



DRILLING AND COMPLETION COMMITTEE

# IRP 28: Drilling and Completions Waste Management

An Industry Recommended Practice (IRP)  
for the Canadian Oil and Gas Industry

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Leading Energy Services,  
Supply, Manufacturing and Innovation

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# 28.0 Preface

## 28.0.1 Purpose

The purpose of this document is to provide best practices to understand and standardize the processes for drilling and well servicing waste management across the following jurisdictions:

- British Columbia
- Alberta
- Saskatchewan
- Manitoba

## 28.0.2 Audience

The intended audience for this document includes waste generators, waste transporters and waste receivers with the primary focus on the waste generator. It is assumed that the reader has at least a basic understanding of drilling and well servicing activities that generate waste.

## 28.0.3 Scope and Limitations

The scope of IRP 28 includes waste definitions, classification and characterization requirements, responsibilities (operator, waste generator, transporter, receiver), on-site storage requirements, disposal options and transportation of waste generated during drilling and completion operations. This includes camp waste such as garbage and sewage. IRP 28 scope does not include production waste but many of the waste management practices, particularly those for completions waste, described within the IRP could be applied to production waste.

IRP 28 is not intended to replace local jurisdictional regulations or the transportation regulations that are already defined in the Transportation of Dangerous Goods (TDG) regulations. These regulations are referenced throughout the document.

## 28.0.4 Revision Process

IRPs are developed by the Drilling and Completions Committee (DACC) with the involvement of both the upstream petroleum industry and relevant regulators. Energy Safety Canada acts as administrator and publisher.



Technical issues brought forward to the DACC, as well as scheduled review dates, can trigger a re-evaluation and review of this IRP in whole or in part. For details on the IRP creation and revisions process, visit the Energy Safety Canada website at [www.EnergySafetyCanada.com](http://www.EnergySafetyCanada.com).

A complete list of revisions can be found in Appendix A.

## 28.0.5 Sanction

The following organizations have sanctioned this document:

*Canadian Association of Oilwell Energy Contractors (CAOEC)*

*Canadian Association of Petroleum Producers (CAPP)*

*Petroleum Services Association of Canada (PSAC)*

*Explorers & Producers Association of Canada (EPAC)*

## 28.0.6 Range of Obligations

Throughout this document the terms ‘must’, ‘shall’, ‘should’, ‘may’ and ‘can’ are used as indicated below:

**Table 1. Range of Obligation**

<b>Term</b>	<b>Usage</b>
<b>Must</b>	A specific or general regulatory and/or legal requirement that must be followed. Statements are bolded for emphasis.
<b>Shall</b>	An accepted industry practice or provision that the reader is obliged to satisfy to comply with this IRP. Statements are bolded for emphasis.
<b>Should</b>	A recommendation or action that is advised.
<b>May</b>	An option or action that is permissible within the limits of the IRP.
<b>Can</b>	Possibility or capability.

## 28.0.7 Background

There are a significant number of regulatory and guidance documents for waste management in western Canada and within specific jurisdictions.

There are a number of regulatory documents across the jurisdictions. The regulations may differ and/or conflict which can lead to errors and the potential for hazardous situations.

While there are regulations that address oilfield waste management there is little (or conflicting) guidance for reuse of completions and well servicing fluids. Completion or servicing fluids can often be reutilized by the oil and gas industry in other operations but current wording of waste management requirements make this difficult and the regulatory process to do so is not well defined.

To address these concerns, and on the advice of the Canadian Association of Petroleum Producers (CAPP), the CAPP Waste Management Committee proposed the development of IRP 28. The goal of the IRP is to identify all current applicable requirements across provinces, outline the major differences and similarities between them and provide an overview of industry recommendations for waste management options for the oil and gas sector.

# 28.1 Introduction

Drilling and completions operations generate operation-specific wastes along with the typical camp waste generated by human habitation. All of these wastes have to be managed with a waste management plan. IRP 28 provides definitions for the various types of waste referenced in the document (see 28.2 Defining Waste) and uses these terms consistently throughout.

The management of drilling and completions waste is highly regulated. Improper waste management can cause adverse effects to worker health and safety or to the environment so it is important to understand and follow all of the jurisdictional regulations (provincial and federal) regarding the handling, storage, transportation and disposal of the waste.

While regulations can vary by jurisdictional regulator(s), there are commonalities that can be applied when developing a waste management plan. The waste management plan has to consider the characterization and classification of waste, handling requirements, storage requirements, disposal options, transportation considerations and options for reuse or recycling of waste. This IRP provides regulatory references and resources by topic and provides complete reference information for these sources in Appendix D.

There are very specific responsibilities for waste generators, transporters and receivers. Adhering to these responsibilities in conjunction with the applicable regulations for waste management helps to ensure that waste is managed in a manner that is safe for the workers, the public and the environment, from generation of the waste to final disposal.

It is hoped that the information provided in this IRP will lead to more consistent application of waste management practices and safer handling of waste.

## 28.2 Defining Waste

IRP 28 uses the following definitions throughout the document.

### 28.2.1 Waste

Waste is an unwanted substance or mixture of substances directly generated through oil and gas exploration and production activities.

Some waste streams can be reused (e.g., drilling and fracture fluids). These waste streams do not fall under the definition of waste until they are no longer required by the user.

A waste stream from one company may be a desirable stream for another purpose or company. In these circumstances the original waste generator may require additional approvals for the transfer of the waste. Consult with the local jurisdictional regulator for specifics.

### 28.2.2 Dangerous or Hazardous Waste

The specific characteristics for defining a waste stream as hazardous or dangerous vary by jurisdiction but the waste management practices are the same so this IRP considers Dangerous Oilfield Waste (DOW) and Hazardous Waste (HAZ) to be synonymous and references them as DOW/HAZ throughout.

DOW/HAZ waste is an unwanted substance or mixture of substances that exhibits dangerous or hazardous properties as defined by the regulations of the jurisdiction where they were generated.

See 28.4 Classification and Characterization for more detail.

### 28.2.3 Non-Dangerous or Non-Hazardous Waste

Non-Dangerous Oilfield Waste (non-DOW) and non-Hazardous Waste (non-HAZ) are synonymous and are referenced as non-DOW/non-HAZ throughout this IRP.

Non-DOW/non-HAZ waste is an unwanted substance or mixture of substances that does not exhibit dangerous or hazardous properties.

## 28.2.4 Solid Waste

Solid wastes are waste streams that pass a free liquids test.

**IRP Local jurisdictional regulations for determining the presence of free liquids must be followed.**

IRP In the absence of local jurisdictional regulations, or with approval from the local jurisdictional regulator, the Paint Filter Liquids Test (US EPA Method 9095B) should be used.

## 28.2.5 Municipal Solid Waste

Municipal solid waste (MSW) is the domestic waste that accumulates on a site from human occupancy. These wastes can be incinerated, transported to a transfer station or disposed of at a municipal landfill.

**Note:** Incineration may require additional permits or approvals from a local jurisdictional regulator.

## 28.2.6 Waste Containing H<sub>2</sub>S

Hydrogen sulphide (H<sub>2</sub>S) is a highly toxic and flammable gas that can be trapped in waste. The presence of H<sub>2</sub>S can impact the handling, treatment, transportation and disposal options for the waste.

H<sub>2</sub>S concentration in air can be measured with various monitoring devices. A concentration of 7 ppm in air can impact personnel. Occupational Health and Safety (OH&S) limits for exposure are defined by OH&S legislation for each jurisdiction (e.g., 10 ppm in Alberta). H<sub>2</sub>S concentration in sludges or solids is difficult to measure accurately through monitors.

Agitation of H<sub>2</sub>S contaminated solids or sludges may release H<sub>2</sub>S into the atmosphere.

**IRP Mitigations shall be in place to minimize or control the release of H<sub>2</sub>S into the atmosphere when handling H<sub>2</sub>S contaminated solids or sludges.**

**IRP Any concentration of H<sub>2</sub>S shall be evaluated to determine whether additional personal protective equipment (PPE) is required for workers coming in contact with the waste.**

**IRP If the drilling and well servicing waste originates from a sour production field or well, H<sub>2</sub>S concentration shall be considered when determining the appropriate handling, treatment and disposal options.**

**IRP** If the waste material is sour it must be sent to a facility authorized to receive this type of material or it must be sweetened on-site prior to transport.

**Note:** Waste facilities have different acceptance levels for H<sub>2</sub>S waste streams. Confirm acceptability prior to shipment.

See IRP 02: Completing and Servicing Sour Wells for more information about safety requirements for H<sub>2</sub>S, air monitoring and sweetening of sour waste streams on site.

## 28.2.7 NORM

Natural occurring radioactive materials (NORM) are materials found in formations that contain radioactive elements of natural origin. It can accumulate over time as precipitate (scale) in fluid containers or be deposited along the insides of equipment or pipe.

Radiation levels in NORM contaminated materials are typically quite low. However, the long half-life of some NORM isotopes is a health risk concern (e.g., Radium 226 half-life is 1,620 years). The most common exposure hazard is the inhalation of NORM dust.

NORM can contaminate the following equipment and materials:

- Valves
- Wellheads
- Pumps
- Tubing and tubing strings
- Vessels
- Pipelines
- Sludge
- Pond liners
- Filters

**IRP** If the waste originates from a production field or well known to have NORM, the waste shall be tested for NORM and the radiation concentration shall be considered when determining the appropriate handling, treatment, disposal and transportation options.

Many waste management facilities screen for NORM at the entrance to the facility. The load will be refused if the facility is not approved to accept waste streams containing NORM.

For more information about NORM refer to the Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials on the Government of Canada website.

### 28.2.8 Radiation Contaminated Materials

Radioisotopes are sometimes used in drilling and well servicing operations (e.g., as tracers) and result in radiation contaminated waste. These isotopes are used under license from the Canadian Nuclear Safety Commission (CNSC) and disposal options for streams contaminated with the isotopes are dictated in the permit issued by the CNSC for their use.

**IRP Radioactive materials introduced during drilling or well servicing operations must follow CNSC regulations for handling, transportation and disposal.**

**IRP As per the CNSC, each licensee (person, organization, company) that has a nuclear license pursuant to Section 24 of the Nuclear Safety and Control Act, that has care and control of the radioactive (RA) source must have an approved procedure by the CNSC in their license for such operation.**

For radioactive sources, the radioactive material supplier will supply a permit from the CNSC which describes onsite disposal methods (if applicable) or final disposal options.

**IRP All disposal methods must to be managed as per the licensee permit.**

### 28.2.9 Hydraulic Fracturing Flowback Waste

Flowback fluids from hydraulic fracturing operations are a waste stream under current regulations. These fluids need to be monitored as they flow back in order to determine when the well changes from returning fracturing flowback to returning fluids associated with production.

**Note:** Regulations do not currently define the specific point at which the fluids flowing back change from fracturing fluids to produced water but each fluid stream (fracturing fluids and produced water) may trigger the need for different disposal options depending on the jurisdiction they are generated in.

Historically, fluids have been considered flowback when returned from completions and considered produced water when returned from production operations. However, this may not provide the correct characterization and classification for disposal and does not necessarily provide consistency across waste generators.

Determining when the fluids change from flowback to produced fluids can be accomplished in a number of different ways. Methods include one or more of the following:

- Monitoring flowback and testing with a total dissolved solids (TDS) meter until a 10,000 ppm TDS is reached.
- Visually inspecting the sample fluid to determine if the material is “broken gel”. Broken gel will not be murky, cloudy or opaque in appearance.
- Testing for methane levels (methane levels can increase with the concentration of produced fluids flowing back).
- Comparing volumes of fluids injected in fracturing operations with volumes of fluids returned.
- Analyzing fluids to ensure they meet specs of receiving production facilities.

IRP Fluids that are below 10,000 ppm TDS and/or do not meet the visual assessment are to be treated as fracturing fluid (water based) and should be shipped to a waste management facility approved to handle the waste.

**Note:** The disposal options for fracturing flowback vary by jurisdiction. Consult local jurisdictional regulations.

For fluids above 10,000 ppm TDS see 28.6.3 Disposal Wells for disposal well options.

Sand associated with fracturing flow back has to be sent to an approved waste management facility (see 28.6.4 Waste Management Facilities) or managed on site as per CNSC regulations if radioactive (see 28.2.8 Radiation Contaminated Materials).

**IRP If non-water based fracturing fluid has been used (e.g., oil, acid, etc.) the returns, including solids, must be sent to an approved waste management facility.**

## 28.2.10 Unused Fresh Water

Unused fresh water is not considered waste. If not carried to other operations, unused fresh water may be discharged back to the environment to keep the water within the hydrologic cycle if permitted by the landowner and provided it meets the criteria outlined by the local jurisdictional regulations.

**Note:** Unused fresh water is different from collected precipitation. Each has their own criteria to meet before discharging back to the environment.

**IRP Local jurisdictional regulations for discharge of water must be followed.**

**IRP Unused fresh water must not be returned directly to a water body.**



## 28.2.11 Sewage

Sewage from drilling and well servicing operations can be managed on site using a membrane or mechanical treatment system. Treated effluent may be disposed of on surrounding lands depending on local jurisdictional regulations (see Table 2). Solids are hauled to an approved municipal lagoon or facility using a septic vacuum truck.

Sewage waste can also be tanked, stored and hauled as a total waste to an approved municipal lagoon or facility using a septic vacuum truck.

**IRP Local jurisdictional regulations for sewage must be followed.**

**IRP Any release of treated effluent to the surrounding lands, both crown-owned and private, must have land owner approval.**

**IRP Systems must be installed by an approved qualified person or business approved by the local jurisdiction.**

Each jurisdiction has a volumetric definition of what constitutes small systems sewage. Table 2 outlines the volumes, information about provincial regulations and permitting details.

**Table 2. Sewage Regulations and Permitting for Small Systems Sewage**

Jurisdiction	Volume	Resources	Permits
Alberta: Private Sewage Systems	<25 m <sup>3</sup> per day	<ul style="list-style-type: none"> <li>Safety Codes Act</li> <li>Alberta Private Sewage Disposal Systems Regulation, Government of Alberta, Municipal Affairs</li> <li>Alberta Private Sewage Systems – Standard of Practice</li> </ul>	Permits are issued by Safety Codes Council and sewage system set up by Approved Vendors through the Council
British Columbia: Sewerage System Regulation	<25 m <sup>3</sup> per day	<ul style="list-style-type: none"> <li>Public Health Act,</li> <li>B.C. Guidelines for Industrial Camps Regulation,</li> </ul>	Permits are granted based on local Health Authority Officers approval
Manitoba	Based on site conditions	<ul style="list-style-type: none"> <li>Onsite Wastewater Management Systems Regulation, Government of Manitoba, Conservation and Climate</li> <li>Water Works, Sewerage and Sewage Disposal Regulation, The Public Health Act, Government of Manitoba, Conservation and Climate</li> </ul>	Permitted through application process with Conservation and Climate Representatives

Jurisdiction	Volume	Resources	Permits
Saskatchewan	Based on site conditions	<ul style="list-style-type: none"> <li>The Private Sewage Works Regulations, The Public Health Act</li> <li>Sewage Handling Practices at Work Camps and Temporary Work Sites</li> </ul>	Permits are granted based on the approval from the local Public Health Officer

## 28.2.12 Drilling Waste

Drilling waste refers to the drilling fluid and cuttings returned to the surface during drilling activities but drilling fluid is not the only waste stream generated during drilling operations. Table 3 identifies the types of waste that can be generated during drilling.

**Note:** When defining drilling waste, the drilling fluid system (as per Table 3) includes both the fluids that go into the well and any fluids or solids that return from the formation during operations. Drilling fluid is also referred to by industry as drilling mud.

**Table 3. Waste Generated During Drilling Operations**

Waste Type	Definition	Examples
Fresh water based drilling fluid system	The drilling fluid system in which the base fluid is water.	<ul style="list-style-type: none"> <li>Drilling fluid with drill cuttings</li> <li>Formation fluids</li> <li>Pipelines bores</li> <li>Silicates fluid systems</li> </ul>
Salt based drilling fluid system	The drilling fluid system in which the base fluid is salt or produced water.	<ul style="list-style-type: none"> <li>CaCl<sub>2</sub> Brine</li> <li>NaCl Brine</li> <li>Source water or produced water</li> <li>Drill cuttings</li> </ul>
Hydrocarbon based drilling fluid system	The drilling fluid system in which the base fluid is a hydrocarbon.	<ul style="list-style-type: none"> <li>Invert</li> <li>Drill cuttings</li> </ul>
Cement returns and cement affected fluids	Excess cement circulated to the surface after downhole cementing. This may include pre-flush, scavenger, cement and any excess liquid component that settles out as the cement hardens (cement water).	<ul style="list-style-type: none"> <li>Cement</li> <li>Green (unset) cement</li> <li>Cement water</li> </ul>

Waste Type	Definition	Examples
Drilling rig and associated equipment wastes	Miscellaneous wastes associated with drilling operations such as oily rags, filters, domestic garbage. This may include unused drilling fluid additives.	<ul style="list-style-type: none"> <li>Contaminated debris, absorbents, rags and soil</li> <li>Empty containers (pails, drums, sacks, etc.)</li> <li>Antifreeze/glycol/lubricating oil</li> <li>Absorbents/rags</li> <li>Pipe thread caps</li> <li>Metals – recyclable</li> <li>Rig wash</li> <li>Boiler blowdown fluids</li> </ul>
Drillstem testing fluids	Drillstem testing is a well test conducted while the drill string is in the hole. Fluids associated with this procedure are flowed back to surface.	
Contaminated drilling fluids	Consists of formation fluid that flows back to surface with the associated drilling fluid system (e.g., crude oil, saltwater, etc.).	
Other	Other miscellaneous waste.	<ul style="list-style-type: none"> <li>Emulsion</li> <li>MSW</li> <li>Collected precipitation (clean and impacted)</li> <li>Sewage</li> </ul>

**Note:** Unused additives are not considered waste and can be returned to the supplier or used in subsequent operations. If they are not returned or used in subsequent operations, they need to be disposed of appropriately based on their characterization and classification.

**IRP** If rig wash or boiler blowdown water is incorporated into the drilling fluids, characterization and classification of the waste stream shall be completed after the addition of the rig wash and/or boiler blowdown water.

IRP Boiler blowdown should be sent to an approved waste management facility after characterization and classification.

The following regulations and references provide more information about drilling waste management:

- AER D047: Waste Reporting Requirements for Oilfield Waste Management Facilities
- AER D050: Drilling Waste Management
- AER D050: Drilling Waste Management FAQs for information for landowners on consent for the disposal, treatment or storage of drilling waste

- AER D055: Storage Requirements for the Upstream Oil and Gas Industry, section 11
- AER D058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry
- AER Assessing Drilling Waste Disposal Areas: Compliance Options Reclamation Certification Document
- AER Manual 002: Drilling Waste Inspections
- British Columbia Oil and Gas Handbook Drilling Waste Management Chapter
- Saskatchewan GL99-01 Drilling Waste Management Guideline
- Manitoba Landspraying While Drilling (LWD) Application and Approval Guidelines

### 28.2.13 Well Servicing Waste

Well servicing operations (e.g., wellbore remediation, stimulation, completions, decommissioning, etc.) have different wastes generated than drilling operations. Table 4 identifies the types of waste that can be generated during well servicing operations.

**Table 4. Waste Generated During Well Servicing Operations**

Waste Type	Definition	Examples
Servicing and workover fluids (hydrocarbon based, water based, salt based, methanol)	Fluids that are used in various servicing operations.	<ul style="list-style-type: none"> <li>• Acid (active and neutralized)</li> <li>• Caustic</li> <li>• Cement</li> <li>• Fracturing sand (with and without radioactive tracers)</li> <li>• Fracturing fluid (water based and hydrocarbon based)</li> <li>• Wax waste</li> <li>• Wash fluids</li> <li>• Injection fluids (water or fluids containing radioactive tracer)</li> <li>• Solvents</li> </ul>
Produced fluids		<ul style="list-style-type: none"> <li>• Crude oil/condensate</li> <li>• Emulsions</li> <li>• Water</li> </ul>
Wellbore fluids		<ul style="list-style-type: none"> <li>• Drilling fluid left in the hole after drilling</li> <li>• A fluid used to displace the drilling fluid and left in the hole</li> <li>• Formation fluid</li> </ul>

Waste Type	Definition	Examples
Contaminated materials		<ul style="list-style-type: none"> <li>• Debris</li> <li>• Absorbents</li> <li>• Soil</li> </ul>
Metals		<ul style="list-style-type: none"> <li>• Pipe steel</li> </ul>
Other	Other miscellaneous waste.	<ul style="list-style-type: none"> <li>• Collected precipitation (clean and impacted)</li> <li>• MSW</li> <li>• Sewage</li> </ul>

**Note:** Produced water used as a workover fluid is no longer considered produced water in some jurisdictions and needs to be reclassified. Refer to local jurisdictional regulations regarding produced water as a workover fluid.

**IRP Any fluids and solids returned from the wellbore during a workover/service (e.g., acids, methanol, etc.) are considered waste and must be characterized and sent to an appropriate disposal facility.**

The following regulations and references provide more information about well servicing waste management:

- AER D047: Waste Reporting Requirements for Oilfield Waste Management Facilities
- AER D055: Storage Requirements for the Upstream Oil and Gas Industry, section 11
- AER D058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry
- AER D059: Well Drilling and Completion Data Filing Requirements
- BC Oil and Gas Waste Regulation: Section 7: Requirements for Discharges from Specific Operations
- Saskatchewan Information Guideline PDB ENV 11 GL2000-01: Saskatchewan Hydraulic Fracturing Fluids and Propping Agents Containment and Disposal Guideline
- Saskatchewan-Directive S-01: Saskatchewan Upstream Petroleum Industry Storage Standards

## 28.3 Objectives and Responsibilities

There are different roles with specific responsibilities for meeting waste management objectives during the waste life cycle. These include waste generators, transporters and receivers.

### 28.3.1 Waste Management Objectives

The primary objectives for managing waste are:

- Protection of all workers handling the waste (e.g., generators, transporters, receivers, etc.).
- Protection of the public.
- Protection of the environment.

Other objectives include the following:

- Reuse/reduce/recycle/recover initiatives.
- Storage and/or transportation efficiencies.
- Operational efficiencies (e.g., multi-well pad, field or concurrent operations).
- Classification and characterization of the waste (e.g., hazardous or dangerous).

### 28.3.2 Waste Management Plan

An effective waste management plan is one that is established prior to the generation of any waste. These can be prepared inhouse or using environmental consulting services with the experience to assist with the planning and execution of waste management plans.

The wellsite operator (licensee) is responsible for the management of all waste generated on their site and are considered to be the waste generator for site-generated waste.

**IRP The operator/licensee shall have a waste management plan in place for all waste expected to be generated at the wellsite.**

This may be a site-specific plan, a field-level plan or a plan for a well with a similar operational profile (e.g., sweet vs. sour, drilling operation, completions operation, fracturing scenario, etc.) as long as the plan can be referenced at the wellsite.

- IRP The waste management plan should include a risk assessment of the types of wastes that could be generated at the wellsite.
- IRP The waste management plan should consider the formation where work is being completed (e.g., sour formations, NORM, known issues with loss of circulation, etc.).
- IRP The waste management plan shall identify mitigations (equipment, procedural and personnel) that need to be in place to manage risk for all expected operations.**
- IRP The waste management plan shall identify the requirements for the protection of workers based on the type of wastes expected.**

Many, but not all, drilling wastes are benign in nature and consist mostly of water and soil from the drilled hole. Land application of these benign waste streams can be a waste management option (see 28.6.4 Land-Based Disposal). Waste generators need to be aware that the drilling fluid system and the types of additives or contingency products used during operations can affect the available waste management options for the resulting waste stream. Additives that are not included in the waste management plan may require additional testing or revisions to the waste management plan for the drilling fluid on site. Communicating with the operator/licensee representative about the use of additives or contingency products is important to ensure appropriate handling and disposal.

Well servicing operations generate different waste than drilling and the waste streams often contain contaminants that can impact the waste disposal options available. Planning needs to consider all the servicing operations that may be required.

- IRP The waste management plan should include contingency plans for unexpected events that could occur during operations (e.g., unplanned additives, loss of fluids, artesian wells) or issues with the planned waste facility's capacity at the time of disposal.

Waste can be contaminated with radiation, both naturally occurring (i.e., NORM) or induced during operations (e.g., tracers). Procedures to protect all workers on site from radiation and/or radioactive particles need to be identified in the waste management plan. See 28.2.7 NORM and 28.2.7 Radiation Contaminated Materials for more information.

Items to be covered in the waste management apply to all waste generated at the well site and include the following:

- Options for characterization and classification of waste, particularly those that do not have a waste profile sheets or Safety Data Sheet (SDS) (e.g., testing requirements, regulatory implications, etc.). See 28.4.1 Waste Profile Sheets for more information about waste profile sheets.
- Storage requirements and procedures.
- Disposal options and procedures. This includes identification of approved disposal facilities for each type of waste.
- Transportation considerations (e.g., appropriate transportation mechanism – tank vs. truck, shipping documentation requirements, procedures, etc.).

**IRP The waste management plan must follow the regulatory requirements specific to the jurisdiction(s) of waste generation, transportation and disposal.**

**IRP In British Columbia, a hazardous waste generator must complete a Schedule 5 for the British Columbia Ministry of Environment and Climate Change Strategy for registration as a generator of hazardous waste (as per the Hazardous Waste Regulation).**

### 28.3.3 Generator Responsibilities

The waste generator (also known as the consignor when wastes are transported) is the operator/licensee. Wellsite consultants can act on behalf of a licensee but the ultimate responsibility for proper waste management lies with the license holder.

**IRP Waste generators shall be responsible for the following:**

- Properly characterizing and classifying waste with supporting documentation (e.g., sampling, analysis, SDS, profile sheets, etc.). This may require sampling and analysis of the waste using an appropriate testing lab, procedures and techniques.
- Identifying the volume of waste (estimated or actual) for shipping.
- Identifying the source location of the waste.
- Determining appropriate options for management of the waste.
- Protecting their workers, the public and the environment when handling waste on site and preparing for transportation or disposal.
- Preparing accurate and complete shipping documents (see 28.7.2 Shipping Documents).
- Ensuring waste is managed by an authorized activity on site or sent to an approved facility capable of accepting the waste.



- Ensuring that wastes are transported in the appropriate containers.
- Tracking their waste through the complete life cycle of the waste (cradle to grave).
- Ensuring that a communication plan exists to advise their on-site representative(s) of any waste that is generated that is not explicitly outlined in the waste management plan or when a contingency product or additive is used.
- Communicating with landowners and/or stakeholders regarding waste management activities on their land.

**IRP The waste generator shall confirm that the waste receiver has approval to operate the waste facility and that the facility can manage the waste being sent.**

The waste generator can be held liable for waste sent to a waste receiver who does not properly manage and/or dispose of the waste or for unapproved management of waste.

### 28.3.4 Transporter Responsibilities

The waste transporter (also known as the waste carrier) is the person or party who receives or takes control of waste for the purpose of transportation.

**IRP Waste transporters shall be responsible for the following:**

- Ensuring that the waste they are receiving has been properly documented by the waste generator on the shipping document (volume, generation location, characterization and classification).
- Maintaining the integrity of the characterization and classification of waste (see 28.4.4 Mixing Waste) by ensuring comingling of different wastes types or wastes from different generators does not occur between the waste pick up location and the waste disposal facility.
- Protecting their workers, the public and the environment when receiving waste for transport, during transport and when offloading waste.
- Monitoring fluid levels (in person or using tank alarms) during the transfer of fluids to prevent spills.
- Ensuring that wastes are transported in the appropriate containers.
- Ensuring their transport containers have the appropriate containment mechanisms to handle waste.
- Communicating back to the waste generator if the waste gets shipped to an alternate location.
- Updating the shipping documentation as per their role in the process (see 28.7.2.4 Information Required on a Shipping Document).

### 28.3.5 Receiver Responsibilities

The waste receiver (also known as the consignee when wastes are transported) is the person or party who accepts or receives waste for the purpose of storage, consolidation, transfer, treatment or disposal.

**IRP Waste receivers shall be responsible for the following:**

- Ensuring waste generators are aware of the capabilities and limitations of their treatment and disposal facilities.
- Ensuring that only waste the facility is approved to handle is received.
- Ensuring they have the proper equipment and procedures in place to handle the receipt and processing of the waste they receive, whether or not it is properly identified (see 28.3.6 Mixing Waste).
- Protecting their workers, the public and the environment when receiving and processing waste.
- Updating the shipping documentation as per their role in the process (see 28.7.2.4 Information Required on a Shipping Document).

### 28.3.6 Records Management

**IRP Records of all drilling and well servicing waste generated on site shall be kept and made available upon request.**

These records may include a copy of shipping documents (see 28.8.1 Shipping Documents), truck tickets, daily drilling logs, land application report, etc. Some wastes have specific provincial tracking and reporting requirements. Consult local jurisdictional regulations for reporting and retention requirements.

### 28.3.7 Regulatory Management Tools

There are electronic tools available for waste tracking and the generation and/or submission of waste shipment documents (e.g., e-manifests). Some of these are provided by the local jurisdictional regulator and some are not. Those that are not provided by the regulator may or may not meet all of the regulatory requirements. It is the responsibility of the waste generator to ensure all of the required submissions are made.

**IRP Any tools for generating or submitting waste shipping documents or for waste tracking that are not developed by the local jurisdictional regulator must meet the minimum data requirements for the local jurisdictional regulator or the use of the regulator-developed tools may also be required.**

**Table 5. Provincial Electronic Regulatory Management Tools**

Province	Tool	Usage and References
Alberta	AER Digital Data System (DDS) Integrated Application Registry (IAR) OneStop	<ul style="list-style-type: none"> <li>• Pre-spud notification. See AER D050 Section 21.3 Pre-Disposal Notification Requirements.</li> <li>• Post disposal notification. See AER D050, Section 21.4 Post-Disposal Notification Requirements.</li> <li>• Oilfield waste audit response.</li> </ul>
British Columbia	Kermit or E-Submissions	<ul style="list-style-type: none"> <li>• Post disposal notification including GIS (Polygons). See BCOGC Oil and Gas Handbook, Chapter 10, Section 4.6.</li> </ul>
Manitoba		<ul style="list-style-type: none"> <li>• Submit to Petroleum Branch within 30 days (via fax or email). See the Landspraying While Drilling Application and Approval Guidelines, Section 2.</li> </ul>
Saskatchewan	MER Integrated Resources Information System (IRIS)	<ul style="list-style-type: none"> <li>• Pre-disposal and pre-drilling notifications. See Oil and Gas Conservation Act, Oil and Gas Conservation Regulation (2012), PNG 013.</li> <li>• Post-disposal notifications. See PNG 013.</li> <li>• GL99-01 Drilling Waste Management Guideline</li> </ul>

# 28.4 Characterization and Classification

Waste is classified and characterized for the protection of the workers handling the waste, both on site and during transport, first responders and the public in the event of a spill or issue. Generators use the information when determining appropriate waste management plan options and receivers use the information to properly handle and dispose of the waste.

Consult local jurisdictional regulations for area-specific information and waste characterization and classification requirements (see 28.4.5 Regulations and References).

## 28.4.1 Waste Profile Sheets

Many waste streams have an abundance of historical information to support their characterization and classification. CAPP has prepared waste profile sheets for several common oilfield wastes based on this historical testing information. These waste profiles can be used as a tool for waste generators to help create their waste management plan, to assist in the characterization and classification of waste and as supporting documentation for waste streams being transported.

The waste profile sheets identify the following:

- General information about the waste (original use, physical description, contaminants and regulatory codes).
- Hazard information (physical characteristics, health risks, SDS information, WHMIS label, PPE requirements, environmental concerns and first aid measures).
- Management methods (classification based on provincial waste regulations, storage, disposal and reportable release criteria).
- Transportation information (UN No., shipping name, class, packing group, special provisions, container information and document requirements).
- General comments about the waste.

More detail about the information included in the Waste Profile Sheets and their use can be found in the CAPP Guide: Oilfield Waste Profile Sheets.

Having these waste profile sheets for common wastes means these waste streams do not have to be resampled and tested each time the waste stream is generated or

transported but they do not cover all types of waste. Waste characteristics can also change over time or when additives are introduced so testing of waste streams may still be required in some circumstances.

**IRP Sampling and analysis of waste streams that do not have a waste profile sheet or SDS shall be conducted in order to appropriately characterize and classify the waste stream.**

**IRP Periodic testing of all waste streams shall be conducted to confirm previously determined characterization and classification.**

Combining wastes with different waste profile sheets or combining a waste with a profile sheet with a waste that does not have a waste profile sheet changes the waste profile and nullifies the waste profile sheet for the original waste. See 28.4.4 Mixing Waste for more information.

## 28.4.2 Waste Characterization

The waste generator is responsible for properly characterizing each waste stream. The waste characterization is then used to assess the appropriate handling, treatment and disposal of that waste.

Waste characterization is the assessment of physical, chemical and toxicological characteristics (i.e., properties). Waste characterization provides the necessary information to properly classify waste as per regulatory requirements.

The three primary reasons for characterization are to assess:

1. The occupational health and safety hazards and control measures needed for worker safety.
2. The dangers relating to transportation on public roads.
3. The environmental consequences of the waste so that a disposal or management option that appropriately addresses those consequences may be used.

There are many products used in drilling and completion operations that can impact the waste management plan. SDS provide information about products and can be used to assist in waste management planning when these products are used.

**IRP** When characterizing any waste, the SDS and original TDG classification for the raw product should be consulted (e.g., if soil is contaminated with glycol consult the SDS for glycol).

Typical physical and chemical properties used to characterize waste can include the following:

- Physical state (liquid/solid/gas)
- Odour
- pH (Corrosivity)
- Freezing/melting point
- Boiling point
- Flash point
- Vapour pressure
- Relative density
- Colour
- Lower/upper explosive limits
- Viscosity
- Spontaneous combustion
- Water incompatibility
- Leachable constituents

### 28.4.3 Waste Classification

Waste characterization provides the data about the waste stream that allow for its classification. Classification as per regulatory requirements is required for determining appropriate waste management options and preparation of shipping documentation. Classification varies by jurisdiction and is based upon the criteria outlined in various provincial and federal environmental regulations.

**IRP The waste generator must classify wastes based on local jurisdictional regulations and guidance documents.**

Regulations and guidance documents such as AER D058, the AEP Alberta User Guide for Waste Managers and the British Columbia Hazardous Waste Legislation Guide include a classification procedure to help determine whether a waste is DOW/HAZ or non-DOW/non-HAZ Waste.

Once classified, there may be different regulatory requirements to follow (e.g., manifesting for DOW/HAZ streams) and disposal options may vary between DOW/HAZ and non-DOW/non-HAZ waste streams. Waste management facility approvals specify the type of waste the facility is approved to accept and can impact the waste management strategy. See 28.6.5 Waste Management Facilities for more information.

**IRP** Waste that is TDG regulated must be further classified for transport to identify its unique class (e.g., flammable solid, flammable liquid, corrosive, etc.) as per TDG regulations.

**Note:** Disposal and transportation are regulated by two different jurisdictions but should be aligned on classification. The majority of waste that is classified as DOW/HAZ is also TDG regulated with very few exceptions. Ensure compliance with TDG regulations prior to shipment.

#### 28.4.4 Mixing Waste for Transport

Mixing waste can lead to potentially dangerous situations during transport or when the waste is delivered to the receiver (e.g., toxic releases, fire or explosion). Proper waste characterization and classification and proper waste segregation during transport may mitigate this risk. This includes situations where the transportation tank may contain residue from a previous load.

**Note:** Characterization and classification of the original waste is rendered invalid when wastes with different waste characterization and classification are combined in one load. Additional assessment of the combined waste is required to ensure any new potential hazards are identified and that the waste management plan is still appropriate.

**IRP** If multiple waste loads are to be combined in one shipment from the waste generator and any of the wastes are classified as DOW/HAZ, the waste generator shall ensure shipping documentation appropriately identifies the load.

The requirements for identification vary by jurisdiction.

**IRP** In Alberta, when a shipment contains multiple types of oilfield waste and the individual quantities of each waste type are not known, the oilfield waste generator must document the shipment based on the most dangerous waste and identify each waste code, source site locations and the total combined volume (as per AER D058).

**IRP** In other jurisdictions, characterization and classification of the total waste shall be completed with the shipping documentation reflecting the total load.

**IRP** Transporters shall not mix loads from multiple sources that the waste generator is not aware of to ensure the shipping documentation correctly characterizes and classifies the waste and to prevent mixing of

**incompatible chemicals that can lead to potentially dangerous situations (e.g., toxic releases, fire or explosion).**

The ultimate decision about whether to receive a waste stream is the responsibility of the waste receiver. Ideally each shipment would contain only a properly identified and documented waste but information from local jurisdictional regulators indicates this is not always the case.

**IRP If the receiver has any doubt about the waste characterization and classification the shipment shall be reassessed to ensure the health and safety of all workers exposed to the waste and that the selected disposal option is still appropriate.**

This assessment may include waste segregation (e.g., quarantine), testing to validate waste contents, additional discussions with the waste generator and/or transporter and enacting appropriate procedures to protect the workers (e.g., ensuring that workers are not in confined space with the load).

## 28.4.5 Regulations and References

The following regulations and references provide more information about classification and characterization of waste:

- AER D058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry
- Alberta EDGE (Environmental and Dangerous Goods Emergencies) Dangerous Goods and Rail Safety publication
- Alberta User Guide for Waste Managers
- British Columbia Hazardous Waste Legislation Guide
- CAPP Guide: Oilfield Waste Profile Sheets
- Transportation of Dangerous Goods Regulation Clear Language Edition



# 28.5 Storage Requirements

The following storage options are available for waste generated during drilling and completion operations:

- Rig tanks
- Floc tanks
- 3-Sided shale bins
- Domestic waste containers
- Pits/sumps
- Aboveground synthetically-lined walled storage systems (AWSS)/C-Ring
- Bladders with structural frames
- Engineered containment ponds
- Cement bins

There can be different local jurisdictional regulations for storage options based on waste characterization or storage duration. Consult local jurisdictional regulations for information specific to storage requirements for the area and waste (see 28.5.8 Regulatory Resources).

## 28.5.1 Considerations

The following factors are important when determining appropriate storage options for a waste stream:

- Setbacks (e.g., proximity to water body or environmentally sensitive area, accessibility for firefighting and other emergency operations)
- Applicable engineering, manufacturing, regulatory and operational standards
- Odours
- Secondary containment requirements
- Liner requirements (thickness, compatibility, disposal)
- Air monitoring requirements (e.g., H<sub>2</sub>S, BTEX)
- Leak detection requirements
- Security (for wildlife and unwanted access)
- Signage

**IRP Air monitoring shall be as per IRP 02: Completing and Servicing Sour Wells if there is potential for H<sub>2</sub>S in the waste.**

See 28.2.6 H<sub>2</sub>S Potential Waste for more information about H<sub>2</sub>S.

**IRP Monitoring for NORM shall be in place and the transportation and disposal plan shall be altered to accommodate if NORM are encountered.**

See 28.2.7 Naturally Occurring Radioactive Materials for more information about NORM.

**IRP Radioactive materials must be stored as per CNSC regulations and the nuclear license issued by the CNSC.**

See 28.2.8 Radiation Contaminated Materials for more information about radioactive materials.

**IRP Concrete must not be used as a primary containment.**

## 28.5.2 Earthen Storage Structures

Certain waste streams with a lower potential to cause adverse environmental impacts (e.g., water based drilling waste or water, cement) may be stored in earthen structures (i.e., pits/sumps, earthen bermed storage structures).

**IRP Local jurisdictional regulations for earthen structures must be followed.**

IRP Pit/sump suitability and construction should be overseen by experienced personnel.

Assessment of the soil conditions and the potential for interaction with local ground water or intermittent water bodies is required.

Earthen storage structures can be constructed with or without a liner. Consider the following to determine whether an earthen storage structure is suitable and whether a synthetic liner is required:

- Setbacks (water bodies, fence lines, ignitable sources).
- Elevated groundwater conditions.
- Soil permeability.
- Waste type or characteristics (e.g., contaminants that may have high impact(s) to the environment like methanol or chlorides can be mitigated with a liner).
- Waste physical state (liquid, sludge or solid).
- Size of earthen structure.

- Challenges with liner installation, inspection and disposal.

IRP A liner manufacturer should be consulted when selecting a liner.

**IRP A minimum freeboard (buffer) of one metre shall be maintained in the pits/sumps.**

IRP Earthen storage structures should be designed to avoid collecting any surface precipitation.

### 28.5.3 Tank Requirements

**IRP All salt and hydrocarbon-based completion or drilling waste streams shall be stored in tanks.**

See Table 3 in 28.2.12 Drilling Waste and Table 4 in 28.2.32 Well Servicing Waste for waste examples.

Consider waste storage tanks when operations are proximal to sensitive environmental receptors.

Tanks can be reused from site to site and may require less site preparation than an earthen storage structure.

**IRP Local jurisdictional regulations for storage tanks must be followed.**

Consider the following about the storage tank use and placement:

- Setback requirements for the jurisdiction (water bodies, other equipment needed onsite).
- Site preparation (e.g., whether the tank needs pilings or ground preparation is required).
- Ultimate disposal method.
- Waste type and characteristics.
- Double-walled vs. single-walled.
- Secondary containment requirements.
- Truck access.

IRP Fluid levels should be monitored (by a person or using tank alarms) during transfer to prevent spills.

**IRP A drip tray or enviro-box shall be used around connections to the tanks.**

IRP Tank systems should be monitored on a regular basis (see local jurisdictional regulations for specifics).

### 28.5.4 Aboveground Synthetically-Lined Walled Storage Systems

AWSS are a specialized system commonly referred to as a C-ring. This storage system uses corrugated steel walls and a single or double liner. AWSS are mainly used to contain produced water, cement, flowback and freshwater and typically range in size from 10 m<sup>3</sup> to 10,000 m<sup>3</sup>. Certain uses for AWSS may require special authorization from the local jurisdictional regulator.

**IRP Local jurisdictional regulations for AWSS must be followed.**

IRP AWSS should be placed on the cut side of the lease for stability.

IRP Wildlife deterrents should be in place around the AWSS.

### 28.5.5 Bladders with Structural Frames

Bladders with structural frames can be used to store water-based fluids for fracturing operations. Consult local jurisdictional regulations for requirements for the use of these structures and what approvals are required.

### 28.5.6 Engineered Containment Ponds

Produced or flowback water can be stored in engineered containment ponds for storage and reuse.

**IRP The use of engineered containment ponds must be approved by the local jurisdictional regulator.**

The regulatory approval will typically have conditions about what can be stored (e.g., no hydrocarbons or NORM).

### 28.5.7 Spill Clean-up Materials

IRP Any spill clean-up materials should be loaded directly into a designated storage tank or truck. If those options are not available the material should be stored on a synthetic liner of at least 15 mm thick and be contained within the liner to avoid surface run-on or runoff.

## 28.5.8 Consolidation of Wastes

- IRP Waste may be consolidated until it is economically feasible to transport for final disposal but the combined waste shall have proper classification and characterization completed prior to transport. See 28.4.4. Mixing Waste for more information.**
- IRP Different classifications (DOW/HAZ and non-DOW/non-HAZ) of wastes must not be mixed for the purpose of diluting a waste stream to a lesser classification.**
- IRP Wastes should be segregated on site and placed in respective bins (e.g., filters, rags, used oil, domestic waste).
- IRP Oilfield waste should not be mixed with MSW at the generating site.

Consolidation of waste off site (i.e., not where the waste was originally generated) may require approval from the local jurisdictional regulator.

## 28.5.9 Regulations and Resources

The following regulations and references provide more information about storage requirements:

- AER D050: Drilling Waste Management
- AER D055: Storage Requirements for the Upstream Petroleum Industry
- AER D055 Addendum: Addendum: Interim Requirements for Aboveground Synthetically- Lined Wall Storage Systems, Updates to Liner Requirements, and Optional Diking Requirements for Single-Walled aboveground Storage Tanks
- AER D058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry
- AER D058 Addendum: Oilfield Waste Management Facility Approvals— Notification and Amendment Procedures
- AER Report 2009-A: Updates to Storage Requirements for the Upstream Petroleum Industry
- BCOGC Handbook Chapter 10, Hazard Waste Regulation
- BCOGC Drilling and Production Regulation section 50 and 51
- Saskatchewan Directive S-01 Saskatchewan Upstream Petroleum Industry Storage Standards
- Saskatchewan Guideline GL97-01 Oily Byproduct Storage Structure Construction and Operation
- Saskatchewan PDB ENV 09 GL99-01 Drilling Waste Management Guideline

- Manitoba Drilling and Production Regulation

## 28.6 Disposal Options

There are several options for the disposal of waste depending on the type, state and classification. Consult local jurisdictional regulations for information specific to the area and waste (see 28.10 Regulatory Resources).

### 28.6.1 Transfer Stations

A transfer station is a third-party receiver used for the purpose of collecting and storing wastes until volumes are sufficient for transfer to treatment and final disposal facilities.

The following are common drilling and well servicing wastes received at transfer stations:

- Glycol/lubricating oil
- Filters
- Absorbents/rags
- MSW
- Scrap metal
- Flammable liquids
- Empty containers (e.g., pails, drums, sacks) and pallets

### 28.6.2 Landfills

Landfills are used to permanently dispose of solid waste streams. They are classified based on the waste type they are approved to receive and manage. It is the responsibility of the waste generator to characterize and classify their waste and ensure it is disposed of at an appropriate landfill.

**Note:** Waste generators can be asked, at their own cost, to collect waste deposited into landfills if it is determined that the waste was not appropriate for that class of landfill.

Municipal landfills may not be approved to accept oilfield wastes even if the waste is characterized as non-DOW/non-HAZ.

It is the responsibility of the waste generator to ensure the landfill has the proper authorizations in place to accept the waste stream when choosing a landfill.

**Table 6. Landfill Types**

Common Name	Province	Waste Type
Class I Landfill	Alberta	Select Hazardous Waste
Class II Landfill	Alberta	Non-Hazardous Waste
Class III Landfill	Alberta	Inert waste
Secure Landfill	British Columbia	Select Hazardous Waste
Non-Secure Landfill	British Columbia	Non-Hazardous Waste
Industrial Waste Landfill	Manitoba	Non-Hazardous Waste
Non-Hazardous Industrial Landfill	Saskatchewan	Non-Hazardous Waste

### 28.6.3 Disposal Wells

A disposal well is a specifically designed well used for the safe injection of fluids into underground formations. Local jurisdictional regulations define the waste types permitted for each waste disposal well type (see Table 7).

**Note:** It is a common misconception that water disposal wells can be used for any type of waste water. Consult local jurisdictional regulations for disposal requirements.

It is important to understand the waste fluid type and the class of the disposal well when choosing a disposal well for injection of waste streams.

**IRP** The selected disposal well must be able to accept the waste stream being disposed of (see Table 7).

**Table 7. Disposal Well Types**

Common Name	Province	Waste Type
Class 1A Disposal Well	Alberta	Industrial Waste
Class 1B Disposal Well	Alberta	Produced Water Specified Waste (e.g., fracturing flowback fluids)
Class II Disposal Well	Alberta	Produced Water Brine Equivalent
Injection/Disposal Well	British Columbia	Depends on injection zone and approval from the local jurisdictional regulator (permit specific)
Disposal Well	Saskatchewan	Produced water or brine equivalent, pigging fluids, Enhanced Oil Recovery (EOR) waste water (e.g., water based fracturing flowback fluids meeting regulatory criteria)



Common Name	Province	Waste Type
Waste Disposal Well	Saskatchewan	Specified Oil and Gas Wastes, Specified Non-Oil and Gas Wastes, Produced Water (e.g., fracturing flowback fluids)

**IRP In Alberta, unused fresh water must stay in the hydrologic cycle and must not be injected into formations.**

IRP In other jurisdictions, unused fresh water should stay in the hydrologic cycle and should not be injected into formations.

### 28.6.4 Land-Based Disposal

Some drilling waste (see 28. 2.12 Drilling Waste) can be mixed into the lease or sprayed onto and/or incorporated (e.g., tilling) into the soils of the surrounding lands at a prescribed rate when there are pre-arranged land use agreements in place.

Consider the following when evaluating whether drilling waste disposal on land is an option:

- Base fluid utilized to make up fluid
- Potential for contaminants
- Salt content
- Toxicity of additives utilized
- Hydrocarbon content of drilling fluids from the formation

**IRP Local jurisdictional regulations for land application of specific drilling wastes must be followed to protect lease and surrounding surface water, groundwater, soil and vegetation.**

**Note:** An appropriate alternative disposal option must be used if waste does not meet local jurisdictional regulations for land-based disposal (e.g., facility disposal).

Cement may also be disposed of via land application (burial) if it meets local jurisdictional regulations. It can also be hauled to an approved facility (landfill) for disposal.

Consider the following when planning land-based disposal:

- Geography of the lease (e.g., size, slope, setbacks, ground conditions, etc.).
- Proximity to water bodies, sensitive species or protected areas.
- Erosion prevention.
- Water infiltration (i.e., do not create barriers to water naturally infiltrating the soil).

- Containment (i.e., prevent pooling or migration off the disposal area).
- Disposal footprint (i.e., minimize the amount of land disturbed for disposal operations).
- Sampling and testing requirements (as per local jurisdictional regulations).
- Impact of temperature (winter vs. summer operations).
- Future land use and reclamation requirements (e.g., protection of agricultural lands, hierarchy of preference of lands, crop nutrient requirements (i.e., Nitrogen loading), soil settlement (slumping) after closing sump, burying cement returns in a manner that avoids pooling, settling or resurface of materials).

The operator/licensee is responsible for any adverse effects from land application of wastes (on site or off). Errors can lead to remediation efforts.

IRP Experienced professionals should be consulted if land-based disposal options are considered.

IRP Land-based disposal operations should be overseen by experienced professionals.

**IRP Hydrocarbon based drilling fluids must not be land applied.**

Table 8 shows land-based disposal options available by province.

**Table 8. Land-Based Disposal Options by Province**

Province	Disposal Options
Alberta	<ul style="list-style-type: none"> <li>• MBC</li> <li>• Landspread</li> <li>• Landspray</li> <li>• Landspray while drilling (LWD)</li> <li>• Pump Off</li> </ul>
British Columbia	<ul style="list-style-type: none"> <li>• MBC</li> <li>• Landspread</li> <li>• Landspray</li> <li>• Landspray while drilling</li> <li>• Pump Off</li> </ul>
Manitoba	<ul style="list-style-type: none"> <li>• Spreading</li> <li>• Landspray while drilling</li> </ul>
Saskatchewan	<ul style="list-style-type: none"> <li>• Residual solids disposal</li> <li>• Landspread</li> <li>• Landspray after completion of drilling</li> <li>• Landspray while drilling</li> </ul>

Vacuum trucks are the most frequently used equipment for spray/land application operations.

IRP Vacuum trucks should meet the following criteria when used for land spray/land application operations:

- Have cab controlled discharge/gate valves (with caps on for transport).
- Be capable of achieving prescribed application rates.
- Have suitable low pressure tires for minimal impact on non-frozen ground (e.g., tire pressure reducing systems or floater tires).
- Include safety beacons.
- Have operator-approved insurance, including environmental liability coverage.
- Include effective tank agitation for offsite disposal operations that include drill fluids and cuttings (total waste).
- Include an effective vacuum system capable of pulling total waste onto the truck and building sufficient pressure within the tank for discharge.
- Include a spray plate that is suitable to fan the waste (approximately 12-13 m wide).
- Include a positive air shut off.
- Include spill kits for spill cleanup (e.g., shovels, squeegees, buckets).

**IRP The storage tank of the vacuum truck shall not have any hydrocarbon, salt, chemical or sewage contamination prior to LWD or landspray operations.**

Longer distances to disposal locations may require a semi vacuum truck instead of a typical tandem or tri-drive vacuum truck in order to move larger volumes of waste.

Determine whether solids will be slurried in with fluids or isolated prior to drilling. If isolated then shale shakers, centrifuges and floc tanks can be used to separate constituents.

Track hoe, rubber tire hoe and a dozer are often used for the disposal of solids via MBC or landspread on lease.

Three inch water pumps (with a sprinkler, irrigation gun or perforated hose) are most commonly used for the disposal of clear fluids to surrounding lands during pump off operations.

Common challenges and regulatory non-compliance issues with land-based disposal include the following:

- Appropriate soil-to-waste mix ratio or incomplete mixing of waste into subsoil
- Difficult ground conditions (e.g., rutting)

- Fluid migration during spring melt
- Shale outs (i.e., clumps of shale that form in the tank and don't spray evenly with the fluid)
- Slope and/or inconsistent slopes across a field
- Proximity to a water body
- Overapplication of spray
- Trucks going to the wrong field
- Access to the field
- Not getting appropriate landowner approval (e.g., cement returns, leased lands, LWD)

An example of field screening methods for fluids, receiving lands and equipment can be found in AER D050: Drilling Waste Management.

## 28.6.5 Waste Management Facilities

A waste management facility is a system of surface equipment used to process DOW/HAZ and non-DOW/non-HAZ liquid, solid and sludge oilfield waste. There are many waste management facility options for disposal based on characterization and classification of the waste.

A waste management facility can consist of the following components:

- Waste processing
- Fluid injection
- Custom treatment
- Clean oil terminalling
- Bioremediation
- Thermal treatment
- Landfill

Many waste streams generated during drilling and completion operations are best managed at waste management facilities. These include the following:

- Contaminated materials (soil, rags debris)
- Empty containers
- Used chemicals (e.g., antifreeze, glycol and lubricating oil)
- Absorbents and rags
- Pipe thread caps
- Recyclable metals
- Rig wash
- Boiler blow down
- Servicing and workover fluids
- Cement and green cement
- MSW
- Drill stem testing fluids
- Contaminated drilling fluids

#### 28.6.5.1 **First Party vs. Third Party**

First-party facility license holders (receivers) can only accept waste generated by the same licensee. Depending on the approval conditions for the specific facility, waste may be limited to that which is generated on site or the authorization may allow for wastes coming from various offsite locations provided those sites are owned by the same first-party facility owner.

Third-party facilities (receivers) are authorized to accept waste streams from various sites and multiple waste generators. Third-party receivers are typically standalone companies that specialize in waste management.

#### 28.6.5.2 **H<sub>2</sub>S**

Confirm that the destination facility is approved to receive and manage sour waste if the waste stream is known to contain H<sub>2</sub>S. The upper threshold for sour waste at waste management facilities is typically 1% or 10,000 ppm. See 28.2.6 H<sub>2</sub>S Potential Waste for more information about H<sub>2</sub>S Waste.

#### 28.6.5.3 **NORM**

Confirm that the destination facility is approved to receive and manage NORM waste if the waste stream is known to contain NORM. See 28.2.7 NORM for more information.

## 28.6.6 Reuse and Recycling

Alternatives to land-based or facility-based disposal exist in some jurisdictions that allow for waste to be reused or recycled. Some common uses include the following:

- Stabilization
- Washing operations (such as cavern washing)
- Drying/evaporation of fluids
- Remediation of solid wastes
- Thermal/incineration
- Road bed/road surface construction

**IRP Any alternative technologies to repurpose a waste as a product must have approval from the local jurisdictional regulator.**

Some drilling and well servicing fluids are designed for repeated reuse. The management of these fluids is often lumped in with waste management requirements even though they do not typically meet the normal definition of waste (i.e., they are unwanted by the current user but wanted by someone else). Typically, these fluids follow the same waste management requirements as waste streams when it comes to classification, transportation and documentation.

Companies are encouraged to find ways to reduce their oilfield waste through various reuse/reduce/recycle initiatives. Consult local jurisdictional regulators for approval requirements.

### 28.6.6.1 Water Based Drilling Fluids

Water based drilling fluids can be reused in subsequent hole sections or other wells. They can be treated for reuse either on site or off.

**IRP Groundwater must be protected from any potential adverse effects of water based drilling fluids.**

**IRP Reuse of water based drilling fluids must follow local jurisdictional regulations**

The following can affect reusability:

- Hydrocarbons
- Bactericides
- Surfactants
- Toxic chemicals

- Salinity
- Solids content
- Bacterial load

On-site processing for reuse of water based drilling fluid involves polishing the drilling fluid with centrifuges, shakers or other equivalent technology. Off-site treatment uses a similar process at a standalone site that typically processes drilling fluid from multiple locations.

**Note:** Off-site treatment may require approvals from the local jurisdictional regulator

**IRP The operator/licensee, not the drilling fluid supplier, shall be documented as the waste generator when transporting water based drilling fluids for reconditioning or reuse.**

#### 28.6.6.2 Hydrocarbon Based Drilling Fluid

Hydrocarbon based drilling fluids are typically recycled or reused. They can be returned to the drilling fluid supplier for reconditioning and can then be reused in another operation.

If planning to return hydrocarbon based drilling fluids to the supplier for reconditioning, it is the responsibility of the operator/licensee to ensure the supplier of the drilling fluids has the appropriate approvals in place to receive the fluids for reconditioning.

**IRP The operator/licensee, not the drilling fluid supplier, shall be documented as the waste generator for the transport of hydrocarbon based drilling fluids for reconditioning or reuse.**

#### 28.6.6.3 Produced Water

Produced water is a common waste stream generated during drilling and well servicing operations. It is typically disposed of by injecting back into underground formations through water injection wells (see 28.6.3 Disposal Wells) but can also be used in drilling and completion operations as an alternative to fresh water.

**Note:** Some jurisdictional regulators exclude produced water from the definition of waste (e.g., AER and AEP Water Use Strategies) and encourage the use of the produced water as an alternative water source for operations. Even if not defined as waste by the jurisdiction, assessment of produced water for characterization, classification, storage, transportation and disposal is still required.

Produced fluids can come into contact with the same hazards as oilfield wastes (e.g., H<sub>2</sub>S, NORM and radioactive tracers) that would require special considerations (see

28.2.6 Waste Containing H<sub>2</sub>S, 28.2.7 NORM and 28.2.8 Radiation Contaminated Materials).

IRP The following should be considered when using produced water as a water source for drilling and completion operations:

- Transportation (via truck or pipeline).
- Storage (before and after use).
- Waste management at end of life.
- Regulatory approvals required prior to use.

The transport of produced water can have potential TDG implications. For example, a vacuum truck used to haul crude oil is also often used to haul produced water. This is permitted provided that the carrier meets all TDG requirements (e.g., for placarding, training, documentation, containment, etc.)

**IRP If non-regulated produced water is hauled in a tank that has crude oil residue and has not been cleaned and purged of the crude oil, the following TDG requirements must be met:**

- The specification tank must be TDG-compliant.
- The appropriate Class 3 safety marks (placard) of the previous crude oil load must be displayed on the tank.
- The dangerous goods shipping document, identifying the previously contained crude oil, must be onboard the transport unit.
- The loaded produced water should be identified on a separate document. Otherwise, the inspectors may assume the tank either contains residue crude oil or is loaded with crude oil.
- The person who transports the product must be adequately trained in TDG and hold a TDG training certificate.

More information about produced water is available in the TDG Bulletin: Produced Water on the Produced Water page under Transport Canada's Dangerous Goods topic at the Government of Canada website

#### 28.6.6.4 Collected Contaminated Water

Surface water that collects on site is often used in on-site operations. Testing may be required to determine whether contaminants render the water a hazardous material and there may be additional tracking requirements or regulatory approval required. If not used in operations on site the water is considered a waste stream that needs to be included in the waste management plan.



#### 28.6.6.5 Leachate

Leachate is precipitation that has come in contact with contaminants. It is generated at oilfield or industrial waste landfills (which are different from municipal solid waste landfills) and can be used in some on-site operations (e.g., fracturing operations, salt cavern washing). Approvals are often required by both the generator of the leachate and the potential user of these fluids. Consult with the local jurisdictional regulator to identify any regulatory requirements before reusing leachate.

Use of leachate will have similar implications to produced water for waste management options at the end of operations.

### 28.6.7 Regulations and Resources

The following regulations and references provide more information about the disposal of waste:

- AER D050: Drilling Waste Management
- AER D051: Injection and Disposal Wells – Well Classifications, Completions, Logging, and Testing Requirements
- AER D058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry
- AER Manual 002: Drilling Waste Inspections
- AER ST107: AER Approved Oilfield Waste Management Facilities
- BC Ministry of Environment Environmental Management Act
- Saskatchewan Directive S-01 Upstream Petroleum Industry Storage Standards
- Saskatchewan Directive PNG008 – Injection and Disposal Well Requirements
- Saskatchewan PDB ENV 09 GL99-01 Drilling Waste Management Guideline
- Saskatchewan Information Guideline PDB ENV 11 GL2000-01: Saskatchewan Hydraulic Fracturing Fluids and Propping Agents Containment and Disposal Guideline.
- Manitoba Hazardous Waste Regulation
- Manitoba Landspray While Drilling Application and Approval Guidelines, Section 2

# 28.7 Transport

## 28.7.1 Preparing for Transport

Regulations are in place at both the federal and provincial levels to ensure the safe transport of dangerous goods. Oilfield wastes may or may not fall under these jurisdictions depending on their characterization (DOW/HAZ or non-DOW/non-HAZ). It is the responsibility of the waste generator to prepare waste for transport. See 28.3.1 Generator Responsibilities for more information about specific responsibilities of the waste generator.

The following need to be considered when preparing a waste stream for transport:

- Characterization and classification of waste.
- Volume of waste (estimated or actual measured).
- Waste preparation requirements (e.g., stabilizers, drying, sorting, etc.).
- Shipment documentation requirements (see 28.7.2 Shipping Documents)
- Requirements for shipping labels or placards.
- Transport vehicle type required (e.g., vacuum truck, end dump, tanker truck, etc.).
- Verification that the intended receiver is approved to manage the waste.
- Tracking requirements (cradle to grave).

**IRP In Alberta waste streams must be classified and pass the paint filter test prior to the addition of any amendments to stabilize during transport (e.g., sawdust).**

IRP In other jurisdictions solids should pass the paint filter test before amendments are added.

**IRP All waste must be characterized and classified by the waste generator prior to shipping.**

**Note:** The CAPP Waste Profile Sheets can assist with characterization and classification. See 28.4.1 Waste Profile Sheets for more information.

**IRP Waste characterization and classification shall be completed prior to adding amendments to the waste.**

**IRP Waste characterization and classification shall be documented on the shipping document.**

**IRP TDG regulated wastes must be handled and transported according to TDG regulations.**

### 28.7.2 Equivalency Certifications

In some situations, it may be difficult to meet all the requirements of TDG for the transport of certain materials (e.g., analytical testing, container use, signage, etc.). The TDG Regulations allow for transporters or generators to apply for an equivalency certification. The application outlines how the alternative method of transport will still achieve an equivalent level of safety.

**IRP A copy of the equivalency certificate must accompany any loads transported under the equivalency certificate and transport must be as per the method outlined in the certificate.**

In Alberta, a similar process is available called a Permit of Equivalent Level of Safety (PELS).

**IRP A copy of the PELS permit must accompany loads transported under these PELS and transport must be as outlined in the PELS.**

CAPP and PSAC have applied for a number of these certificates and permits on behalf of their members and copies are available for member use via the CAPP and PSAC websites ([www.capp.ca](http://www.capp.ca) and [www.psac.ca](http://www.psac.ca)).

### 28.7.3 Shipping Documents

Any waste stream can be documented on a waste manifest for transport. Non-DOW/non-HAZ waste does not require a manifest but does require some other form of shipping documentation. Valid forms of documentation include, but are not limited to, the following:

- Truck ticket
- Waste docket
- Recycle docket
- Bill of lading
- Movement document
- Waste manifest

The purpose of the shipping document is to ensure waste, both DOW/HAZ and non-DOW/non-HAZ, are safely transported and received at their intended point of treatment

and/or disposal. The information detailed on them allows for a more effective and efficient response in the event of an incident. The information provided is also required for waste tracking (see Section 28.7.3 Tracking) and may be subject to regulatory audits.

See Appendix B for examples of some forms of shipping documents.

**IRP All waste shall have a valid form of documentation for transport.**

**IRP** If the waste stream being transported is known to contain H<sub>2</sub>S the shipping document should include a comment identifying the waste as including H<sub>2</sub>S (e.g., Caution waste includes H<sub>2</sub>S).

See 28.2.6 H<sub>2</sub>S Potential Waste for more information.

**IRP** If the waste stream being transported is known to contain NORM it the shipping document should include a comment identifying the waste as including NORM (e.g., Caution waste includes Natural Occurring Radioactive Material).

See 28.2.7 NORM for more information.

**IRP If the waste stream has radiation contaminated materials the shipping document must identify them as TDG Class 7 Dangerous Goods Radioactive Material.**

See 28.2.8 Radiation Contaminated Materials for more information.

#### 28.7.3.1 When to Use a Waste Manifest

**IRP All DOW/HAZ waste must use a waste manifest for transport in Alberta or British Columbia. A truck ticket is not a substitute for the manifest.**

**Note:** In Saskatchewan DOW/HAZ waste does not require a waste manifest unless it is crossing provincial boundaries but still requires a valid form of shipping documentation.

**IRP The waste manifest must include all of the required information for a TDG shipping document as laid out in section 3.5 of the TDG regulations.**

Check with local jurisdictional regulations for any specific waste manifest form or templates that may be applicable (e.g., inter-provincial waste shipments). See 28.7.4.2 Hazardous Waste Carrier Requirements for more information.

#### 28.7.3.2 How to Complete a Manifest

Manifests are auditable documents with unique identifier numbers assigned to them.

**IRP Manifests shall not be copied or reused.**

**IRP The generator copies must be retained for a minimum of two years for TDG and as per local jurisdictional regulations.**

**IRP If material being transported is TDG regulated, the authorizing contact for the waste generator must be trained and hold a training certificate from TDG (i.e., be TDG certified).**

Table 9 identifies the steps required to complete a manifest. See Appendix B for samples with additional instructions for completing each section.

**Table 9. Completing a Manifest**

Description	Responsibility	Action
Step 1 Complete generator (consignor) information	Waste generator	<ul style="list-style-type: none"> <li>• Completes applicable information in section.</li> <li>• Sign off on the waste generator section of the document (legal responsibility).</li> <li>• Retains the generator copy on site.</li> <li>• Gives remaining pages to the transporter.</li> </ul>
Step 2 Complete transport (carrier) information	Waste transporter	<ul style="list-style-type: none"> <li>• Completes applicable information in section.</li> <li>• Sign off on the transport section.</li> <li>• Waste transporter carries the remaining pages with waste shipment to destination.</li> </ul>
Step 3 Complete receiver (consignee) information	Waste Receiver	<ul style="list-style-type: none"> <li>• Completes all applicable information listed receiver section.</li> <li>• Gives the transporter copy to waste transporter.</li> <li>• Retains the receiver copy.</li> <li>• Sends the generator copy to the waste generator.</li> </ul>

### 28.7.3.3 Common Manifesting Errors

The following are some of the typical errors made when completing the manifest:

- Photocopying or printing existing manifests to be used as a template.
- Generating both truck tickets and manifests for a given TDG regulated waste load in which the applicable TDG information does not match.
- Using an incorrect shipping name for the corresponding UN Number (when applicable).
- Missing information (e.g., waste info, LSD, operator code, quantity, etc.).
- Misclassification of waste (based on DOW/HAZ classification /waste description) or wrong TDG classification is used.
- Emergency numbers missing or invalid.
- Authorized individual did not sign off as the waste generator (consignor).
- Distribution of manifest copies completed incorrectly.
- Using an old manifest document that might not meet current requirements (e.g., order of data, disclaimers, signature of the generator representative, etc.).

#### 28.7.3.4 Information Required on a Shipping Document

**IRP The shipping document must meet the requirements of the applicable regulator. At minimum, the following information must be included on a shipping document:**

- The name and address of the waste generator (consignor).
- Source location of the waste.
- Date of shipment or date received.
- Proper description of the waste and applicable waste code.
- TDG shipping name (including UN number, Class and Packing Group if applicable).
- Quantity being shipped (including unit of measure).
- 24-hour number.
- Driver Signature and contact number.
- Waste generator (consignor) signoff/certification.
- Equivalency certificate number (TDG or PELS) if shipping under the certificate (see 28.7.2 Equivalency Certifications).

### 28.7.4 Tracking

Waste generators are responsible for their waste through the full waste life cycle (cradle to grave). Generators need to be aware of the quantities and types of waste they generate, how they are handled and where and how they are disposed.

**IRP All waste generators must have a waste tracking process.**

IRP Tracking systems should be able to prove effectiveness and display due diligence (i.e., internal paper or electronic tracking system or use of a third-party tracking company).

### 28.7.5 Transportation

#### 28.7.5.1 Inter-Provincial Waste Movement

The federal government regulates inter-provincial movements of hazardous waste and hazardous recyclable material.

**IRP The waste generator must use a movement document that includes the information stipulated by the Cross-Border Movement of Hazardous and Recyclable Hazardous Waste Material Regulation.**

**IRP Inter-provincial movement documents must be retained for 5 years.**

### 28.7.5.2 Hazardous Waste Carrier Requirements

**IRP** Waste generators moving hazardous waste must ensure that the waste transporter carrying the waste has a valid licence to transport hazardous waste in the applicable jurisdiction.

**IRP** The British Columbia hazardous waste carrier licence is specific to the type of hazardous waste being transported and waste generators shall confirm the carrier is approved for the specific hazardous waste prior to shipment.

**Note:** Other provinces are covered by their own regulations and are not subject to this restriction.

Table 10 identifies the provinces/territories that require a hazardous waste carrier licence.

**Table 10. Waste Carrier Licensing**

Jurisdiction	Hazardous Waste Carrier License Required	Hazardous Waste Carrier License Type
Alberta	Yes	ABC License
British Columbia	Yes	LT License
Manitoba	Yes	MBC License
Saskatchewan	No	N/A

### 28.7.6 Regulations and Resources

The following regulations and references provide more information about transporting waste:

- AER D058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry
- British Columbia Hazardous Waste Regulation
- Cross-Border Movement of Hazardous and Recyclable Hazardous Waste Material Regulation
- Transportation of Dangerous Goods Regulation Clear Language Edition



# Appendix A: Revision Log

The revisions to IRP 28 are logged in the following table. Refer to 28.0.11 Background for additional information about the history of this IRP.

**Table 11. Revisions Summary**

<b>Edition</b>	<b>Section(s)</b>	<b>Remarks/Changes</b>
1		New IRP sanctioned January 2022

The following individuals helped develop Edition 1 of IRP 28 through a subcommittee of DACC.

**Table 12. Edition 1 Development Committee**

<b>Name</b>	<b>Company</b>	<b>Organization Represented</b>
Sherry Kenneway (Co-Chair)	Canadian Natural Resources Limited	CAPP
Tyler McDonald (Co-Chair)	Secure Energy	CAPP
Gary Ericson	Saskatchewan Ministry of Energy and Resources	Regulator
Jonas Fenn	Saskatchewan Ministry of Energy and Resources	Regulator
Chris Frank	Precision Well Servicing	CAOEC
Matt Gibson	Ovintiv Inc.	CAPP
David Hart	Canadian Natural Resources Limited	CAPP
Brendan Hysuik	Saskatchewan Ministry of Energy and Resources	Regulator
Mackenzi Mitchell	Streamflo Industries Ltd.	PSAC
Sean Parenteau	Cenovus Energy	CAPP
Jason Pecht	Summit An Earth Services company	PSAC
Gavin Plosz		SME
Peter Rudakas	Envolve Energy Services	PSAC
Chris Salewich	Cenovus Energy	CAPP
Mark Salkeld	Katch Kan Ltd.	SME
Emilia Sobiewski	Shell Canada Ltd.	CAPP
Dave Turner	Canadian Natural Resources Limited	CAPP

# Appendix B: Sample Shipping Documents

The following figures show examples of different types of shipping documents. Figures 1 through 3 are manifests and Figure 4 is a truck ticket.

**Note:** While only a truck ticket is shown as an example of a non-manifest shipping document, all other non-manifest shipping documents (as mentioned in 28.7.2 Shipping Documents) would contain the same information as shown in the sample truck ticket.

PDFs of these samples can be found for view and download with the IRP on the Energy Safety Canada website.

**Note:** These samples are provided for reference only and are not to be copied.

Figure 1. Sample Manifest

WASTE MANIFEST EXAMPLE

FORM No. XXXXXXXX

A) GENERATOR (CONSIGNOR)							B) TRANSPORTER (CARRIER)													
COMPANY NAME: ABC OIL & GAS CORPORATION				OPERATOR CODE (GENERATOR): 0X290 <small>(CODE ASSIGNED BY REGULATORS)</small>			COMPANY NAME:			CITY:		PROV.:								
ADDRESS: ADDRESS		CITY: CITY		PROVINCE: PROV		POSTAL CODE: x9x 9x9		ADDRESS:			POSTAL CODE:									
SOURCE SITE LOCATION: 100001-01-001-01W400 <small>(REFERENCE DOWNHOLE UWI OR SURFACE LOCATION ASSOCIATED WITH WASTE)</small>							DATE:		UNIT No.:		TELEPHONE:		FAX:							
LICENCE TYPE (W.P.F.) & LICENCE NUMBER: Licence #0123456 <small>(LICENCE # ASSOCIATED WITH LOCATION ABOVE)</small>							Certification – I declare that I have received wastes / goods as offered by the Generator in Part A for delivery to the intended Receiver and that the information contained in the Part B is correct and complete. NAME: (PRINT) _____ SIGNATURE: _____													
INTENDED RECEIVER: LINDBERGH							C) RECEIVER (CONSIGNEE): <small>(FILLED IN BY RECEIVER)</small>													
CITY: LINDBERGH				PROV.:										COMPANY NAME:			CITY:		PROV.:	
RECEIVING SITE LOCATION: 05-26-056-05 W4M <small>(SURFACE LOCATION OF WASTE RECEIVER)</small>														ADDRESS:			POSTAL CODE:			
COMMENTS: WASH WATER WITH HYDROCARBONS, TICKET #A012345 GEL/CHEM DRILLING MUD, TICKET #B678910  <small>(INCLUDE COMPANY SPECIFIC WASTE TRACKING REQUIREMENTS HERE SUCH AS CORRESPONDING TRUCK TICKET NUMBERS IF APPLICABLE. IN THE CASE OF SHIPPING TDG REGULATED WASTE THE COMMENTS WILL PROVIDE MORE DETAIL THAN THE PROPER SHIPPING NAME MAY PROVIDE.)</small>							RECEIVING SITE LOCATION:							OPERATOR CODE/ BA CODE:						
UN NUMBER	PROPER SHIPPING NAME (TECHNICAL NAME)	PACKING CLASS	SUB CLASS	PACKING GROUP	QUANTITY SHIPPED (K/L, L, M <sup>3</sup> )	WASTE CODE	DI(D)OW OR N(N)ON-D(OW)	PACKAGING No.	PACKAGING CODE	HANDLING CODE	QUANTITY RECEIVED	OIL %	WATER %	SOLID %	HANDLING CODE	TRANS. DECON				
3175	SOLIDS CONTAINING FLAMMABLE LIQUID	4.1	N/A	III	15 M3	SOL00	D	1	03	07										
DESCRIPTION (E.G.: NON-TDG GOODS OR WASTE):							PACKAGES		WEIGHT											
<input type="checkbox"/> RESIDUE – LAST CONTAINED <input type="checkbox"/> TOXIC BY INHALATION							DATE SHIPPED: MAY 12, 2020		TIME SHIPPED: 9:34 AM		IF HANDLING CODE '01', '02', OR '21' SPECIFY:									
I hereby declare that the contents of the consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations.							24/hr Contact Number: <small>(INSERT NUMBER HERE FOR EMERGENCIES)</small>		DATE RECEIVED:		TIME RECEIVED:		IDENTIFY DISCREPANCIES BETWEEN WASTE/GOODS RECEIVED AND DETAILS LISTED IN PART A IN THE COMMENTS SECTION:							
NAME (PRINT): BOB SMITH <small>(GENERATOR CONTACT)</small>							SIGNATURE:		NAME OF AUTHORIZED PERSON (PRINT):		TELEPHONE:		SIGNATURE:							
FOR NON-TRANSPORTATION EMERGENCIES CONTACT ABC OIL & GAS (555) 456-7100																				
(ONLY IF APPLICABLE) ERAP REFERENCE # _____							ERAP TELEPHONE# _____													

PRESS FIRMLY AND PRINT CLEARLY

DISTRIBUTION: WHITE – GENERATOR (VIA RECEIVER), YELLOW – RECEIVER, PINK – TRANSPORTER, BLUE – GENERATOR

Figure 2. Sample Provincial Manifest

PROVINCIAL MANIFEST EXAMPLE

FORM No. XXXXXXXX

A) GENERATOR (CONSIGNOR)							B) TRANSPORTER (CARRIER)									
COMPANY NAME: GENERATOR COMPANY NAME				OPERATOR CODE (GENERATOR): XXXX (CODE ASSIGNED BY REGULATORS)			COMPANY NAME: TRANSPORTER COMPANY NAME			CITY: CALGARY	PROV.: AB					
ADDRESS: COMPANY ADDRESS		CITY: CITY	PROVINCE: PROV	POSTAL CODE: XXX XXX			ADDRESS: COMPANY ADDRESS (HEAD OFFICE OR FIELD OFFICE)			POSTAL CODE: XXX XXX						
SOURCE SITE LOCATION: 100/00-00-000-00W4/00 (REFERENCE DOWNHOLE UWI) OR SURFACE LOCATION ASSOCIATED WITH WASTE							DATE: MAY 1, 2020	UNIT No.: XX	TELEPHONE: XXX-XXX-1234	FAX: XXX-XXX-1234						
LICENCE TYPE (W.P.F.) & LICENCE NUMBER: License #0123456 (LICENCE # ASSOCIATED WITH LOCATION ABOVE)							Certification – I declare that I have received wastes / goods as offered by the Generator in Part A for delivery to the intended Receiver and that the information contained in the Part B is correct and complete.									
INTENDED RECEIVER: INTENDED RECEIVER COMPANY & FACILITY NAME							NAME: (PRINT)			SIGNATURE:						
CITY: LOCATION			PROV.: LOCATION				DRIVERS NAME			DRIVER'S SIGNATURE						
RECEIVING SITE LOCATION: SITE ADDRESS OR FACILITY LOCATION							C) RECEIVER (CONSIGNEE): (FILLED IN BY RECEIVER)									
COMMENTS: WASH WATER WITH HYDROCARBONS, TICKET #A012345 GEL/CHEM DRILLING MUD, TICKET #B678910  (INCLUDE COMPANY SPECIFIC WASTE TRACKING REQUIREMENTS HERE SUCH AS CORRESPONDING TRUCK TICKET NUMBERS IF APPLICABLE. IN THE CASE OF SHIPPING TDG REGULATED WASTE THE COMMENTS WILL PROVIDE MORE DETAIL THAN THE PROPER SHIPPING NAME MAY PROVIDE.)							COMPANY NAME: RECEIVER COMPANY NAME			CITY: EDMONTON	PROV.: AB					
							ADDRESS: RECEIVER COMPANY ADDRESS (FOR GIVEN FACILITY)			POSTAL CODE: XXX XXX						
							RECEIVING SITE LOCATION: 00-00-000-00 W4M (EITHER LOCATION OR FACILITY NAME)			OPERATOR CODE/ BA CODE: XXXX (CODE ASSIGNED BY REGULATORS)						
UN NUMBER	PROPER SHIPPING NAME (TECHNICAL NAME)	PRIMARY CLASS	SUB CLASS	PACKING GROUP	QUANTITY SHIPPED (KG, L, M <sup>3</sup> )	WASTE CODE	D/DOWN OR N/NON-DOWN	PACKAGING NO.	CODE	HANDLING CODE	QUANTITY RECEIVED	OIL %	WATER %	SOLI D %	HANDLING CODE	TRANS. DESIGN
3175	SOLIDS CONTAINING FLAMMABLE LIQUID	4.1	N/A	III	15 M3	N/A	D	1	03	07	15 M3	80	15	5	07	
DESCRIPTION (E.G.: NON-TDG GOODS OR WASTE):				PACKAGES	WEIGHT											
<input type="checkbox"/> RESIDUE – LAST CONTAINED <input type="checkbox"/> TOXIC BY INHALATION							DATE SHIPPED: MAY 1, 2020	TIME SHIPPED: 9:34 AM		IF HANDLING CODE '01', '02', OR '21' SPECIFY:						
I hereby declare that the contents of the consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations.							24-Hour Number: 1-800-XXX-1234		DATE RECEIVED: MAY 2, 2020		TIME RECEIVED: 12:52 PM					
NAME (PRINT): GENERATOR NAME      SIGNATURE: GENERATOR SIGNATURE							IDENTIFY DISCREPANCIES BETWEEN WASTE/GOODS RECEIVED AND DETAILS LISTED IN PART A IN THE COMMENTS SECTION:									
FOR NON-TRANSPORTATION EMERGENCIES CONTACT ABC OIL & GAS (555) 456-7100							NAME OF AUTHORIZED PERSON (PRINT): RECEIVER CONTACT SIGN-OFF									
(ONLY IF APPLICABLE) ERAP REFERENCE # _____ ERAP TELEPHONE# _____							TELEPHONE: XXX-XXX-1234									
							SIGNATURE:									

PRESS FIRMLY AND PRINT CLEARLY

DISTRIBUTION: WHITE – GENERATOR (VIA RECEIVER), YELLOW – RECEIVER, PINK – TRANSPORTER, BLUE – GENERATOR



Figure 4. Sample Truck Ticket

<b>ABC TRUCKING</b>			Truck Ticket #	123456	
555 Front Street High Level AB T2P 3N1					
Date:	12-Jan-22	Unit #	55	Job #	1400NPP
		JSA #	11110		
		Driver Name :	JANE DOE		
Billing Information					
Customer:	Generator Company				
Received From (Consignor)	Generator Company North Place Plant	LSD	09-02-081-23W4M		
Delivered To (Consignee)	Receiver Company Yellow River	LSD	14-04-082-22W4M		
Waste Shipment info					
Shipment Description	Volume	AER Waste CODE			
Produced water from C Tank	12M3	WATER			
Produced water from D tank	22M3	WATER			
<b>Total Volume</b>	<b>34M3</b>				
<b>*If DOW- AB Waste Manifest Required</b>					
Residue Last Contained?	Crude Oil UN 1267				
<b>*If residue last contained dangerous good previous shipping document for the dangerous good must also accompany load</b>					
Waste Generator Signature	<i>Sandy Right</i>				
Common AER Waste Codes (From D047)					
Produced Water	WATER	Frac Fluid	FRFLDW	Wash Fluids	WSHWTR
Drilling Waste	DRWSGC	Sludge-Emulsion	SLGEML	Well workover fluids	WWOFLD

# Appendix C: Glossary

See 28.2 Definitions for detailed waste definitions.

**AEP** Alberta Environment and Parks

**AER** Alberta Energy Regulator

**AWSS** Aboveground (Synthetically-Lined) Walled Storage System

**BCOGC** British Columbia Oil and Gas Commission

**BTEX** Benzene Toluene Ethylbenzene Xylene

**CAOEC** Canadian Association of Oilwell Energy Contractors

**CAPP** Canadian Association of Petroleum Producers

**CaCl<sub>2</sub>** Calcium Chloride

**CNSC** Canadian Nuclear Safety Commission

**DACC** Drilling and Completions Committee

**DOW** Dangerous Oilfield Waste

**EPA** Environmental Protection Agency

**EPAC** Explorers & Producers Association of Canada

**HAZ** Hazardous Waste

**H<sub>2</sub>S** Hydrogen Sulphide

**IRP** Industry Recommended Practice

**MBC** Mix/Bury/Cover

**MER** Ministry of Energy and Resources

**MSW** Municipal Solid Waste

**NaCl** Sodium Chloride

**NORM** Naturally Occurring Radioactive Materials

**OH&S** Occupational Health and Safety

**PSAC** Petroleum Services Association of Canada

**PPE** Personal Protective Equipment

**PPM** Parts per Million

**SDS** Safety Data Sheet

**TDG** Transportation of Dangerous Goods

**TDS** Total Dissolved Solids

**WHMIS** Workplace Hazardous Materials Information System



# Appendix D: References and Resources

## DACC References

Available from [www.energysafetycanada.com](http://www.energysafetycanada.com)

- IRP 02: Completing and Servicing Sour Wells

## Local Jurisdictional Regulations and Information

### **Alberta**

Available from [www.alberta.ca](http://www.alberta.ca):

- AEP Alberta User Guide for Waste Managers
- Alberta EDGE (Environmental and Dangerous Goods Emergencies) Dangerous Goods and Rail Safety publication, September 2018
- Environmental Protection and Enhancement Act, July 2020
- Private Sewage Disposal Systems Regulation, January 2016
- Safety Codes Act, July 2020

Available from [www.aer.ca](http://www.aer.ca)

- Assessing Drilling Waste Disposal Areas: Compliance Options Reclamation Certification Document (found under [Reclamation Certificate Application Submissions | Alberta Energy Regulator](#))
- Directive 050: Drilling Waste Management
- Directive 055: Storage Requirements for the Upstream Oil and Gas Industry
- Directive 058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry
- Directive 079: Surface Development in Proximity to Abandoned Wells
- ID 2003-01: 1) Isolation Packer Testing, Reporting, and Repair Requirements; 2) Surface Casing Venting Flow/Gas Migration Testing, Reporting, and Repair Requirements; 3) Casing Failure Reporting and Repair Requirements
- Manual 002: Drilling Waste Inspections

- Report 2009-A: Updates to Storage Requirements for the Upstream Petroleum Industry
- ST107: AER Approved Oilfield Waste Management Facilities

### ***British Columbia***

Available from [www.gov.bc.ca](http://www.gov.bc.ca):

- B.C. Guidelines for Industrial Camps Regulation, October 2017
- Hazardous Waste Legislation Guide, October 2016
- Hazardous Waste Regulation, November 2017
- Sewerage System Regulation, October 2018

Available from [www.bcoqc.ca](http://www.bcoqc.ca):

- British Columbia Oil and Gas Handbook Drilling Waste Management Chapter, November 2012

### ***Manitoba***

Available from [www.gov.mb.ca](http://www.gov.mb.ca):

- Drilling and Production Regulation, June 1994
- Hazardous Waste Regulation, M.R. 195/2015
- Landspraying While Drilling (LWD) Application and Approval Guidelines, June 2006
- Onsite Wastewater Management Systems Regulation, Man Reg 83/2003, June 2010.
- Water Works, Sewerage and Sewage Disposal Regulation, Man Reg 331/88 R, May 2007

### ***Saskatchewan***

Available from [www.saskatchewan.ca](http://www.saskatchewan.ca):

- Directive S-01 Saskatchewan Upstream Petroleum Industry Storage Standards
- Directive PNG008 – Injection and Disposal Well Requirements
- Directive PNG013 – Well Data Submission Requirements
- Guideline PNG023 - Submission of Drill Cuttings: Oil, Gas and Potash Wells
- Guideline GL97-01 Oily Byproduct Storage Structure Construction and Operation

- PDB ENV 09 GL99-01 Drilling Waste Management Guideline
- PDB ENV 11 GL2000-01: Saskatchewan Hydraulic Fracturing Fluids and Propping Agents Containment and Disposal Guideline
- The Private Sewage Works Regulations, The Public Health Act, September, 2011
- Sewage Handling Practices at Work Camps and Temporary Work Sites, October 2012

## Government of Canada Resources

Available from [www.gc.ca](http://www.gc.ca) or [www.canada.ca](http://www.canada.ca):

- [Canadian Guidelines for the Management of Naturally Occurring Radioactive Materials \(NORM\)](#)
- Cross-Border Movement of Hazardous and Recyclable Hazardous Waste Material Regulation
- TDG Bulletin: [Produced water](#)
- Transportation of Dangerous Goods Regulation (SOR/2001-286), February 2020

## Other References and Resources

- CAPP Guide: Waste Profile Sheets ([Oilfield Waste Profile Sheets Guide | CAPP](#))
- Paint Filter Liquids Test (US EPA Method 9095B) ([SW-846 Test Method 9095B: Paint Filter Liquids Test | Hazardous Waste Test Methods / SW-846 | US EPA](#))