DENR STAKEHOLDER GROUP ON OIL AND GAS REGULATION

LAND APPLICATION RULES AND THEIR RELATIONSHIP TO OIL AND GAS SITES

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LAND APPLICATION UNIT

Permitting and Compliance For Non-Discharge Systems:

- Closed-Loop Recycle Systems
- Surface Irrigation (Spray/Drip)
- High Rate Infiltration
- Reclaimed Water Utilization
- Land Application of Residuals

LAND APPLICATION UNIT

Program Benefits

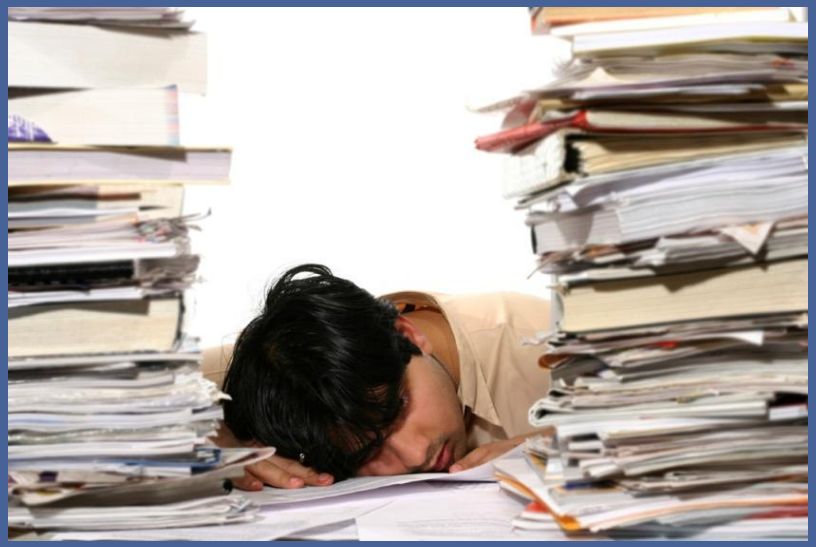
- Allows wastewater treatment and disposal while avoiding a surface discharge
- Reuses a waste as a beneficial product
  - Conservation of potable water resources
  - Supplement to fertilizer products
- Protects human health and the environment
  - Disposal based on hydraulics and nutrient loading
  - Setbacks and operations requirement are paired with effluent quality.
  - Must be protective of surface water and groundwater quality standards

PROJECT EVALUATION

- Complete Application Form
- Property ownership
  - Wastewater systems must controlled by Permittee
  - Residuals can be applied on other properties
- Soils, Agronomic, Hydrogeologic Evaluations
- Engineering Plans, Specs, Calcs
- Operation and Maintenance Plan

MULTI LAYER PROTECTION

- Performance Standards
  - Effluent limitations
  - Allowable application rates
- Setbacks
- Operation and Maintenance
- Monitoring and Reporting
  - Effluent Quality/Quantity
  - Irrigation activities
  - Groundwater monitoring
  - Soil analysis
- Inspections



REUSE OF FLOWBACK/ PRODUCED WATER

RECLAIMED WATER PERMITS

- Reuse of flowback waters for fracking fluid or other uses would require a reclaimed water permit

- Industrial reuse does not need to meet typical effluent standards if used in industry's process and no public access

PERMITTING CONCERNS FOR LAND APPLICATION OF OIL & GAS WASTES

- GW Standards
  - pH: 6.5-8.5
  - Chloride: 250 mg/l
  - Dissolved Solids: 500 mg/l
  - Volatile/Semivolatile Compounds
- Hydrogeology Evaluation
  - Mounding analysis
  - Predictive modeling of contaminants
    - Protective of GW resource at the compliance boundary.

Produced water sample

(6 s.u.)

(2400 mg/l)

(>2400 mg/l)

(340 ug/l benzene)

PERMITTING CONCERNS FOR LAND APPLICATION OF OIL & GAS WASTES

- Salts
  - Chlorides can be toxic to plants
    - CL > 350 mg/l can cause sever problems to cover crops
    - Recovered water data suggest Chlorides >2000 mg/l
  - Total Dissolved solids in indicator of suitability
    - TDS > 1,920 are generally unacceptable for irrigation.
    - Recovered water data suggest Chlorides >2000 mg/l
  - High SAR (Ration of Na to Ca + Mg)
    - Damage soil structure and reduce infiltration (SAR).
    - No data available, but likely a concern.
- Limited Application rates = large disposal areas

CONCERNS WITH EXISTING RULES

- **15A NCAC 02T .0113 - PERMITTING BY REGULATION**

(10) Drilling muds, cuttings and well water from the development of wells or from other construction activities including directional boring;

- Concerns with quality and quantity of E&P wastes
- Desire to keep many activities deemed permitted
- May be challenging to establish threshold for exemption
- Landfill is desired disposal method for material not suitable for onsite disposal

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- Options for establishing thresholds for exemption:
  - Volume of cuttings/development water?
  - Depth of well/boring?
  - Type of well/boring (water well vs. O/G well)
  - Waste characteristics?

OTHER CONSIDERATIONS

- **SECTION .1000 – CLOSED-LOOP RECYCLE SYSTEMS**
  - **SCOPE –** Clarify that produced water reuse is not considered closed loop system.
    - Exposure to environment not consistent with Closed-loop requirements.

CONTACT INFORMATION

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