



Stormwater Management Plan

Archer Field Oil and Gas Development Plan

This Stormwater Management Plan (Plan) has been prepared by Chaco Energy Company (Chaco) for its Archer Field Oil and Gas Development Plan (OGDP) in Cheyenne County, Colorado. The Plan addresses Energy & Carbon Management Commission (ECMC) guidance and the requirement at Rule 304.c.(15) to prepare a Stormwater Management Plan consistent with Rule 1002.f. The Plan addresses the following locations:

Table 1. Locations

Location	Location ID	Qtr Qtr T12S R44W	Lat/Lon
Champlin 360 Amoco A #4	380504 (Re-entry)	NWSE Sec. 29	38.977390, -102.359945
Pelton 41-31 #1	380356 (Re-entry)	NENE Sec. 31	38.969823, -102.373764
Champlin Tank Pad	New	NWSW Sec. 29	38.977813, -102.369827
Pelton Tank Pad	New	NENE Sec. 31	38.970818, -102.372405

1.0 Oil and Gas Location and Construction Site Details

1.1 Proposed Oil and Gas Operations

Chaco will re-enter and complete one previously plugged and abandoned conventional vertical well at each well pad location. The primary target is helium gas. Each well will be approximately 5,400 feet deep.

Estimated disturbance acreages are shown in Tables 2 - 5.

Table 2. Champlin 360 Amoco A#4

Disturbance	Land Use	Disturbance (ac)	Description
Oil and Gas Location	Crop	2.07	New Disturbance
Working Pad Surface		1.80	
Production Pad		0.23	

Table 3. Pelton 41-31 #1

Disturbance	Land Use	Disturbance (ac)	Description
Oil and Gas Location	Rangeland	2.07	New Disturbance
Working Pad Surface		1.80	
Production Pad		0.23	

Table 4. Champlin Tank Pad

Disturbance	Land Use	Disturbance (ac)	Description
Oil and Gas Location	Rangeland	1.06	New Disturbance
Working Pad Surface		0.87	
Production Pad		0.87	

Table 5. Pelton Tank Pad

Disturbance	Land Use	Disturbance (ac)	Description
Oil and Gas Location	Rangeland	0.66	New Disturbance
Working Pad Surface		0.52	
Production Pad		0.52	

1.2 Site Descriptions

An environmental field review was conducted in June 2023 for the Oil and Gas Locations.

The locations are not immediately upgradient of a wetland or riparian corridor [Rule 304.b.(2).B.vii] based on topography and a land survey conducted for the locations.

The locations are not within 500 feet of the Ordinary High Water Mark (OHWM) of any river, perennial or intermittent stream, lake, pond, or wetland [Rule 1202.a.(3)].

The locations are described in Table 6 with respect to water.

Table 6. Land Use and Water

Location	Land Use	Nearest Water	Downgradient?	Description
Champlin 360 Amoco A #4	Crop	1,100' N	No	Upland Swale Lacking OHWM
Pelton 41-31 #1	Rangeland	590' SW	No	Swale with Dispersed Depressions
Champlin Tank Pad	Rangeland	1,780' NE	Yes	Upland Swale Lacking OHWM
Pelton Tank Pad	Rangeland	1,300' SW	No	Swale with Dispersed Depressions

A photograph illustrating the swale with dispersed depressions is shown on the Form 2A, Hydrology Map, for Pelton 41-31 #1.

1.3 Nature of Activity

The locations are predominantly flat. They require minimal site clearing and grading to level areas for equipment. Disturbance areas are shown on the Construction Layout Drawings submitted with the Form 2As.

Estimated volumes of soil disturbance are listed in Table 7.

Table 7. Volumes of Soil Disturbance

Location	Soil Disturbance (cy)
Champlin 360 Amoco A #4	1,250
Pelton 41-31 #1	975
Champlin Tank Pad	850
Pelton Tank Pad	715

On the well pads, Chaco will re-enter each well using a workover rig and freshwater. Chaco will use recycled produced water for well completion to perforate the well. Freshwater returns will be stored in a steel tank and recirculated. Produced water will be stored in a truck tank for 1 day of well completion at each well location.

During production, well pads will contain only a wellhead. Gas from the wellhead will be piped underground to the associated tank pad.

On each tank pad, Chaco will locate one 3-phase separator, one produced water tank, one condensate tank, and an enclosed combustor. Gas will be piped underground from the tank pad to tie into the existing Ladder Creek Gathering System operated by Tumbleweed Midstream. Produced water will be trucked off site approximately twice per month for disposal in an ECMC-permitted underground injection control well operated by a third-party operator. Condensate will be trucked off site for commercial sale approximately 4 times per year.

1.4 Sequence of Activity

Each location is expected to require 2 days to construct.

Each well pad is expected to require 2 days for re-entry and 1 day for completion.

Each location is expected to require 1 day for interim reclamation. Revegetation will occur during the first growing season and within 3 months on crop land and 6 months on non-crop land after well development is complete.

1.5 Access Road and Flowline Corridor Construction

All access roads are unpaved. New access roads will be constructed by grading a dirt road that is crowned in the middle for drainage. Access roads will be approximately 15 feet wide.

Flowline trenches will be approximately 2 feet wide for installation of a buried 3-inch steel off-location flowline to transport gas. The trench will be 4 feet deep with 3 feet of soil cover.

Access roads are shown on the Form 2A, Access Road Maps.

Flowlines are shown on the Form 2A, Related Location and Flowline Maps.

Access road and flowline disturbances are listed in Table 8.

Table 8. Access Road and Flowline Disturbance

Location	Access Road (feet)	Access Road (acres)	Flowline (feet)	Flowline (acres)
Champlin 360 Amoco A #4	3,160	1.08	2,653	0.12
Pelton 41-31 #1	670	0.23	237	0.01
Champlin Tank Pad	380	0.13	0.00	0.00
Pelton Tank Pad	350	0.12	0.00	0.00

2.0 Supplemental Site Information

2.1 Site Area and Disturbance Area

The locations are predominantly flat. There is little variation in grade across the locations. Cut and fill to support the locations are estimated to be limited to discrete areas on the working pad surface and are shown on the Construction Layout Drawings.

2.2 Soil Description, Data, and Erosion Potential

According to the Natural Resources Conservation Service (NRCS) Map Unit Descriptions, soil at each Oil and Gas Location is well drained. Slopes range from 0 to 4 percent.

Across the locations, NRCS Map Unit Descriptions for the A-horizons are 0 to 6 or 0 to 13 inches of silt loam overlaying 6 to 10 inches of silty loam or silty clay loam, with areas of B-horizon in 13 to 32 inches of silty clay loam near the Pelton locations.

Actual field verified topsoil depths from a June 2023 environmental field review are shown in the Topsoil Protection Plan. The results show an A-horizon of 3 to 9 inches of silt loam and B-horizon of 3 to 24 inches of silty clay loam.

The depths to the restrictive feature are more than 80 inches.

2.3 Vegetation Description

Dominant vegetation is described by location with percent cover in Table 9.

Table 9. Dominant Vegetation and Percent Cover

Location	Dominant Vegetation	Percent Cover
Champlin 360 Amoco A #4	Wheat	50
Pelton 41-31 #1	Blue grama, buffalo grass, lambsquarter, soft brome	85
Champlin Tank Pad	Blue grama, cheatgrass, sunflower	60
Pelton Tank Pad	Buffalo grass, fourwing saltbrush, lambsquarter, soft brome, sunflower	95

2.4 Pre-disturbance Coverage Estimate

The pre-disturbance vegetation cover in Table 9 was determined by environmental site review in June 2023.

2.5 Known Weed Infestations

No weed infestations were identified at any of the Oil and Gas Locations during the environmental site review in June 2023.

2.6 Non-stormwater discharges

The Oil and Gas Locations will have no non-stormwater discharges.

2.7 Receiving Waters

The Oil and Gas Locations have no immediately downgradient surface water or receiving water.

3.0 Stormwater Management Control Measures

3.1 Potential Pollution Sources

Potential pollution sources during construction are soil and sediment from disturbed areas. Potential pollution sources during well re-entry and production are fluid and material drips, leaks, or spills.

3.2 Sources Listed in Rule 1002.f.(3).A and Pollution Prevention Measures

Potential pollution sources listed in Rule 1002.f.(3).A and their pollution prevention measures are described below.

Well Pads

Chemicals and Materials

During well re-entry, freshwater will be stored and recirculated using a steel tank and water pump. During well completion, recycled produced water will be stored in a truck tank for 1 day of completion. During production, well pads will contain only a wellhead. Chemical to support well treatment will be inside a polyethylene tote with integrated containment.

Fueling

The workover rig will have an integrated fuel tank. A liner will be placed beneath the fuel tank to monitor for and capture potential drips and leaks. Vehicles will not be fueled on site.

Tank Pads

Produced Water and Condensate

Gas will be transferred by buried flowline from the well pad to the associated tank pad. Produced water and condensate will be stored in one produced water tank and one condensate tank. Tanks will be steel. They will be inside of lined steel secondary containment sized to 150 percent of the largest tank. Produced water will be transported by truck to an off-site underground injection control well described in the Form 2A, Waste Management Plan. Condensate will be transported by truck for commercial sale.

Outdoor Processing Activities

On-site processing will consist of one 3-phase separator.

All

Significant Dust or Particulate Generating Processes

Exposed soils have potential to generate dust. Dust will be controlled when needed using a water truck to form a crust.

Erosion Controls

There is not a sufficient elevation change between the Working Pad Surface and surrounding topography to result in significant erosion.

The elevation change across the Working Pad Surfaces is approximately 5 feet, or less. Minimal grading will be needed just to level portions of work area. There will be no significant cuts or fills. The flow direction for stormwater is shown on the Construction Layout Drawings.

Soil removed from the Working Pad Surface will be mounded to avoid loose soils. Topsoil will be reused on the portion of the Working Pad Surface identified on the Facility Drawings for interim reclamation. Interim reclamation will occur during the first growing season after well development is complete, and within 3 months on crop land and 6 months on non-crop land.

Loose soil and sediment on the locations will be controlled using stormwater wattles.

Waste Disposal Practices

Well re-entry does not produce drill cuttings for disposal. Other wastes are described in the Waste Management Plan. Trash will consist of domestic trash and packaging. It will be bagged or containerized to prevent it from blowing. Unused material will be removed for reuse at another location.

Leaks and Spills

The workover rig motor will have a liner underneath to capture drips or leaks. The locations will be continuously monitored during well re-entry for signs of leaks or spills and corrective action.

Well pads during production will have well treatment chemical inside a polyethylene tote with integrated containment.

Tank pads will have tanks inside lined steel secondary containment sized to 150 percent of the volume of the largest tank. Loading and unloading will occur inside of the secondary containment. Catch basins will be installed on loadout piping. Loadout piping will contain bull plugs when not in use. Transfer lines will be monitored visually at the connection points for stains, drips, or other signs of leakage requiring correction and will be repaired promptly. The operator will maintain isolation valves by performing function tests and maintaining the valves in accordance with its manufacturer's specifications per Rule 1103.a.

There will be no fuel storage on the locations during production.

Ground Disturbing Maintenance Activities

After construction and interim reclamation, there will be no anticipated ground disturbing maintenance activities.

Reclamation

The locations will be downsized during interim reclamation to the areas shown in Tables 2 – 5. They will be stabilized and revegetated.

3.3 Structural and Non-structural Practices

Structural Practices

Wattles – Loose soil and sediment on the locations will be controlled using stormwater wattles. The wattles will be placed in the direction of stormwater flow and are shown on the Layout Drawings.

Vegetation Armoring – The locations will be seeded during interim reclamation to provide vegetation armoring. Seeding also can be added to natural vegetation occurring on topsoil stockpiles to armor the stockpiles and prevent erosion.

Secondary Containment – During well re-entry, motors will have liners. During production, storage tanks will have steel secondary containment and chemical tanks will have integrated polyethylene containment.

Non-structural Practices

Minimize disturbance – Disturbances will be limited to the portions of the Oil and Gas Locations needed to support well re-entry and production so that vegetation and/or stable soils remain in place. Disturbed portions of the Working Pad Surfaces not needed for production will be stabilized and revegetated as part of interim reclamation. Ingress, egress, and parking will occur in designated areas.

Waste Management - Trash will be bagged or containerized. Vehicles and equipment will be monitored for drips and leaks during well re-entry with booms and absorbents available to address inadvertent spills and properly disposed of as oil waste. Material not needed to support production will be removed from the locations during interim reclamation.

Site Inspections – Inspections will be performed continuously during well re-entry. Inspections will be performed routinely during production, as described below. Findings will be used to determine whether stormwater controls are adequate, deteriorating, or allowing for erosion or transport of soils and sediments off site. Issues identified during inspection will be promptly corrected. If there is evidence of ponding or erosion from the location, diversion ditches may need to be added to improve stormwater channelization.

3.4 Vehicle Tracking Control

The access roads will tie into the dirt county road. Aggregate will be placed when needed at the apron to act as a wheel shaker and to control erosion.

3.5 Material Handling and Spill Prevention

Routine inspection of valves, transfer lines, tanks, and secondary containment will identify potential damage, deterioration, or signs of staining and leaks. Shut off valves and bull plugs will be function tested to ensure adequate containment of fluids. Vehicles and equipment used on site will be properly maintained and will be monitored for leakage. Site personnel will be trained in spill prevention, response, and response equipment. Training will include how spills or releases will be investigated, controlled, and contained in accordance with Rule 912.a.

3.6 Management of Waste Material

Trash will be bagged or containerized to prevent it from blowing. It will be hauled off site using a light duty pickup truck. Produced water will be transported off site by truck for disposal at an underground injection control well. Unused material during well re-entry will be removed from the location to use at another well site. Tank bottoms and workover fluid will be contained in the production tanks until cleaned out by vacuum truck and transported by truck to a processing facility. Any oily waste will be collected in a polyethylene tote and transported for disposal. Waste generation, management, and disposal are described in the Waste Management Plan.

4.0 Site-specific Construction and Stormwater/Erosion Control Measure Drawings

In accordance with ECMC guidance, this section refers to the Form 2A, Construction and Facility Layout Drawings.

5.0 Inspection and Maintenance Procedures

5.1 Trained and Qualified Site Inspections

Stormwater inspections will be conducted by personnel trained on the content of this Stormwater Management Plan. Personnel will be qualified regarding stormwater preventative measures, practices, controls, and maintenance in the field.

5.2 Scope of the Inspection

During stormwater inspections, personnel will review the Oil and Gas Location perimeter; erosion control measures (e.g., wattles); disturbed areas and reclaimed areas; equipment, material, and storage areas; and vehicle access.

Inspections will look for damaged or missing wattles, missing staking, evidence of erosion or uncontrolled stormwater, pooled or ponding stormwater, improper drainage, and evidence of soils or sediment leaving the location. Stormwater control maintenance needs will be identified and addressed with appropriate follow up.

5.3 State and Local Inspection Requirements

The operator will comply with construction stormwater management requirements administered by the Colorado Department of Public Health and Environment (CDPHE). The county does not regulate stormwater for oil and gas locations.

5.4 Inspection Procedures and Frequency

The Oil and Gas Location and stormwater controls will be monitored daily during site preparation and well re-entry. Evidence of soil or sediment runoff, maintenance needs, and any spills or leaks will be addressed. During production, inspection will occur at a minimum of once every 7 days, consistent with stormwater requirements administered by CDPHE. The frequency may be reduced to once every 30 days after ground disturbance is complete and the site is stabilized with interim reclamation. The site operator will look for evidence of erosion, runoff, and stabilization and vegetative success from interim reclamation. The operator will ensure that erosion and sediment controls identified in this plan are maintained, functioning properly, and that there is no evidence of movement of soils, erosion, or ponding.

5.5 Reporting and Recordkeeping Requirements

Recordkeeping will be consistent with recordkeeping requirements administered by CDPHE. During well re-entry, stormwater records will be included with drilling operations records. During production, the site operator will record stormwater inspection and maintenance needs as part of the maintenance records for the location. Documentation will be available through the operator's Denver, Colorado office.

6.0 Site-specific Construction and Stormwater/Erosion Control BMPs

Table 10 lists site-specific best management practices to control and minimize stormwater and sediment run on and run off.

Table 10. Best Management Practices

Structural	
•	Wattles will be placed in the direction of stormwater flow.
•	The fuel tank used during well re-entry will be integrated with the workover rig. There will be no separate fueling on the location.
•	Equipment with motors will have a liner under the motor to capture drips or leaks.
•	Tanks will be located inside of steel secondary containment sized to contain 150 percent of the volume of the largest tank.
•	The chemical container for well treatment will have polyethylene secondary containment.
•	Booms and absorbents will be available on site for spill response material. The spill response material will support cleanup of small leaks or spills. A larger incident may require support from a third-party provider.
Non-Structural	
•	Valves and bull plugs will be routinely function tested. Deficiencies will be corrected promptly.
•	Waste materials will be bagged or containerized to prevent it from blowing and to avoid contact with precipitation.
•	Locations will be inspected for excessive erosion. Where needed, areas will be recompacted.

<ul style="list-style-type: none">• Vehicles and equipment will be monitored for leaks during well development.
<ul style="list-style-type: none">• Ingress, egress, and parking will occur in designated areas.
<ul style="list-style-type: none">• During pre-production, inspection of equipment will occur daily to detect staining, drips, or leaks that could result in spills.
<ul style="list-style-type: none">• The Oil and Gas Locations and stormwater controls will be monitored daily during site preparation and development. After development, stormwater inspection will occur at a minimum of once every 7 days, consistent with stormwater requirements administered by CDPHE. The frequency may be reduced to once every 30 days after ground disturbance is complete and the site is stabilized with interim reclamation.
<ul style="list-style-type: none">• The location and access road will not be accessible to the public to prevent unauthorized access and excessive wear on access roads.
<ul style="list-style-type: none">• Stabilization and revegetation will be performed as part of interim reclamation during the first growing season and within 3 months on crop land and 6 months on non-crop land.
<ul style="list-style-type: none">• During production, an operator will be on site daily to oversee areas that require corrective action.