



Anadarko E&P Onshore LLC

Waste Management Plan Land Application of Water-Based Bentonitic Drilling Fluids & Associated Drill Cuttings

This document outlines the operational requirements to be used when applying water-based bentonitic drilling fluids and associated drill cuttings to private or company-owned spread fields or the land treatment and application of water-based bentonitic drilling fluids and associated cuttings on the pad location where they were generated to maintain compliance with COGCC Rule 907.d.(3). These materials are being applied as a beneficial soil amendment.

Only water-based bentonitic drilling fluids and associated drill cuttings generated by Anadarko E&P Onshore LLC (Anadarko) will be applied at these sites. No other E&P waste shall be deposited at these sites.

Spread Fields (Private Surface or Company Owned)

1. Anadarko shall obtain written authorization from the surface owner (if non-Anadarko land) prior to land application of water-based bentonitic drilling fluids and associated drill cuttings. The signed agreement shall state that only Anadarko-generated materials will be accepted and that incorporation of the material will occur within 10 days of application.
2. Each spread field will be divided into approximately equal sized pods. A 3-inch maximum lift of water-based bentonitic drilling fluids and associated drill cuttings will be applied.
3. Daily tracking tickets will be used and will include the following information:
 - * name of well where material was generated
 - * date of transfer of the material from the well to the spread field
 - * volume of material taken to the spread field
 - * name of transporter
 - * pod where drilling fluid was applied
4. The volume of material transported to the spread field will be tracked using a spreadsheet to help ensure the 3-inch maximum lift per pod is not exceeded.
5. Conditions permitting Anadarko personnel will ensure the material will be incorporated into the soil within 10 days.

6. Soil sampling will be conducted following incorporation.
 - * A 4-point composite soil sample will be collected from an interval of 0-8 inches below ground surface (bgs), from every pod where material was applied.
 - * At a minimum, soil samples will be analyzed for total petroleum hydrocarbons (TPH – C6-C36), benzene, toluene, ethylbenzene, xylenes (BTEX), electrical conductivity (EC), sodium adsorption ratio (SAR), pH, arsenic, and barium to ensure compliance with COGCC Table 910-1 or applicable background levels of native soils.
7. In the event of any Table 910-1 exceedance, a COGCC Form 4 Sundry Notice will be prepared and submitted (along with supporting documentation) to explain the exceedance and outline appropriate remediation measures.

Land Treatment and Application Onsite (Private Surface or Company Owned)

1. Anadarko shall obtain written authorization from the surface owner (if non-Anadarko land) prior to onsite land treatment with solidification and/or bioremediation products and application of water-based bentonitic drilling fluids and associated cuttings to the well pad location. The signed agreement shall state that only Anadarko-generated materials will be accepted and that incorporation of the material after treatment will occur within 10 days, weather permitting, after the conclusion of drilling and/or well completion activities at the well pad location.
2. During treatment, water-based bentonitic drilling fluids and associated cuttings will be stored in a temporary containment area.
3. Soil sampling will be conducted to ensure that resulting concentrations do not exceed Table 910-1 allowable levels or applicable background levels.
4. Soil sampling will be conducted following incorporation.
 - * A 4-point composite soil sample will be collected from an interval of 0-8 inches bgs, from every well pad where material was applied.
 - * At a minimum, soil samples will be analyzed for TPH, BTEX, EC, SAR, pH, arsenic, and barium to ensure compliance with COGCC Table 910-1 or applicable background levels of native soils.
5. In the event of any Table 910-1 or applicable background level exceedance, a COGCC Form 4 Sundry Notice will be prepared and submitted (along with supporting documentation) to explain the exceedance and outline appropriate remediation measures.