

Fluid Leak Detection Plan – 304.c.(13)

Federal RGU 44-1-298 Oil and Gas Location

Loc ID #335640

December 2022



INTRODUCTION

TEP Rocky Mountain LLC (“TEP”) has developed the following Fluid Leak Detection Plan to document the location of the production facilities and equipment at the Federal RGU 44-1-298 pad and to describe the engineering and administrative processes to prevent the discharge of fluids (oil, condensate, or produced water) to the environment, and to document the repair of any fluid leaks or discharges. The procedures and processes used to monitor, inspect, test, and maintain the equipment, vessels, tanks, structures, flowlines, at the location are described in greater detail below. This Fluid Leak Detection Plan has been prepared in accordance with the requirements of COGCC Rule 304.c.(13).

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. 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”), which overlies Federal minerals. The Oil and Gas Location is located approximately 24.4 miles southwest of the Town of Meeker, Colorado. The land on which the pad is located is classified as resource / rangeland. The eighteen (18) proposed wells planned for development on this location would be directionally drilled into the underlying Federal leases.

The existing 3.77-acre Federal RGU 44-1-298 pad will be reconstructed and expanded to a 5.63-acre footprint to support drilling and completion operations of the eighteen (18) proposed directional wells. The long-term disturbance, or the disturbance required for long-term production operations, attributed to the Federal RGU 44-1-298 pad will be approximately 1.65-acres. All proposed disturbance will be located on Federal surface.

The existing 0.23-acre access road to the Federal RGU 44-1-298 pad will undergo improvements and will be expanded to a 0.28-acre footprint to provide sufficient ingress and egress to the Oil and Gas Location for the proposed development activities. The long-term disturbance attributed to the access road will be 0.17-acres.

The proposed pipeline corridors associated with development of the proposed wells on the Federal RGU 44-1-298 pad will create approximately 3.56-acres of surface disturbance. Of the 4.13-acres of surface disturbance, approximately 0.07-acres will be considered existing surface disturbance (i.e. existing roads), approximately 3.30-acres will be considered re-disturbance (i.e. existing reclaimed rights-of-ways), and approximately 0.19-acres will be considered new disturbance. The long-term disturbance attributed to the proposed pipeline is limited to the 0.05-acres of existing disturbance associated with the existing roads that will be re-established following pipeline construction. All proposed surface disturbance associated with permanent pipeline installation will be located on Federal surface.

The total surface disturbance associated with development of the Federal RGU 44-1-298 pad and associated facilities is approximately 9.47-acres, all of which will be located on Federal surface. Of the 9.47-acres of disturbance, 7.37-acres will be within areas of existing disturbance or areas disturbed by previous development activities. The long-term disturbance, or disturbance remaining after interim reclamation, will be approximately 1.87-acres.

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.

PRE-PRODUCTION FLUID LEAK DETECTION

Drilling Operations

During drilling operations, regular Auditory, Visual, and Olfactory Monitoring (AVO) inspections are performed on equipment containing water-based drilling fluids, hydrocarbons, or associated chemicals. AVO inspections include taking the time to look, smell and listen for leaks. In addition to these AVO inspections, daily hazard identification inspections are conducted on all areas of the pad. Unless noted otherwise, only water-based drilling fluids (WBM) will be utilized during drilling operations on the proposed Oil and Gas Location.

The fluid management system used during drilling operations is monitored from both the rig floor and drilling mud tanks. This system utilizes an Electronic Drilling Recorder (ERD) and a Pit Volume Totalizer (PVT) to closely monitor changes in pressure, volume, or flow rate, which are indicators for leak detection. In the event abrupt changes in operating conditions are identified on surface equipment used to manage fluids, rig personnel are deployed to inspect the system including transfer lines and storage tanks. Alarms are also set on the ERD and PVT systems to automatically notify rig personnel if conditions change outside of expected parameters.

TEP utilizes real-time gas measurement and installs a gas analyzer in the drilling rig's flowline that can measure C1, C2, C3, C4+, and CO₂ that is liberated during the drilling process and circulated up the wellbore with the water-based drilling fluid. TEP utilizes gas monitoring to ensure mud weight is sufficient and the well is properly controlled. Any background gas brought to surface in the water-based drilling mud is circulated through the mud-gas separator on the drilling rig and sent to an enclosed combustion device (ECD).

Completions Operations

During completion operations, regular AVO inspections are performed on all lines, tanks, totes, or other vessels containing recycled produced water, hydrocarbon, fluids, or fluid additives as well as any flowback equipment through which hydrocarbons, produced water, and other fluids pass through. The fluid transfer system used during completion operations is monitored from the on-site mobile command center for changes in pressure, volume, or rate which are used as indicators for leak detection. In the event abrupt changes in operating conditions are identified on equipment used for fluid transfer, completions personnel are deployed to inspect the system including pumps, transfer lines and storage tanks

An impermeable polyethylene liner will be installed beneath the hydraulic fracturing equipment and manifold used during completion operations. The use of this liner prevents recycled produced water, hydrocarbons, fluids, and other fluid additives from reaching the soil in the unlikely event a leak does occur. Additionally, frac tanks will be placed within a polyethylene lined secondary containment to ensure containment of produced water in the event of a release. The liner is inspected for integrity throughout completion operations and maintenance/repair to the liner occurs as needed.

During all pre-production operations, the location is staffed and monitored 24/7 by a drilling rig crew, completion crew, and TEP contractors or personnel. Additional comprehensive inspections are conducted for drilling and completions/workovers in compliance with BLM and COGCC regulations. These additional inspections include routine BOP tests and pressure testing of various hydraulic fracturing equipment and lines prior to commencing operations.

PRODUCTION FLUID LEAK DETECTION

Produced Fluid Facilities and Equipment

The on-location production equipment planned for use during production operations at the Federal RGU 44-1-298 pad includes the following:

- Proposed Separators:
 - Five (5) Quad Separators
 - One (1) Double Separator
 - Two (2) Low Pressure Separator
 - One (1) Two-Phase Vertical Separator
- Proposed Tank Battery: Twelve (12) tanks within a 97' x 38' lined, steel secondary containment
 - Six (6) 500bbl produced water tanks (internally coated)
 - Three (3) 500bbl condensate tanks (internally coated)
 - Two (2) 500bbl gun barrel tanks (internally coated)
 - One (1) 500bbl blowdown/vent tank (internally coated)
- Proposed Electric Water Pump (1)
- Proposed Air Compressor / Receiver (1)
- Proposed Enclosed Combustion Device (3)
- Chemical Pumps: Five (5)
- Chemical Tanks: Four (4) 500gal
- Chemical Tanks: One (1) 135gal
- Various on-location pipelines as described in the Federal RGU 44-1-298 Plan of Development which has been submitted as an attachment to the Form 2A for this location.

The proposed locations for the production equipment are shown on the Layout Drawings, which has been attached to the Form 2A for this location.

Monitoring and Inspections

Routine Production Inspections and Monitoring: Production equipment is physically monitored and inspected by TEP Production Technicians during routine visits to each location. At a minimum, all sites are physically inspected on a weekly basis, and some locations are visited more often. During these routine site visits, the Production Technicians are visually inspecting all components of the fluid production process for any signs / evidence of active leaks, drips, releases, or pending leaks. The routine physical inspection of the location and production equipment includes a close examination of the following components:

- Production Tanks
- Thief Hatches
- Secondary Containment Structures and poly liners (if equipped)
- Separators (interior and exterior)
- Flowlines and Production Piping (between processing equipment)

The Production Personnel are specifically looking for any evidence of active leaks from tanks, piping, pit liners, and associated fittings on equipment. Obvious signs of leakage may include drips, bubbles, puddling and pooling of liquids, wet spots, corrosion (rust, flaking / blistered / bubbled paint, etc.). Less obvious signs of leakage may include an unexplained loss of tank volumes, loss of normal operating pressures,

unusual sounds, odors, etc. When a leak or loss of fluid is confirmed, the Production Technician takes immediate action to stop the flow of liquids (if possible) and initiate the appropriate repairs. TEP Production Technicians will communicate details of the fluid loss with their direct supervisor, who will notify TEP's Spill Response Coordinator who will investigate and evaluate the incident and initiate spill reporting and cleanup actions as needed.

AVO / LDAR / STEM / OOOOa / Flare Inspections: The following inspections are also performed at all production facilities (as appropriate) and present another opportunity where TEP personnel are conducting a physical inspection of each location and performing a thorough inspection of site equipment.

- Audio, Visual, and Olfactory (AVO) inspections are conducted monthly at each location throughout the life of the facility.
- Leak Detection and Repair (LDAR) inspections are performed at all locations; however, the inspection frequency is tiered based upon the level of emission controls that are required / employed at each location.
- Storage Tank Emission Monitoring (STEM) inspections are performed monthly at any location where emissions must be controlled (> 2 tons per year).
- OOOOa inspections are performed semi-annually on any facility constructed after 2015.
- Flare Logs are completed daily for all locations where active flares and emissions controls are required.

The technicians performing these air compliance inspections are also highly specialized and trained to identify and perform on-the-spot repairs to production fluid equipment to correct a variety of maintenance and repair issues.

SPCC Inspections: As required by Spill Prevention Control and Countermeasures (SPCC) regulations found at 40 CFR 112, TEP conducts routine inspections of all regulated oil storage facilities and related equipment (including secondary containment structures). These inspections are conducted annually to verify the types and number of production equipment that is located at each facility, and to ensure that the secondary containment structures are in good working condition, and that they are adequately sized to contain the contents of the largest single tank (plus a 25-year, 24-hour precipitation event) in the event of a spill / release. Please see *Appendix A, Spill Prevention Control and Countermeasures Inspection Checklist*, for an example of facilities and equipment inspected.

Storm Water Compliance Inspections: As required by the Colorado Department of Public Health and Environment (CDPHE) Storm Water Discharge Permit requirements, TEP conducts on-going and routine inspections of all facilities, pipeline corridors, and access roads. Depending upon the location, these inspections are conducted every 2 weeks (active construction sites), or every 30 days (post-construction sites). These inspections are yet another opportunity where Oil and Gas Locations, facilities, and equipment are being inspected and monitored on a continual basis.

Dedicated Continuous Monitoring (SCADA): New Oil and Gas Locations are also equipped with Supervisory Control and Data Acquisition (SCADA) monitoring technology which enables remote monitoring of individual well attributes (e.g., well-head pressures, casing pressures, production/sales volumes, etc.). In addition, most locations with produced water / condensate tanks, are also equipped with SCADA systems to monitor fluid production rates, actual fluid volume tank levels, etc. In addition, various alarms (e.g., high liquid level alarm) can be set to notify technicians if a tank is close to exceeding its maximum capacity and is at risk of overfilling / spilling. The SCADA is also useful to detect any sudden, unexplained loss in fluid volumes, which is another means indicative of a potential leak / release.

TESTING MAINTENANCE PROCEDURE AND SCHEDULE

Testing

TEP production personnel perform pressure / integrity testing of all new construction production piping and pipeline facilities prior to being placed into active service as required under the 1100 Series Rules. Pressure testing for all new and relocated pressure piping and facilities are pressure tested according to TEP's *Construction Specification for Land Pipeline Construction*.

Pressure / integrity testing is also conducted on all existing (in-service) off-location flowlines on an annual basis, or after any repair. All pressure / integrity testing is conducted per TEP's *Pressure Testing Standard – Facilities & Construction* which has been prepared in accordance with ASME B 31.8 and ASME B 31.4 standards.

Corrosion Control for production piping and pipeline facilities is implemented in accordance with the requirements as proposed by the ASME B31.4 standards 460 - 468, *Corrosion Control*.

Maintenance

All required maintenance for production piping, pipeline facilities, tank storage, and secondary containment structures is performed by TEP's Construction and Maintenance personnel. Maintenance is performed on an "as-needed" basis.

PRODUCED FLUIDS PROCEDURES

TEP has prepared the following procedures to reduce the potential for discharge from produced fluid facilities and equipment at all Oil and Gas Locations:

- TEP Piceance Basin Spill Prevention and Response Plan
- TEP Piceance Basin Integrated SPCC Plan
- TEP Drilling and Workover Facilities Integrated SPCC Plan

These procedures are maintained at the TEP Parachute Field Office located in Parachute, CO.

RECORD KEEPING REQUIREMENTS

Written procedures associated with the inspection and testing activities conducted per the requirements of this Plan will be signed by the appropriate personnel and retained for a period of three (3) years or as indicated in COGCC's rules.

SITE SPECIFIC FLUID LEAK DETECTION BMPs

TEP will use the following site-specific BMPs at the Federal RGU 44-1-298 pad to evaluate / determine that all above ground and below ground onsite (and offsite) fluid handling, storage, transmission, and transportation equipment have integrity and comply with the applicable standards cited in the COGCC rules include the following:

- Audio, Visual, and Olfactory (AVO) inspections: AVO inspections will be conducted monthly at the Oil and Gas Location throughout the life of the facility;
- Routine inspection of all production equipment, wellheads, temporary equipment, etc.; Routine inspections to be conducted at the Oil and Gas Location will include: Routine physical inspections of production equipment (by TEP production personnel); Air Compliance inspections and monitoring (by TEP Air Compliance staff); SPCC Inspections (by 3rd party contractor), Storm

Water Management inspections (by 3rd party contractor), and continuous, dedicated SCADA monitoring of fluid production rates and pressures, and fluid storage volumes (by TEP production personnel);

- As part of our LDAR, STEM, OOOOa inspection / compliance programs, TEP will adhere to the use of Approved Instrument Monitoring Methods (AIMM) for inspecting production equipment and facilities at the Oil and Gas Location;
- Spill prevention training is provided to all field employees on a monthly basis. The monthly training consists of reviewing past incidents, root causes of the incidents, and what specific actions (lessons-learned) could be taken to prevent the reoccurrence of such incidents in the future;
- Flowlines will be integrity-tested per the 1100 Series rules;
- TEP spill response procedures will be adhered to for any spills or releases occurring at the Oil and Gas Location. All spills will be managed in accordance with the COGCC 900 Series rules;
- Leak Detection and Repair (LDAR) inspections are performed at all locations; however, the inspection frequency is tiered based upon the level of emission controls that are required / employed at each location.
- Storage Tank Emission Monitoring (STEM) inspections are performed monthly at any location where emissions must be controlled (> 2 tpy).
- OOOOa inspections are performed semi-annually on any facility constructed after 2015.
- Flare Logs are completed daily for all locations where active flares and emissions controls are required.
- Spill prevention training will be provided to all field employees on an annual basis;
- Any leaks or spills detected during monitoring will be reported within 24 hours in accordance with Rule 912.b;
- Annual flowline integrity testing will occur according to COGCC rules 1101 and 1102. Inspection and record retention of flowline testing will be in accordance per COGCC regulation; all records will be made available to the COGCC upon request;
- All load lines will be bull plugged or capped;
- All on-location flowlines will be inspected and tested per Rule 1104;
- All equipment deficiencies will be corrected immediately or as soon as practical (all identified problems and corrections/repairs will be documented and records will be maintained in the TEP's office);
- TEP will track and clean up all spills, including those that are not reportable;
- TEP will temporarily shut in all production wells on the pad in the event of any upset condition;
- All piping is pressure tested and inspected for leaks prior to flowback; and
- Automation technology will be utilized at this location; this technology includes the use of fluid level monitoring for the tanks and high-level shut offs.

APPENDIX A
SPILL PREVENTION CONTROL AND COUNTERMEASURES
INSPECTION CHECKLIST

Piceance SPCC Field Inspection Checklist

Report Date:

Inspection ID:

Page 1 of 2

A. Location Information

Enter the inspection date and time.

Choose the facility that you inspected.

Enter the name of the inspector.

Take a photo of the facility placard.

Images Attached

B. Storage Tanks

1. Tank surfaces and valves appear leak-free.

Yes / No

2. Tanks are free of damage, rust and deterioration.

Yes / No

3. Bolts, rivets and seams are undamaged.

Yes / No

4. Tank supports appear in good condition.

Yes / No

5. Tank foundations are level and intact, without erosion.

Yes / No

6. Tanks are appropriately labeled.

Yes / No

7. Vents are unobstructed.

Yes / No

8. Level/Indicator alarm and telemetry in place.

Yes / No

9. Cathodic protection installed and connected.

Yes / No

10. All valves associated with condensate tanks are sealed.

Yes / No

11. All valves have plugs.

Yes / No

12. Secondary containment is in good condition.

Yes / No

13. If present, secondary containment liner appears intact and functional, without visible wear points, gaps, slices or holes.

Yes / No

14. Secondary containment is free of accumulated stormwater.

Yes / No

15. Secondary containment is free of stains and other signs of leaks.

Yes / No

Take a photo of: the tank battery, Methanol tanks (if present), Drip Pot (if present).

Images Attached

C. Separators/Dehydrators and Other Equipment/Vessels

1. Separators, dehydrator and other equipment/vessels are free of stains and other signs of leaks, inside and out.

Yes / No

2. Internal piping and vessels are visually free of damage, rust and deterioration.

Yes / No

3. Secondary containment is in good condition.

Yes / No

Take a photo of: Separators, Flare (if present), TEG (if present).

Images Attached

D. Piping and Pipelines

1. Valve seals, gaskets and other appurtenances appear leak-free.

Yes / No

D. Piping and Pipelines

2. Pipelines and supports appear undamaged and in good condition.

Yes / No

3. Flowline piping area(s) are free of stains and other signs of leaks.

Yes / No

4. Buried piping remains covered in all areas.

Yes / No

Take a photo of wellheads.

Images Attached

E. Truck Loading Areas

1. Load buckets are present, functional and in good condition.

Yes / No

2. All connections are located within secondary containment.

Yes / No

3. Loading area(s) are free of stains and other signs of spills.

Yes / No

4. BMPs are in place and provide adequate secondary containment for manned loading operations.

Yes / No

5. Loading ground line(s) are in place and operational.

Yes / No

F. General Facility

1. Drain ditches, catch basins and ponds are oil-free and appear to be operating properly.

Yes / No

2. Fencing and gates are functional at public access sites.

Yes / No

3. Appropriate signage is present.

Yes / No

G. Facility Changes

1. Tank number, volume, contents and layout same as ACTS. (If No, take photos of: tank, tank plaque, tank NFPA label. If not legible in photo, type information into comments.)

Yes / No

Photo(s) of tank, plaque, and/or NFPA label:

Images Attached

2. Separators, dehydrators and other vessels/equipment number, size, contents and layout same as ACTS. (If No, take photos of: equipment and MFG label. If not legible in photo, type information into comments.)

Yes / No

Photo(s) of equipment and/or MFG label:

Images Attached

3. Secondary containment dimensions and construction same as ACTS.

Yes / No

4. Other aspects of the site layout, drainage, BMPs, security and operations consistent with facility diagram.

Yes / No

5. Site diagram is accurate.

Yes / No

Site diagram change photos:

Images Attached

6. Facility change comments:

H. Maintenance / Repairs

Maintenance / Repairs Required? (CHECK IF YES)

Yes / No

Comments on Maintenance / Repairs Required

Yes / No

Maintenance/Repair Issue Photos:

Images Attached