EXPLORATION AND PRODUCTION
WASTE MANAGEMENT PLAN

SOUTHEAST PROJECT AREA
CHEYENNE, ELBERT, KIOWA, KIT CARSON, LINCOLN, AND WASHINGTON COUNTIES, COLORADO

REVISED JANUARY 2017

Prepared for:

WIEPKING-FULLERTON, L.L.C.
Englewood, Colorado

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EXPLORATION AND PRODUCTION
WASTE MANAGEMENT PLAN
LTE Project Number: 0501 14002

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EXECUTIVE SUMMARY

Wiepking-Fullerton Energy, L.L.C. (Wiepking-Fullerton) is an oil and gas exploration and production (E&P) company operating in the Southeast Project Area in Cheyenne, Elbert, Kiowa, Kit Carson, Lincoln, and Washington counties, Colorado. Wiepking-Fullerton is registered with the Colorado Oil and Gas Conservation Commission (COGCC) and is assigned Operator Number 96340.

This E&P Waste Management Plan (Plan) outlines the operational requirements that will be implemented by Wiepking-Fullerton in a comprehensive manner and describes the methods that may be employed when disposing of E&P waste. Wiepking-Fullerton will comply with the COGCC Rules as outlined in this Plan. Treatment and/or disposal options presented in this Plan are intended to address E&P waste generated by Wiepking-Fullerton that include: 1) water-based bentonitic drilling fluids and associated cuttings, 2) oily waste, 3) produced water, and 4) other E&P waste.

1.0 REGULATORY FRAMEWORK

Wiepking-Fullerton Energy, L.L.C. (Wiepking-Fullerton) is an oil and gas exploration and production (E&P) company operating in the Southeast Project Area in Cheyenne, Elbert, Kiowa, Kit Carson, Lincoln, and Washington counties, Colorado. Wiepking-Fullerton is registered with the Colorado Oil and Gas Conservation Commission (COGCC) and is assigned Operator Number 96340.

Wiepking-Fullerton has developed practices and procedures to ensure E&P waste is managed in compliance with the COGCC 900 Series Rules (Appendix A). Reclamation of Wiepking-Fullerton well pad sites will be completed in accordance with the COGCC 1000 Series Rules (Appendix B). The practices and procedures in this E&P Waste Management Plan (Plan) for the relevant E&P waste generated by Wiepking-Fullerton are summarized in the following sections. For the purpose of this Plan, Wiepking-Fullerton's operating activities are referred to as the Southeast Project Area (Figure 1).

2.0 WATER-BASED BENTONITIC DRILLING FLUIDS AND ASSOCIATED DRILL CUTTINGS

2.1 DRYING AND BURYING IN DRILLING PITS

2.1.1 General

The primary disposal method for water-based bentonitic drilling fluids and associated drill cuttings is to dry and bury the material in drilling pits that have been excavated on the well pads during drilling operations. Drilling pits may be constructed on crop land or non-crop land. The following sections describe how water-based bentonitic drilling fluids and associated drill cuttings will be managed and disposed.

2.1.2 Material Handling

On both crop land and non-crop land, drilling pits will be constructed prior to drilling operations. The pits will be constructed to allow a minimum of three feet of freeboard.

On non-crop land, water-based bentonitic drilling fluids and associated drill cuttings will be contained in a drilling pit excavated prior to drilling operations. Water-based bentonitic drilling fluids and associated drill cuttings will remain in the pit until samples are analyzed by an accredited third-party laboratory selected by Wiepking-Fullerton, as outlined below in section 2.1.3 below.

On crop land, water based bentonitic drilling fluids and associated drill cuttings will be segregated. Water-based bentonitic drilling fluids will be stored in temporary storage containment (frac tank(s), 3-sided bins, or equivalent) and disposed of accordingly per COGCC Rule 907.d. Water-based bentonitic drill cuttings will be temporarily staged on the drill pad with appropriate best management practices (BMPs) until samples are analyzed by an accredited third-party laboratory selected by Wiepking-Fullerton, as outlined below in Section 2.1.3 below.

2.1.3 Sampling and Analysis Plan

To achieve compliance with COGCC Rule 907.d.(3)A., Wiepking-Fullerton has established a sampling and analysis plan (SAP) with protocols for sampling background soil and solidified water-based bentonitic drill cuttings.

2.1.3.1 Background Soil Sampling

Once drilling activities have concluded, Wiepking-Fullerton will collect a minimum of four discrete soil samples from the native surface soil at locations approximately 10 feet to 15 feet beyond any disturbed area in each cardinal direction. The soil samples will be analyzed for arsenic and one soil sample will also be analyzed for electrical conductivity (EC), pH, and sodium adsorption ratio (SAR) to characterize background soil conditions.

2.1.3.2 Water-Based Bentonitic Drilling Fluids and Associated Drill Cuttings

On Non-Crop Land

If water-based bentonitic drilling fluids and associated drill cuttings will be disposed of within the drilling pit and the drilling pit is located on non-crop land, then after drilling activities have concluded, Wiepking-Fullerton will collect, at a minimum, two 5-point composite samples of the drilling pit contents and one floor sample from the native soil beneath the drilling pit contents. These samples will be analyzed for COGCC Table 910-1 soil parameters, with the exception of polyaromatic hydrocarbons (PAHs) and boron.

On Crop Land

If water-based bentonitic drilling cuttings will be disposed of within the drilling pit and the drilling pit is located on crop land, then after drilling activities have concluded, Wiepking-Fullerton will collect, at a minimum, two 5-point composite samples of the staged drill cuttings, one discrete soil sample from each side wall of the excavated drilling pit, and one floor sample from the native soil beneath the excavated drilling pit. These samples will be analyzed for COGCC Table 910-1 soil parameters, with the exception of PAHs and boron.

For both crop land and non-crop land, if oil staining is observed in native soil or the pit contents, additional soil sampling may be collected. In these instances, discrete soil samples will be collected from those areas with observed oil staining to verify compliance with COGCC Table 910-1 concentration levels identified above.

2.1.4 Disposal

Wiepking-Fullerton will obtain written authorization from the surface owner (if non-Wiepking-Fullerton owned property) prior to drying and burying water-based bentonitic drilling fluids and associated drill cuttings within the drilling pit at the source location. The signed agreement will state that only Wiepking-Fullerton-generated materials will be disposed of at the source location and only solidified water-based bentonitic drill cuttings will be deposited within the pit.

2.1.4.1 On Crop Land

If laboratory analytical results confirm that concentrations in all soil samples are compliant with COGCC Table 910-1 concentration levels or below established background levels, as identified in Section 2.1.3.2 above, the excavated pit floor will be alleviated using mechanical equipment, and the staged drill cuttings will be placed into the drilling pit for disposal. Once the pit contents are sufficiently dried to allow for compaction, the pit contents will be compacted and reclaimed as described below in Section 2.1.5. Water-based bentonitic drilling fluids (except for de minimis amounts) will be disposed of per COGCC Rule 907.d.

2.1.4.2 On Non-Crop Land

If laboratory analytical results confirm that concentrations in all soil samples are compliant with COGCC Table 910-1 concentration levels or below established background levels, as identified in Section 2.1.3.2 above, the pit contents will be sufficiently dried, compacted, and reclaimed as described below in Section 2.1.5.

2.1.5 Reclamation

2.1.5.1 On Crop Land

Pits on crop land will be reclaimed in accordance with COGCC Rule 1003.d.(1). Pits will be backfilled and soil will be replaced to the original grade within three months of concluding drilling and completions activities. Pit contents will be compliant with COGCC Table 910-1 concentration levels or established background levels prior to backfilling.

2.1.5.2 On Non-Crop Land

Pits on non-crop land will be reclaimed in accordance with COGCC Rule 1003.d.(2). Pits contents will be dried and compacted and soil will be replaced to the original grade within six months of concluding drilling and completions activities. Pit contents will be compliant with COGCC Table 910-1 concentration levels or established background levels prior to backfilling.

For both crop land and non-crop land, if compliance with COGCC Table 910-1 concentration levels is not achieved, the contents may be bioremediated via land treatment per Section 2.2 below, incorporated on-site per Section 2.3 below, or disposed of at a permitted commercial waste facility per Section 2.4 below. In the event of bioremediation via land treatment or on-site incorporation, Wiepking-Fullerton will submit a COGCC Form 27 to the COGCC for approval prior to initiating bioremediation activities.

2.2 LAND TREATMENT

2.2.1 General

In the event that water-based bentonitic drilling fluids and associated drill cuttings are not compliant with the COGCC Table 910-1 concentration levels, land treatment can be an option to bioremediate the oily waste. If land treatment is selected, a supplemental Remediation Work

Plan (Form 27) will be submitted to the COGCC for approval prior to land treatment activities per COGCC Rule 907.e.(2)).

2.2.2 Material Handling

2.2.2.1 Water-Based Bentonitic Drilling Fluids and Associated Drill Cuttings

Free oil (if present) will be removed from the pit contents and the water-based bentonitic drilling fluids and associated drill cuttings will be solidified and bioremediated using commercially available bioremediation products (e.g., EcoSponge™, Geozorb™, etc.) on Wiepking-Fullerton-operated well pads located in the Southeast Project Area. Only residual water-based bentonitic drilling fluids and associated drill cuttings generated by Wiepking-Fullerton will be land treated at Wiepking-Fullerton well pad locations. No other E&P wastes will be deposited or bioremediated at these sites along with the drilling fluid or drill cuttings. In the event that land treatment will be conducted off of the production well pad location, Wiepking-Fullerton will receive written approval from the landowner.

Wiepking-Fullerton will either construct drilling pits or use temporary storage containment (frac tank(s), 3-sided bins, or equivalent) at well pad locations to store water-based bentonitic drilling fluids and associated drill cuttings during drilling operations. The water-based bentonitic drilling fluids will remain in the drilling pit or in the temporary storage containment until any free liquid has evaporated or has been removed via mechanical equipment. The remaining drill cuttings will be sufficiently solidified prior to staging for land treatment. Recovered drilling fluids will be disposed of per COGCC Rule 907.d.

The drill cuttings will be mixed with a bioremediation product, and suitable solidification and bioremediation materials will be used, as needed, to further dry the cuttings and prevent free liquid from leaching from the cuttings to the native soil below the pit or temporary storage containment. A solidification and/or bioremediation product may be used to assist with the solidification process; however, mixing native soil with the cuttings will be the primary method of solidification. Native soil used for solidification will come from lower horizons and will not include top soil. Once removed from the pit or temporary storage containment, the drill cuttings will be temporarily stockpiled on-site, followed by spreading in evenly sized windrows in a designated area. The windrows will be placed as to prevent pooling, ponding, or run-off of fluids. The solidified drill cuttings will be stockpiled in windrows to a maximum width of 12 feet and a maximum height of 6 feet. The windrows will be located on the drill pad in an area that will allow Wiepking-Fullerton to minimize the drill pad footprint, which will allow for reclamation to resume per the COGCC 1000 Series Rules. Biodegradation of the cuttings will be enhanced by disking, tilling, aerating, and/or adding nutrients, water, or biological amendments to promote microbial hydrocarbon degradation, as needed.

2.2.2.2 Stormwater Controls

The drill cuttings windrows will be managed using perimeter BMP structural controls, such as an earthen berm, a ditch, or wattles, to control potential stormwater run-on and run-off. Routine inspections of these structural controls will be conducted to ensure that they are properly maintained and performing as they are designed. Following any precipitation event significant

enough to cause erosion, the liquid level within the structural controls will be inspected and liquids will be removed for proper disposal. These structural controls will be maintained as necessary while soil treatment activities are being conducted.

2.2.2.3 Weed Control

Weed control will be conducted to manage the growth and propagation of invasive and non-desirable weed species at each reclaimed well pad per COGCC 1000 Series Rules.

2.2.3 Sampling and Analysis Plan

To achieve compliance with COGCC Table 910-1 concentration levels, Wiepking-Fullerton has established a SAP, including protocols for sampling background soil and water-based bentonitic drilling fluids and associated cuttings.

2.2.3.1 Background Soil Sampling

Once drilling activities have concluded, Wiepking-Fullerton will collect a minimum of four discrete soil samples from the native surface soil at locations approximately 10 feet to 15 feet beyond any disturbed area in each cardinal direction. The soil samples will be analyzed for arsenic and one soil sample will also be analyzed for EC, pH, and SAR to characterize background soil conditions.

2.2.3.2 Treated Water-Based Bentonitic Drilling Fluids and Associated Drill Cuttings

Once the water-based bentonitic drilling fluids and associated drill cuttings have been windrowed, Wiepking-Fullerton will collect one 5-point composite sample per every 100 cubic yards of the windrowed materials. Sampling activities will be conducted once per calendar quarter. The composited samples will be analyzed for COGCC Table 910-1 concentration levels except for PAHs and boron. Quarterly sampling will continue until the analytical results indicate compliance with the above listed concentration levels or established background levels.

2.2.4 Beneficial Reuse

Upon receipt of laboratory analytical results indicating that the treated cuttings are compliant with COGCC Table 910-1 concentration levels or established background levels, the cuttings will be beneficially reused on site or at other COGCC-permitted facilities in the Southeast Project Area operated by Wiepking-Fullerton. Potential beneficial uses include maintenance of well pads, access roads, containment berms, backfill, fill, or other similar applications.

2.2.5 Reclamation

Land treatment areas will be located in a portion of the drill pad where the foot print will not be minimized/reclaimed per COGCC Rule 1003. Once the treated cuttings are used beneficially as described above, the area used for land treatment will be restored to its original grade and utilized for ongoing oil and gas operations. If the treated material does not achieve compliance with COGCC Table 910-1 concentration levels or established background levels within three years, the material will be disposed of at a permitted commercial waste facility.

2.3 LAND APPLICATION

2.3.1 General

If land application is selected for disposal of water-based bentonitic drilling fluids and associated cuttings, a Land Application Plan will be submitted along with a supplemental Sundry Notice (Form 4) to the COGCC for approval prior to land application activities per COGCC Rules 907.a.(3) and 907.d.(3)B in accordance with the guidelines provided in the attached Land Application Checklist (Appendix C).

Wiepking-Fullerton may incorporate water-based drilling fluids and associated drill cuttings at the well pad location or on land not used for oil and gas operations if proven that the contents comply with COGCC Table 910-1 concentration levels as a beneficial amendment. If land application occurs, Wiepking-Fullerton will obtain prior written surface owner approval per COGCC Rule 907.d.(3)B.ii.

2.3.2 Material Handling

2.3.2.1 Water-Based Bentonitic Drilling Fluids and Associated Drill Cuttings

Wiepking-Fullerton will either construct drilling pits or use temporary storage containment (frac tank(s), 3-sided bins, or equivalent) at the well pad location for the storage of water-based bentonitic drilling fluids and associated drill cuttings during drilling operations. The water-based bentonitic drilling fluids will remain in the pit or in the temporary storage containment until any free liquid has evaporated or has been removed via mechanical equipment. The remaining drill cuttings will be sufficiently solidified for land application. Recovered drilling fluids will be disposed of per COGCC Rule 907.d.

Suitable solidification and/or bioremediation amendments will be used to further dry the cuttings and prevent free liquids from leaching from the cuttings to the native soil below the pit. A solidification and/or bioremediation product may be used to assist with the solidification process; however, mixing native soil from deeper horizons with the drill cuttings will be the primary method of solidification. Once removed from the pit or temporary storage containment, the drill cuttings will be temporarily stockpiled at the land application site and incorporate within 10 days.

2.3.3 Sampling and Analysis Plan

To achieve compliance with COGCC Rules 907.a.(3) and 907.d.(3)b, Wiepking-Fullerton has established a SAP, including protocols for sampling background soil and water-based bentonitic drilling fluids and associated cuttings.

2.3.3.1 Background Soil Sampling

Wiepking-Fullerton will collect a minimum of four discrete soil samples from the native surface soil at the land application site, prior to staging the material to be incorporated. These samples will be analyzed to characterize background soil conditions. The soil samples will be analyzed,

at a minimum, for arsenic. Analysis of additional COGCC Table 910-1 soil parameters may be included depending on the nature of the land application site.

2.3.3.2 Water-Based Bentonitic Drilling Fluids and Associated Drill Cuttings

Once drilling activities have concluded, Wiepking-Fullerton will collect, at a minimum, two 5-point composite samples of the drilling pit contents and one floor sample from the native soil beneath the drilling pit contents. These samples will be analyzed for COGCC Table 910-1 soil parameters, with the exception of PAHs and boron, and compared to Table 910-1 concentrations levels.

If oil staining is observed in native soil or the pit contents, additional soil samples may be collected. In these instances, discrete soil samples will be collected from those areas with observed oil staining to verify compliance with COGCC Table 910-1 concentration levels identified above.

2.3.4 Beneficial Reuse

Water-based bentonitic drilling fluids and associated drill cuttings may be beneficially reused to promote native soil health and vegetation establishment.

Once removed from the pit or temporary storage containment, the pit contents will be temporarily stockpiled at the land application site. The water-based bentonitic drilling fluids and associated drill cuttings will be spread evenly across the re-contoured well pad to a depth no greater than three inches. After the soil has been staged for incorporation, it will be incorporated with the native soil within 10 days of application per COGCC Rule 907.d(3)B.ii. Disk tilling will ensure proper incorporation with the native soil. Post-incorporation sampling will consist of collecting one 4- to 5-point composite soil sample per one-half acre of the post-incorporation land area. The composite samples will be analyzed for COGCC Table 910-1 soil parameters, with the exception of PAHs and boron.

2.3.5 Reclamation

2.3.5.1 Spreadfield

Once the water-based bentonitic drilling fluids and associated cuttings have been sufficiently incorporated into the native soil and resulting post-incorporation laboratory analytical results indicate compliance with COGCC Table 910-1 concentration levels or established background levels, the land application site will be returned to the landowner to resume agricultural activities (if located in an agricultural field) or returned to its original land use per the approved Land Application Plan.

2.3.5.2 Drill Pad

Once the water-based bentonitic drilling fluids and associated cuttings have been sufficiently incorporated into the native soil and resulting post-incorporation laboratory analytical results indicate compliance with COGCC Table 910-1 concentration levels or established background levels, the well pad will be reclaimed per the approved Land Application Plan.

If post-incorporation sampling results indicate that COGCC Table 910-1 concentration levels have been exceeded, then Wiepking-Fullerton will submit a Remediation Work Plan (Form 27) for remediation of impacted materials.

2.4 LANDFILL

2.4.1 General

In certain circumstances, Wiepking-Fullerton may dispose of water-based bentonitic drilling fluids and associated drill cuttings at a permitted commercial waste facility.

2.4.2 Material Handling

If water-based bentonitic drilling fluids and associated drill cuttings are transported to a permitted commercial waste facility, the following requirements will be met.

A Waste Generation Manifest Log will be generated and kept on file for a period of no less than five years after the project end-date for the transportation of the materials from the source location to the waste facility and will be made available to the COGCC upon request. The Waste Generation Manifest Log will include, at a minimum, the following information as required by COGCC Rule 907.b.(2):

- The date of the transport;
- The identity of the waste generator;
- The identity of the waste transporter;
- The location of the waste pickup site;
- The type and volume of waste; and
- The name and location of the treatment or disposal site.

2.4.3 Sampling and Analysis Plan

To achieve compliance with COGCC Rule 1003.d., Wiepking-Fullerton has established a SAP, including protocols for background soil sampling and confirmation sampling of excavations.

2.4.3.1 Background Soil Sampling

Once drilling activities have concluded, Wiepking-Fullerton will collect a minimum of four discrete soil samples from the native surface soil at locations approximately 10 feet to 15 feet beyond any disturbed area in each cardinal direction. The soil samples will be analyzed for arsenic and one soil sample will also be analyzed for EC, pH, and SAR to characterize background soil conditions.

2.4.3.2 Water-Based Bentonitic Drilling Fluids and Associated Drill Cuttings

Once water-based bentonitic drilling fluids and associated drill cuttings have been removed from the drilling pit for disposal, Wiepking-Fullerton will collect, at a minimum, four sidewall

samples (one from each pit sidewall) and one floor sample from the native soil beneath the emptied drilling pit. These samples will be analyzed for COGCC Table 910-1 soil parameters, with the exception of PAHs and boron and compared to Table 910-1 concentration levels.

2.4.4 Reclamation

Once the water-based bentonitic drilling fluids and associated cuttings have been removed from the drilling pit for disposal and the analytical results for the remaining native soil indicate compliance with COGCC Table 910-1 concentration levels or established background levels as identified in Section 5.3.2, the well pad will be reclaimed per COGCC Rule 1003.

2.5 OTHER DISPOSAL OR BENEFICIAL REUSE OPTIONS

Wiepking-Fullerton does not anticipate using a method for handling water-based bentonitic drilling fluids and associated cuttings other than the options presented in this Plan. However, in the event that Wiepking-Fullerton needs to use an option not identified in this Plan for handling water-based bentonitic drilling fluids and associated drill cuttings, a detailed plan describing how the waste will be handled, along with sampling procedures to ensure COGCC Table 910-1 compliance, will be submitted to the COGCC for approval, prior to drilling operations, via a Sundry Notice (Form 4).

3.0 OILY WASTE

Oily waste that could be encountered in Wiepking-Fullerton's Southeast Project Area includes those materials containing crude oil, condensate, or other E&P waste, such as soil, hydraulic fracturing sand, drilling fluids, and pit sludge that contain hydrocarbons.

3.1 DISPOSAL

If Wiepking-Fullerton plans to dispose of oily waste, disposal will be at a commercial solid waste disposal facility and the following requirements will be met.

A Waste Generation Manifest Log will be generated and kept on file for a period of no less than five years after the project end-date for the transportation of the materials from the source location to the waste facility and will be made available to the COGCC upon request. The Waste Generation Manifest Log will include, at a minimum, the following information as required by COGCC Rule 907.b.(2):

- The date of the transport;
- The identity of the waste generator;
- The identity of the waste transporter;
- The location of the waste pickup site;
- The type and volume of waste; and
- The name and location of the treatment or disposal site.

3.2 LAND TREATMENT

In the case of a reportable spill, Wiepking-Fullerton will submit a Site Investigation and Remediation Workplan, Form 27, for prior approval by the Director. Treatment will thereafter be completed in accordance with COGCC Rules 909 and 910.

Free oil will be removed from the oily waste prior to land treatment. Oily waste will be spread evenly at a depth of no greater than 18 inches to prevent pooling, ponding, or runoff. Wiepking-Fullerton will prevent contamination of stormwater runoff, ground water, or surface water. Biodegradation will be enhanced by disking, tilling, aerating, or adding nutrients, microbes, water, or other amendments, as appropriate. Land-treated oily waste incorporated in place or beneficially reused will not exceed the concentration levels in COGCC Table 910-1.

When land treatment occurs in an area not being used for oil and gas operations, Wiepking-Fullerton will obtain prior written surface owner approval. When land treatment occurs on an approved oil and gas location prior to completion of interim reclamation or on the surface disturbance remaining after interim reclamation, notice will be provided to the surface owner. Land treatment will be conducted in a manner that does not preclude compliance with reclamation COGCC Rules 1003 and 1004 and will follow the practices and procedures approved in the Site Investigation and Remediation Workplan (Form 27).

4.0 PRODUCED WATER

Wiepking-Fullerton's disposal methods for produced water are either injection into a Class II disposal well permitted in accordance with COGCC Rule 325, or disposal at a properly permitted commercial facility. Wiepking-Fullerton tracks the disposal of produced water under either scenario and can provide the disposal records upon request.

Wiepking-Fullerton does not plan to treat their produced water or to dispose of their produced water via an evaporation/percolation pit, road spreading, discharging into state waters, or evaporation in a lined pit at a centralized E&P waste management facility.

5.0 OTHER E&P WASTE

Other E&P waste such as workover fluids, tank bottoms, pigging wastes from gathering and flow lines, and natural gas gathering, processing, and storage wastes will be treated or disposed of by either disposal at a commercial solid waste disposal facility or injection into a Class II injection well permitted in accordance with COGCC Rule 325.

If Wiepking-Fullerton disposes of other E&P wastes, disposal will be at a commercial solid waste disposal facility and the following requirements will be met.

A Waste Generation Manifest Log will be generated and kept on file for a period of no less than five years after the project end-date for the transportation of the materials from the source location to the waste facility and will be made available to the COGCC upon request. The Waste

Generation Manifest Log will include, at a minimum, the following information as required by COGCC Rule 907.b.(2):

- The date of the transport;
- The identity of the waste generator;
- The identity of the waste transporter;
- The location of the waste pickup site;
- The type and volume of waste; and
- The name and location of the treatment or disposal site.

FIGURES

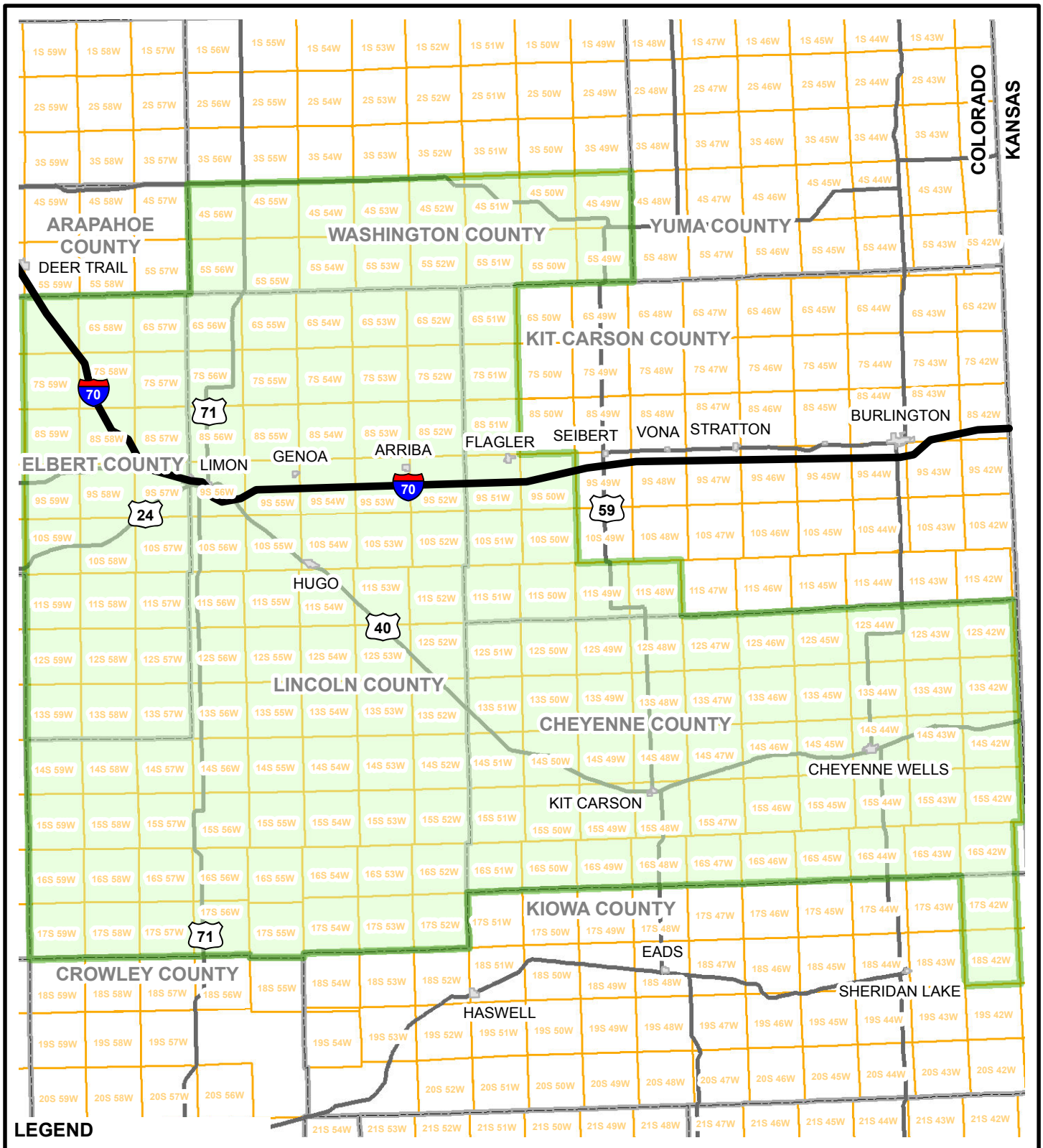

FIGURE 1
SOUTHEAST PROJECT AREA
CHEYENNE, ELBERT, KIOWA, KIT CARSON, LINCOLN, AND WASHINGTON COUNTIES, COLORADO

WIEPKING-FULLERTON ENERGY, L.L.C.

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APPENDIX A

COGCC 900 SERIES RULES

E&P WASTE MANAGEMENT

901. INTRODUCTION

a. **General.** The rules and regulations of this series establish the permitting, construction, operating and closure requirements for pits, methods of E&P waste management, procedures for spill/release response and reporting, and sampling and analysis for remediation activities. The 900 Series rules are applicable only to E&P waste, as defined in § 34-60-103(4.5), C.R.S., or other solid waste where the Colorado Department Of Public Health And Environment has allowed remediation and oversight by the Commission.

b. **COGCC reporting forms.** The reporting required by the rules and regulations of this series shall be made on forms provided by the Director. Alternate forms may be used where equivalent information is supplied and the format has been approved by the Director.

c. **Additional requirements.** Whenever the Director has reasonable cause to believe that an operator, in the conduct of any oil or gas operation, is performing any act or practice which threatens to cause or causes a violation of Table 910-1 and with consideration of water quality standards or classifications established by the Water Quality Control Commission ("WQCC") for waters of the state, the Director may impose additional requirements, including but not limited to, sensitive area determination, sampling and analysis, remediation, monitoring, permitting and the establishment of points of compliance. Any action taken pursuant to this Rule shall comply with the provisions of Rules 324A. through D. and the 500 Series rules.

d. **Alternative compliance methods.** Operators may propose for prior approval by the Director alternative methods for determining the extent of contamination, sampling and analysis, or alternative cleanup goals using points of compliance.

e. **Sensitive area determination.** When the operator or Director has data that indicate an impact or threat of impact to ground water or surface water, the Director may require the operator to make a sensitive area determination and that determination shall be subject to the Director's approval. The sensitive area determination shall be made using appropriate geologic and hydrogeologic data to evaluate the potential for impact to ground water and surface water, such as soil borings, monitoring wells, or percolation tests that demonstrate that seepage will not reach underlying ground water or waters of the State and impact current or future uses of these waters. Operators shall submit data evaluated and analysis used in the determination to the Director.

f. **Sensitive area operations.** Operations in sensitive areas shall incorporate adequate measures and controls to prevent significant adverse environmental impacts and ensure compliance with the concentration levels in Table 910-1, with consideration to WQCC standards and classifications.

902. PITS - GENERAL AND SPECIAL RULES

a. Pits used for exploration and production of oil and gas shall be constructed and operated to protect public health, safety, and welfare and the environment, including soil, waters of the state, and wildlife, from significant adverse environmental, public health, or welfare impacts from E&P waste, except as permitted by applicable laws and regulations.

b. Pits shall be constructed, monitored, and operated to provide for a minimum of two (2) feet of freeboard at all times between the top of the pit wall at its point of lowest elevation and

the fluid level of the pit. A method of monitoring and maintaining freeboard shall be employed. Any unauthorized release of fluids from a pit shall be subject to the reporting requirements of Rule 906.

c. Any accumulation of oil or condensate in a pit shall be removed within twenty-four (24) hours of discovery. Operators shall use skimming, steam cleaning of exposed liners, or other safe and legal methods as necessary to maintain pits in clean condition and to control hydrocarbon odors. Only de minimis amounts of hydrocarbons may be present unless the pit is specifically permitted for oil or condensate recovery or disposal use. A Form 15, Earthen Pit Report/Permit, may be revoked by the Director and the Director may require that the pit be closed if an operator repeatedly allows more than de minimis amounts of oil or condensate to accumulate in a pit. This requirement is not applicable to properly permitted and properly fenced, lined, and netted skim pits that are designed, constructed, and operated to prevent impacts to wildlife, including migratory birds.

d. Where necessary to protect public health, safety and welfare or to prevent significant adverse environmental impacts resulting from access to a pit by wildlife, migratory birds, domestic animals, or members of the general public, operators shall install appropriate netting or fencing.

e. Pits used for a period of no more than three (3) years, or more than three (3) years if the Director has issued a variance, for storage, recycling, reuse, treatment, or disposal of E&P waste or fresh water, as applicable, may be permitted in accordance with Rule 903 to service multiple wells, subject to Director approval.

f. Unlined pits shall not be constructed on fill material.

g. Except as allowed under Rule 904.a, unlined pits shall not be constructed in areas where pathways for communication with ground water or surface water are likely to exist.

h. Produced water shall be treated in accordance with Rule 907 before being placed in a production pit.

i. Operators shall utilize appropriate biocide treatments to control bacterial growth and related odors as needed.

903. PIT PERMITTING/REPORTING REQUIREMENTS

a. An Earthen Pit Report/Permit, Form 15, shall be submitted to the Director for prior approval for the following pits:

(1) All production pits.

(2) Special purpose pits except those reported under Rule 903.b.(1) or Rule 903.b.(2).

(3) Drilling pits designed for use with fluids containing hydrocarbon concentrations exceeding 10,000 ppm TPH or chloride concentrations at total well depth exceeding 15,000 ppm.

(4) Multi-well pits containing produced water, drilling fluids, or completion fluids that will be recycled or reused, except where reuse consists only of moving drilling fluids from one (1) oil and gas location to another such location for reuse there.

b. An Earthen Pit Report/Permit, Form 15, shall be submitted within thirty (30) calendar days after construction for the following:

(1) Special purpose pits used in the initial phase of emergency response.

(2) Flare pits where there is no risk of condensate accumulation.

c. An Earthen Pit Report/Permit, Form 15, shall not be required for drilling pits using water-based bentonitic drilling fluids with concentrations of TPH and chloride below those referenced in Rule 903.a.(3).

d. An Earthen Pit Report/Permit, Form 15, shall be completed in accordance with the instructions in Appendix I. Failure to complete the form in full may result in delay of approval or return of form.

e. The Director shall endeavor to review any properly completed Earthen Pit Report/Permit, Form 15, within thirty (30) calendar days after receipt. In order to allow adequate time for pit permit review and approval, operators shall submit an Earthen Pit Report/Permit, Form 15, at the same time as the Application for Permit-to-Drill, Form 2, is submitted. The Director may condition permit approval upon compliance with additional terms, provisions, or requirements necessary to protect the waters of the state, public health, or the environment.

904. PIT LINING REQUIREMENTS AND SPECIFICATIONS

a. Pits that were constructed before May 1, 2009 on federal land, or before April 1, 2009 on other land, shall comply with their permit conditions and the rules in effect at the time of their construction. The following pits shall be lined if they are constructed on or after May 1, 2009 on federal land, or on or after April 1, 2009 on other land:

(1) Drilling pits designed for use with fluids containing hydrocarbon concentrations exceeding 10,000 ppm TPH or chloride concentrations at total well depth exceeding 15,000 ppm.

(2) Production pits, other than skim pits, unless the operator demonstrates to the Director's satisfaction that the quality of the produced water is equivalent to or better than that of the underlying groundwater or the operator can clearly demonstrate by substantial evidence, such as by appropriate percolation tests, that seepage will not reach the underlying aquifer or waters of the state at contamination levels in excess of applicable standards. Subject to Rule 901.c, this requirement shall not apply to such pits in Huerfano or Las Animas Counties constructed before May 1, 2011, or to such pits in Washington, Yuma, Logan, or Morgan counties constructed before May 1, 2013.

(3) Special purpose pits, except emergency pits constructed during initial emergency response to spills/releases, or flare pits where there is no risk of condensate accumulation.

(4) Skim pits.

(5) Multi-well pits used to contain produced water, drilling fluids, or completion fluids that will be recycled or reused, except where reuse consists only of moving drilling fluids from one oil and gas location to another such location for reuse there. Subject to Rule 901.c, this requirement shall not apply to multi-well pits used to contain produced water in Huerfano or Las Animas Counties constructed before May 1, 2011, or to multi-well

pits used to contain produced water in Washington, Yuma, Logan, or Morgan counties constructed before May 1, 2013.

(6) Pits at centralized E&P waste management facilities and UIC facilities.

b. The following specifications shall apply to all pits that are required to be lined by rule or by permit condition:

(1) Materials used in lining pits shall be of a synthetic material that is impervious, has high puncture and tear strength, has adequate elongation, and is resistant to deterioration by ultraviolet light, weathering, hydrocarbons, aqueous acids, alkali, fungi or other substances in the produced water.

(2) All pit lining systems shall be designed, constructed, installed, and maintained in accordance with the manufacturers' specifications and good engineering practices.

(3) Field seams must be installed and tested in accordance with manufacturer specifications and good engineering practices. Testing results must be maintained by the operator and provided to the Director upon request.

c. The following specifications shall also apply to pits that are required to be lined, except those at centralized E&P waste management facilities, unless an oil and gas operator demonstrates to the satisfaction of the Director that a liner system offering equivalent protection to public health, safety, and welfare, including the environment and wildlife resources, will be used:

(1) Liners shall have a minimum thickness of twenty-four (24) mils. The synthetic or fabricated liner shall cover the bottom and interior sides of the pit with the edges secured with at least a twelve (12) inch deep anchor trench around the pit perimeter. The anchor trench shall be designed to secure, and prevent slippage or destruction of, the liner materials.

(2) The foundation for the liner shall be constructed with soil having a minimum thickness of twelve (12) inches after compaction covering the entire bottom and interior sides of the pit, and shall be constructed so that the hydraulic conductivity shall not exceed 1.0×10^{-7} cm/sec after testing and compaction. Compaction and permeability test results measured in the laboratory and field must be maintained by the operator and provided to the Director upon request.

(3) As an alternative to the soil foundation described in Rule 904.c.(2), the foundation may be constructed with bedding material that exceeds a hydraulic conductivity of 1.0×10^{-7} cm/sec, if a double synthetic liner system is used; however, the bottom and sides of the pit shall be padded with soil or synthetic matting type material and shall be free of sharp rocks or other material that are capable of puncturing the liner. Each synthetic liner shall have a minimum thickness of twenty-four (24) mils.

d. The following specifications shall also apply to pits used at centralized E&P waste management facilities, unless an oil and gas operator demonstrates to the satisfaction of the Director that a liner system offering equivalent protection to public health, safety, and welfare, including the environment and wildlife resources, will be used:

(1) Liners shall have a minimum thickness of sixty (60) mils. The synthetic or fabricated liner shall cover the bottom and interior sides of the pit with the edges secured

with at least a twelve (12) inch deep anchor trench around the pit perimeter. The anchor trench shall be designed to secure, and prevent slippage or destruction of, the liner materials.

(2) The foundation for the liner shall be constructed with soil having a minimum thickness of twenty-four (24) inches after compaction covering the entire bottom and interior sides of the pit, and shall be constructed so that the hydraulic conductivity shall not exceed 1.0×10^{-7} cm/sec after testing and compaction. Compaction and permeability test results measured in the laboratory and field must be maintained by the operator and provided to the Director upon request.

(3) As an alternative to the soil foundation described in Rule 904.d.(2), a secondary liner consisting of a geosynthetic clay liner, which is a manufactured hydraulic barrier typically consisting of bentonite clay or other very low permeability material, supported by geotextiles or geomembranes, which are held together by needling, stitching, or chemical adhesives, may be used.

e. In Sensitive Areas, the Director may require a leak detection system for the pit or other equivalent protective measures, including but not limited to, increased record-keeping requirements, monitoring systems, and underlying gravel fill sumps and lateral systems. In making such determination, the Director shall consider the surface and subsurface geology, the use and quality of potentially-affected ground water, the quality of the produced water, the hydraulic conductivity of the surrounding soils, the depth to ground water, the distance to surface water and water wells, and the type of liner.

905. CLOSURE OF PITS, AND BURIED OR PARTIALLY BURIED PRODUCED WATER VESSELS.

a. Drilling pits shall be closed in accordance with the 1000-Series Rules.

b. Pits not used exclusively for drilling operations, buried or partially buried produced water vessels, and emergency pits shall be closed in accordance with an approved Site Investigation and Remediation Workplan, Form 27. The workplan shall be submitted for prior Director approval and shall include a description of the proposed investigation and remediation activities in accordance with Rule 909. Emergency pits shall be closed and remediated as soon as the initial phase of emergency response operations are complete or process upset conditions are controlled.

(1) Operators shall ensure that soils and ground water meet the concentration levels of Table 910-1.

(2) **Pit evacuation.** Prior to backfilling and site reclamation, E&P waste shall be treated or disposed in accordance with Rule 907.

(3) Liners shall be disposed as follows:

A. **Synthetic liner disposal.** Liner material shall be removed and disposed in accordance with applicable legal requirements for solid waste disposal.

B. **Constructed soil liners.** Constructed soil liner material may be removed for treatment or disposal, or, where left in place, the material shall be ripped and mixed with native soils in a manner to alleviate compaction and prevent an impermeable barrier to infiltration and ground water flow and shall meet soil standards listed in Table 910-1.

(4) Soil beneath the low point of the pit must be sampled to verify no leakage of the managed fluids. Soil left in place shall meet the standards listed in Table 910-1.

c. **Discovery of a spill/release during closure.** When a spill/release is discovered during closure operations, operators shall report the spill/release on the Spill/Release Report, Form 19, in accordance with Rule 906. Leaking pits and buried or partially buried produced water vessels shall be closed and remediated in accordance with Rules 909. and 910.

d. **Unlined drilling pits.** Unlined drilling pits shall be closed and reclaimed in accordance with the 1000 Series rules and operators shall ensure that soils and ground water meet the concentration levels in Table 910-1.

906. SPILLS AND RELEASES

a. **General.** Operators shall, immediately upon discovery, control and contain all spills/releases of E&P waste or produced fluids to protect the environment, public health, safety, and welfare, and wildlife resources. Operators shall investigate, clean up, and document impacts resulting from spills/releases as soon as practicable. The Director may require additional activities to prevent or mitigate threatened or actual significant adverse environmental impacts on any air, water, soil or biological resource, or to the extent necessary to ensure compliance with the concentration levels in Table 910-1, with consideration to WQCC ground water standards and classifications.

b. **Reporting spills or releases of E&P Waste or produced fluids.**

(1) Report to the Director. Operators shall report a spill or release of E&P Waste or produced fluids that meet any of the following criteria to the Director verbally or in writing as soon as practicable, but no more than twenty-four (24) hours after discovery (the “Initial Report”).

A. A spills/release of any size that impacts or threatens to impact any waters of the state, a residence or occupied structure, livestock, or public byway;

B. A spill/release in which one (1) barrel or more of E&P Waste or produced fluids is spilled or released outside of berms or other secondary containment;

C. A spill/release of five (5) barrels or more regardless of whether the spill/release is completely contained within berms or other secondary containment.

The Initial Report to the Director shall include, at a minimum, the location of the spill/release and any information available to the Operator about the type and volume of waste involved.

If the Initial Report was not made by submitting a COGCC Spill/Release Report, Form 19 the Operator must submit a Form 19 with the Initial Report information as soon as practicable but not later than 72 hours after discovery of the spill/release unless extended by the Director.

In addition to the Initial Report to the Director, the Operator shall make a supplemental report on Form 19 not more than 10 calendar days after the spill/release is discovered that includes an 8 1/2 x 11 inch topographic map showing the governmental section and location of the spill or an aerial photograph showing the location of the spill; all pertinent

information about the spill/release known to the Operator that has not been reported previously; and information relating to the initial mitigation, site investigation, and remediation measures conducted by the Operator.

The Director may require further supplemental reports or additional information.

(2) Notification to the local government. In addition to the Initial Report to the Director, as soon as practicable, but not more than 24 hours after discovery of a spill/release of E & P Waste or produced fluids reportable under Rule 906.b.(1)A or B, above, an Operator shall provide verbal or written notification to the entity with jurisdiction over emergency response within the local municipality if the spill/release occurred within a municipality or the local county if the spill/release did not occur within a municipality. The notification shall include, at a minimum, the information provided in the Initial Report to the Director.

(3) Notification to the Surface Owner. In addition to the Initial Report to the Director, within 24 hours after discovery of a spill/release of E & P Waste or produced fluids reportable under Rule 906.b.(1)A or B, an Operator shall provide verbal notification to the affected Surface Owner or the Surface Owner's appointed tenant. If the Surface Owner cannot be reached within 24 hours, the Operator shall continue good faith efforts to notify the Surface Owner until notice has been provided. The verbal notification shall include, at a minimum, the information provided in the Initial Report to the Director.

(4) Report to Environmental Release/Incident Report Hotline. A spill/release of any size which impact or threaten to impact any surface water supply area shall be reported to the Director and to the Environmental Release/Incident Report Hotline (1-877-518-5608). Spills and releases that impact or threaten a surface water intake shall be verbally reported to the emergency contact for that facility immediately after discovery.

(5) Reporting chemical spills or releases. Chemical spills and releases shall be reported in accordance with applicable state and federal laws, including the Emergency Planning and Community Right-to-Know Act, the Comprehensive Environmental Response, Compensation, and Liability Act, the Oil Pollution Act, and the Clean Water Act, as applicable.

c. **Remediation of spills/releases.** When threatened or actual significant adverse environmental impacts on any air, water, soil or other environmental resource from a spill/release exist or when necessary to ensure compliance with the concentration levels in Table 910-1 with consideration to WQCC ground water standards and classifications, the Director may require operators to submit a Site Investigation and Remediation Workplan, Form 27.

(1) Such spills/releases shall be remediated in accordance with Rules 909 and 910.

(2) The operator shall make good faith efforts to notify and consult with the affected Surface Owner, or the Surface Owner's appointed tenant, prior to commencing operations to remediate E&P waste from a spill/release in an area not being utilized for oil and gas operations. Such efforts shall not unreasonably delay commencement of remediation approved by the Director.

d. **Spill/release prevention.**

(1) **Secondary containment.** Secondary containment structures shall be sufficiently impervious to contain discharged material. Secondary containment that was constructed before May 1, 2009 on federal land, or before April 1, 2009 on other land, shall comply with the rules in effect at the time of construction. Secondary containment constructed on or after May 1, 2009 on federal land, or on or after April 1, 2009 on other land shall be constructed or installed around all tanks containing oil, condensate, or produced water with greater than 3,500 milligrams per liter (mg/l) total dissolved solids (TDS) and shall be sufficient to contain the contents of the largest single tank and sufficient freeboard to contain precipitation. Operators are also subject to tank and containment requirements under Rules 603. and 604. This requirement shall not apply to water tanks with a capacity of fifty (50) barrels or less.

(2) **Spill/release evaluation.** Operators shall determine and document the cause of a spill/release of E & P Waste or produced fluids and, to the extent practicable, identify and timely implement measures to prevent spills/releases due to similar causes in the future.

907. MANAGEMENT OF E&P WASTE

a. **General requirements.**

(1) **Operator obligations.** Operators shall ensure that E&P waste is properly stored, handled, transported, treated, recycled, or disposed to prevent threatened or actual significant adverse environmental impacts to air, water, soil or biological resources or to the extent necessary to ensure compliance with the concentration levels in Table 910-1, with consideration to WQCC ground water standards and classifications.

(2) E&P waste management activities shall be conducted, and facilities constructed and operated, to protect the waters of the state from significant adverse environmental impacts from E&P waste, except as permitted by applicable laws and regulations.

(3) **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.

b. **Waste transportation.**

(1) E&P waste, when transported off-site within Colorado for treatment or disposal, shall be transported to facilities authorized by the Director or waste disposal facilities approved to receive E&P waste by the Colorado Department of Public Health and Environment. When transported to facilities outside of Colorado for treatment or disposal, E&P waste shall be transported to facilities authorized and permitted by the appropriate regulatory agency in the receiving state.

(2) **Waste generator requirements.** Generators of E&P waste that is transported off-site shall maintain, for not less than five (5) years, copies of each invoice, bill, or ticket and such other records as necessary to document the following requirements A through F:

A. The date of the transport;

B. The identity of the waste generator;

C. The identity of the waste transporter;

D. The location of the waste pickup site;

E. The type and volume of waste; and

F. The name and location of the treatment or disposal site.

Such records shall be signed by the transporter, made available for inspection by the Director during normal business hours, and copies thereof shall be furnished to the Director upon request.

c. **Produced water.**

(1) **Treatment of produced water.** Produced water shall be treated prior to placement in a production pit to prevent crude oil and condensate from entering the pit.

(2) **Produced water disposal.** Produced water may be disposed as follows:

A. Injection into a Class II well, permitted in accordance with Rule 325.;

B. Evaporation/percolation in a properly permitted pit;

C. Disposal at permitted commercial facilities;

D. Disposal by roadspreading on lease roads outside sensitive areas for produced waters with less than 3,500 mg/l TDS when authorized by the surface owner and in accordance with an approved waste management plan per Rule 907.a.(3). Roadspreading of produced waters shall not impact waters of the state, shall not result in pooling or runoff, and the adjacent soils shall meet the concentration levels in Table 910-1. Flowback fluids shall not be used for dust suppression.

E. Discharging into state waters, in accordance with the Water Quality Control Act and the rules and regulations promulgated thereunder.

i. Operators shall provide the Colorado discharge permit number, latitude and longitude coordinates, in accordance with Rule 215.f, of the discharge outfall, and sources of produced water on a Source of Produced Water for Disposal, Form 26, and shall include a U.S.G.S. topographic map showing the location of the discharge outfall.

ii. Produced water discharged pursuant to this subsection (2).E. may be put to beneficial use in accordance with applicable state statutes and regulations governing the use and administration of water.

F. Evaporation in a properly lined pit at a centralized E&P waste management facility permitted in accordance with Rule 908.

(3) **Produced water reuse and recycling.** Produced water may be reused for enhanced recovery, drilling, and other approved uses in a manner consistent with existing water rights and in consideration of water quality standards and classifications established by the WQCC for waters of the state, or any point of compliance established by the Director pursuant to Rule 324D.

(4) **Mitigation.** Water produced during operation of an oil or gas well may be used to provide an alternative domestic water supply to surface owners within the oil or gas field, in accordance with all applicable laws, including, but not limited to, obtaining the necessary approvals from the WQCD for constructing a new "waterworks," as defined by Section 25-1-107(1)(X)(II)(A), C.R.S. Any produced water not so used shall be disposed of in accordance with subsection (2) or (3). Providing produced water for domestic use within the meaning of this subsection (4) shall not constitute an admission by the operator that the well is dewatering or impacting any existing water well. The water produced shall be to the benefit of the surface owner within the oil and gas field and may not be sold for profit or traded.

d. **Drilling fluids.**

(1) **Recycling and reuse.** Drilling pit contents may be recycled to another drilling pit for reuse consistent with Rule 903.

(2) **Treatment and disposal.** Drilling fluids may be treated or disposed as follows:

A. Injection into a Class II well permitted in accordance with Rule 325;

B. Disposal at a commercial solid waste disposal facility; or

C. Land treatment or land application at a centralized E&P waste management facility permitted in accordance with Rule 908.

(3) **Additional authorized disposal of water-based bentonitic drilling fluids.** Water-based bentonitic drilling fluids may be disposed as follows:

A. Drying and burial in pits on non-crop land. The resulting concentrations shall not exceed the concentration levels in Table 910-1, below; or

B. Land application as follows:

i. **Applicability.** Acceptable methods of land application include, but are not limited to, production facility construction and maintenance, and lease road maintenance.

ii. **Land application requirements.** The average thickness of water-based bentonitic drilling fluid waste applied shall be no more than three (3) inches prior to incorporation. The waste shall be applied to prevent ponding or erosion and shall be incorporated as a beneficial amendment into the native soils within ten (10) days of application. The resulting concentrations shall not exceed those in Table 910-1.

iii. **Surface owner approval.** Operators shall obtain written authorization from the surface owner prior to land application of water-based bentonitic drilling fluids.

iv. **Operator obligations.** Operators shall maintain a record of the source, the volume, and the location where the land application of the water-based bentonitic drilling fluid occurred. Upon the Director's written request, this information shall be provided within five (5) business days, in a format readily reviewable by the Director. Operators with control and authority over the wells from which the water-based bentonitic drilling fluid wastes are obtained retain responsibility for the land application operation, and shall diligently cooperate with the Director in responding to complaints regarding land application of water-based bentonitic drilling fluids.

v. **Approval.** Prior Director approval is not required for reuse of water-based bentonitic drilling fluids for land application as a soil amendment.

e. **Oily waste.** Oily waste includes those materials containing crude oil, condensate or other E&P waste, such as soil, frac sand, drilling fluids, and pit sludge that contain hydrocarbons.

(1) Oily waste may be treated or disposed as follows:

A. Disposal at a commercial solid waste disposal facility;

B. Land treatment onsite; or

C. Land treatment at a centralized E&P waste management facility permitted in accordance with Rule 908.

(2) Land treatment requirements:

A. In the case of a reportable spill, Operators shall submit a Site Investigation and Remediation Workplan, Form 27, for prior approval by the Director. Treatment shall thereafter be completed in accordance with the workplan and Rules 909. and 910.

B. Free oil shall be removed from the oily waste prior to land treatment.

C. Oily waste shall be spread evenly to prevent pooling, ponding, or runoff.

D. Contamination of stormwater runoff, ground water, or surface water shall be prevented.

E. Biodegradation shall be enhanced by disking, tilling, aerating, or addition of nutrients, microbes, water or other amendments, as appropriate.

F. Land-treated oily waste incorporated in place or beneficially reused shall not exceed the concentrations in Table 910-1.

G. When land treatment occurs in an area not being utilized for oil and gas operations, operators shall obtain prior written surface owner approval. When land treatment occurs on an approved Oil and Gas Location prior

to completion of interim reclamation or on the surface disturbance remaining after interim reclamation, notice shall be provided to the surface owner.

H. Land treatment shall be conducted in a manner that does not preclude compliance with reclamation rules 1003 and 1004.

f. **Other E&P Waste.** Other E&P waste such as workover fluids, tank bottoms, pigging wastes from gathering and flow lines, and natural gas gathering, processing, and storage wastes may be treated or disposed of as follows:

(1) Disposal at a commercial solid waste disposal facility;

(2) Treatment at a centralized E&P waste management facility permitted in accordance with Rule 908;

(3) Injection into a Class II injection well permitted in accordance with Rule 325; or

(4) An alternative method proposed in a waste management plan in accordance with rule 907.a.(3) and approved by the Director.

907A. MANAGEMENT OF NON-E&P WASTE

a. Certain wastes generated by oil and gas-related activities are non-E&P wastes and are not exempt from regulation as solid or hazardous wastes. These wastes need to be properly identified and disposed of in accordance with state and federal regulations.

b. Certain wastes generated by oil and gas-related activities can either be E&P wastes or non-E&P wastes depending on the circumstances of their generation.

c. The hazardous waste regulations require that a hazardous waste determination be made for any non-E&P solid waste. Hazardous wastes require storage, treatment, and disposal practices in accordance with 6 C.C.R. 1007-3. All non-hazardous/non-E&P wastes are considered solid waste which require storage, treatment, and disposal in accordance with 6 C.C.R. 1007-2.

908. CENTRALIZED E&P WASTE MANAGEMENT FACILITIES

a. **Applicability.** Operators may establish non-commercial, centralized E&P waste management facilities for the treatment, disposal, recycling or beneficial reuse of E&P waste. This rule applies only to non-commercial facilities, which means the operator does not represent itself as providing E&P waste management services to third parties, except as part of a unitized area or joint operating agreement or in response to an emergency. Centralized facilities may include components such as land treatment or land application sites, pits, and recycling equipment.

b. **Permit requirements.** Before any person shall commence construction of a centralized E&P waste management facility, such person shall file with the Director an application on Form 28 and pay a filing and service fee established by the Commission (see Appendix III), and obtain the Director's approval. The application shall contain the following:

(1) The name, address, phone and fax number of the operator, and a designated contact person.

(2) The name, address, and phone number of the surface owner of the site, if not the operator, and the written authorization of such surface owner.

(3) The legal description of the site.

(4) A general topographic, geologic, and hydrologic description of the site, including immediately adjacent land uses, a topographic map of a scale no less than 1:24,000 showing the location, and the average annual precipitation and evaporation rates at the site.

(5) **Centralized facility siting requirements.**

A. A site plan showing drainage patterns and any diversion or containment structures, and facilities such as roads, fencing, tanks, pits, buildings, and other construction details.

B. Scaled drawings of entire sections containing the proposed facility. The field measured distances from the nearer north or south and nearer east or west section lines shall be measured at ninety (90) degrees from said section lines to facility boundaries and referenced on the drawing. A survey shall be provided including a complete description of established monuments or collateral evidence found and all aliquot corners.

C. The facility shall be designed to control public access, prevent unauthorized vehicular traffic, provide for site security both during and after operating hours, and prevent illegal dumping of wastes. Appropriate measures shall also be implemented to prevent access to the centralized facility by wildlife or domestic animals.

D. Centralized facilities shall have a fire lane of at least ten (10) feet in width around the active treatment areas and within the perimeter fence. In addition, a buffer zone of at least ten (10) feet shall be maintained within the perimeter fire lane.

E. Surface water diversion structures, including, but not limited to, berms and ditches, shall be constructed to accommodate a one hundred (100) year, twenty four (24) hour event. The facility shall be designed and constructed with a run-on control system to prevent flow onto the facility during peak discharge and a run-off control system to contain the water volume from a twenty-five (25) year, twenty-four (24) hour storm.

(6) **Waste profile.** For each type of waste, the amounts to be received and managed by the facility shall be estimated on a monthly average basis. For each waste type to be treated, a characteristic waste profile shall be completed.

(7) **Facility design and engineering.** Facility design and engineering data, including plans and elevations, design basis, calculations, and process description.

A. Geologic data, including, but not limited to:

i. Type and thickness of unconsolidated soils;

ii. Type and thickness of consolidated bedrock, if applicable;

iii. Local and regional geologic structures; and

iv. Any geologic hazards that may affect the design and operation of the facility.

B. Hydrologic data, including, but not limited to:

i. Surface water features within two (2) miles;

ii. Depth to shallow ground water and major aquifers;

iii. Water wells within one (1) mile of the site boundary and well depth, depth to water, screened intervals, yields, and aquifer name;

iv. Hydrologic properties of shallow ground water and major aquifers including flow direction, flow rate, and potentiometric surface;

v. Site location in relation to the floodplain of nearby surface water features;

vi. Existing quality of shallow ground water; and

vii. An evaluation of the potential for impacts to nearby surface water and ground water.

C. Engineering data, including, but not limited to:

i. Type and quantity of material required for use as a liner, including design components;

ii. Location and depth of cut for liners;

iii. Location, dimensions, and grades of all surface water diversion structures;

iv. Location and dimensions of all surface water containment structures; and

v. Location of all proposed facility structures and access roads.

(8) **Operating plan.** An operating plan, including, but not limited to:

A. A detailed description of the method of treatment, loading rates, and application of nutrients and soil amendments;

B. Dust and moisture control;

C. Sampling;

D. Inspection and maintenance;

E. Emergency response;

F. Record-keeping;

G. Site security;

H. Hours of operation;

I. Noise and odor mitigation; and

J. Final disposition of waste. Where treated waste will be beneficially reused, a description of reuse and method of product quality assurance shall be included.

(9) **Ground water monitoring.**

A. **Water Wells.**

Water samples shall be collected from water wells known to the operator or registered with the Colorado State Engineer within a one (1) mile radius of the proposed facility and shall be analyzed to establish baseline water quality. Analytical parameters shall be selected based upon the proposed waste stream and shall include, at a minimum, all major cations and anions, total dissolved solids, iron and manganese, nutrients (nitrates, nitrites, selenium), benzene, toluene, ethylbenzene, xylenes, pH, and specific conductance. Operators shall use reasonable good faith efforts to identify and obtain access to such water wells for the purpose of collecting water samples. If access cannot be obtained, then the operator shall notify the Director of the wells for which access was not obtained and sampling of such wells by the operator shall not be required. Not conducting sampling because access to water wells cannot be obtained shall not be grounds for denial of the proposed facility.

Copies of all test results described above shall be provided to the Director and the water well owner within three (3) months of collecting the samples. Laboratory results shall also be submitted to the Director in an electronic data deliverable format.

B. **Site-specific monitoring wells.**

i. Where applicable, the Director shall require ground water monitoring to ensure compliance with the concentration levels in Table 910-1 and WQCC standards and classifications by establishing points of compliance, unless an oil and gas operator demonstrates to the satisfaction of the Director that an alternative method offering equivalent protection of public health, safety, and welfare, including the environment and wildlife resources, can be employed and provided the operator employs a dual liner with a leak detection system that provides for immediate leak detection from the uppermost liner. All monitoring well construction must be completed in accordance with the State Engineer's regulations on well construction, "Water Well Construction Rules" (2 C.C.R. 402-2).

ii. Where monitoring is required, the direction of flow, ground water gradient and quality of water shall be established by the installation of a minimum of three (3) monitor wells, including an up-gradient well and two (2) down-gradient wells that will serve as points of compliance, or other methods authorized by the Director.

(10) **Surface water monitoring.** Where applicable, the Director shall require baseline and periodic surface water monitoring to ensure compliance with WQCC surface water standards and classifications. Operators shall use reasonable good faith efforts to obtain access to such surface water for the purpose of collecting water samples. If access cannot be obtained, then the operator shall notify the Director of the surface water for which access was not obtained and sampling of such surface water by the operator shall not be required. Not conducting sampling because access to surface water cannot be obtained shall not be grounds for denial of the proposed facility.

(11) **Contingency plan.** A contingency plan that describes the emergency response operations for the facility, 24-hour contact information for the person who has authority to initiate emergency response actions, and an outline of responsibilities under the joint operating agreement regarding maintenance, closure, and monitoring of the facility.

c. **Permit approval.** The Director shall endeavor to approve or deny the properly completed permit within thirty (30) days after receipt and may condition permit approval as necessary to prevent any threatened or actual significant adverse environmental impact on air, water, soil or biological resources or to the extent necessary to ensure compliance with the concentration levels in Table 910-1, with consideration to WQCC ground water standards and classifications.

d. **Financial assurance.** The operator of a centralized E&P waste management facility shall submit for the Director's approval such financial assurance as required by Rule 704. prior to issuance of the operating permit.

e. **Facility modifications.** Throughout the life of the facility the operator shall submit proposed modifications to the facility design, operating plan, permit data, or permit conditions to the Director for prior approval.

f. **Annual permit review.** To ensure compliance with permit conditions and the 900 Series rules, the facility permit shall be subject to an annual review by the Director. To facilitate this review, the operator shall submit an annual report summarizing operations, including the types and volumes of waste actually handled at the facility. The Director may require additional information.

g. **Closure.**

(1) **Preliminary closure plan.** A general preliminary plan for closure shall be submitted with the Centralized E&P Waste Management Facility Permit, Form 28. The preliminary closure plan shall include, but not be limited to:

A. A general plan for closure and reclamation of the entire facility, including a description of the activities required to decommission and remove all equipment, close and reclaim pits, dispose of or treat residual waste, collect samples as needed to verify compliance with soil and ground water standards, implement post-closure monitoring, and complete other remediation, as required.

B. An estimate of the cost to close and reclaim the entire facility and to conduct post-closure monitoring. Cost estimates shall be subject to review by the Director.

(2) **Final closure plan.** A detailed Site Investigation and Remediation Workplan, Form 27, shall be submitted at least sixty (60) days prior to closure for approval by the Director. The workplan shall include, but not be limited to, a description of the activities required to decommission and remove all equipment, close and reclaim pits, dispose of or treat residual waste, collect samples as needed to verify compliance with soil and ground water standards, implement post-closure monitoring, and complete other remediation, as required.

h. Operators may be subject to local requirements for zoning and construction of facilities and shall provide copies of any approval notices, permits, or other similar types of notifications for the facility from local governments or other agencies to the Director for review prior to issuance of the operating permit.

909. SITE INVESTIGATION, REMEDIATION, AND CLOSURE

a. **Applicability.** This section applies to the closure and remediation of pits other than drilling pits constructed pursuant to Rule 903.a.(3); investigation, reporting and remediation of spills/releases; permitted waste management facilities including treatment facilities; plugged and abandoned wellsites; sites impacted by E&P waste management practices; or other sites as designated by the Director.

b. **General site investigation and remediation requirements.**

(1) **Sensitive Area Determination.** Operators shall complete a sensitive area determination in accordance with Rule 901.e.

(2) **Sampling and analyses.** Sampling and analysis of soil and ground water shall be conducted in accordance with Rule 910. to determine the horizontal and vertical extent of any contamination in excess of the concentrations in Table 910-1.

(3) **Management of E&P waste.** E&P waste shall be managed in accordance with Rule 907.

(4) **Pit evacuation.** Prior to backfilling and site reclamation, E&P waste shall be treated or disposed in accordance with Rule 907. and the 1000 Series rules.

(5) **Remediation.** Remediation shall be performed in a manner to mitigate, remove, or reduce contamination that exceeds the concentrations in Table 910-1 in order to ensure protection of public health, safety, and welfare, and to prevent and mitigate significant adverse environmental impacts. Soil that does not meet concentrations in Table 910-1 shall be remediated. Ground water that does not meet concentrations in Table 910-1 shall be remediated in accordance with a Site Investigation and Remediation Workplan, Form 27.

(6) **Reclamation.** Remediation sites shall be reclaimed in accordance with the 1000 Series rules for reclamation.

c. **Site Investigation And Remediation Workplan, Form 27.** Operators shall prepare and submit for prior Director approval a Site Investigation and Remediation Workplan, Form 27, for the following operations and remediation activities:

(1) Unlined pit closure when required by Rule 905.

(2) Remediation of spills/releases in accordance with Rule 906.

(3) Land treatment of oily waste in accordance with Rule 907.e.

(4) Closure of centralized E&P waste management facilities in accordance with Rule 908.g.

(5) Remediation of impacted ground water in accordance with Rule 910.b.(4).

d. **Multiple sites.** Remediation of multiple sites may be submitted on a single workplan with prior Director approval.

e. **Closure.**

(1) Remediation and reclamation shall be complete upon compliance with the concentrations in Table 910-1, or upon compliance with an approved workplan.

(2) **Notification of completion.** Within thirty (30) days after conclusion of site remediation and reclamation activities operators shall provide the following notification of completion:

A. Operators conducting remediation operations in accordance with Rule 909.b. shall submit to the Director a Site Investigation and Remediation Workplan, Form 27, containing information sufficient to demonstrate compliance with these rules.

B. Operators conducting remediation under an approved workplan shall submit to the Director, by adding or attaching to the original workplan, information sufficient to demonstrate compliance with the workplan.

f. **Release of financial assurance.** Financial assurance required by Rule 706. may be held by the Director until the required remediation of soil and/or ground water impacts is completed in accordance with the approved workplan, or until cleanup goals are met.

910. CONCENTRATIONS AND SAMPLING FOR SOIL AND GROUND WATER

a. **Soil and groundwater concentrations.** The concentrations for soil and ground water are in Table 910-1. Ground water standards and analytical methods are derived from the ground water standards and classifications established by WQCC.

b. **Sampling and analysis.**

(1) **Existing workplans.** Sampling and analysis for sites subject to an approved workplan shall be conducted in accordance with the workplan and the sampling and analysis requirements described in this rule.

(2) **Methods for sampling and analysis.** Sampling and analysis for site investigation or confirmation of successful remediation shall be conducted to determine the nature and extent of impact and confirm compliance with appropriate concentration levels in Table 910-1.

A. **Field analysis.** Field measurements and field tests shall be conducted using appropriate equipment, calibrated and operated according to manufacturer specifications, by personnel trained and familiar with the equipment.

B. **Sample collection.** Samples shall be collected, preserved, documented, and shipped using standard environmental sampling procedures in a manner to ensure accurate representation of site conditions.

C. **Laboratory analytical methods.** Laboratories shall analyze samples using standard methods (such as EPA SW-846 or API RP-45) appropriate for detecting the target analyte. The method selected shall have detection limits less than or equal to the concentrations in Table 910-1.

D. **Background sampling.** Samples of comparable, nearby, non-impacted, native soil, ground water or other medium may be required by the Director for establishing background conditions.

(3) **Soil sampling and analysis.**

A. **Applicability.** If soil contamination is suspected or known to exist as a result of spills/releases or E&P waste management, representative samples of soil shall be collected and analyzed in accordance with this rule.

B. **Sample collection.** Samples shall be collected from areas most likely to have been impacted, and the horizontal and vertical extent of contamination shall be determined. The number and location of samples shall be appropriate to the impact.

C. **Sample analysis.** Soil samples shall be analyzed for contaminants listed in Table 910-1 as appropriate to assess the impact or confirm remediation. The analytical parameters shall be selected based on site-specific conditions and process knowledge and shall be agreed to and approved by the Director.

D. **Soil impacted by produced water.** For impacts to soil due to produced water, samples from comparable, nearby non-impacted native soil shall be collected and analyzed for purposes of establishing background soil conditions including pH and electrical conductivity (EC). Where EC of the impacted soil exceeds the level in Table 910-1, the sodium adsorption ratio (SAR) shall also be determined.

E. **Soil impacted by hydrocarbons.** For impacts to soil due to hydrocarbons, samples shall be analyzed for TPH or organic compounds per Table 910-1 as determined by site-specific conditions and process knowledge..

(4) **Ground water sampling and analysis.**

A. **Applicability.** Operators shall collect and analyze representative samples of ground water in accordance with these rules under the following circumstances:

(i) Where ground water contamination is suspected or known to exceed the concentrations in Table 910-1;

(ii) Where impacted soils are in contact with ground water; or

(iii) Where impacts to soils extend down to the high water table.

B. **Sample collection.** Samples shall be collected from areas most likely to have been impacted, downgradient or in the middle of excavated areas. The number and location of samples shall be appropriate to determine the horizontal and vertical extent of the impact. If the concentrations in Table 910-1 are exceeded, the direction of flow and a ground water gradient shall be established, unless the extent of the contamination and migration can otherwise be adequately determined.

C. **Sample analysis.** Ground water samples shall be analyzed for benzene, toluene, ethylbenzene, xylene, and API RP-45 constituents, or other parameters appropriate for evaluating the impact. The analytical parameters shall be selected based on site-specific conditions and process knowledge and shall be agreed to and approved by the Director.

D. **Impacted ground water.** Where ground water contaminants exceed the concentrations listed in Table 910-1, operators shall notify the Director and submit to the Director for prior approval a Site Investigation and Remediation Workplan, Form 27, for the investigation, remediation, or monitoring of ground water to meet the required concentrations in Table 910-1.

911. PIT, BURIED OR PARTIALLY BURIED PRODUCED WATER VESSEL, BLOWDOWN PIT, AND BASIC SEDIMENT/TANK BOTTOM PIT MANAGEMENT REQUIREMENTS PRIOR TO DECEMBER 30, 1997.

a. **Applicability.** This rule applies to the management, operation, closure and remediation of drilling, production and special purpose pits, buried or partially buried produced water vessels, blowdown pits, and basic sediment/tank bottom pits put into service prior to December 30, 1997 and unlined skim pits put into service prior to July 1, 1995. For pits constructed after December 30, 1997 and skim pits constructed after July 1, 1995, operators shall comply with the requirements contained in Rules 901. through 910.

b. **Inventory.** Operators were required to submit to the Director no later than December 31, 1995, an inventory identifying production pits, buried or partially buried produced water vessels, blowdown pits, and basic sediment/tank bottom pits that existed on June 30, 1995. The inventory required operators to provide the facility name, a description of the location, type, capacity and use of pit/vessel, whether netted or fenced, lined or unlined, and where available, water quality data. Operators who have failed to submit the required inventory are in continuing violation of this rule.

c. **Sensitive area determination.**

(1) For unlined production and special purpose pits constructed prior to July 1, 1995 and not closed by December 30, 1997, operators were required to determine whether the pit was located within a sensitive area in accordance with the Sensitive Area Determination Decision Tree, Figure 901-1 (now Rule 901.e.) and submit data evaluated and analysis used in the determination to the Director on a Sundry Notice, Form 4. In December 2008, Figure 901-1 was deleted from the 900-Series Rules.

(2) For steel, fiberglass, concrete, or other similar produced water vessels that were buried or partially buried and located in sensitive areas prior to December 30, 1997, operators were required to test such vessels for integrity, unless a monitoring or leak detection system was put in place.

d. The following permitting/reporting requirements applied to pits constructed prior to December 30, 1997:

(1) A Sundry Notice, Form 4, including the name, address, and phone number of the primary contact person operating the production pit for the operator, the facility name, a description of the location, type, capacity and use of pit, engineering design, installation features and water quality data, if available, was required for the following:

A. Lined production pits and lined special purpose pits constructed after July 1, 1995.

B. Unlined production pits constructed prior to July 1, 1995 which are lined in accordance with Rule 905. by December 30, 1997.

(2) An Application For Permit For Unlined Pit, Form 15 was required for the following:

A. Unlined production pits and special purpose pits in sensitive areas constructed prior to July 1, 1995, and not closed by December 30, 1997.

B. Unlined production pits outside sensitive areas constructed after July 1, 1995 and not closed by December 30, 1997.

(3) An Application For Permit For Unlined Pit, Form 15 and a variance under Rule 904.e.(1). (repealed, now Rule 502.b.) was required for unlined production pits and unlined special purpose pits in sensitive areas constructed after July 1, 1995.

(4) A Sundry Notice, Form 4 was required for unlined production pits outside sensitive areas receiving produced water at an average daily rate of five (5) or less barrels per day calculated on a monthly basis for each month of operation constructed prior to December 30, 1997.

e. The Director may have established points of compliance for unlined production pits and special purpose pits and for lined production pits in sensitive areas constructed after July 1, 1995.

f. **Closure requirements.**

(1) Operators of production or special purpose pits existing on July 1, 1995 which were closed before December 30, 1997, were required to submit a Sundry Notice, Form 4, within thirty (30) days of December 30, 1997. The Sundry Notice, Form 4 shall include a copy of the existing pit permit, if a permit was obtained, and a description of the closure process.

(2) Pits closed prior to December 30, 1997 were required to be reclaimed in accordance with the 1000 Series rules. Pits closed after December 30, 1997 shall be closed in accordance with the 900 Series rules and reclaimed in accordance with the 1000 Series rules.

(3) Operators of steel, fiberglass, concrete or other similar produced water vessels buried or partially buried and located in sensitive areas were required to repair or replace vessels and tanks found to be leaking. Operators shall repair or replace vessels and tanks found to be leaking. Operators shall submit to the Director a Sundry Notice, Form 4, describing the integrity testing results and action taken within thirty (30) days of December 30, 1997.

(4) Closure of pits and steel, fiberglass, concrete or other similar produced water vessels, and associated remediation operations conducted prior to December 30, 1997 are not subject to Rules 905., 906., 907., 909. and 910.

912. VENTING OR FLARING NATURAL GAS

a. The unnecessary or excessive venting or flaring of natural gas produced from a well is prohibited.

b. Except for gas flared or vented during an upset condition, well maintenance, well stimulation flowback, purging operations, or a productivity test, gas from a well shall be flared or vented only after notice has been given and approval obtained from the Director on a Sundry Notice, Form 4, stating the estimated volume and content of the gas. The notice shall indicate whether the gas contains more than one (1) ppm of hydrogen sulfide. If necessary to protect the public health, safety or welfare, the Director may require the flaring of gas.

c. Gas flared, vented or used on the lease shall be estimated based on a gas-oil ratio test or other equivalent test approved by the Director, and reported on Operator's Monthly Report of Operations, Form 7.

d. Flared gas that is subject to Sundry Notice, Form 4, shall be directed to a controlled flare in accordance with Rule 903.b.(2) or other combustion device operated as efficiently as possible to provide maximum reduction of air contaminants where practicable and without endangering the safety of the well site personnel and the public.

e. Operators shall notify the local emergency dispatch or the local governmental designee of any natural gas flaring. Notice shall be given prior to flaring when flaring can be reasonably anticipated, or as soon as possible, but in no event more than two (2) hours after the flaring occurs.

Table 910-1
CONCENTRATION LEVELS[1]

Contaminant of Concern	Concentrations
Organic Compounds in Soil	
TPH (total volatile and extractable petroleum hydrocarbons)	**500 mg/kg**
Benzene	**0.17 mg/kg[2]**
Toluene	**85 mg/kg[2]**
Ethylbenzene	**100 mg/kg[2]**
Xylenes (total)	**175 mg/kg[2]**
Acenaphthene	**1,000 mg/kg[2]**
Anthracene	**1,000 mg/kg[2]**
Benz(a)anthracene	**0.22 mg/kg[2]**
Benzo(b)fluoranthene	**0.22 mg/kg[2]**
Benzo(k)fluoranthene	**2.2 mg/kg[2]**
Benzo(a)pyrene	**0.022 mg/kg[2]**
Chrysene	**22 mg/kg[2]**
Dibenzo(a,h)anthracene	**0.022 mg/kg[2]**
Fluoranthene	**1,000 mg/kg[2]**
Fluorene	**1,000 mg/kg[2]**
Indeno(1,2,3,c,d)pyrene	**0.22 mg/kg[2]**
Naphthalene	**23 mg/kg[2]**
Pyrene	**1,000 mg/kg[2]**

Organic Compounds in Ground Water	
Benzene	**5 µg/l[3]**
Toluene	**560 to 1,000 µg/l[3]**
Ethylbenzene	**700 µg/l[3]**
Xylenes (Total)	**1,400 to 10,000 µg/l[3,4]**
Inorganics in Soils	
Electrical Conductivity (EC)	**<4 mmhos/cm or 2x background**
Sodium Adsorption Ratio (SAR)	**<12[5]**
pH	**6-9**
Inorganics in Ground Water	
Total Dissolved Solids (TDS)	**<1.25 x background[3]**
Chlorides	**<1.25 x background[3]**
Sulfates	**<1.25 x background[3]**
Metals in Soils	
Arsenic	**0.39 mg/kg[2]**
Barium (LDNR True Total Barium)	**15,000 mg/kg[2]**
Boron (Hot Water Soluble)	**2 mg/l[3]**
Cadmium	**70 mg/kg[3,6]**
Chromium (III)	**120,000 mg/kg[2]**
Chromium (VI)	**23 mg/kg[2,6]**
Copper	**3,100 mg/kg[2]**
Lead (inorganic)	**400 mg/kg[2]**
Mercury	**23 mg/kg[2]**
Nickel (soluble salts)	**1,600 mg/kg[2,6]**
Selenium	**390 mg/kg[2,6]**
Silver	**390 mg/kg[2]**
Zinc	**23,000 mg/kg[2,6]**
Liquid Hydrocarbons in Soils and Ground Water	
Liquid hydrocarbons including condensate and oil	**Below detection level**

COGCC recommends that the latest version of EPA SW 846 analytical methods be used where possible and that analyses of samples be performed by laboratories that maintain state or national accreditation programs.

[1] Consideration shall be given to background levels in native soils and ground water.
[2] Concentrations taken from CDPHE-HMWMD Table 1 Colorado Soil Evaluation Values (December 2007).
[3] Concentrations taken from CDPHE-WQCC Regulation 41 - The Basic Standards for Ground Water.
[4] For this range of standards, the first number in the range is a strictly health-based value, based on the WQCC's established methodology for human health-based standards. The second number in the range is a maximum contaminant level (MCL), established under the Federal Safe Drinking Water Act which has been determined to be an acceptable level of this chemical in public water supplies, taking treatability and laboratory detection limits into account. The WQCC intends that control requirements for this chemical be implemented to attain a level of ambient water quality that is at least equal to the first number in the range except as follows: 1) where ground water quality exceeds the first number in the range due to a release of contaminants that occurred prior to September 14, 2004 (regardless of the date of discovery or subsequent migration of such contaminants) clean-up levels for the entire contaminant plume shall be no more restrictive than the second number in the range or the ground water quality resulting from such release, whichever is more protective, and 2) whenever the WQCC has adopted alternative, site-specific standards for the chemical, the site-specific standards shall apply instead of these statewide standards.
[5] Analysis by USDA Agricultural Handbook 60 method (20B) with soluble cations determined by method (2). Method (20B) = estimation of exchangeable sodium percentage and exchangeable potassium percentage from soluble cations. Method (2) = saturated paste method (note: each analysis requires a unique sample of at least 500 grams). If soils are saturated, USDA Agricultural Handbook 60 with soluble cations determined by method (3A) saturation extraction method.
[6] The table value for these inorganic constituents is taken from the CDPHE-HMWMD Table 1 Colorado Soil Evaluation Values (December 2007). However, because these values are high, it is possible that site-specific geochemical conditions may exist that could allow these constituents to migrate into ground water at

levels exceeding ground water standards even though the concentrations are below the table values. Therefore, when these constituents are present as contaminants, a secondary evaluation of their leachability must be performed to ensure ground water protection.

APPENDIX B

COGCC 1000 SERIES RULES

RECLAMATION REGULATIONS

1001. INTRODUCTION

a. **General.** The rules and regulations of this series establish the proper reclamation of the land and soil affected by oil and gas operations and ensure the protection of the topsoil of said land during such operations. The surface of the land shall be restored as nearly as practicable to its condition at the commencement of drilling operations.

b. **Additional requirements.** Notwithstanding the provisions of the 1000 Series rules, when the Director has reasonable cause to believe that a proposed oil and gas operation could result in a significant adverse environmental impact on any air, water, soil, or biological resource, the Director shall conduct an onsite inspection and may request an emergency meeting of the Commission to address the issue.

c. **Surface owner waiver of 1000-Series Rules.** The Commission shall not require compliance with Rules 1002. (except Rules 1002.e.(1), 1002.e.(4), and 1002.f, for which compliance will continue to be required), Rule 1003, or Rule 1004 (except Rules 1004.c.(4) and 1004.c.(5), for which compliance will continue to be required), if the operator can demonstrate to the Director's or the Commission's satisfaction both that compliance with such rules is not necessary to protect the public health, safety and welfare, including prevention of significant adverse environmental impacts, and that the operator has entered into an agreement with the surface owner regarding topsoil protection and reclamation of the land. Absent bad faith conduct by the operator, penalties may only be imposed for non-compliance with a Commission order issued after a determination that, notwithstanding such agreement, compliance is necessary to protect public health, safety and welfare. Prior to final reclamation approval as to a specific well, the operator shall either comply with the rules or obtain a variance under Rule 502.b. This rule shall not have the effect of relieving an operator from compliance with the 900 Series Rules.

1002. SITE PREPARATION AND STABILIZATION

a. Effective June 1, 1996:

(1) **Fencing of drill sites and access roads on crop lands.** During drilling operations on crop lands, when requested by the surface owner, the operator shall delineate each drillsite and access road on crop lands constructed after such date by berms, single strand fence, or other equivalent method in order to discourage unnecessary surface disturbances.

(2) **Fencing of reserve pit when livestock is present.** During drilling operations where livestock is in the immediate area and is not fenced out by existing fences, the operator, at the request of the surface owner, will install a fence around the reserve pit.

(3) **Fencing of well sites.** Subsequent to drilling operations, where livestock is in the immediate area and is not fenced out by existing fences, the operator, at the request of the surface owner, will install a fence around the wellhead, pit, and production equipment to prevent livestock entry.

b. **Soil removal and segregation.**

(1) **Soil removal and segregation on crop land.** As to all excavation operations undertaken after June 1, 1996 on crop land, the operator shall separate and store soil horizons separately from one another and mark or document stockpile locations to facilitate subsequent reclamation. When separating soil horizons, the operator shall segregate horizons based upon noted changes in physical characteristics such as organic content,

color, texture, density, or consistency. Segregation will be performed to the extent practicable to a depth of six (6) feet or bedrock, whichever is shallower.

(2) **Soil removal and segregation on non crop-land.** As to all excavation operations undertaken after July 1, 1997 on non-crop land, the operator shall separate and store the topsoil horizon or the top six (6) inches, whichever is deeper, and mark or document stockpile locations to facilitate subsequent reclamation. When separating the soil horizons, the operator shall segregate the horizon based upon noted changes in physical characteristics such as organic content, color, texture, density, or consistency.

(3) **Horizons too rocky or too thin.** When the soil horizons are too rocky or too thin for the operator to practicably segregate, then the topsoil shall be segregated to the extent possible and stored. Too rocky shall mean that the soil horizon consists of greater than thirty five percent (35%) by volume rock fragments larger than ten (10) inches in diameter. Too thin shall mean soil horizons that are less than six (6) inches in thickness. The operator shall segregate remaining soils on crop land to the extent practicable to a depth of three (3) feet below the ground surface or bedrock, whichever is shallower, based upon noted changes in physical characteristics such as color, texture, density or consistency and such soils shall be stockpiled to avoid loss and mixing with other soils.

c. **Protection of soils.** All stockpiled soils shall be protected from degradation due to contamination, compaction and, to the extent practicable, from wind and water erosion during drilling and production operations. Best management practices to prevent weed establishment and to maintain soil microbial activity shall be implemented.

d. **Drill pad location.** The drilling location shall be designed and constructed to provide a safe working area while reasonably minimizing the total surface area disturbed. Consistent with applicable spacing orders and well location orders and regulations, in locating drill pads, steep slopes shall be avoided when reasonably possible. The drill pad site shall be located on the most level location obtainable that will accommodate the intended use. If not avoidable, deep vertical cuts and steep long fill slopes shall be constructed to the least percent slope practical. Where feasible, operators shall use directional drilling to reduce cumulative impacts and adverse impacts on wildlife resources.

e. **Surface disturbance minimization.**

(1) In order to reasonably minimize land disturbances and facilitate future reclamation, well sites, production facilities, gathering pipelines, and access roads shall be located, adequately sized, constructed, and maintained so as to reasonably control dust and minimize erosion, alteration of natural features, removal of surface materials, and degradation due to contamination.

(2) Operators shall avoid or minimize impacts to wetlands and riparian habitats to the degree practicable.

(3) Where practicable, operators shall consolidate facilities and pipeline rights-of-way in order to minimize adverse impacts to wildlife resources, including fragmentation of wildlife habitat, as well as cumulative impacts.

(4) **Access roads.** Existing roads shall be used to the greatest extent practicable to avoid erosion and minimize the land area devoted to oil and gas operations. Roadbeds shall be engineered to avoid or minimize impacts to riparian areas or wetlands to the extent practicable. Unavoidable impacts shall be mitigated. Road crossings of streams shall be designed and constructed to allow fish passage, where practicable and appropriate. Where feasible and practicable, operators are encouraged to share access roads in

developing a field. Where feasible and practicable, roads shall be routed to complement other land usage. To the greatest extent practicable, all vehicles used by the operator, contractors, and other parties associated with the well shall not travel outside of the original access road boundary. Repeated or flagrant instance(s) of failure to restrict lease access to lease roads which result in unreasonable land damage or crop losses shall be subject to a penalty under Rule 523.

f. **Stormwater management.**

(1) All oil and gas locations are subject to the Best Management Practices requirements of Rule 1002.f.(2). In addition, upon the termination of a construction stormwater permit issued by the Colorado Department of Public Health and Environment for an oil and gas location, such oil and gas location is subject to the Post-Construction Stormwater Program requirements of Rule 1002.f.(3), except that such requirements are not applicable to Tier 1 Oil and Gas Locations.

(2) Oil and gas operators shall implement and maintain Best Management Practices (BMPs) at all oil and gas locations to control stormwater runoff in a manner that minimizes erosion, transport of sediment offsite, and site degradation. BMPs shall be maintained until the facility is abandoned and final reclamation is achieved pursuant to Rule 1004. Operators shall employ BMPs, as necessary to comply with this rule, at all oil and gas locations, including, but not limited to, well pads, soil stock piles, access roads, tank batteries, compressor stations, and pipeline rights of way. BMPs shall be selected based on site-specific conditions, such as slope, vegetation cover, and proximity to water bodies, and may include maintaining in-place some or all of the BMPs installed during the construction phase of the facility. Where applicable based on site-specific conditions, operators shall implement BMPs in accordance with good engineering practices, including measures such as:

A. **Covering materials and activities and stormwater diversion** to minimize contact of precipitation and stormwater runoff with materials, wastes, equipment, and activities with potential to result in discharges causing pollution of surface waters.

B. **Materials handling and spill prevention procedures and practices** implemented for material handling and spill prevention of materials used, stored, or disposed of that could result in discharges causing pollution of surface waters.

C. **Erosion controls** designed to minimize erosion from unpaved areas, including operational well pads, road surfaces and associated culverts, stream crossings, and cut/fill slopes.

D. **Self-inspection, maintenance, and good housekeeping procedures and schedules** to facilitate identification of conditions that could cause breakdowns or failures of BMPs. These procedures shall include measures for maintaining clean, orderly operations and facilities and shall address cleaning and maintenance schedules and waste disposal practices. In conducting inspections and maintenance relative to stormwater runoff, operators shall consider seasonal factors, such as winter snow cover and spring runoff from snowmelt, to ensure site conditions and controls are adequate and in place to effectively manage stormwater.

E. **Spill response procedures** for responding to and cleaning up spills. The necessary equipment for spill cleanup shall be readily available to personnel. Spill Prevention, Control, and Countermeasure plans incorporated by reference must be identified in the Post-Construction Stormwater Management Program specified in Rule 1002.f.(3).

F. **Vehicle tracking control practices** to control potential sediment discharges from operational roads, well pads, and other unpaved surfaces. Practices could include road and pad design and maintenance to minimize rutting and tracking, controlling site access, street sweeping or scraping, tracking pads, wash racks, education, or other sediment controls.

(3) Operators of oil and gas facilities shall develop a Post-Construction Stormwater Program in compliance with this section no later than the time of termination of stormwater permits issued by the Colorado Department of Public Health and Environment for construction of oil and gas facilities.

A. The Post-Construction Stormwater Program shall reflect good faith efforts by operators to select and implement BMPs intended to serve the purposes of this rule. BMPs shall be selected to address potential sources of pollution which may reasonably be expected to affect the quality of discharges associated with the ongoing operation of production facilities during the post-construction and reclamation operation of the facilities. Pollutant sources that must be addressed by BMPs, if present, include:

i. Transport of chemicals and materials, including loading and unloading operations;

ii. Vehicle/equipment fueling;

iii. Outdoor storage activities, including those for chemicals and additives;

iv. Produced water and drilling fluids storage;

v. Outdoor processing activities and machinery;

vi. Significant dust or particulate generating processes;

vii. Erosion and vehicle tracking from well pads, road surfaces, and pipelines;

viii. Waste disposal practices;

ix. Leaks and spills; and

x. Ground-disturbing maintenance activities.

B. The Post-Construction Stormwater Program shall be developed, supervised, documented, and maintained by a qualified person(s) with training or prior work experience specific to stormwater management. Employees and subcontractors shall be trained to make them aware of the BMPs implemented and maintained at the site and procedures for reporting needed maintenance or repairs. Documentation shall include a description of the BMPs selected to ensure proper implementation, operation, and maintenance.

C. Facility-specific maps, installation specification, and implementation criteria shall also be included when general operating procedures and descriptions are not adequate to clearly describe the implementation and operation of BMPs.

1003. INTERIM RECLAMATION

a. **General.** Debris and waste materials other than de minimis amounts, including, but not limited to, concrete, sack bentonite and other drilling mud additives, sand plastic, pipe and cable, as well as equipment associated with the drilling, re-entry, or completion operations shall be removed. All E&P waste shall be handled according to the 900 Series rules. All pits, cellars, rat holes, and other bore holes unnecessary for further lease operations, excluding the drilling pit, will be backfilled as soon as possible after the drilling rig is released to conform with surrounding terrain. On crop land, if requested by the surface owner, guy line anchors shall be removed as soon as reasonably possible after the completion rig is released. When permanent guy line anchors are installed, it shall not be mandatory to remove them. When permanent guy line anchors are installed on cropland, care shall be taken to minimize disruption or cultivation, irrigation, or harvesting operations. If requested by the surface owner or its representative, the anchors shall be specifically marked, in addition to the marking required below, so as to facilitate farming operations. All guy line anchors left buried for future use shall be identified by a marker of bright color not less than four (4) feet in height and not greater than one (1) foot east of the guy line anchor. In addition, all well sites and surface production facilities shall be maintained in accordance with Rule 603.j.

b. **Interim reclamation of areas no longer in use.** All disturbed areas affected by drilling or subsequent operations, except areas reasonably needed for production operations or for subsequent drilling operations to be commenced within twelve (12) months, shall be reclaimed as early and as nearly as practicable to their original condition or their final land use as designated by the surface owner and shall be maintained to control dust and minimize erosion to the extent practicable. As to crop lands, if subsidence occurs in such areas additional topsoil shall be added to the depression and the land shall be re-leveled as close to its original contour as practicable. Interim reclamation shall occur no later than three (3) months on crop land or six (6) months on non-crop land after such operations unless the Director extends the time period because of conditions outside the control of the operator. Areas reasonably needed for production operations or for subsequent drilling operations to be commenced within twelve (12) months shall be compacted, covered, paved, or otherwise stabilized and maintained in such a way as to minimize dust and erosion to the extent practicable.

c. **Compaction alleviation.** All areas compacted by drilling and subsequent oil and gas operations which are no longer needed following completion of such operations shall be cross-ripped. On crop land, such compaction alleviation operations shall be undertaken when the soil moisture at the time of ripping is below thirty-five percent (35%) of field capacity. Ripping shall be undertaken to a depth of eighteen (18) inches unless and to the extent bed rock is encountered at a shallower depth.

d. **Drilling pit closure.** As part of interim reclamation, drilling pits shall be closed in the following manner:

   (1) **Drilling pit closure on crop land and within 100-year floodplain.** On crop land or within the 100-year floodplain, water-based bentonitic drilling fluids, except *de minimis* amounts, shall be removed from the drilling pit and disposed of in accordance with the 900 Series rules. Operators shall ensure that soils meet the concentration levels of Table 910-1, above. Drilling pit reclamation, including the disposal of drilling fluids and cuttings, shall be performed in a manner so as to not result in the formation of an impermeable barrier. Any cuttings removed from the pit for drying shall be returned to the pit prior to backfilling, and no more than *de minimis* amounts may be incorporated into the surface materials. After the drilling pit is sufficiently dry, the pit shall be backfilled. The backfilling of the drilling pit shall be done to return the soils to their original relative positions. Closing and reclamation of drilling pits shall occur no later than three (3) months after drilling and completion activities conclude.

(2) **Drilling pit closure on non-crop land.** All drilling fluids shall be disposed of in accordance with the 900 Series rules. Operators shall ensure that soils meet the concentration levels of Table 910-1, above. After the drilling pit is sufficiently dry, the pit shall be backfilled. Materials removed from the pit for drying shall be returned to the pit prior to the backfilling. No more than *de minimis* amounts may be incorporated into the surface materials. The backfilling of the drilling pit will be done to return the soils to their original relative positions so that the muds and associated solids will be confined to the pit and not squeezed out and incorporated in the surface materials. Closure and reclamation of drilling pits shall occur no later than six (6) months after drilling and completion activities conclude, weather permitting.

(3) **Minimum cover.** On crop lands, a minimum of three (3) feet of backfill cover shall be applied over any remaining drilling pit contents. As to both crop lands and non-crop lands, during the two (2) year period following drilling pit closure, if subsidence occurs over the closed drilling pit location additional topsoil shall be added to the depression and the land shall be re-leveled as close to its original contour as practicable.

e. **Restoration and revegetation.** When a well is completed for production, all disturbed areas no longer needed will be restored and revegetated as soon as practicable.

(1) **Revegetation of crop lands.** All segregated soil horizons removed from crop lands shall be replaced to their original relative positions and contour, and shall be tilled adequately to re-establish a proper seedbed. The area shall be treated if necessary and practicable to prevent invasion of undesirable species and noxious weeds, and to control erosion. Any perennial forage crops that were present before disturbance shall be re-established.

(2) **Revegetation of non-crop lands.** All segregated soil horizons removed from non-crop lands shall be replaced to their original relative positions and contour as near as practicable to achieve erosion control and long-term stability, and shall be tilled adequately in order to establish a proper seedbed. The disturbed area then shall be reseeded in the first favorable season following rig demobilization. Reseeding with species consistent with the adjacent plant community is encouraged. In the absence of an agreement between the operator and the affected surface owner as to what seed mix should be used, the operator shall consult with a representative of the local soil conservation district to determine the proper seed mix to use in revegetating the disturbed area. In an area where an operator has drilled or plans to drill multiple wells, in the absence of an agreement between the operator and the affected surface owner, the operator may rely upon previous advice given by the local soil conservation district in determining the proper seed mixes to be used in revegetating each type of terrain upon which operations are to be conducted.

Interim reclamation of all disturbed areas no longer in use shall be considered complete when all ground surface disturbing activities at the site have been completed, and all disturbed areas have been either built on, compacted, covered, paved, or otherwise stabilized in such a way as to minimize erosion to the extent practicable, or a uniform vegetative cover has been established that reflects pre-disturbance or reference area forbs, shrubs, and grasses with total percent plant cover of at least eighty percent (80%) of pre-disturbance levels or reference areas, excluding noxious weeds. Re-seeding alone is not sufficient.

(3) **Interim reclamation completion notice, Form 4.** The operator shall submit a Sundry Notice, Form 4, which describes the interim reclamation procedures and any associated mitigation measures performed, any changes, if applicable in the landowner's designated final land use, and at a minimum four (4) photographs taken during the growing season facing each cardinal direction which document the success of the interim reclamation and one (1) photograph which documents the total cover of live perennial vegetation of

adjacent or nearby undisturbed land or the reference area. Each photograph shall be identified by date taken, well name, GPS location, and direction of view.

f. **Weed control.** During drilling, production, and reclamation operations, all disturbed areas shall be kept as free of all undesirable plant species designated to be noxious weeds as practicable. Weed control measures shall be conducted in compliance with the Colorado Noxious Weed Act, C.R.S. §35-5.5-115 and the current rules pertaining to the administration and enforcement of the Colorado Noxious Weed Act. It is recommended that the operator consult with the local weed control agency or other weed control authority when weed infestation occurs. It is the responsibility of the operator to monitor affected and reclaimed lands for noxious weed infestations. If applicable, the Director may require a weed control plan.

1004. FINAL RECLAMATION OF WELL SITES AND ASSOCIATED PRODUCTION FACILITIES

a. **Well sites and associated production facilities.** Upon the plugging and abandonment of a well, all pits, mouse and rat holes and cellars shall be backfilled. All debris, abandoned gathering line risers and flowline risers, and surface equipment shall be removed within three (3) months of plugging a well. All access roads to plugged and abandoned wells and associated production facilities shall be closed, graded and recontoured. Culverts and any other obstructions that were part of the access road(s) shall be removed. Well locations, access roads and associated facilities shall be reclaimed. As applicable, compaction alleviation, restoration, and revegetation of well sites, associated production facilities, and access roads shall be performed to the same standards as established for interim reclamation under Rule 1003. All other equipment, supplies, weeds, rubbish, and other waste material shall be removed. The burning or burial of such material on the premises shall be performed in accordance with applicable local, state, or federal solid waste disposal regulations and in accordance with the 900-Series Rules. In addition, material may be burned or buried on the premises only with the prior written consent of the surface owner. All such reclamation work shall be completed within three (3) months on crop land and twelve (12) months on non-crop land after plugging a well or final closure of associated production facilities. The Director may grant an extension where unusual circumstances are encountered, but every reasonable effort shall be made to complete reclamation before the next local growing season.

b. **Production and special purpose pit closure.** The operator shall comply with the 900 series rules for the removal or treatment of E&P waste remaining in a production or special purpose pit before the pit may be closed for final reclamation. After any remaining E&P waste is removed or treated, all such pits must be back-filled to return the soils to their original relative positions. As to both crop lands and non-crop lands, if subsidence occurs over closed pit locations, additional topsoil shall be added to the depression and the land shall be re-leveled as close to its original contour as practicable.

c. **Final reclamation threshold for release of financial assurance.** Successful reclamation of the well site and access road will be considered completed when:

(1) On crop land, reclamation has been performed as per Rules 1003 and 1004, and observation by the Director over two growing seasons has indicated no significant unrestored subsidence.

(2) On non-crop land, reclamation has been performed as per Rules 1003 and 1004, and disturbed areas have been either built on, compacted, covered, paved, or otherwise stabilized in such a way as to minimize erosion to the extent practicable, or a uniform vegetative cover has been established that reflects pre-disturbance or reference area forbs, shrubs, and grasses with total percent plant cover of at least eighty percent (80%) of pre-disturbance or reference area levels, excluding noxious weeds, as determined by the Director through a visual appraisal. The Director shall consider the total cover of live

perennial vegetation of adjacent or nearby undisturbed land, not including overstory or tree canopy cover, having similar soils, slope and aspect of the reclaimed area.

(3) Disturbances resulting from flow line installations shall be deemed adequately reclaimed when the disturbed area is reasonably capable of supporting the pre-disturbance land use.

(4) A Sundry Notice Form 4, has been submitted by the operator which describes the final reclamation procedures, any changes, if applicable, in the landowner's designated final land use, and any mitigation measures associated with final reclamation performed by the operator, and

(5) A final reclamation inspection has been completed by the Director, there are no outstanding compliance issues relating to Commission rules, regulations, orders, permit conditions or the act, and the Director has notified the operator that final reclamation has been approved.

d. Final reclamation of all disturbed areas shall be considered complete when all activities disturbing the ground have been completed, and all disturbed areas have been either built upon, compacted, covered, paved, or otherwise stabilized in such a way as to minimize erosion, or a uniform vegetative cover has been established that reflects pre-disturbance or reference area forbs, shrubs, and grasses with total percent plant cover of at least eighty percent (80%) of pre-disturbance or reference area levels, excluding noxious weeds, or equivalent permanent, physical erosion reduction methods have been employed. Re-seeding alone is not sufficient.

e. **Weed control.** All areas being reclaimed shall be kept as free as practicable of all undesirable plant species designated to be noxious weeds. Weed control measures shall be conducted in compliance with the Colorado Noxious Weed Act, C.R.S. §35-5.5-115 and the current rules pertaining to the administration and enforcement of the Colorado Noxious Weed Act. It is recommended that the operator consult with the local weed control agency or other weed control authority when weed infestation occurs. It is the responsibility of the operator to monitor affected and reclaimed lands for noxious weed infestations. If applicable, the Director may require a weed control plan.

APPENDIX C

LAND APPLICATION CHECKLIST

COLORADO OIL & GAS CONSERVATION COMMISSION

Land Application Plan - Checklist for Water-based Bentonitic Drilling Fluids and Associated Cuttings

Instructions

This document was developed to assist operators in preparing a plan for land application of allowable drilling fluids and/or associated drill cuttings generated from drilling with water based bentonitic drilling fluids only.

The intent of a Land Application Plan ("LAP") is to enable COGCC to better track the final disposition of drilling fluids and drill cuttings, to ensure the material is being fully incorporated into the land while minimizing run-off or other impacts to adjacent land or surface water, and to verify that resulting soils comply with Table 910-1 standards after incorporation. This Checklist provides operators with guidance on uniform information to be included in the LAP, and is intended to help ensure consistency during the COGCC approval process.

The LAP should be submitted via eForm 4, Sundry Notice. The following items should be included in the LAP, along with a copy of this checklist to aid in timely review and approval of the plans.

Recommended Information:	**Included**
Sundry eForm 4	☐

Process to Receive Facility ID Number for eForm 4 Submittal:

- The operator shall contact staff area Environmental Protection Specialist by email and provide the following information:
  - Facility name;
  - GPS coordinates of the entrance to the facility or other relevant feature that will remain fixed over the life of the facility;
  - Topographic map or aerial photograph with boundaries of the land application area.
- Upon receipt of the lat/long, facility name and map, COGCC staff will create a Land Application Facility and reply to the operator with the Facility ID # to be used on the eForm 4 for submittal of the additional information.
- COGCC will process the eForm 4 and approve when appropriate. Operator shall not begin land application until approval of the eForm 4.

Disposal Location Information	**Included**
1) Latitude and Longitude of the physical entrance to the facility or other relevant feature that will remain fixed over the life of the facility.	☐
2) Map showing the governmental Section, Township and Range as well as nearby hydrologic features (all surface water features and known water wells within 1/4 mile of the facility boundaries). The map shall be at an appropriate scale to illustrate the surface hydrology	☐

3) Land use (Crop Land: dry land agricultural, irrigated, improved pasture, hay meadow, CRP; Non-Crop Land: rangeland, timber, recreational, industrial, commercial, residential) ☐

4) If land use is Non-Crop Land, provide a justification for the application of drilling fluids and/or cuttings as a beneficial amendment for Non-Crop Land, along with a detailed surface reclamation plan for the land application site. ☐

5) Is the proposed land application site in a Sensitive Area? On what data has the determination been made? Include actual depth to groundwater, if available, or estimated depth based on available information; soil type and proximity to surface waters and wetlands should also be considered. ☐

6) Verification that the land application facility is not in a mapped Sensitive Wildlife Habitat or Restricted Surface Occupancy Area as defined by mapped areas available on COGCC GIS Online map. ☐

7) Background sampling and analysis plan to establish pre-application conditions and a listing of parameters being analyzed. Samples should include, at a minimum, background parameters listed in COGCC table 910-1. ☐

8) Surface Owner contact information and a date of signature for the agreement between the surface owner and the operator approving this activity. ☐

9) Operator shall provide means of access to land application site when requested by COGCC for purposes of inspection. ☐

10) Verification that land application of drilling fluids/cuttings is consistent with local (City, County) zoning land use policy (refer to existing permit number or determination that permits were not required). ☐

11) Description of site control measures, including proposed signage, to prevent unauthorized dumping or access by the public if appropriate. ☐

12) Description of the benefit to native soil that application of the water based bentonitic fluids and/or drill cuttings will achieve. ☐

Material Volume **Included**

1) Estimate of the maximum volume of drilling fluids/cuttings to be applied at the facility in a given year based on anticipated loading rates. ☐

Material Handling **Included**

1) Description of any plan for treating drilling fluids/cuttings prior to land application (bioremediation, solidification, etc.) ☐

2) Description of any stockpiling or segregation of drilling fluids/cuttings prior to leaving the well site (e.g. note whether material that cannot be treated onsite or transported ☐

directly to a land application site will be disposed at a landfill and/or transported to a centralized waste management facility).

3) Method of material tracking (manifests/haul tickets). Tracking information will be retained by the operator and provided to the COGCC upon request as per Rule 907.b. ☐

4) Description of material handling and best management practices that will be implemented at the land application facility to address the following as applicable: ☐

- stockpiling, mixing
- method of incorporation (thickness, machinery for spreading and incorporating)
- timeframe for incorporation within 10 days of application
- runoff/sediment controls
- tracking control
- dust control
- odor control
- contingency for frozen or muddy conditions that would prevent timely incorporation

5) Confirm that the facility will receive drilling fluids/cuttings for less than 3 years consecutively from the date of waste management plan approval, or from the date of first land application as reported to COGCC via Sundry Notice eForm 4. ☐

Post Application Sampling and Closure Requirements	**Included**

1) Provide a post-application sampling and analysis plan that includes proposed sampling locations to support a closure request. ☐

2) To receive closure: ☐

- The operator shall notify the COGCC via Form 4 requesting closure of the land application facility.
- Submit post-application sample results along with a sample location map
- Verify that site soils comply with Table 910-1.
- Verify that all drilling fluids and associated drill cuttings have been thoroughly incorporated.
- Verify that any temporary runoff/sediment controls have been removed.
- Verify that surface owner is satisfied with final condition of property.
- Verify that surface reclamation has been performed, if appropriate. (Verification can include photo-documentation, email correspondence, dates of work performed, etc.)