

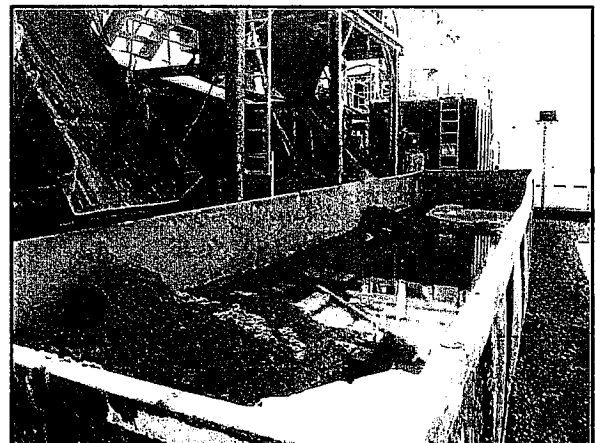
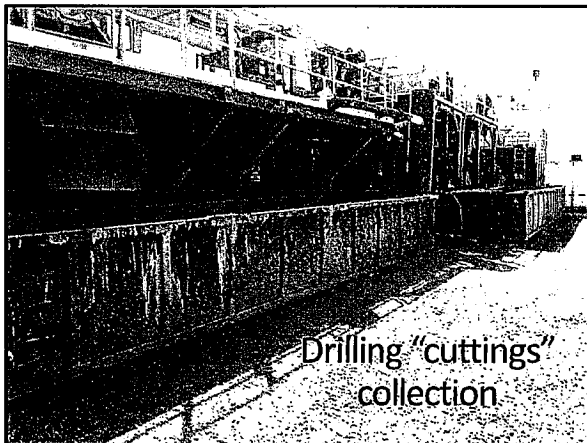
Oil and Gas Drilling/Production Wastes

Waste Eligible for Land-Spreading

- Water based drilling mud and cuttings generated by drilling oil and gas wells and associated injection wells

Waste Not Eligible for Land-Spreading

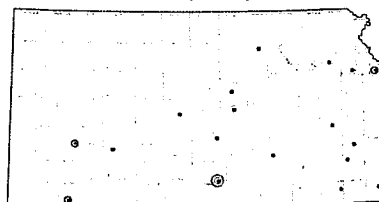
- Produced salt water
- Fracking fluids
- Petroleum-based drilling waste or produced petroleum products/wastes





Alternative Disposal Methods for Drilling Waste

- Traditional disposal in on-site pits (KCC)
- Land-spreading (KCC lead in state; some transport to OK)
- Salt caverns (KDHE)
- Commercial MSW landfills (KDHE)



Land-Spreading: Disposal vs Beneficial Use

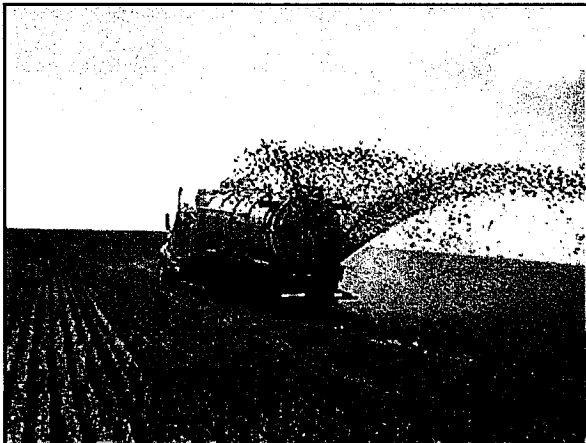
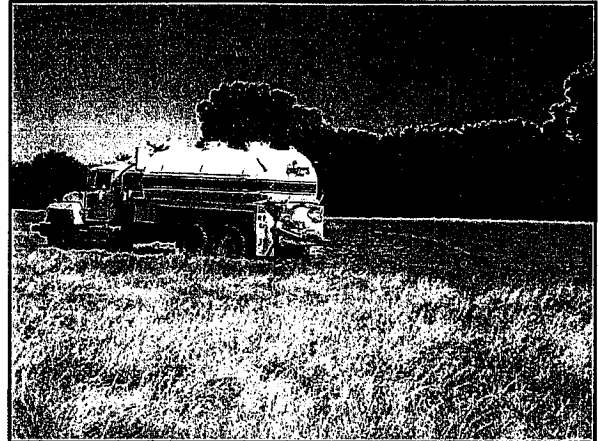
- Land-spreading may be beneficial in certain cases, according to KSU agronomists, but overall it is classified as disposal in Kansas
- Beneficial use decisions
 - ↳ Made by KDHE Bureau of Waste Management
 - ↳ True benefit must be demonstrated (only certain soil types)
 - ↳ Application required
 - ↳ Environmental impacts evaluated
- Other possible beneficial uses
 - ↳ Road stabilization
 - ↳ Other ?

Regulatory Basis Authorizing Land-Spreading as Disposal

- KCC and KDHE worked with the Legislature to modify solid waste law HB 2597
- Land-spreading is included in list of SW disposal activities that can occur without a permit – KSA 65-3407c
- Application must be submitted to KCC
- Approval to land-spread must be obtained from KCC which will administer program

Key Provisions of HB 2597

- Land-spreading must follow KDHE's best mgt practices
- If annual precipitation is > 25 inches, incorporation into soil is required
- Groundwater table must be > 10 feet
- No documented chloride contamination in groundwater
- Each location requires separate application
- \$250 application fee to KCC
- KCC administers program
- KDHE must adopt new land-spreading regulations by January 1, 2014



Key Land Eligibility Criteria

- First time use or > 3 yr and < 300 ppm Cl
- Chloride < 500 ppm
- Buffer requirements (several)
- Slope < 8%
- Unconsolidated material (soil) > 2 feet
- Select soil types
- Groundwater table > 10 feet
- No documented Cl contamination in groundwater

Other Application Submittals

- Drilling mud components
- Soil texture determination
- Site maps (buffers, receptors, slope, cells)
- Lab analyses (soil, irrigation water)
- Waste sampling and analysis plan
- Land-spreading operation procedure
- Contingency Plan
- \$250 Fee

Loading Rate Calculations

Average concentration in top 12 inches must be less than 900 ppm chloride

Maximum chloride concentration in waste to be land-spread 10,000 ppm

Dilution is allowed

Online tool calculates loading rate based on soil and waste chloride content or electrical conductivity

Implementation of Land-Spreading

- Notify KCC 48 hours prior to land-spreading
- Record data on tables and maps (provided format)
- Follow "Best Management Practices" (record any discrepancies)
- Submit report to KCC within 60 days of completion
- Re-establish vegetative cover as necessary

Benefits of Land-Spreading Option

- Avoid concentrated disposal of large volumes (200,000+ gal/well) in on-site pits
- Minimize transportation impacts to limited SubD Landfills
- Reduced cost of drilling waste disposal



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