

**Water Plan – 304.c.(18)**

**Federal RGU 44-1-298 Oil and Gas Location**

**Loc ID #335640**

**December 2022**



## **INTRODUCTION**

The purpose of this Water Plan is to provide COGCC with specific information regarding the source and quantity of water that will be used during drilling and completion activities at the Federal RGU 44-1-298 pad. The sources of water, the volumes, and the water take-out points are described in greater detail below. This Water Plan has been prepared in accordance with COGCC Rule 304.c.(18). This plan also provides details regarding reuse and recycling of produced water during development of the proposed wells on the Federal RGU 44-1-298 pad. The reuse and recycling requirements outlined in COGCC Rule 905.a.(3) are described in detail below.

## **SITE DESCRIPTION**

The existing Federal RGU 44-1-298 pad is one (1) of two (2) Oil and Gas Locations included in the Ryan Gulch Phase 3 Oil and Gas Development Plan (“OGDP”). Development of the Federal RGU 44-1-298 pad involves the reconstruction of the existing pad, construction of a new pipeline corridor for natural gas and produced water transportation, and utilization of other existing facilities (i.e. Federal RGU 23-7-297 pad) to support well completion and production operations.

The existing Federal RGU 44-1-298 pad is located in Lot 35 and Lot 36 of Section 1, Township 2 South, Range 98 West, 6th P.M., within Rio Blanco County, Colorado, on Federal surface administered by the Bureau of Land Management (“BLM”). TEP is proposing to reconstruct the Federal RGU 44-1-298 pad to support drilling, completion, and production operations of the eighteen (18) proposed natural gas wells. The Federal RGU 44-1-298 pad will have a constructed pad elevation of 6,277.5 feet.

The existing 3.77-acre Federal RGU 44-1-298 pad will be reconstructed and expanded to a 5.63-acre footprint for drilling and completions operations of the eighteen (18) proposed directional wells. The long-term disturbance attributed to the Federal RGU 44-1-298 pad will be approximately 1.65-acres. The existing access road will be utilized during development of the proposed wells on the Federal RGU 44-1-298 pad. The existing access road will be improved during reconstruction of the Oil and Gas Location to support proposed activities. The existing access road improvements will account for 0.28-acres of disturbance with approximately 0.17-acres remaining after reclamation. The proposed pipeline corridors will account for an additional 3.56-acres of disturbance with approximately 0.05-acres (existing roads) remaining after reclamation. The total disturbance associated with development of the Federal RGU 44-1-298 pad will be approximately 9.47-acres. Approximately 1.87-acres of disturbance will remain long-term following interim reclamation of the proposed facilities and pipeline corridors. All proposed disturbance will be located on Federal surface. Please see the Plan of Development attached to the Form 2A for a detailed breakdown of disturbance acreage for all project components associated with the Federal RGU 44-1-298 pad.

Construction activities for the Federal RGU 44-1-298 pad are scheduled to begin September 2023 and are expected to take approximately sixty (60) days to complete. Drilling operations for the eighteen (18) proposed directional wells will begin in November 2024. Since SIMOPS is planned for development of these wells, well completion operations would begin January 2025. Drilling operations are expected to take approximately one-hundred-eighty-three (183) days and should be completed in May 2025. Well completion operations are expected to take approximately one-hundred-and-eighty (180) days and should be completed in July 2025. Reclamation of the Federal RGU 44-1-298 pad will begin August 2025 and is expected to take approximately thirty (30) days to complete.

## WATER SOURCES AND VOLUMES

### Dust Control

Fresh water will be required for dust control during site construction, drilling operations, and during long-term production operations. The primary fresh water sources to be used for dust control activities will be from the Mautz Ranch Fresh Water Pond. The Mautz Ranch Fresh Water Pond is a freshwater loadout located on private property along Ryan Gulch South of the Mautz Ranch Multi-Well Pit (COGCC Loc ID: 422672). Two alternative sources, the Burke Fresh Water Takeout and the Mantle Fresh Water Takeout may be utilized in the event there is no available fresh water at the Mautz Ranch Fresh Water Pond. All fresh water will be transported by private contract water hauling trucks equipped with 80 bbls tanks.

The water hauling trucks will utilize existing county roads and lease roads and will follow existing truck routes where applicable. The intake on the water pumps at the source locations will be fitted with a quarter-inch (0.25") mesh screen to prevent impacts to aquatic wildlife in the pond. TEP estimates that approximately 3,000bbls (167bbls / well) of fresh water will be used for dust control during construction.

Dust control measures will be implemented as required per COGCC Rule 427.b-c. Only fresh water (potable or non-potable) will be used to conduct dust suppression activities within 300 feet of the ordinary high-water mark of any water body. On average, TEP estimates that approximately 500 bbls / well of fresh water will be used to control dust during drilling operations. Dust control measures are described in greater detail in the Dust Mitigation Plan attached to the Form 2A. The sources and volumes of fresh water required for dust control activities are summarized in Table 1, Water Source Table.

### Drilling Operations

Fresh water will be required for drilling operations (surface, intermediate, and production casing). The primary fresh water sources to be used for drilling activities will be from the Mautz Ranch Fresh Water Pond. The Mautz Ranch Fresh Water Pond is located on Ryan Gulch on TEP property. Two alternative sources, the Burke Fresh Water Takeout and the Mantle Fresh Water Takeout, may be utilized in the event there is no available fresh water at the Mautz Ranch Fresh Water Pond. All fresh water will be transported by private contract water hauling trucks equipped with 80 bbls tanks.

The water hauling trucks will utilize existing county, state, and lease roads and will follow existing truck routes where applicable. The intake on the water pumps at the source locations will be fitted with a quarter-inch (0.25") mesh screen to prevent impacts to aquatic wildlife in the river or ditch. TEP estimates that approximately 4,000bbls per well of fresh water will be used for drilling operations.

### Well Completions Operations

Well completion operations will be conducted utilizing recycled produced water from other producing natural gas wells operated by TEP, which is stored and managed at TEP's existing water management facilities in Ryan Gulch. Recycled produced water will be transported from three (3) TEP owned and operated water management facilities including the proposed Pitcher's Mound Centralized E&P Waste Management Facility, the existing Mautz Ranch Multi-Well Pit, and the existing Northeast Ryan Gulch Water Recycling Facility. Water will be pumped from each facility to the Federal RGU 23-7-297 pad during well completion operations via existing pipeline infrastructure. Fluids for well completion operations will then be pumped from the Federal RGU 23-7-297 pad to the wells on the Federal RGU 44-1-298 pad via proposed temporary surface steel frac pipelines. The sources and volumes of recycled produced water required for completions support activities are summarized in Table 1, Water Source Table.

If additional produced water is needed for well completion operations, TEP will consider entering into a Water Share agreement with a nearby operator to minimize freshwater use and ensure recycled water is used to the greatest extent possible in completions operations.

## WATER SOURCING INFORMATION

Water to support the drilling and completion activities as described above will be obtained from the following sources:

- Fresh water (Primary source): Water will be supplied from Mautz Ranch Fresh Water Pond, private water rights owned by TEP Rocky Mountain, LLC., 1058 CR 215, Parachute, CO, 81635.
- Fresh water (Secondary source): Water may be supplied from the Mantle Fresh Water Takeout, private water rights own by a third party contract.
- Fresh water (Tertiary source): Water may be supplied from the Burke Fresh Water Takout, private water rights own by third party contract.
- Produced (recycled) water: Water will be provided from produced water supplies that are treated and recycled by TEP Rocky Mountain, LLC., 1058 CR 215, Parachute, CO, 81635.

**Table 1, Water Source Table**

Name / Water Source Type	Water Source Use	Water Take-Out Point		Permit Type	Transport Method	Volume Per Well (bbls)
		Latitude	Longitude			
<b>Surface Water - Primary Source:</b> Mautz Ranch Fresh Water Pond - TEP	Drilling activities: Surface Casing; Intermediate/ Production Casing; Dust Control	39.8608	-108.4345	Private Contract	Trucking	5,000
<b>Surface Water - Secondary Source:</b> Mantle Fresh Water Takeout	Drilling activities: Surface Casing; Intermediate/ Production Casing; Dust Control	39.8445	-108.2477	Private Contract	Trucking	TBD
<b>Surface Water - Tertiary Source:</b> Burke Fresh Water Takeout	Drilling activities: Surface Casing; Intermediate/ Production Casing; Dust Control	39.9787	-108.2515	Private Contract	Trucking	TBD
<b>Recycled / Produced Water</b> Mautz Ranch Multi-Well Pit	Completions, fracing, stimulation	39.8634	-108.43677	Private	Pipeline	230,000

## **REUSE AND RECYCLING PLAN**

Development of the eighteen (18) proposed wells on the Federal RGU 44-1-298 pad will benefit from reuse and recycling of produced water during hydraulic fracturing operations. Produced water generated from existing wells operated by TEP would be transported from one of TEP existing Centralized E&P Waste Management Facility to the RGU 23-7-297 pad for use during well completion operations. Produced water is collected, transported to, and treated at one of TEP's Centralized Waste Management Facilities. After treatment, the recycled water will be pumped to the remote frac pad (RGU 23-7-297 pad: COGCC Location ID 316408) via existing pipeline infrastructure where the water will be stored in approximately five (5) Minion Tanks (aka. Modular Large Volume Tanks or MLVTs), each with a working capacity of approximately 10,000 bbls. Fluids for well completion operations will then be pumped from the RGU 23-7-297 pad into the proposed wells on the Federal RGU 44-1-298 pad via proposed temporary surface steel frac lines.

Produced water, if not re-used or recycled during well completion operation, would otherwise require disposal via (1) natural evaporation at the evaporation ponds, (2) delivered and injected into one of the approved TEP operated underground injection control ("UIC") facilities, (3) re-used in hydraulic fracturing operations at other permitted locations, or (4) hauled to an approved third-party disposal facility. Reuse and recycling of produced water for well completion operations provides several benefits, including:

- 1) Decreases freshwater withdrawals from surface water sources,
- 2) Decreases reliance on injection wells for disposal of production/flowback water,
- 3) Decreases well completion costs versus alternative sources,
- 4) Increases operational efficiencies from re-using local supplies of production / flowback water to meet water demands for drilling, completion, and workover activities,
- 5) Reduces volume of truck traffic, versus alternatives that could involve trucking water from other sources.

### **Proposed Volume**

TEP is currently planning to utilize approximately 230,000 barrels of produced water per well during well completion operations. With eighteen (18) proposed wells, this totals approximately 4.14MM barrels of produced water that would be pumped to the Federal RGU 23-7-297 pad and utilized for hydraulic fracturing operations. The actual volume of water to be pumped during completion operations may vary depending on characteristics of geologic formations and other factors.

### **Method of Waste Treatment and Storage**

#### *Treatment of Recycled Produced Water*

All water delivered to the Federal RGU 23-7-297 pad during well completion operations will generally be preprocessed produced water at one or more of TEP's existing Centralized E&P Waste Management Facilities. Generally, produced water that these facilities are processed through gun barrels and other separation equipment to minimize the hydrocarbon concentration within the produced water. The produced water within the pit is treated with biocides when necessary.

#### *Storage Tanks*

Recycled produced water delivered to the Federal RGU 23-7-297 pad for use during well completion operations will be stored in Minion Tanks prior to being pumped to operations on the proposed wells at the RGU 44-1-298 pad. TEP's contractor will erect five (5) ten-thousand-barrel (10,000bbl) Minion Tanks with

an individual working capacity of nine thousand barrels (9,000bbls). The total capacity of the five (5) Minion Tanks is fifty thousand barrels (50,000bbls) with a total working capacity of forty-five thousand barrels (45,000bbls).

The Minion Tank is comprised of a ridged steel frame structure bolted together to form a cylindrical shell with an internal synthetic bladder secured to the steel frame. Each tank is forty-eight point nine feet (48.9') in diameter and thirty-two feet (32') high. The bladder system is designed in accordance with API Standard 650 – Welded Tanks for Oil Storage.

### *Containment System*

Each Minion Tank includes a synthetic bladder installed within the steel frame shell, which will serve as the primary containment for recycled water stored at the Federal RGU 23-7-297 pad during well completion operations.

A secondary containment structure will be erected along the north side of the pad to provide one hundred and fifty percent (150%) containment of the largest tank. The secondary containment structure will be comprised of a Muscle Wall containment structure with an interior liner. The Muscle Wall is a portable, low-density polyethylene hollow plastic four-foot (4') high barrier, which interlock to provide a ridged containment structure. Each section of Muscle Wall is six foot (6') in length. Approximately 160 sections of Muscle Wall will be required to form the containment structure. The interior liner will be a sixty millimeter (60mil) reinforced polyethylene liner, which will be attached to the Muscle Wall using straps and clips as specified by the manufacture.

The Federal RGU 23-7-297 pad has been reconstructed with a minimum one- and one-half feet (1.5') high pad perimeter earthen berm which has been constructed utilizing excavated subsurface material. The compacted pad perimeter berm will be the tertiary containment for the proposed Minion Tanks providing approximately thirty-seven thousand five hundred barrels (37,500 bbls) of capacity in the event of a spill or release. This equates to approximately three hundred and seventy five percent (375%) containment of the largest tank.

Please see the Preliminary Well Completion and Stimulation Layout Drawing in the Layout Drawing package attached to the Form 2A for a depiction of the preliminary layout of the proposed completions equipment on the Federal RGU 23-7-297 pad.

### *Containment Calculation*

The total capacity of the five (5) Minion Tanks is approximately fifty thousand barrels (50,000bbls). The volume of the largest tank within the secondary containment structure will be ten thousand barrels (10,000bbls). Per COGCC Rule 603.o.(1), “[o]perators will design secondary containment structures to be sufficiently sized to contain at least 150% of the volume of the largest single [t]ank within the containment”. The total required holding capacity of the secondary containment must be a minimum of 15,000bbls plus tank displacement.

With the displacement factored in for the additional five tanks, secondary containment should be:

$$150\% \text{ of Largest Tank} + (((\pi \times r^2 \times \text{containment high}) \times \text{oil barrel conversion}) \times \text{add'l tanks})$$

$$1.5 \times 10,000\text{bbls} + (((\pi \times 24.452 \times 4') \times 0.17811) \times 4)$$

$$\text{Total Secondary Containment} = 20,352 \text{ bbls}$$

The proposed Muscle Wall secondary containment will be approximately three hundred and ninety feet (406') in length by seventy-two feet (72') in width by four feet (4') in height. The secondary containment will have a total capacity of approximately 20,825 bbls.

A minimum one- and one-half foot (1.5') high earthen perimeter berm will be used for tertiary containment. The tertiary containment is estimated to contain approximately 37,500 bbls, equating to approximately two hundred and ninety percent (375%) of the largest tank volume.

**Produced Water Quality and Quality Assurance**

Produced water delivered to the Federal RGU 23-7-297 pad for storage in the proposed Minion Tanks will be pre-treated at one of TEP's existing water management facility. Produced water is generally processed through gun barrels and other hydrocarbon separating equipment to minimize the hydrocarbon content within the produced water.

TEP does not use any of the chemicals identified in Table 437-1 *as additives* in any of our completion fluids. There are trace concentrations of some organic compounds (e.g., Benzene, Ethylbenzene, Xylene, etc.), but these are naturally occurring chemicals found within the formation water that is collected and treated. TEP complies with COGCC Rule 437.b, which does not prevent operators from recycling or reusing produced water that has naturally occurring, trace amounts of the chemicals listed in Table 437-1. TEP also complies with Rule 437.c, which allows for the use of those chemical constituents at either the Table 915-1 standard, or the unconcentrated naturally occurring background level, *whichever is greater*. Please see Table 2, Recycled Produced Water – Table 437-1 Concentrations, for detailed water sampling results.

Flowback water may be stored in the proposed tanks following completion of initial well completion operations. All flowback water will go through a four-phase separator prior to storage in the Minion Tanks to separate gas, water, condensate, and sand that may return from the well following well completion. Flowback water processed and stored in the Minion Tanks will be pumped back into TEP's water management system during flowback operations.

**Table 2, Recycled Produced Water - Table 437-1 Concentrations**

Water Quality Sampling Results Data Summary - Table 437-1 Mautz Ranch Centralized E&P Waste Management Facility Facility ID: 444993 Date: October 8, 2021								
Chemical Name	Units	Analytic Method	Result	Qual	RL	MDL	DF	Table 915-1 Levels
<b>Metals</b>								
Arsenic	MG/L	6010C	0.0149		0.01	0.0055	1	
Cadmium	MG/L	6010C	0.00243	U	0.005	0.00243	1	
Chromium	MG/L	6010C	0.0146	B	0.01	0.000811	1	
Lead	MG/L	6010C	0.00237	U	0.01	0.00237	1	
Mercury	MG/L	7470A	0.000152	J	0.0004	0.00005226	1	
<b>Volatile Organic Compounds</b>								
Benzene	UG/L	SW8260C	2410		20	2.6	20	5
Ethylbenzene	UG/L	SW8260C	195		20	10	20	700

m-Xylene & p-Xylene	UG/L	SW8260C	3170		100	12.6	20	
o-Xylene	UG/L	SW8260C	509		100	12	20	
Xylenes, Total	UG/L	SW8260C	3680		200	32	20	1400 to 10000
2-Ethylhexanol	UG/L	SW8260C	4000		4000	4000	20	
1,3,5-Trimethylbenzene	UG/L	SW8260C	288		20	11.2	20	67
1,4-Dioxane	UG/L	SW8260C	4000	U	8000	4000	20	
<b>Semi-volatile Organic Compounds</b>								
N,N-dimethylformamide	UG/L	SW8270D	1.84	U*_	45.9	1.84	5	
<b>Method 8015D - Glycols - Direct Injection (GC/FID)</b>								
2-Butoxyethanol	UG/L	SW8015D	5	U	5	5	1	
<b>Method 8015D - Nonhalogenated Organic Compounds - Direct Injection (GC/FID)</b>								
1-Butanol	UG/L	SW8015D	2.77	U	5	2.77	1	
<b>Field Parameters</b>								
Water temp, field	deg C	YSI 556	25.3					
pH, field	s.u.	YSI 556	7.21					
Specific cond., field	uS/cm	YSI 556	14300					
Conductivity, field	uS/cm	YSI 556	---					
DO saturation, field	%	YSI 556	14.09					
DO, field	mg/L	YSI 556	---					
ORP, field	mv	YSI 556	6					
<b>Field Parameters (cont.)</b>								
Turbidity, field	ntu	Micro TPI	49.09					
Discharge	cfs		NA					
Color	nu		Black SS					
Odor	nu		High					
Effervescence	nu		None					
Sediment	nu		High					
Bubbles	nu		Low					
VOA Headspace	nu		None					
<b>Table 437-1 Compounds Not Analyzed</b>								
2-mercaptoethanol								
benzene, 1,1'-oxybis-,tetrapropylene derivatives, sulfonated sodium salts (BOTS)								
butylglycidyl ether								
Quaternary ammonium compounds, dicoco alkyldimethyl chlorides (QAC)								
Bis hexamethylene tiamine penta methylene phosphonic acid (BMPA)								
Diethylenetriamine penta (methylene-phosphonic acid) (DMPA)								
FD&C blue no. 1								
Tetrakis (triethanolaminato)								

Notes: U = not detected at the method detection limit; J = result between RL and MDL, estimated; H = hold time exceeded; NM = not measured; AV = result averaged; VAR = variable; \*\_ LCS and/or LCSD is outside of acceptable limit, low biased; --- = no standard for this parameter; SS = Suspended solids

### **Proposed Timeline for Reuse and Recycling**

Produced water will be utilized during well completion operation on the Federal RGU 44-1-298 pad, which is scheduled to occur between January 2025 and July 2025.

### **Anticipated Method of Transport**

Recycled produced water is currently transported from existing Oil and Gas Locations to TEP's existing Centralized E&P Waste Management Facilities via existing pipelines when existing pipelines are available. Produced water from other Oil and Gas Locations that do not have existing water pipeline infrastructure are transported via truck to existing facilities closest to the source location. Water collected and stored at existing Centralized E&P Waste Management Facilities would then be transported via pipeline to Federal RGU 23-7-297 pad for temporary storage prior to well completion operations. When well completion operations begin, produced water will be pumped through the five (5) proposed four-and one-half inch (4.5") temporary surface steel frac lines from the Federal RGU 23-7-297 pad to the well or well(s) being completed at the RGU 44-1-298 pad.

### **Final disposition of the waste**

Produced water will be utilized during well stimulation operations for the proposed wells by pumping the produced water downhole to stimulate the target formation. Any produced water that is returned during flowback operations will be reused and recycled at the Federal RGU 23-7-297 pad for completion of the remaining wells at the Federal RGU 23-6-297 pad. Following well completion operations, flowback / produced water will be handled as described in the Produced Water section of the Waste Management Plan, which has been attached to the Form 2A.

### **RATIONAL FOR USING FRESH WATER**

**Drilling Operations:** Fresh water (non-potable) is required for drilling operations to ensure that consistent drilling mud densities and compositions are achieved. Generally, recycled produced water contains Total Dissolved Solids (TDS) and chloride concentrations that are too high, and therefore unsuitable for use when drilling through shallow, fresh-water aquifers.

**Completion Operations:** TEP is using recycled produced water for completion activities which is by far the most water-intensive aspect of well construction. Fresh water will not be used for well completion operations.

**Dust Control:** Many of the access roads in this area run parallel to or are near surface water features (i.e. Ryan Gulch). Use of fresh water for dust control purposes is safer (i.e., more environmentally friendly) than using recycled produced water that typically contains higher concentrations of organic and inorganic compounds than fresh water. Use of fresh water for dust control on these roads will minimize any residual pollutants that could accumulate in soils, and which could potentially be transported to nearby surface waters.

### **SITE SPECIFIC BEST MANAGEMENT PRACTICES**

The following Best Management Practices will be utilized during development of the Federal RGU 44-1-298 Oil and Gas Location:

1. Recycled produced water will be utilized for well completion operations minimizing the amount of fresh water required for development of the proposed wells on this location:

2. Locally sourced fresh water will be used to minimize fugitive dust during construction, drilling, completion, and production operations:
3. TEP will use pipelines to transport water for hydraulic fracturing to and from location;
4. TEP will recycle or beneficially reuse flowback and produced water for use downhole; and
5. Only fresh water (potable or non-potable) will be used to conduct dust suppression activities within 300 feet of the ordinary high-water mark of any water body.