

**APPLICATION TO LAND SPREAD SOLID WASTE
GENERATED BY DRILLING OIL & GAS WELLS**

(Drilling Mud to be Water Based)
Filing Fee \$250 (non-refundable)

Kansas Statute KSA 65-3407c (a) (8) and Kansas Regulations KAR 28-29-1600 through 1608

Each application land area limited to 160 acres

If the operator intends to land spread solid waste generated by drilling oil and gas wells (hereinafter referred to as drilling waste), the Site Selection portion of the application (Part 1) must be submitted by the applicant for review and approval prior to drilling activities. After drilling occurs, complete Part 2 for documentation regarding drilling waste quantities and chloride content, calculated and actual land spreading rates, and verification that best management practices were used.

PART 1. SITE SECTION APPROVAL

Section 1. Operator and Generator Site Information

Operator License #: _____
Operator Name: _____
Mailing Address 1: _____
Address 2: _____
City: _____ State: _____ Zip: _____ + _____
Contact Person: _____
Phone: (_____) _____ Fax: (_____) _____
Email Address: _____
Well Location:
_____ - _____ - _____ - _____ Sec. _____ Twp. _____ North South R. _____ East West
_____ Feet from North / South Line of the Section GPS Location: Lat: _____, Long: _____
_____ Feet from East / West Line of Section Datum: NAD27 NAD83 WGS84
County: _____ State*: _____
Lease Name: _____ Well #: _____
API No.: _____
Expected Spud Date: _____ Target Formation: _____
FOR KCC USE ONLY *If out of state well, Permitting authority: _____
KCC Land Spreading Contact name and title: _____
Approval #: LS _____ Contact phone number: _____

Section 2. Pre-conditions of the Proposed Land Spreading Area

1. a) Is this the first land spreading of drilling waste on this land? Yes No
If answered 'yes' above, then proceed to #2; if 'no,' then answer b) and c) below:
b) Was the previous land spreading over 3 years ago? Yes No
c) Is the residual chloride concentration less than 300 ppm in the receiving soil? Yes No
If answered 'no' to either b) OR c), then land spreading will not be allowed.

Section 2. Pre-conditions of the Proposed Land Spreading Area *continued*

2. Is the receiving soil chloride concentration less than 500 ppm? Yes No
3. Buffer requirements. Is the proposed land spreading site at least:
- a) 200 feet from the property line boundary? Yes No
or are the adjacent property owner and use the same as proposed land application site? Yes No
- b) 100 feet from an intermittent stream as per USGS maps? Yes No
- c) 200 feet from any perennial stream? Yes No
- d) 200 feet from any freshwater pond, lake, or wetland? Yes No
- e) 1,000 feet from water wells for domestic or agricultural use OR 500 feet if the applicant can demonstrate that the site is hydrogeologically downgradient from water wells? Yes No
- f) 500 feet from habitable structure? Yes No
- g) One-half mile from any actively-producing water well used for municipal purposes? Yes No
- h) 100 feet from a drainage swale, ditch, or other physical feature which channels overland flow? Yes No
4. Is the maximum slope of the land spreading area 8 percent or less? Yes No
5. For the land spreading area, is the depth of soil/unconsolidated material at least two feet in thickness? Yes No
6. The soil texture of the land spreading area must be: a minimum 12-inch, continuous soil layer; continuous across the site; within the top six feet below the surface; above the shallowest consolidated layer; and is limited to the following soil types. (As per Section 5.2 of this application, documentation must be included to verify this determination.) Indicate the soil texture(s) below:
- | | | |
|--|--|-------------------------------------|
| <input type="checkbox"/> Loam | <input type="checkbox"/> Silt Loam | <input type="checkbox"/> Silt |
| <input type="checkbox"/> Sandy Clay Loam | <input type="checkbox"/> Silty Clay Loam | <input type="checkbox"/> Clay Loam |
| <input type="checkbox"/> Sandy Loam | <input type="checkbox"/> Fine Sandy Loam | <input type="checkbox"/> Sandy Clay |
| <input type="checkbox"/> Silty Clay | <input type="checkbox"/> Clay | |
- Does the soil texture meet one of the above listed soils? Yes No
7. Based upon historical data or site conditions, is the groundwater elevation at least 10 feet below the ground surface? Yes No
8. If the site includes irrigation, is the chloride concentration of the irrigation water less than 350 ppm? Yes No
9. The maximum predicted NORM level of the drilling waste is less than:
- 1.5 times the highest NORM level found in drilling waste samples collected from Kansas http://www.kcc.state.ks.us/conservation/summary_ks_norm_level_092013.pdf
 - and 370 Bq/kg (10pCi/g) (see KAR 28-29-1602)
- If answered 'no' to any of questions 2-9, then land spreading will not be allowed.* Yes No
10. Does documented chloride groundwater contamination exist below the proposed area as published by the Kansas Department of Health and Environment? Yes No
<http://maps.kdhe.state.ks.us/kschloride/>
If answered 'yes' to question 10, then land spreading will not be allowed.
11. Does the proposed area receive greater than 25 inches of precipitation per year? Yes No
If yes, incorporation is required. See attached map at the end of the application.

FOR KCC USE ONLY**KCC Land Spreading Approval #: LS _____**

Section 3. Land Spread Site Information

Property Owner's Name: _____

Mailing Address: _____

City: _____ State: _____ Zip: _____ + _____

Site Acreage: _____ (Maximum 160 acres) **FOR KCC USE ONLY****KCC Land Spreading Approval #: LS** _____Legal location of the land spreading site: ___ - ___ - ___ - ___ Sec. _____ Twp. _____ N S R. _____ E W

County: _____ GPS Location: Lat: _____, Long: _____

Datum: NAD27 NAD83 WGS84
(e.g. xx.xxxxx) (e.g. -xxx.xxxxx)

Current land use of the proposed spreading site (check all that apply):

 Agriculture Commercial Industrial Residential Other: _____

Current land use of surrounding area (check all that apply):

 Agriculture Commercial Industrial Residential Other: _____Are there any land use restrictions, zoning requirements, or local permits required? Yes No

If yes, please describe and attach copies of any documentation:

Distance and direction to the nearest habitable structure:

Section 4. Consent and Access Agreement

The land spreading operator and landowner must grant employees of the Kansas Corporation Commission (KCC) and Kansas Department of Health and Environment (KDHE) access to the land spreading area for purposes of observing land spreading practices and to sample drilling waste and/or soil as necessary to assess compliance with the best management practices set forth in this application. The consent and access agreement must be submitted with this application: [Landowner Consent and Access Agreement \(Form CLSP-1a\)](#).

Section 5. Submittal Requirements (provide operator name and lease name on each submittal item)

- List the expected drilling mud components and a detailed list of the additives** (include product name and constituents of the additives).
- Provide an affidavit on a form provided by the KCC** verifying that the drilling mud is water based AND predicted naturally occurring radioactive material (NORM) levels of drilling waste are within acceptable limits. The form is provided online: [Affidavit of Operator Supporting Application to Land Spread Solid Waste \(Form CLSP-1b\)](#).
- Soil texture of receiving site(s)** must be determined, according to requirements of KAR 28-29-1603, by an agronomist or a soil scientist (with at least a Bachelor of Science Degree in their respective fields) OR by laboratory analysis from a laboratory participating in the North America Proficiency Testing Program (NAPTP) or certified by AASHTO Materials Reference Laboratory. If using an agronomist or a soil scientist, an on-site visit is required and documentation completed by the agronomist or soil scientist must be submitted. The documentation must characterize the entire site. If using a soils laboratory, a soil texture analysis with chain of custody shall be included in addition to the sampling requirements listed in Item 5 below (chloride concentration of the receiving soil) and included in Item 4.c. below (Maps). The acceptable soil texture must be located within 6 feet below the surface, and following requirements must be met:
 - The acceptable soil texture must be at least 12 inches and continuous
 - The sampling must be a continuous core, no less than the top of 24 inches below the surface
 - The soil profile must be minimally disturbed
 - The log of the core sampling must be documented
 - A minimum of four separate locations must be core sampled within the cell
 - A discrete core soil sample for each location must be analyzed by the laboratory or by an agronomist/soil scientist

Provide documentation from the laboratory, including a chain of custody. Include a copy of the USDA soil survey map for the site.

Section 5. Submittal Requirements *continued***4. Maps.**

- a. Provide an aerial map that shows the location of the proposed site(s) and include the following features within one-half mile of the site: habitable structures, property boundaries, waters of the state, ponds, lakes, wetlands, domestic water wells, municipal wells, drainage channels, streams and any other relevant features. This map should also be detailed enough that it could be used to locate the land spreading site or contain additional directions to the site from the nearest highway. Include a north arrow and scale.
- b. Provide a topographic map that includes the slope of the ground to be used for spreading. (Slope is required to be 8 percent or less.)
- c. Provide a cell identification map that shows a grid dividing the site into cells (10 acres maximum). The map shall:
 - i. Have a unique label for each cell.
 - ii. Include the locations and chloride concentration of the soil samples taken (see #7 below).
 - iii. Delineate the area that receives irrigation (see #7 below).
 - iv. Note which areas will be re-established with vegetation or re-established for crops (see #12 below). If applicable, note areas where land restoration, other than establishing vegetation or conditions to support crops, is planned.
 - v. Include notation indicating the adjacent property use and ownership. If the property ownership and use is the same as the land application area, the 200 foot buffer required in Section 2, Item 3.a. will not be required.
 - vi. Include soil texture information (see #2 above).
 - vii. Delineate the land spreading area. The land spreading area must be delineated with physical references and measurements to ensure that future land spreading is applied to the correct areas and for field verification by those monitoring the land spreading. Delineation can use GPS survey, field stakes, relatively permanent field characteristics (corner fence posts, tree), etc.
 - viii. Legal description of the site, include county
 - ix. The depth of unconsolidated material at the site
 - x. The property boundaries
 - xi. The buffer zones

For informational purposes only, an example map has been completed and is located here: [Example Map and Calculations](#).

5. **Chloride analysis of receiving soil.** Provide the analysis and chain of custody for chloride concentration of the receiving soil. The sample labels must match the cell identification described in Item 4c. For each ten acre area (or less), a minimum of four representative core samples from the surface (0 – 12 inches) must be combined in one sample and thoroughly mixed. A minimum one-pint composite sample shall be analyzed by a Kansas certified laboratory or North American proficiency testing program participating laboratory.
6. **Water table documentation.** Water table levels should be evaluated and no spreading should occur on ground where the water table is less than 10 feet below spreading depth. Water table information is available from the Kansas Geological Survey. Submit documentation regarding water table information (depth below ground surface and/or average elevation). Documentation can include historical data or site conditions. Note the direction of groundwater flow (if known).
7. **Analysis of irrigation water (if applicable).** If the site has irrigation water, provide the analysis by a KDHE certified laboratory for the chloride concentration of the irrigation water.
8. **Consent and access agreement (see Section 4).** Provide documentation that the land owner has agreed to land spreading.
9. **Proposed sampling rates and Chloride analysis of drilling waste.** Describe proposed sampling rate and explain how samples will be collected and prepared for analysis. These samples must be analyzed for chloride concentration by a KDHE certified or NAPTP participating laboratory or field method. An estimate of chloride concentration may be calculated from an electrical conductivity measurement (see calculation below).

Acceptable field analytical methods for analyzing the drilling fluids filtrate are:

- | | |
|-------------------------------------|---|
| a. Silver Nitrate Titration | d. Electrical Conductivity (estimate of chloride concentration) |
| b. Mercuric Nitrate Titration | EC in micromhos/cm x 0.64 = TDS in ppm |
| c. Chloride Ion Selective Electrode | TDS x 0.61 = estimate Chloride Content in ppm |

Other proposed field analytical methods will require KCC review and written approval.

The submittal must include the manufacturer information sheet, preparation of the sample for testing, chloride concentration range of the method, calibration requirements, and any method limitations. The operator shall ensure that each person who analyzes drilling waste in the field is qualified to perform each analysis. In the calculation spreadsheet, field results will be multiplied by 1.2 to compensate for the margin of error compared to laboratory analysis.

The minimum sampling rate is listed below. Describe sampling method to ensure that a representative sample is obtained:

- a. **Tanks:** At least one sample from each tank is required.
- b. **Earthen pits:** A minimum of four samples, each from different quadrants of the pit, is required for volumes of 12,500 barrels or less. If there are more than 12,500 barrels, then the sampling rate shall be a minimum of four quadrant samples plus one sample for each 1,000 barrels over 12,500 barrels.

10. Description of proposed land spreading procedures.

- a. Describe the process and equipment used to spread and, if applicable, incorporate the drilling waste into the soil. If incorporation is used, provide information on the maximum time period from spreading to incorporation.

Section 5. Submittal Requirements *continued*

- b. Information should be provided on how the equipment will be regulated to assure that the material is spread at the approved rate. Provide the boom width, flow rate, ground speed, etc., that will be used to control the land spreading rate.
 - c. Describe the proposed manner in which drilling waste will be stored at the site of generation.
11. **Contingency Plan.** Describe how drilling waste will be managed when land spreading is not possible due to weather restrictions, e.g., precipitation, saturated soil condition, frozen ground, or drilling waste composition exceed limits.
 12. **Submit a plan to reestablish vegetative cover, conditions to support crops, or other proposed restoration. Include erosion controls if not cropland.**
 13. **Submit \$250 nonrefundable filing fee payment with application.**

Section 6. Land Spreading Best Management Practices

1. **The applicant shall notify** the appropriate KCC District Field office 48 hours prior to the commencement of land spreading to allow a Commission representative an opportunity to be present during land spreading activities.
2. **The drilling waste must be stored** at the site of generation in tanks or pits until ready for land spreading. The operator may store drilling waste in sealed tanks at the disposal site for no more than 24 hours before the drilling waste is land spread.
3. **Weather restrictions:** Land spreading, including incorporation, shall not be performed:
 - a. During precipitation events or, according to national weather service predictions, has a greater than 50% probability of occurring within 24 hours.
 - b. When the soil moisture content is at a level such that the soil cannot readily absorb the addition of materials.
 - c. When the ground is frozen.
4. **Runoff or ponding shall not be allowed during spreading.** Any discharge or release from the approved site will constitute a violation of the Clean Water Act.
5. **If after one year from the date of KCC approval,** land spreading has not begun, approval will expire. For future use of the site, a new land spreading application will be required.
6. **Land spreading shall be uniform** over the approved land spreading area.
7. **Land spreading depth is limited to the loading rate calculations,** not to exceed two inches.
8. **Land spreading is not allowed** if the chloride concentration of the drilling waste exceeds 10,000 ppm. (Refer to Part 2 Determination of Loading Rates and Documentation of Land Spreading Activity.)
9. **If the site is located in a county with at least 25" annual precipitation,** then incorporation is required. The attached map at the end of this application identifies the counties requiring incorporation. Incorporation includes, but is not limited, to discing, plowing, knifing, and shallow injection. Incorporation shall be completed within 48 hours after land spreading is completed.
10. **The maximum land spreading loading rate** shall ensure that the total chloride concentration in the upper 12 inches of soil does not exceed 900 ppm.
11. **If the observed NORM level in the drilling waste is more than 370 Bq/kg (10 pCi/g),** the operator shall immediately cease land spreading and shall notify KCC within two business days. The operator shall evaluate the condition of the land spreading site to determine any potential site impact and perform all corrective measures required by the KCC or the department to protect human health or safety or the environment. The operator shall not conduct any additional land spreading at the site unless authorized by the KCC.

SIGNATURES:

Signature of Applicant: _____ Name: *(Print or type)* _____

Title: _____ Operator Name: _____

Date: _____

----- **TO BE COMPLETED BY KCC** -----

Operator License #: _____ KCC Land Spreading Approval #: LS _____

KCC Authorization Signature: _____ Title: _____

Date Approved: _____

PART 2. DETERMINATION OF LOADING RATES AND DOCUMENTATION OF LAND SPREADING ACTIVITY

This part is self-implementing; however, notice shall be provided to the appropriate KCC District Office 48 hours prior to initiation of land spreading activity.

If drilling waste from more than one well is to be land spread at one approved location, a separate copy of this page shall be completed for each well.

General Information (Operator and well information pertain to source of waste to be land spread)

Operator License #: _____ Operator Name: _____
 Lease Name: _____ Well #: _____
 API #: _____ KCC Land Spreading Approval #: LS _____
 Legal Location of Well: ____ - ____ - ____ - ____ Sec. _____ Twp. _____ North South R. _____ East West
 _____ Feet from North / South Line of the Section GPS Location: Lat: _____, Long: _____
(e.g. xx.xxxxx) (e.g. -xxx.xxxxx)
 _____ Feet from East / West Line of Section Datum: NAD27 NAD83 WGS84
 County: _____ State*: _____
 Spud Date: _____ *If out of state well, Permitting authority: _____
 Contact name and title: _____
 Contact phone number: _____

Will the land spreading be completed by the operator? Yes No

If no, complete the following:

Individual or Company Name: _____
 Contact Name: _____ Phone: (_____) _____
 Email Address: _____ Cell Phone: (_____) _____

1. Is the drilling mud water-based? Yes No
2. Is the chloride concentration of the drilling waste less than 10,000 ppm? Yes No
3. Are the drilling mud components and additives the same as those components identified on the approved application? Yes No
4. If the drilling waste is sampled for NORM, is the NORM less than: Yes No
 - 1.5 times the highest NORM level found in drilling waste samples collected from Kansas
 - [Affidavit of Operator Supporting Application to Land Spread Solid Waste \(Form CLSP-1b\)](#)
 - and 370 Bq/kg (10 pCi/g)

If answered 'no' to any of the above, then land spreading will not be allowed.

Drilling Waste Information

To complete land spreading calculations for each tank/pit, the following information will be needed:

- ✓ Tank or Pit Number/Identification
- ✓ Volume of Drilling Wastes (in gallons or barrels)*
- ✓ Chloride Concentration (ppm) of drilling waste and analysis method **
- ✓ Receiving Soil Chloride Concentration (ppm) and analysis method
- ✓ Irrigation Water Chloride Concentration (ppm) and analysis method
- ✓ Estimated Annual Irrigation Water (inches)

Use Spreadsheet provided at: [Land Spreading Calculations](#) to calculate the maximum thickness of application, acreage necessary, and rate of spreading. See Item 3 below for required calculation submittals. For informational purposes only, an example spreadsheet has been completed and is located here: [Land Spreading Calculations Example](#).

The maximum land spreading loading rate shall ensure that the chloride concentration in the upper 12-inches of soil does not exceed 900 ppm and that the maximum application depth does not exceed two inches in depth.

* One barrel is equivalent to 42 gallons.

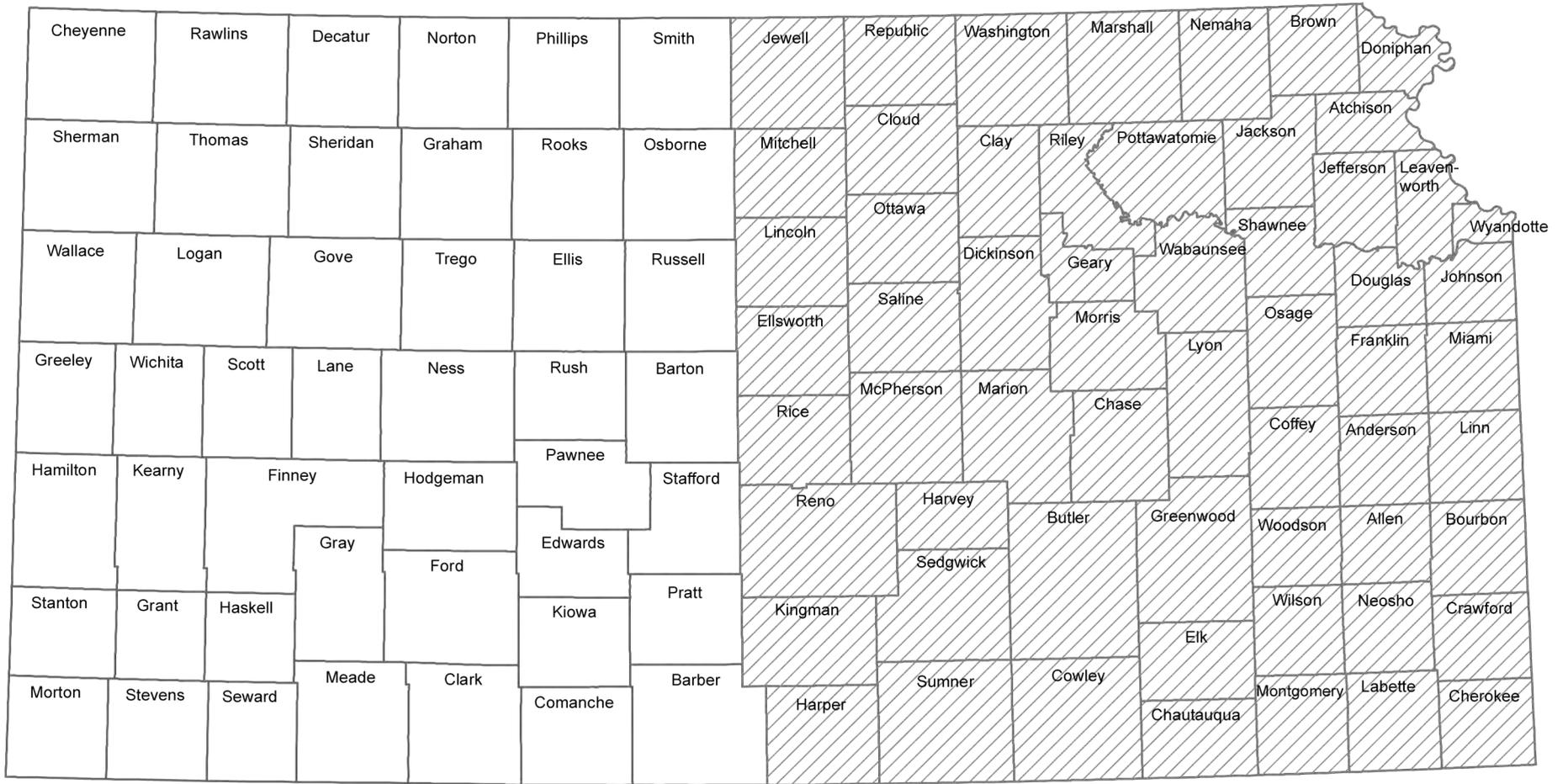
** If analysis by field method, the concentration will be multiplied by 1.2.

PART 2. DETERMINATION OF LOADING RATES AND DOCUMENTATION OF LAND SPREADING ACTIVITY *continued*

Post-Land Spreading Reporting (submit Page 6 and Items 1 through 5 within 60 days of land spreading activities and Item 6 within 12 months) Include the KCC land spreading approval number on each submittal item.

1. **Maps.** Update the map approved in Part 1, Section 5, Item 4.c. to show the actual land spreading area used. The map shall correlate with the electronic spreadsheet described in Item 3 below. The map shall:
 - a. Include original cell labels, KCC land spreading approval number, well ID, operator name, lease name, S-T-R, County, land spreading contractor name (if applicable), and date of land spreading.
 - b. Delineate the area used by each tank or pit so that this area can be field located at a later date. Example methods of delineation include measurements from relatively permanent field characteristics; GPS survey points; field stakes; or a combination of these. The tank or pit numbers shall match the labels used in the spreadsheet described in item 3 below.
 - c. Note unused cells.For informational purposes only, an example map has been completed and is located here: [Example Map and Calculations](#).
2. **Sampling rates and analysis of drilling waste.** Describe sampling rate, sampling procedure, method of analysis (field instrumentation or laboratory analysis), and analysis results.
3. **Land Spreading Rate Calculations.** On the electronic spreadsheet provided by the State, provide drilling waste information used to calculate the minimum acreage necessary and the maximum depth of spreading. The electronic spreadsheet is provided on the KCC website: [Land Spreading Calculations](#). Below the calculations, record the cell number that corresponds with the map, acreage used, and date of land spreading. Include a copy of the completed spreadsheet in the report. If any deviation from the approved methods occurs and the deviation could result in a chloride loading rate greater than the rate approved by the KCC, the operator shall report the deviation to the KCC by the end of the next business day.
4. **Land spreading procedures used.**
 - a. Document any discrepancies of the process and equipment used as submitted in Part 1, Section 5, Item 10.
 - b. If incorporation was used, provide information on the maximum time period from spreading to incorporation.
5. **Best Management Practices.** Note any discrepancies from the land spreading best management practices listed in Part 1, Section 6.
6. **Within 12 months after the conclusion of land spreading,** submit to the KCC a report describing the timing and success of establishing vegetative cover or conditions suitable to support crops. If the operator has not met this criteria, the operator shall submit a new plan describing how this will be addressed. The plan must reference the KCC land spreading approval number from the approved application.
7. **Record Keeping.** The operator shall maintain the following documents for at least five years after the land spreading occurs and the documents must be available to KCC and KDHE upon request:
 - a. The results of all analyses.
 - b. A copy of each land spreading application (including attachments) and approval.
 - c. A copy of each land spreading report and all required attachments.
 - d. If any drilling waste was analyzed in the field, a copy of calibration logs for each piece of equipment used and the qualifications of each person that performed the analysis.

Shaded Counties must Incorporate Oil & Gas Exploration Drilling Waste if Disposed Using Land-Spreading Process



 Indicates precipitation rate greater than 25 inches per year