has the same meaning as in the *Drilling and Production Regulation* under the *Petroleum and Natural Gas Act*. Under the *Drilling and Production Regulation* "operator" means the owner responsible to the commission for the drilling, completion, production and abandonment of a well or test hole or the general construction, operation and reclamation of any production facility or plant covered by this regulation.

**"processing plant"** means a facility that extracts hydrogen sulphide, carbon dioxide, helium, ethane or natural gas liquids from natural gas.

The definition of a processing plant applies regardless of size, capturing even the smallest fuel gas sweetening units.

**"produced water"** means water or brine that is brought to the surface with the natural gas or oil from a well but excludes workover or completion liquids

**"production liquid"** means any liquid produced from a well, including oil, water, and workover or completion liquids

**"sweet natural gas"** means natural gas that contains less than 230 milligrams of total sulphur per cubic metre of natural gas

**"tank"** means a container used to store oil, natural gas, produced water, or other fluids associated with drilling and production of oil or natural gas, including containers mounted on vehicles

**"well equipment"** means valves, flare stacks, pumps, meters or other associated devices located immediately adjacent to the well bore

**"well head separator"** means a device designed and used for separating gases and liquids produced from a well without the use of heat

## 10.2 Air Emissions

Facilities that discharge large amounts of sulphur or VOCs are usually excluded from OGWR authorization (see s 2(1)). Permits are usually the appropriate form of authorization since discharges tend to be ongoing and because approvals have a maximum duration of only 15 months.

Operations excluded from the OGWR include those that:

- Remove or discharge 30 tonnes or more of sulphur from natural gas in a 15 day period (except that acid gas re-injection facilities are eligible for authorization under the OGWR regardless of the sulphur through-put (sec 2(4)),
- Discharge 4 tonnes or more of volatile organic compounds in a 15 day period.

Facilities that typically discharge less than these amounts are generally authorized to discharge to air under OGWR. OGWR authorization requirements differ according to the typical magnitude of contaminant discharges.

Section 4 of the OGWR authorizes discharge of air contaminants for facilities from which discharges are relatively small, and are unlikely to routinely cause impacts and are often too numerous to routinely track. Registration or fee payment is not required.

Section 6 of the OGWR authorizes discharges from facilities that emit contaminants at rates between those for the smaller facilities authorized under Section 4 and those for large facilities excluded from the OGWR. Section 6 authorization requires registration and fees.

Although most air emissions authorized by the OGWR are not subject to specific discharge quality criteria or standards, it is expected that up-to-date emissions control technology is utilized and that all ambient air quality guidelines are met.

EMA prohibits the discharge of waste in a manner that causes pollution. If it is suspected that an adverse effect may be occurring due to a particular discharge, the MoE may request more information (under Section 8 of the OGWR), or issue pollution abatement orders.

In addition to provisions of the EMA, the OGC has specific authorities under the P&NG Act (and the Pipelines Act) that may be used to control emission quality and to protect the environment.

**10.2.1 NO<sub>x</sub> Emissions from Drivers**

Schedule 1 of the OGWR contains standards for nitrogen oxide emissions from drivers (engines) used to power compressors, electricity generators and oil pumps (refer to Table 4.0 below).

**OGWR Schedule 1 - NO<sub>x</sub> Emission Standards**

Fuel Used to Power Driver	Maximum NO <sub>x</sub> Emissions (NO <sub>x</sub> as NO <sub>2</sub> , grams per kilowatt hour)
Natural gas	2.7
Natural gas / liquid fuel combination	6.7
Liquid fuel	10.7

Schedule 1 emission standards are applicable to individual drivers that are:

- operated for more than 200 hours per calendar year, and that have
- rated power greater than 600 kilowatts if installed after February 26, 1997 or
- rated power greater than 100 kilowatts, if installed after January 1, 2006
- rated power greater than 100 kilowatts, regardless of installation date, when any drivers at a facility are added or modified

When drivers are added or modified at a facility, the cumulative NOX discharge from the facility does not increase unless all drivers with a rated power greater than 100 kilowatts meet Schedule 1. Examples are provided in Appendix B to help illustrate how addition and modification of drivers affects NOX emissions requirements.

**10.2.2 Sulphur Emissions**

The OGWR does not contain emission standards for sulphur oxides. MoE has established [Sulphur Recovery Criteria for Natural Gas Plants](#). These criteria apply to all plants where the inlet sulphur rate  $\geq 2$  t/day or  $< 2$  t/day if ambient air quality guidelines for sulphur are not met and also apply to production facilities burning sour fuel at a rate equivalent to  $\geq 2$  t sulphur/day. Because facilities discharging or removing more than 2 tonnes sulphur/day are excluded from the OGWR, most facilities operating under authorization of the OGWR are not required to implement sulphur recovery.

The OGWR imposes limits on H<sub>2</sub>S concentrations and odours from tank discharges:

- maximum 1 hour ambient H<sub>2</sub>S level of 10 ppb at the perimeter of properties on which equipment or facilities are located (OGWR sec 3);
- 10 ppm H<sub>2</sub>S concentration in vapour discharged from tanks being transported (OGWR S.5(3))
- Prohibition on objectionable odours from tanks being transported (OGWR S. 5(3)(b))
- Prohibition on objectionable odours at the perimeter of property on which tanks are located (OGWR S. 5 (2)).

For some types of equipment or facilities, the amount of sulphur emitted is the factor that determines whether registration is required or not. Fees must be paid for total sulphur emissions from all registered production and processing facilities.

### 10.3 Effluent Discharges

The OGWR authorizes discharge to land of surface runoff and precipitation that accumulates in on-site flare pits, and discharge to underground formations of produced water and acid gas.

Other liquid wastes, such as drips and leaks from equipment, effluent from pipeline pigging activities, and sewage, are not authorized for discharge to the environment by OGWR.

#### 10.3.1 Produced Water Discharges

Section 7(1) of the OGWR authorizes the discharge of produced water to an underground formation in accordance with section 94 of the Drilling and Production Regulation. This OGWR authorization is exempt from section 3 to 14, 18, 19 and 37 of the Hazardous Waste Regulation.

The OGWR does not authorize construction or operation of wells to be used for underground injection. Injection wells must be authorized under the *Petroleum and Natural Gas Act*.

#### 10.3.2 Acid Gas Injection

Acid gas injection into underground formations is authorized by section 7(5) of the OGWR under the condition that the OGC approve the discharge under section 100 of the *Petroleum and Natural Gas Act*. Refer to the [OGC Application Resource Book](#) and the OGC [Guideline for Approval of a Scheme to Dispose of Acid Gas](#) for further details on application requirements.

#### 10.3.3 Flare Pit Precipitation

Requirements for discharge of precipitation that accumulates in flare pits are the same for all facilities to which the OGWR applies. See Appendix B for details.

Existing flare pits associated with facilities are not authorized to be used as exfiltration pits or for discharge or for storage of liquids or solids from operations such as blow down. Flare pits are often contaminated to some degree and are often contaminated sites as determined by CSR.

Pursuant to the OGWR, water **from precipitation** that accumulates in flare pits may be discharged to the land according to the process shown on the following page. Details are shown in Appendix B.

#### 10.3.4 Surface Water Runoff

Accumulated surface runoff water, originating from snow melt and rainfall, is authorized by OGWR for discharge to the environment, if OGWR requirements are met. Requirements for discharge of surface runoff are the same for all facilities to which the OGWR applies. These requirements are detailed in Appendix B.

### 10.4 Solid Waste Discharges

The OGWR does not authorize any discharges of solid waste from production facilities and processing plants. Solid wastes must be managed in accordance with EMA, which means that some form of authorization is required or wastes are disposed of at a facility that has authorization.

Filters, rags, absorbent pads and compounds, and sludges (e.g. from tank bottoms, flare pits), may be hazardous waste. Hazardous waste must be handled, stored, transported, and disposed of in accordance with the HWR.

Containers that once held lubricating oil should be drained and recycled under the [B.C. Used Oil Management Association](#) process.

## 10.5 Registration and Fees

All processing plants require registration under Section 6 of the OGWR. Production facilities require registration depending on the cumulative rated power of drivers. The registration process is described below, and summarized in Appendix A.

**Initial Registration Report:** The operator initiates registration by completing a [Facilities Registration Report](#) form and submitting it to the Fort St. John Office of the MoE. Notification of the OGC is not required. A completed registration report for each facility must be submitted to a director within 60 days of the date the facility started to operate.

**Revised Registration Report:** A revised [Facilities Registration Report](#) is required if there is a change in one of the following:

- the name of the operator,
- the estimated mass emissions of sulphur dioxide or NOx (+/- 25%),
- the applicability of the OGWR to the facility as per section 2(1) of the OGWR (e.g. driver power, VOC or total sulphur discharge exceed or fall below the limits of the OGWR).

The same form should be used as for the initial registration report. Only those areas where changes have occurred need to be completed. If a revised report is not submitted within 60 days of the change, OGWR authorization for the facility to discharge air contaminants ceases. Authorization is resumed when the revised report is received by the director. Unauthorized discharges are a violation of the *EMA*, and as such are open to fines and legal prosecution. Failing to submit a revised registration report is a common point of non-compliance with the OGWR. Operators often too not realize that when a facility changes hands, that a revised registration report is required in order to stay in compliance with the OGWR.

**Fees:** Registered facilities that discharge waste to air pay an annual fee. There is a fee for each piece of equipment (e.g. each driver) that qualifies for registration. In addition, for any facility that contains one or more pieces of equipment that require registration, fees are also charged based on all emissions from the facility as a whole.

Fees are based on information contained in the Facilities Registration Report form. Fees are based on the equipment at the site on December 31 of that year. For example, if equipment were added on December 28, 2006, the fees would be the same for the year as if the equipment were added on January 1, 2006. The fees are not pro-rated according to when new equipment is added. Furthermore, the operator responsible for the annual fees is the operator in effect on December 31 of that year. The operator on December 31 is responsible for the fees for the entire preceding year.



## Appendix A: Registration Requirements and Process

Facility/ Equipment/ Operation	Registration Trigger	Form to Complete	Where to send form	When to send form	Post- registration reporting
Well Test	Natural gas with H <sub>2</sub> S≥5%	<a href="#">Well Test Flaring Application</a> <sup>2</sup>	OGC Fort St. John	At least 5 working days prior to proposed flaring	<a href="#">Data Confirmation</a> form to ministry within 30 calendar days after the test <sup>3</sup>
Drivers for Compressor, Oil Pump, or Electricity Generator	Cumulative rated power of 600 – 3000kw <sup>1</sup>	<a href="#">Facilities Registration Report</a>	MoE – Fort St. John	Within 60 days of start up	Revised report to ministry within 60 days of substantive change <sup>4</sup>
Processing Plants (e.g. fuel sweetening)	All	Facilities Registration Report	MoE – Fort St. John	Within 60 days of start up	Revised report to ministry within 60 days of substantive change <sup>4</sup>
Dehydrators, Line Heaters or Treaters	Natural gas used to fuel the equipment >1%H <sub>2</sub> S <b>and</b> Individual Rated power of >150kw	Facilities Registration Report	MoE – Fort St. John	Within 60 days of start up	Revised report to ministry within 60 days of substantive change <sup>4</sup>

Notes:

<sup>1</sup> Cumulative power is calculated separately for drivers of compressors, oil pumps and electricity generators – do not add up the power for compressors + oil pumps + generators.

<sup>2</sup> Environmental Impact Assessment (air dispersion modelling) required with application

<sup>3</sup> Report describing test location, actual stack height, volume and H<sub>2</sub>S content of natural gas combusted, mass of total sulphur combusted expressed as sulphur dioxide.

<sup>4</sup> Report consists of Facilities Registration Report form – selectively completed with areas of change.

**Revision of Facility Registration:** Registrations become invalid if changes to the ownership or operations at a facility are not reported to the ministry. A revised Facilities Registration Report Form must be submitted if there is a substantive change to the original information provided in the original registration report or in a revised report. A **substantive change** means:

- a change in name of operator (i.e., after a company acquisition)
- a change in equipment that results in an increase or decrease of > 25% in the SO<sub>2</sub> or NO<sub>x</sub> emissions

- a change to a facility that formerly did not require registration (e.g. facility captured in Section 4 of the OGWR) that now requires registration
- a change to a formerly permitted facility that now requires registration

If a revised report is not submitted within 60 days of the change, authorization for the facility to discharge air contaminants ceases until the revised report is received by the director. Unauthorized discharges from oil and gas operations are subject to enforcement action under EMA.

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## Appendix B: Discharge of Surface Water Runoff and Flare Pit Precipitation to Land - OGWR S. 7(2)(e) and (3)

The OGWR requirements for discharge of surface water runoff and flare pit precipitation are very similar, but differ with respect to analytical requirements. The process shown below is for surface runoff, and the process shown on the next page is for flare pit precipitation.

### Surface Water Runoff

#### Before Discharge

1. analyze water to ensure that these values are not exceeded:

PARAMETER	VALUE
Chlorides (as Cl)	500 mg/L
Hydrocarbons	No visible sheen
Electrical Conductivity	2 dS/m
pH	6.5 – 8.5

2. record results of analysis
3. obtain written consent of land owner (if discharging onto private land)

#### During Discharge

4. record volumes of water discharged
5. ensure that no erosion or other movement of soil or debris occurs
6. discharge at a controlled rate to ensure that water does not pool on the ground
7. do not discharge into any stream or water body, or where discharge can run into any stream or water body
8. discharge onto stable slope

#### After Discharge

9. maintain records of discharge for five years
10. allow officer to inspect records if requested (do not submit to MoE unless requested to do so)

## B. Flare Pit Precipitation

### Before Discharge

1. laboratory analysis of the water to ensure that these values are not exceeded

Chlorides (as Cl)	500 mg/L
The sum of:	
• Volatile hydrocarbons in water and	15 mg/L
• Extractable Petroleum Hydrocarbons in water	
Electrical Conductivity	2 dS/m
pH	6.5 – 8.5

2. record results of analysis
3. obtain written consent of land owner (if discharging onto private land)

### During Discharge

4. record volumes of water discharged
5. ensure that no erosion or other movement of soil or debris occurs
6. discharge at a controlled rate to ensure that water does not pool on the ground
7. do not discharge into any stream or water body, or where discharge can run into any stream or water body
8. discharge onto stable slope

### After Discharge

9. maintain records of discharge for five years
10. allow officer to inspect records if requested (do not submit to MoE unless requested to do so)

The operator should ensure that discharge will not result in soil concentrations that exceed those allowed by the [Contaminated Sites Regulation](#). This is particularly important at permanent facilities where runoff may be discharged repeatedly to the same location.

## Appendix C: Example of NO<sub>x</sub> Emission Requirements

### NO<sub>x</sub> emission requirements for small drivers when new drivers are added

When new drivers are added to a facility, all drivers > 100 kW must meet Schedule 1 NO<sub>x</sub> emission standards (e.g. ≤ 2.7 g/kW-hr for natural gas fuel), even if the drivers may have previously been exempt because of their size. Consider the following example for a facility built prior to 2006.

#### Initial Status Pre 2006

Driver <sup>1</sup>	Rated Power	Installation Date	NO <sub>x</sub> emission rate	Status
Compressor 1	598 kW	Pre-2006	2.68 g/kW-hr	Compliant with Section 4
Generator	111kW	Pre-2006	5.10 g/kW-hr	Doesn't meet Schedule 1, but compliant with Section 4
<b>Total Annual NO<sub>x</sub> emissions<sup>2</sup></b>			19 t/yr	

1. All drivers are natural gas fueled
2. Assuming, for simplicity, that all drivers operate 24h/d, 365 d/yr (8760 hr).

This facility would be authorized to discharge air contaminants under Section 4 of the OGWR, because neither the compressor drivers nor the generator drivers exceed 600 kW total power. The 111 kW generator complies with the Regulation even though its NO<sub>x</sub> value of 5.10 g/kW-hr exceeds 2.7 g/kW-hr (Schedule 1 for natural gas), because Schedule 1 does not apply to drivers with rated power ≤ 600 kW that were installed on or before Jan 1, 2006. Note that the 598 kW compressor also does not have to meet Schedule 1 NO<sub>x</sub> emission standards if the facility is left unchanged, because it was also installed prior to January 1, 2006.

At some time after January 1, 2006, the facility is upgraded with the addition of 2 more compressor drivers, with emission characteristics described below.

#### Facility Modified (drivers added) March 2006

Driver <sup>1</sup>	Rated Power	Installation Date	NO <sub>x</sub> emission rate	Status after upgrade
Compressor 1	598 kW	Pre-2006	2.68 g/kW-hr	Compliant with Sec 6
Generator	111kW	Pre-2006	5.095 g/kW-hr	Non compliant with Sec 6
Compressor 2	550 kW	March 2006	2.68 g/kW-hr	Compliant with Sec 6
Compressor 3	1324 kW	March 2006	0.94 g/kW-hr	Compliant with Sec 6
<b>Total Annual NO<sub>x</sub> emissions<sup>2</sup></b>			42.8 t/yr	Non-compliant with Sec 6

1. All drivers are natural gas fueled
2. Assuming, for simplicity, that all drivers operate 24h/d, 365 d/yr (8760 hr).

After the addition of 2 compressor drivers, the facility total compressor driver power is now 2583 kW and the total NOx emission from the facility has increased from 19 to 42.8 t/yr. Because the total installed compressor power is greater than 600 kW (but still less than 3000 kW), the facility must now be registered under Section 6 of the OGWR.

Now, not all drivers with rated power > 100 kW meet the NOx requirements of Schedule 1 ( $\leq 2.7$  g/kW-hr). To be compliant with the Regulation, the operator has 2 options (Ref OGWR Sec 6(1)(a)(iv)):

1. Facility NOx emissions can be reduced so that they do not exceed the original facility NOx emission rate of 19 tonnes/year. If this option is chosen, then all new drivers >100 kW must meet Schedule 1 Emission Standards, but the old generator can be left as is.
2. Facility NOx emissions can exceed the original value of 19 tonnes/year if the NOx emission rate of the 111 kW generator can be reduced to meet Schedule 1 ( $\leq 2.7$  g/kW-hr).

If the operator does not choose 1 of the 2 options above, the facility will no longer meet the NOx requirements of the Regulation (section 6 (1) (a) (iv)), and the facility will not be authorized to discharge air contaminants.

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**APPENDIX D: CONTACT INFORMATION**

<b>Topic</b>	<b>Contacts</b>	<b>Telephone</b>
Registration of well tests and facilities	MoE – FSJ	250-261-2096
Oil and Gas Waste Regulation	MoE – PRJ MoE - FSJ	250-565-6448 250-787-3392
British Columbia Oil and Gas Handbook	OGC - FSJ	250-787-3446
Air Quality Dispersion Modeling	MoE - PRG	250-565-4210
Application for Flaring Approval	OGC - FSJ	250-261-5763

OGC: Oil and Gas Commission  
MoE: Ministry of Environment  
PRG: Prince George  
FSJ: Fort St. John

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