Drilling Mud: Waste or Reuse?
A TEXAS STUDY

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POWER Engineers
Overview

- Oil and gas (O&G) exploration and production (E&P) RCRA Exemption
- Texas Commission on Environmental Quality (TCEQ) Vs. Railroad Commission of Texas (RRC)
- Drilling mud management under TCEQ regulations
  - Waste generation
  - Disposal options
  - Source reduction / waste minimization measures
- Drilling mud management under RRC regulations
  - Statewide Rule 8 Authorizations versus Permits
  - Non-Commercial Drilling Fluid Recycling options
  - Land Spreading Activities
<table>
<thead>
<tr>
<th><strong>Exempt</strong></th>
<th><strong>Not Exempt</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Produced water</td>
<td>- Unused fracturing fluids or acids</td>
</tr>
<tr>
<td>- Drilling fluids and drill cuttings from E&amp;P</td>
<td>- Used equipment lubrication, hydraulic, or maintenance fluids</td>
</tr>
<tr>
<td>- Well completion, treatment, and stimulation fluids</td>
<td>- Service company wastes, such as drums, drum rinsate, etc.</td>
</tr>
<tr>
<td>- Workover wastes</td>
<td>- Waste solvents, acids, cleaners, etc.</td>
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</tbody>
</table>

**Rule of thumb:** the waste should come from downhole

**Rule of thumb:** not unique to the oil and gas E&P activity
<table>
<thead>
<tr>
<th><strong>TCEQ</strong></th>
<th><strong>RRC</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulates wastes derived from activities associated with refined products</td>
<td>Regulates wastes derived from activities associated with crude oil and natural gas</td>
</tr>
<tr>
<td>Title 30 TAC Chapter 330</td>
<td>Statewide Rule 8</td>
</tr>
<tr>
<td>Municipal solid waste &amp; special waste regulations</td>
<td>Surface waste management regulations</td>
</tr>
<tr>
<td>Title 30 TAC Chapter 335</td>
<td>Pits, ponds impoundments</td>
</tr>
<tr>
<td>Industrial solid waste regulations</td>
<td>Land farms</td>
</tr>
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<td></td>
<td>Land treatments</td>
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<td>Land application</td>
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<td></td>
<td>Chapter 4, Subchapter B</td>
</tr>
<tr>
<td></td>
<td>Commercial recycling of fluids and muds</td>
</tr>
</tbody>
</table>
Constructing Refined Products Pipelines

- Wastes derived from this activity are:
  - Not RCRA Exempt
  - Regulated by the TCEQ

- Drilling mud may contain:
  - Water
  - Bentonite
  - Polymers (lots of variations possible)

- Waste determination is based on what the mud contains
  - Hazardous or Class 1, 2, or 3 non-hazardous
# TCEQ Industrial & Hazardous Wastes

<table>
<thead>
<tr>
<th>Generator Status</th>
<th>VSQG</th>
<th>SQG</th>
<th>LQG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly Acutely Hazardous Waste Generation</td>
<td>Up to 2.2 lbs.</td>
<td>Up to 2.2 lbs.</td>
<td>&gt; 2.2 lbs.</td>
</tr>
</tbody>
</table>
When Mud is NOT a Solid Waste

30 TAC 335.1(146)(A) – What is a SOLID WASTE?

❖ Exempt Materials
  ❖ Uncontaminated soil, dirt, rock, sand, and other natural or man-made inert solid materials used to fill land if the object of the fill is to make the land suitable for the construction of surface improvements
  ❖ Contaminated – contains a “pollutant” or “hazardous substance”
  ❖ Inert – Essentially insoluble and non-putrescible

❖ Recycled Materials
  ❖ Drilling fluid reuse
  ❖ Drilling mud used for construction
Exempt: Not a Solid Waste

- Drill mud and/or soil cuttings are not contaminated
  - No chemical additives were used during drilling
  - Water and bentonite clay (or other natural clay) may be used
  - The drill site was also not contaminated (no prior spills or impacted media)

- You may:
  - Place these materials on the ground to:
    - Backfill a pit
    - Use as fill on or off-site (with landowner permission)
    - Line a stock pond (better with high clay content)
  - Skip notification to the TCEQ under 30 TAC 335.6
  - This material is not a solid waste
Recycling: No longer a Solid Waste

- Recycling in a manner that constitutes land disposal
  - Placement on the ground outdoors
  - Document the characterization of the waste
  - Do not place Hazardous or Class 1 wastes on the ground

- Notification is required (30 TAC 335.6(a) and (c))
  - For on-site and/or off-site recycling
  - Submit TCEQ Form at least 90 days prior to recycling activities

- Landowner permission is also required
Reduce your waste burdens!

- Plan ahead
  - Keep rain out of your waste pits
  - Drilling fluid systems that recirculate

- Product substitution / avoidance
  - Low toxicity fluids
  - Avoid additives with chromium, barite, cadmium, and mercury

- Recycle whenever possible
TCEQ Disposal Options

**Off-Site Disposal**
- TCEQ-Permitted MSW Landfill
  - Must accept “Special Waste”
  - Waste must be “characterized” and meet disposal criteria
- TCEQ-Permitted IHW Landfill
  - Waste must be characterized and meet disposal criteria

**On-Site Disposal**
- TCEQ IHW On-Site Landfill (30 TAC 335.2(d)(1))
  - No permit required
  - Nonhazardous industrial waste
  - Property owned or effectively controlled by the generator
  - Disposal within 50 miles from generation
  - Not co-mingled with wastes from other sources
  - Must notify TCEQ per 30 TAC 335.6
E&P Drilling Mud Management

- Wastes derived from this activity are:
  - RCRA Exempt
  - Regulated by the RRC

- Drilling mud may contain:
  - Water
  - Bentonite
  - Polymers, paraffin, produced water, treating chemicals, crude oil, etc.

- Disposal of RCRA-exempt wastes must not cause pollution of surface or subsurface water
RRC Statewide Rule 8: The Basics

- Get a permit for:
  - Activities on a lease other than where the oil and gas is generated
    - transporting, handling, storing, discharging, disposing, or reclaiming, or recycling oil and gas
- Do not site pits in the 100-year floodplain
- Any method of disposal not authorized by the rule or permitted is prohibited!
- The only pit absolutely prohibited by the rule is a pit used for the storage of oil.
A Pit by any other name...

### PITS AUTHORIZED BY STATEWIDE RULE 8

<table>
<thead>
<tr>
<th>Pit</th>
<th>Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserve and mud circulation pit</td>
<td>Drilling fluids, cuttings, rig wash, drill stem test fluids, blowout preventer test fluids</td>
</tr>
<tr>
<td>Completion/workover pits</td>
<td>Spent completion fluids, workover fluids, material cleaned out of wellbore</td>
</tr>
<tr>
<td>Basic sediment pits</td>
<td>Basic sediment from production vessels or oil storage tanks (no free saltwater or oil)</td>
</tr>
</tbody>
</table>

### PITS REQUIRING A PERMIT

<table>
<thead>
<tr>
<th>Pit</th>
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<tbody>
<tr>
<td>Drilling fluid storage pits (other than mud circulation pits)</td>
</tr>
<tr>
<td>Drilling fluid disposal pits (other than reserve pits or slush pits)</td>
</tr>
<tr>
<td>Washout pits</td>
</tr>
<tr>
<td>Saltwater storage or disposal pits</td>
</tr>
<tr>
<td>Collecting or skimming pits</td>
</tr>
<tr>
<td>Brine or brining mining pits</td>
</tr>
<tr>
<td>Gas plant evaporation/retention pits</td>
</tr>
<tr>
<td>Any other pit not specifically authorized</td>
</tr>
</tbody>
</table>
Authorized by Statewide Rule 8

- Reserve pits and mud circulation pits
  - Drilling fluids (fresh water, salt water, or oil base)
  - Drill cuttings, sands, and silts separated from the circulating fluids
  - Wash water used for cleaning drill pipe
  - Drill stem test fluids, and
  - Blowout preventer fluids

- Dewater, backfill and compact the pit
  - Where fluids contain chlorides at 6,100 mg/L or less: within one year
  - Chlorides >6,100 mg/L: dewater in 30 days and backfill within one year
Authorized by Statewide Rule 8

- Completion and Workover Pits
  - Dewater within 30 days and backfill and compact within 120 days of well completion

- Basic Sediment Pits
  - Dewater, backfill and compact within 120 days of final cessation of using the pit
### RRC Drilling Fluids: Recycling!

<table>
<thead>
<tr>
<th>Non-Commercial Fluid Recycling (NCFR) Pits</th>
<th>Commercial Recycling Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Statewide Rule 8</strong></td>
<td><strong>Chapter 4, Subchapter B</strong></td>
</tr>
<tr>
<td>Have additional design criteria</td>
<td>Division 1 – General Requirements</td>
</tr>
<tr>
<td>Must be emptied/inspected annually</td>
<td>Division 2 – On-lease solid waste recycling for reuse as road base</td>
</tr>
<tr>
<td>Double lined with monthly leak monitoring</td>
<td>Division 3 - Off-lease solid waste recycling for reuse as road base</td>
</tr>
<tr>
<td>Notify District in writing prior to construction or use</td>
<td>Division 4 – Stationary solid waste recycling</td>
</tr>
<tr>
<td></td>
<td>Division 5 – Off-lease fluid recycling</td>
</tr>
<tr>
<td></td>
<td>Division 6 – Stationary fluid recycling</td>
</tr>
</tbody>
</table>
Non-Commercial Fluid Recycling

- Certain wellbore fluids may be treated and reused without a permit (Rule 8(d)(7)(B)
  - Produced formation water
  - Completion/workover fluids
  - Fracture blowback fluids

- Notify the District office seven (7) days before recycling operations begin
- A permit is required to discharge to waters of the state

- NOTE: drilling mud manufacturer’s are subject to TCEQ regulations
RRC: Land Spreading Facilities

“...uses the physical, chemical and biological capabilities of soil-plant systems to control waste migration without impairing the land for future use...”

- **Landfarming**: treat and dispose of freshwater-based drilling fluids and cuttings
- **Land treatment**: treat and dispose of oil-based drilling fluids and oil-impacted soils
- **Land application permit**: alternative to discharge of fluid wastes

Note: Non-commercial and commercial criteria exist. What follows is non-commercial only!
Statewide Rule 8(d)(3): authorizes without a permit provided:
- Specifically approved wastes (see below) disposed on lease
- With written consent of landowner

Wastes approved without a permit include:
- Water base drilling fluids with chloride concentration 3000 mg/L or less
- Drill cuttings
- Sands and silts obtained while using drill fluids with chloride limit above, and
- Wash water used for cleaning drill pipe and other equipment at the same well site

Must not cause pollution of surface or subsurface water
RRC: Land Treatment Facilities

To spread other oil and gas wastes, including oil-based drilling fluids and cuttings, obtain a permit.

- Application made to Technical Permitting (Austin) and District Office
- Sites should have natural features that prevent or minimize release of pollutants, such as:
  - Isolation from or considerable depth to groundwater
  - Protection against flooding
  - Low permeability soils
  - Topography with low erosion potential
- Requires a written notification to the surface-owner and, if within corporate limits, to the city official
  - allows a 15-day opportunity to protest
RRC: Land Application Permits

...refers to a Permit to land apply produced water or gas plant effluent...

- Potential to cause pollution of surface or subsurface water is considered

- Other factors affect suitability, such as:
  - Wastewater quality
  - Soil characteristics
  - Topography
  - Depth to and quality of groundwater

- Requires a written notification to the surface-owner and, if within corporate limits, to the city official
  - allows a 15-day opportunity to protest
Disposal at a TCEQ- MSW Facility

“Special wastes” include oil and gas E&P wastes typically regulated by the RRC

- TCEQ Regulatory Guidance RG-003

The following “special wastes” require written authorization from RRC and/or TCEQ before disposal in a TCEQ MSW Landfill, including:

- Drill cuttings
- Drilling muds
- Unused drilling muds
- Unused mud additives
- Sand produced during exploration
- Soil contaminated by crude oil or lube oil hydrocarbons
Any Questions?

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