

HGC0000  
HGC-MEM-001 BC-WAS-DSR Rev B  
BC WSA DSR Information Letter

March 15, 2016

To whom it may concern,

Re: *Information Letter* – Implementation of the new British Columbia Water Sustainability Act and BC Dam Safety Regulations (Reg 40/2016)

## **1 Introduction**

### **1.1 Purpose and Scope of Document**

Higher Ground Consulting (HGC) has prepared this document to provide information regarding the recent regulatory changes related to the British Columbia (BC) Water Sustainability Act and Dam Safety Regulations, as it pertains to the storage of water for the oil and gas industry. The document is intended to provide insight into these recent regulatory changes, outline the potential impacts and recommend some specific actions that owners may need to take. This document is intended to be a brief overview and focus on the most relevant changes to water storage. Should further information be required please contact HGC.

### **1.2 Background**

Previously in BC, water use including industrial oil and gas use, was regulated under the Water Act. As of March 1, 2016 the Water Sustainability Act (WSA) has replaced the Water Act.

Along with the WSA, the Dam Safety Regulations (DSR) have also been amended. The new BC Dam Safety Regulation (DSR, [BC Reg 40/2016]), now govern water storage dams in BC.

Under the previous DSR (BC Reg 163/2011), the definition of a dam explicitly limited dams to barriers impounding streams or stream diversions, and therefore excluded storage ponds holding storm water, fresh groundwater, frac water

---

and/or produced water from being classified as dams. In the past, many oil and gas storage structures were excluded from being regulated as dams.

Under the new BC DSR (Reg 40/2016) the definition of a dam is as follows:

***"dam"*** means

- (a) a barrier constructed for the purpose of enabling the storage or diversion of water diverted from a stream or an aquifer, or both, and*
- (b) other works that are incidental to or necessary for the barrier described in paragraph (a);*

Although the BC DSR (Reg 40/2016) does not specifically mention produced or frac water ponds, the BC Oil and Gas Commission (BCOGC) recently issued a document entitled "Water Sustainability Act Application Support for Operators" (March 1<sup>st</sup>, 2016, OGC WSA Support) that clarified produced water structures would not be subject to regulation as dams.

However, under the BC DSR (Reg 40/2016), the definition of "dam" does include structures impounding fresh or non-saline groundwater, such as bermed fresh water ponds. As noted in OGC WSA Support, these structures will now have to comply with the BC DSR (Reg 40/2016). Because the OGC does not employ Dam Safety Officers, these structures will be regulated by the Ministry of Forests, Lands and Natural Resource Operations (FLNRO); structures meeting the definition of a dam (discussed below) will need to be registered with FLNRO and maintained and operated in accordance with BC DSR (Reg 40/2016) and the standards of the Canadian Dam Association (CDA).

---

## 2 The WSA and Dam Safety Regulation

### 2.1 Changes under the Water Sustainability Act

All dams, except “minor dams” are subject to Part 2 of BC DSR (Reg 40/2016). In general Part 2 requires a dam owner to determine the dam failure consequence classification on an annual basis. “Minor dams,” are defined as being less than 7.5m in height and have a storage volume less than 10,000m<sup>3</sup>.

In addition to meeting the definition of dam discussed in Section 1.2, structures meeting any of the following criteria require registration as a dam and are subject to the additional requirements of Part 3 of the BC DSR (Reg 40/2016):

- (a) a dam 1 metre or more in height that is capable of impounding a volume of water greater than 1 000 000 m<sup>3</sup>;*
- (b) a dam 2.5 metres or more in height that is capable of impounding a volume of water greater than 30 000 m<sup>3</sup>;*
- (c) a dam 7.5 metres or more in height;*
- (d) a dam that does not meet the criteria under paragraph (a), (b) or (c) but has a classification of significant, high, very high or extreme.*

Once a structure is registered as a dam, the structure becomes subject to the requirements, guidelines and recommendations of the following documents:

- BC Dam Safety Regulation (BC Reg 40/2016),
- CDA Dam Safety Guidelines, and
- APEGBC Legislated Dam Safety Reviews in BC.

### 2.2 New Requirements of BC DSR (Reg 40/2016)

#### 2.2.1 Regulation of Oil and Gas Storage Ponds

One of the most significant impacts of the WSA is the expansion of the definition of dam to include oil and gas structures storing fresh water. The OGC WSA Support document clearly states that “structures such as a borrow pit, modified by adding a berm or a purpose-built water storage site,” that meet the definition of a dam will need to comply with BC DSR (Reg 40/2016). The WSA and BC DSR (Reg 40/2016) have also expanded “dams” to include structures storing diverted groundwater, which is defined as “water naturally occurring below the

---

surface of the ground,” as well as surface water. However as mentioned above, the OGC has excluded produced water and the associated storage structures from regulation under the WSA. These structures will continue to be managed by the OGC under the existing document entitled “Management of Saline Fluids for Hydraulic Fracturing Guideline” (February 2016, Version 1.1). Newly regulated “dams” in the oil and gas industry will be regulated by FLNRO.

### 2.2.2 Requirements for Owners of Dams

The first step for owners of newly regulated structures will be to determine the consequence of failure and subsequent hazard classification of their structure. This must be done for all dams, except for minor dams, within 60 days of construction under Part 2 of BC DSR (Reg 40/2016). For existing structures that were previously unregulated, owners will have until December 31<sup>st</sup>, 2016 to comply. Dams must be examined to determine the potential impact on human populations downstream of the dam, potential loss of life, impacts to the environment and cultural values, and the impact on infrastructure and economics. The highest classification in any category dictates the overall dam classification. Table 1 (attached) provides the various consequence categories.

Depending on the hazard classification, BC DSR (Reg 40/2016) requires dam owners to carry out and report to FLNRO ongoing monitoring, as summarized below. Table 2 (attached) contains the requirements for inspection and monitoring.

### 2.2.3 Requirements for “Low” Hazard Classification Dams

Many freshwater storage ponds used in the BC oil and gas industry will be “low” hazard classification dams under the new WSA. For owners of “low” hazard dams BC DSR (Reg 40/2016) requires:

- Determine the dam classification of the dam by December 31<sup>st</sup>, 2016 and submit the record proposing this classification to the Dam Safety Officer.
  - Conduct a quarterly site surveillance (may include instrumentation data analysis)
  - Annually test any mechanical components or outlet facilities
-

- Conduct an annual formal inspection
- Conduct an annual review of downstream conditions and reassess the hazard classification

#### 2.2.4 Requirements for “Significant” (or greater) Classification Dams

For ponds classified as “significant” hazard dams due to the associated risks with a breach an owner must:

- Develop a Dam Emergency Plan (DEP)
- Develop a dam Operations, Maintenance and Surveillance (OMS) Manual
- Conduct monthly site surveillance
- Conduct an annual formal inspection
- Annually test the operation of mechanical components and outlet facilities and monitor instrumentation
- Conduct an annual review of downstream conditions and reassess the hazard classification

#### 2.2.5 The Dam Safety Review

BC DSR (Reg 40/2016) does not require a formalized Dam Safety Review for “low” or “significant” hazard structures. However, this is not in alignment with current Canadian Dam Association guidelines, which recommends an audit at 10 year intervals for “significant” structures as well, or the Mines Act in BC, which requires audits for Tailings and Sludge Dams with a “significant” classification. Considering the regulatory climate following the recent mine tailings dam failures in BC, it is possible that the dam safety review requirements will be extended to “significant” structures in the future.

The Dam Safety Review is a formalized process conducted by an independent expert; i.e. an experienced Professional Engineer who is neither employed by the Owner nor the Engineer of Record for the structure (responsible for the design, construction and/or operation of the dam). Section 20 of BC DSR (Reg 40/2016) requires that the engineering professional who carries out the Dam Safety

---

Review has the “qualifications and experience in dam safety analysis,” necessary.

The requirements and expectations for Dam Safety Reviews are further prescribed by the APEGBC practice document “Legislated Dam Safety Reviews in BC.” Section 5 of this document mandates that a “qualified professional engineer” has involvement with a minimum of three (3) previous Dam Safety Reviews and at least 15 years of related experience in dam design, construction, evaluation and operation. HGC staff are qualified to perform Dam Safety Reviews in BC.

### 2.3 Mitigation and Next Steps

The WSA and BC DSR (BC Reg 40/2016) regulations came into effect on March 1<sup>st</sup>, 2016. Owners of existing but previously unregulated dams, which will include a large amount of oil and gas structures, have a period of time to transition to the new regulations. In this time period the following steps will be necessary:

1. Classify all existing structures based on the Dam Failure Classification, to determine which structures will be subject to dam regulations and require registration by December 31<sup>st</sup>, 2016.
2. Develop a Dam Safety Program as outlined in the 2013 Canadian Dam Association Guidelines (CDA Guidelines) and BC Government Inspection and Maintenance of Dams – Dam Safety Guidelines (2011).
3. Conduct site surveillance, a formal inspection and test the operation of all components of the dam. Records must be kept and retained for these activities.
4. Develop a DEP and OMS for “significant” and higher hazard dams in accordance with DSR and CDA Guidelines
5. Have a qualified Professional Engineer conduct a Dam Safety Review for any dams classified as “high,” “very high,” or “extreme.”

In addition to our extensive experience in the design, construction and operation of oil and gas water storage ponds, HGC’s Professional Engineers have been involved in a number of Dam Safety Reviews and have completed Dam Failure Classifications on multiple dams. Our qualified personnel have the experience

---



**Higher Ground Consulting Inc**  
#200, 638 11<sup>th</sup> Ave S.W.  
Calgary, Alberta T2R 0E2  
Ph: (403) 999-4266  
info@hgc.solutions

---

and expertise to perform these tasks, as well as the on-going inspection and monitoring activities that the new WSA and BC DSR (Reg 40/2016) and CDA Guidelines require.

---

### **3 Closure**

We would welcome the opportunity to discuss the potential impacts of the WSA on particular operations and how HGC can support with these changing regulations.

Please do not hesitate to contact HGC should you have further questions or wish to discuss this matter further.

Sincerely,

A handwritten signature in black ink, appearing to read "R. MacDonald".

Richard MacDonald, M.Eng, P.Eng, PMP  
Managing Partner  
**Higher Ground Consulting Inc.**

---