Alberta

1. **Definitions**
    a. Produced Water – Water brought to the surface during oil or gas well drilling, completion, and production operations, which may include formation water, injected water, and flowback water.
        i. If your state defines the term "produced water," please provide that definition below.

        The Oil and Gas Conservation Act (OGCA) and the Oil and Gas Conservation Regulation (OGCR) does not define produced water.

        The AER has published two definitions for produced water. AER Directive 051: Injection and Disposal Wells – Well Classifications, Completions, Logging, and Testing Requirements refers to produced water as water associate with the recovery of oil, bitumen, gas, or coalbed methane. Directive 081: Water Disposal Limits and Reporting Requirements for Thermal In Situ Oil Sands Schemes defines produced water as water that is produced in association with hydrocarbon production from a well that was licensed for the purpose of hydrocarbon production.

    b. Recycle/Reuse – To process or treat produced water or its constituent substances for beneficial use.
        i. If your state defines the term "recycle" or "reuse," please provide the definition(s) below.

        The Oil and Gas Conservation Act (OGCA) and the Oil and Gas Conservation Regulation (OGCR) does not define water for recycle or reuse.

2. **Ownership**
    a. Please describe the authority (deed, lease, contract, statute, regulation, case law, common law etc..) and include any relevant citations under which any of the following occurs.
        i. The right to produce water during well completion and oil and gas production operations.

        Protecting the environment, including water, is part of the AER's mandate. Therefore, any energy resource development that involves water is under our authority. Oil and gas companies in Alberta use water in a variety of activities; some of these activities have the potential to affect the quality and quantity of Alberta's water, either surface water or groundwater. We work hard to ensure that these

companies use and manage water safely and responsibly, and protect water resources from possible impacts from their operations.

ii. Ownership of produced water from oil or gas wells after it has been brought to the surface.
Ownership depends on the mineral rights holder, which is outside of AER jurisdiction.

Produced water is a by-product of oil and gas production. Companies require AER approval prior to using water to develop resources. If a company isn't meeting our requirements, we'll use one of our many compliance and enforcement tools to bring them back into compliance and assess penalties where appropriate.

iii. Use and/or reuse of produced water in the oilfield.
The AER reviews all energy development applications under the Water Act to ensure their operations comply with requirements

iv. Use and/or reuse of produced water outside of the oilfield.
The AER does not regulate outside of the energy industry in Alberta.

b. Place an "x" in each box to indicate who holds the right to each of the following regarding water that has not yet been produced.

Who	Possession	Use	Other rights (please specify)
Landowner			
Operator			
Government			
Other (please specify)			

c. Place an "x" in each box to indicate who holds the right to each of the following regarding produced water after it has been brought to the surface.

Who	Possession	Use	Other rights (please specify)
Landowner			
Operator			
Government			
Other (please specify)			

d. Does the quality of the produced water play a role in the ownership of the water?

3. Liability

a. Please provide the cite to any relevant state statute/case law/regulation regarding liability for:

i. Produced water handling (extraction, transportation, sale, etc.).

https://www.aer.ca/regulating-development/rules-and-directives/directives

Directive 007: Volumetric and Infrastructure Requirements
Directive 017: Measurement Requirements for Oil and Gas Operations
Directive 044: Requirements for Surveillance, Sampling, and Analysis of Water Production in Hydrocarbon Wells Completed Above the Base of Groundwater Protection
Directive 055: Storage Requirements for the Upstream Petroleum Industry
Directive 058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry
Directive 081: Water Disposal Limits and Reporting Requirements for Thermal In Situ Oil Sands Schemes

ii. Use and/or reuse of produced water in the oilfield:

1. By the producer

2. By a different operator

Directive 007: Volumetric and Infrastructure Requirements
Directive 017: Measurement Requirements for Oil and Gas Operations
Directive 044: Requirements for Surveillance, Sampling, and Analysis of Water Production in Hydrocarbon Wells Completed Above the Base of Groundwater Protection
Directive 055: Storage Requirements for the Upstream Petroleum Industry
Directive 058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry
Directive 081: Water Disposal Limits and Reporting Requirements for Thermal In Situ Oil Sands Schemes

iii. Use and/or reuse of produced water outside of the oilfield.

4. State or Provincial Regulatory Agency

a. State or provincial agencies charged with regulating the use/reuse of produced water:

The AER ensures the safe, efficient, orderly, and environmentally responsible development of oil, oil sands, natural gas, and coal resources over their

entire life cycle. This includes allocating and conserving water resources, managing public lands, and protecting the environment while providing economic benefits for all Albertans.

Contact information:

https://www.aer.ca/providing-information/about-the-aer/contact-us

Brief summary of areas of responsibilities:

https://www.aer.ca/protecting-what-matters/holding-industry-accountable/how-does-the-AER-regulate-energy-development-in-alberta

b. Federal agencies charged with regulating the use and/or reuse of produced water: If available, please provide appropriate contact information.

The Canadian Energy Regulator (CER) has federal jurisdiction across Canada for the oversite of energy development.

5. Incentives

a. Does your state or province have any incentives to use and/or reuse produced water in the oilfield? If so, please describe.

The AER publishes the Water Use Industry Performance report which shows non-saline water use and recycle water use for operators in multiple oil and gas extraction sectors (enhanced oil recovery, hydraulic fracturing, in situ oil sands and oil sands mining). This report shows how operators compare to each other and show trends over time for water use for oil and gas extraction. This can encourage communication of best practices amongst operators and shows operators that are doing well at conserving high quality non-saline water and recycling water.

b. Outside of the oilfield? If so, please describe.

Does not apply to the AER

6. Innovations and Successes

a. Do you have any innovative or unique approaches to addressing use and/or reuse of produced water? If so, please provide a brief description.

The Water Conservation Policy for Upstream Oil and Gas operations, which is pending release from Alberta Environment and Parks, aims to conserve high quality non-saline water and promote the use of alternative waters by making the application process for high quality non-saline water more rigorous. The application process will require an assessment of alternative water sources (including recycled water) and the potential environmental effects for possible water source options.

The AER is working on developing more options to provide operators with flexibility for transportation and storage of produced water and flowback water.

b. Does the quality of the produced water pose impediments to recycling and reuse?

The quality of produced water does not generally pose impediments if it is reused in the same operation (e.g., re-injected into the same water flood scheme), but if the produced water is used in a different operation there may be issues with water chemistry not being compatible. With respect to hydraulic fracturing, the quality of the water used to make fracturing fluid can affect the success of a completion operation; however, various chemical additives are widely available to overcome those challenges in many situations.

7. Other Information

a. Please provide any additional notes or commentary below.

Produced water is considered a by-product of oil and gas production and is usually high in chlorides making the water unfit for uses outside of the oil and gas industry. Produced water's main use in Alberta is for pressure maintenance and water flood operations in enhanced oil recovery (EOR) schemes. The AER requires licensees to account for all water volumes produced and disposed of, whether the disposal is done in an EOR scheme, disposed to a water disposal formation, or sent to a waste management facility.