Caerus Piceance LLC
1001 Seventeenth Street
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ELU A18-495 Well Pad Water Use Plan

Purpose:

The information presented below is to inform the COGCC of the plan by Caerus Piceance LLC (Caerus) for water use, specifically for development of the ELU A18-495 Well Pad. This plan covers all requested information by COGCC outlined in Rule 304 c. (18).

Surface/Groundwater Water Sources and Volumes:

Table 1 describes all the fresh water sources that may be used for the development of the ELU A18-495 Well Pad. Caerus maintains numerous industrial freshwater rights in the Piceance Basin surface water bodies for development of its assets. The water balance within the field, Caerus' infrastructure usage and Completions' program fluctuates based on development initiatives. Therefore, the volumes below are estimates developed with the best information available at the time of this documents' writing. It is important to note this as some of the water use amounts may differ from the White River Field Office Bureau of Land Management's (BLM) Environmental Assessment, DOI-BLM-CO-N050-2020-0052-EA, that was assessed in 2020. Caerus submits annual reports to the BLM year-end regarding water usage for each well pad so that they may continuously assess water usage for future review.

Table 1: Fresh Water (Surface) Sources

Name	Fresh Water Source Type	End Use	Lat/Long	Transport Method	Volume (bbls/well)
Una Bridge APOD (WD ID# 3901079)	Surface	Drilling and/or Completions	- 39 23' 37.57"N 108 6' 8.60"W	Pipeline	72,765
North Parachute Ranch West Fork POD (WD ID# 3901083)	Surface	Drilling and/or Completions	39 37' 49.51"N 108 11' 42.57"W	Pipeline	10,000
North Parachute Ranch West Fork POD (WD ID# 3901083)	Surface	Pad Construction and/or Dust Control	39 37' 49.51"N 108 11' 42.57"W	Trucking	1,610

Caerus will not directly use any fresh groundwater resources in the operations for this pad location

Recycled Produced Water:

When Caerus is actively running drilling and completion operations, it is estimated that up to 95% of produced water is recycled for re-use in drilling and downhole operations, but this will vary depending on the development initiatives. Caerus is deeply committed to avoiding, when possible, the use of freshwater for operations. Caerus continually seeks opportunities for beneficial reuse by utilizing another Operator's produced water via water sharing agreements to avoid or offset freshwater use.

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These agreements are often entered into shortly before operations begin. The water sharing agreements are confidential. Caerus has invested significant resources in continued expansion and operations of its' produced water infrastructure for supporting completion operations. This responsible environmental approach eliminates or reduces local freshwater impacts in Caerus' operating area in the Completion stage of operations.

Table 2 below outlines the anticipated recycled produced water sources that will be utilized for hydraulic fracturing operations. Each facility source listed below collects, treats and stores produced water from wells that are owned and operated by Caerus. Treatment at each source is TSS (Total Suspended Solids) removal utilizing DAF (Dissolved Air Floatation technology in which typical removal efficiencies are >90%.

Timeline for the reuse/recycling is highly dependent on the water balance, but the typical window for storing recycled produced water in preparation for completion operations can be ~30-90 days prior to commencement. With thirty-five (35) wells planned on the ELU A18-495 Well Pad roughly 105 days will be devoted for conveying the recycled sources to completions operations via a pipeline and once finished, flowback/produced water is returned to the facilities via pipeline for treatment and storage. Ideally, the water is once again treated, stored and returned to the next subsequent completion operation in Caerus development plan for reuse. However, due to scheduling changes and other unforeseen events causing water volumes to exceed capacity of the infrastructure, the final disposition of the treated recycled sources will be to Caerus' permitted Class 2 UIC wells.

Table 2: Recycled Produced Water Sources

Name*	Waste Water Type	Treatment Type	Storage Type	Beneficial Use	Lat/Long	Transport Method	Volume (bbls/well)
Divide Road Facility (ID #432214)	Recycled Produced Water	TSS Removal	Tanks	Completions	39.669514 / -108.133126	Pipeline	125,910
North Parachute Ranch EP Waste Mgmt (ID #120803)	Recycled Produced Water	TSS Removal	Tanks	Completions	39.579317 / -108.105845	Pipeline	62,955
High Mesa Evap Ponds (ID #149013)	Recycled Produced Water	TSS Removal	Ponds	Completions	39.398429 / -108.059156	Pipeline	7,870

*Individual well sources are identified in the Form 28 Facility annual reports. (The most recent submitted annual reports are found in document # 402586285, 402640395, 402649313).

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Hydraulic Fracturing Chemical Additives:

Caerus does not utilize any of the constituents listed in Table 437-1 as "additives" in hydraulic fracturing operations. However, some of the constituents are naturally present in recycled produced water, which originates in the same formation to which it is reused. Please refer to Appendix A attached to this plan for specifics of concentration of background levels for each recycled produced source that is outlined in "Table – Recycled Produced Water Sources." Caerus has not yet built or developed the wells on the ELU A18-495 well pad, so are not yet available and therefore have not been analyzed. Once the wells are drilled and completed, Caerus will provide a Form 4 sundry with the full analyte suite analysis, if detected, once the wells have been completed.

Rationale for Fresh Water Use:

Drilling - Fresh water is required for Caerus drilling operations to ensure consistent mud properties and chemical compatibility with the base fluid and additives. Produced water contains dissolved solids that alter the mud properties and chemical composition of the mud that does not allow for mud properties required to drill the wells.

Completions – Caerus does not add any proppants downhole during completions. While Caerus strives for recycled produced water to be used as the sole source for hydraulic fracturing operations, there are instances when this is not possible. Unforeseen/uncontrolled weather events, scheduling changes, extrapolation of water forecasts and other factors can create cumulative error in the planning process leading up to the day of execution yielding a deficit of water volume required by design. At this juncture, Caerus utilizes its industrial freshwater rights, in accordance with appropriate water laws, to close the gap in required volume for completions operations.

Pad Construction/Dust Abatement – Fresh water is required for construction of pads and road maintenance due to proximity of surface and ground water sources, and in the instance is required by the surface owner. Utilizing fresh water for this purpose has no potential impact for contamination since the surface sources that Caerus draws from are "background" to the areas in which they are used. Also, such use has little to no impact on the local and global water cycle, as it is returned to the surface.

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Appendix A:

Background Concentrations for Produced Water - Divide Road Facility	
Analyte	Background Concentration (mg/L)
Cadmium	Non-detect
Chromium	0.00619
Lead	0.00308
Arsenic	Non-detect
TPH High Fraction	18.53
TPH Low Fraction	102
Benzene	9.01
Toluene	14.5
Ethylbenzene	0.541
Xylene	7.74
Naphthalene	Non-detect
1,3,5-Trimethylebenzene	0.431
1,2,4-Trimethylbenzene	0.503

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