

**Production Water Reuse and Waste Minimization Plan**  
**Water Transfers Between**  
**Ursa Operating Company LLC and Encana Oil and Gas (USA), Inc.**

## **Introduction**

Ursa Operating Company LLC ("Ursa") and Encana Oil and Gas (USA) Inc. ("Encana") are each currently and separately engaged in natural gas exploration and production operations in the Piceance Basin, which encompasses areas of Garfield and Mesa Counties, Colorado. Hydraulic fracturing operations associated with completing individual natural gas wells in the Piceance Basin require large volumes of water. A very significant percentage of the water used to conduct hydraulic fracturing is provided by operators from recycling and reuse of formation water co-produced with natural gas from their previously drilled production wells. In addition, the flowback water obtained from the return of hydraulic fracturing fluids following well stimulation is recovered and treated for subsequent reuse during additional well completion operations. Producers typically operate various permitted facilities to manage, treat and store produced water from its operations ("Production Water" as defined more specifically in the Appendix A of the Water Custody Transfer Agreement), to support recycling and reuse of water during additional drilling, completion and workover activities. This plan is specific to the transfer of water for reuse and does not supercede the Waste Management Plans developed by each Operator applicable to other assets.

Depending largely on the level and location of drilling activity, conditions may exist when and where Ursa Production and Flowback Water volumes exceed its available treatment and storage capacity and Ursa Production/Flowback Water is transferred for final disposal (with no further possibility for recycling or reuse) to a licensed commercial disposal facility. Under other conditions, Ursa may need additional water to support its activities in new or peripheral areas that are removed from its infrastructure of water gathering lines, and water treatment and storage facilities or otherwise where its own supply of Production and Flowback Water may be inadequate or inconvenient for that specific location or time.

Encana's operations also occur in the Piceance Basin and in some areas are proximal to Ursa operations. Similarly, Encana's operations experience conditions where its supply of Production/Flowback Water is excessive or insufficient to meet its demands for drilling, completion and workover activities for a given location or time. When either operator's demand for makeup water exceeds their current and foreseeable supply of Production and Flowback Water, historically one recourse has been to extract fresh water from either company's rightful water rights and store and treat the fresh water for subsequent downhole use even though other nearby operators may have an abundant supply of Production/Flowback Water that they have no immediate or foreseeable need to use. In this Waste Management Plan, submitted pursuant to The Colorado Oil and Gas Conservation Commission ("COGCC") Rules, Ursa and Encana seek to implement this Production Water Reuse and Waste Minimization Plan for water transfers. The approval of this Plan satisfies the "director approval" requirement to reuse and recycle under COGCC Rules 907(a)(3) and (c)(3).

## **Purpose**

In order to establish a mutually beneficial relationship, that promotes the reuse of Production/Flowback Water and avoids the withdrawal of precious fresh water supplies, Ursa and Encana have entered into a legally binding agreement, a copy of which is attached as Appendix A, whereby volumes of each company's Production/Flowback Water could be transferred to the other company, on an as-needed, as requested basis, for re-use in each other's respective drilling, completion, and workover operations.

Sharing via transfer of Production and Flowback Water between operators represents a best management practice that promotes fresh water conservation, waste minimization, recycling, and re-use; consistent with the stated regulatory objectives of various State agencies (DWR, CDPHE and COGCC). This Production Water Reuse and Waste Minimization Plan (Reuse Plan) satisfies the requirements of the COGCC Rule 907.a(3) for the reuse and recycling of E&P Waste, which states:

***Reuse and recycling.** To encourage and promote waste minimization, operators may propose plans for managing E&P waste through beneficial use, reuse, and recycling by submitting a written management plan to the Director for approval on a Sundry Notice, Form 4, if applicable. Such plans shall describe, at a minimum, the type(s) of waste, the proposed use of the waste, method of waste treatment, product quality assurance, and shall include a copy of any certification or authorization that may be required by other laws and regulations. The Director may require additional information*

### **Anticipated Benefits**

Under this Reuse Plan, each party shall use reasonable and available means to safely transfer Production/Flowback Water, in sufficient volumes and quality, to meet the other party's transfer requests, when mutually agreeable to do so. The benefits of this plan include:

- Shorter haul distances and an overall reduction of truck traffic on lease and county roads, and state and federal highways, for an operator to supply and/or dispose of Production/Flowback Water in the absence of sharing and transfer of Production/Flowback Water between operators. This will result in:
  - Less road damage
  - Decreases in criteria air pollutions from water truck exhaust emissions and fugitive dust
  - Less noise
  - Fewer accidents and spills involving water trucks
- Fewer fresh water withdrawals from surface water sources
- Less reliance on injection wells for disposal of Production and Flowback Water, and
- Increased operating efficiencies from reusing local supplies of Production and Flowback Water to meet water demands for drilling, completion and workover activities.

### **Proposed Use, Transfer and Ownership of Production Water**

To promote waste minimization, Encana, as the Receiver, will accept Production/ Flowback Water generated from Ursa's operations as the Supplier/Shipper in the Piceance Basin of Colorado, if and when needed by Encana and as consented to by Ursa, to support Encana's drilling, completion or work over operations. Ursa's Production/ Flowback Water will be delivered by pipeline or truck to a mutually agreed upon transfer location (~~"Transfer Location" as identified in a Record of Transfer included as Exhibit A in Appendix A~~). Transfer locations will be located at COGCC currently approved locations or facilities, such as storage tanks on well pads, multi-well pits or centralized E&P Waste Management Facilities. Transfer Locations will change over time as activities conclude in one area and move on to other locales. Best management practices for spill prevention and control will be applied at each Transfer Location. Ursa will be responsible for measuring and recording the volumes of Production and Flowback Water transferred utilizing a Record of Transfer.



Similarly, Ursa has agreed to accept Production/ Flowback Water as the Receiver generated from Encana's operations as the Supplier/Shipper in the Piceance Basin of Colorado, if and when needed by Ursa and as consented by Encana, to support Ursa's drilling, completion or workover operations. Encana's Production and Flowback Water will be delivered by Encana to a mutually agreed upon Transfer Location, initially herein identified on the attached Exhibit "B" as the Encana 01EB pad Point of Custody Transfer. Subsequent to the initial Transfer Location, Ursa's received water will be transported via an existing Temporary Water Line of steel construction uphill until it reaches the Ursa CSF T-Pad Temporary Completions Staging area, then transported further through twin 4 inch poly lines until it reaches Ursa CSF E Pad located in Section 9 of Township 7 South – Range 91 West, as shown on Exhibit "B" to use in Ursa's; CSF 44B 09 07 91, CSF 44C 09 07 91, CSF 22C 09 07 91 and CSF 22D 09 07 91. Transfer Locations will change over time as completion activities conclude in one area and move on to other locales. Spill prevention and control Best Management Practices will be applied at each Transfer Location. Encana will be responsible for measuring and recording the volumes of Production and Flowback Water transferred utilizing a Record of Transfer. The COGCC has determined that the activities contemplated herein do not qualify as a Centralized E&P Waste Management Facility.

Ursa shall maintain all legal and regulatory responsibility, custody and control for its Production/Flowback Water until it is delivered to Encana. At the time of delivery Encana will assume all legal and regulatory responsibility, custody and control for that Production and Flowback Water. Similarly, Encana shall maintain all legal and regulatory responsibility, custody and control for its Production and Flowback Water until it is delivered to Ursa. When Ursa will assume all legal and regulatory responsibility, custody and control for that Production and Flowback Water. The Water Custody Transfer Agreement between Ursa and Encana in Appendix A provides the details of this arrangement.

In the event that one party desires to terminate the Water Transfer Agreement, written notice shall be provided to the other party [at least 30 days prior to the effective date of the termination. In addition, the terminating party is also responsible for notifying the COGCC in writing of the termination of the Water Transfer Agreement with the respective operator].

#### **Source, Treatment and Quality of Production Water**

The Supplier/Shipper will be responsible for identifying the source of the Production/Flowback Water on the Record of Transfer, which will only include water from facilities permitted by the COGCC including produced water storage tanks, multi-use or production storage pits, and centralized E&P waste management facilities. The majority of natural gas wells in the Piceance Basin are completed in the Williams Fork Formation, and a minority of the wells are completed in the Iles, Mancos and Niobrara Formations. Varying amounts of formation water are co-produced with the natural gas from within these formations and over the life of the well.

This Reuse Plan recognizes the Colorado State Engineer Office's ("SEO") Rules for Produced Non-tributary Ground Water (C.R.S. § 37-90-137(7), 2 CCR 402-17) that govern the administration of wells, including oil and gas wells, that dewater geologic formations by withdrawing non-tributary ground water to facilitate or permit the mining of minerals. Only Production/Flowback Water derived from an operator's non-tributary oil and gas wells will be allowed as a supply source for a transfer between operators to accommodate reuse under this Reuse Plan. The operator acting as the Supplier/Shipper is responsible for ensuring that only Production and Flowback Water from non-tributary and non-coalbed methane formations is utilized as a source for water transfer and re-use by another operator.

Specifically, SEO Rule 17.7.D delineates geographic areas under which the ground water in certain geologic formations is non-tributary. Non-tributary ground water in this area of the Piceance Basin includes ground water from the currently producing formations of the Undifferentiated, Middle, and Lower Wasatch Formation, the Iles Formation, the Williams Fork Formation, and the Undifferentiated Mesa Verde Group. The delineated areas and subject formations defined as non-tributary may be viewed through Division of Water Resources' public data viewing tools as they are developed and the data files describing the areas are also available for downloading from the Division of Water Resources' website. All of Ursa and Encana produced water is withdrawn from these approved non-tributary groundwater formations.

Prior to transfer for reuse by another operator, the Supplier/Shipper or Receiver, as mutually agreed upon, shall be responsible for treatment of the Production/ Flowback Water which may involve one or more of the following: primary separation at the wellhead, addition of bactericide, removal of any surface accumulations of oil/condensate, and basic separation of solids. Treatment shall be sufficient to allow for the intended reuse of the Production and Flowback Water for makeup fluid to support either drilling, completion, or workover operations for natural gas wells. Each operator will be obligated to provide and maintain documentation of the quality of its Production/ Flowback Water and the volumes transferred in accordance with applicable laws and regulations.

Specifically, Ursa and Encana will each maintain laboratory analytical results for a representative sample(s) of its Production and Flowback Water. On an annual basis, one or more samples will be collected for the type of source(s) representative of the Production and Flowback Water and analyzed for the following chemical parameters using the appropriate EPA standard analytical method:

- |                                       |                        |
|---------------------------------------|------------------------|
| • Volatile organic compounds          | EPA Method 624 (GC/MS) |
| • Semi-volatile organic compounds     | EPA Method 625 (GC/MS) |
| • Dissolved Metals                    | EPA Method 200.7 (ICP) |
| • Dissolved Inorganics (non-metals)   | EPA Method 300.0 (IC)  |
| o Br, Cl, F, Nitrate/Nitrite, Sulfate |                        |
| • General water quality parameters    |                        |
| o Specific Conductance                | EPA Method 120.1       |
| o Hardness                            | EPA Method 130.1       |
| o Total Dissolved Solids              | EPA Method 160.1       |
| o pH                                  | EPA Method 150.2       |
| o Alkalinity                          | EPA Method 310.1       |
| • Gross alpha and beta radioactivity  | EPA Method 900.0       |

#### **Measurements, Recordkeeping and Reporting**

In addition, the party acting as the Supplier/Shipper for each requested transfer of Production/Flowback Water will be responsible for measuring transfer volumes and maintaining records for the volumes transferred in accordance with applicable laws and regulations including COGCC Rule 907.b.(2).



Ursa and Encana will each separately submit an annual report to the COGCC summarizing the transfers of Production/ Flowback Water (both as the Supplier/Shipper and the Receiver) during the calendar year and including laboratory analytical results for representative sample(s) of the Production/Flowback Water provided as the Supplier/Shipper. The annual report will include a spreadsheet that summarizes the information contained in the Record(s) of Transfer, and include copies of individual Records of Transfer. The annual report for the previous calendar year will be submitted to the COGCC by February 15 of the following year.

#### **Voluntary Standard Operating Procedures and Approval Conditions**

- If locations are in a sensitive area because of its proximity to surface water; Operator will comply with applicable Federal and state secondary containment regulations for any volume of fluids contained at the Water Handling Facility site during natural gas development activities and operations; including but not limited to, construction of a berm or diversion dike, diversion/collection trenches within and/or outside of berms/dikes, site grading, or other comparable measures (i.e. Best Management Practices (BMPs) associated with storm water management) sufficiently protective of nearby surface water. Any berm constructed at the well pad location will be stabilized, inspected at regular intervals (as required by EPA, COGCC and CDPHE regulations and permit COAs ), and maintained in good condition.
- Operator must implement Best Management Practices to contain any unintentional release of fluids, including any fluids conveyed via temporary surface pipelines.
- Operator shall provide overflow protection for each tank proposed, if tanks are used.
- Operator proposes that the transfer facilities/locations will be in operation for a period less than three (3) years. Should the operation of this facility continue more than three years, a form 28 shall be submitted and approved before the three-year anniversary date of the first use of the transfer facility/location.

### Authorization and Points of Contact

This Production Water Reuse and Waste Minimization Plan for Water Transfers Between Ursa Operating Company LLC and Encana Oil and Gas (USA) Inc. is hereby authorized for implementation by:

Don Simpson, REGULATORY MGR FOR 7-30-14  
Don Simpson,  
VP Business Development  
Ursa Operating Company LLC  
Date

Julia M. Carter 7/30/2014  
Julia M. Carter  
Manager Western Operations Piceance Regulatory & Permitting  
Encana Services Company Ltd. **Encana Oil & Gas (USA) Inc., acting by  
and through its authorized agent,  
Encana Services Company Ltd.**  
Date

The primary and secondary points of contact representing Ursa are:

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The primary and secondary points of contact representing Encana are:

**Primary**

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