Summary of Type of Wastes Generated & Disposition

- Wastewaters consisting of Produced Water from formation and Flowback Water from stimulation of the formation – **CLASS II INJECTION DISPOSAL WELL (UIC Well)**
- Impacted soils due to spills and housekeeping – **LANDFILL, NON-HAZARDOUS MANIFESTED AS SPECIAL WASTE (E&P Exempt)**
- Drilling Wastes consisting of water-based bentonitic drilling mud and associated cuttings – **LAND APPLICATION** (under operator’s management and COGCC oversight)

Production Facility – Tank Battery

Produced Water at Tank Battery
Crude & Produced Water Spill

Drill Site – Solids Management

Solids Generation

• Typically for horizontal wells completed in the Niobrara or Codell formations
  – 500 to 700 cy of drill cuttings are generated per well
  – Cuttings are handled and managed at the drill pad prior to recycling or disposal
  – Drilling contractor or associated vendors can provide cuttings management options
  – Depending on mud weight and well depth, cuttings change consistency

Drill Cuttings Management
Drill Cuttings Management

Drilling Muds & Solids

- Water-based bentonitic mud
- Associated drill cuttings
- Compounds from on-site treatment (polymers or bulking material)

Drilling Muds and Solids continued

Regulatory Environment:

Land application of associated drill cuttings under 907.a. (3)

Drilling Muds & Solids... continued

Regulatory Conditions:
- Beneficial incorporation as a soil amendment (average 3 inch thickness, incorporate within 10 days of application)
- Waste Hauling and Tracking Records
- Landowner Agreement
- COGCC Form 4, Sundry Notice filed for open and closure of application areas.
Drilling Muds & Solids... continued

Regulatory Conditions (continued):
• Pre, post, and interim sampling for COGCC Table 910-1 Concentration Levels
• Operate beneficial application area for more than 3 years must permit as Centralized E&P Waste Management Facility under COGCC Rule 908
• Local Land Use approval?

Soil Testing (background concentrations & percolation rates)

Cuttings Spreadfield Application

Cuttings Spreadfield Application
Challenges

• landfilling?
• compost additive?
• reuse as soil component?

Transfer of this E&P Waste out of the control of the Oil & Gas Operator (and under COGCC oversight) for disposal requires adherence to the Solid Waste Act by all parties involved!
Questions?

Troy Swain  
PDC Energy  
EHS Professional-Environmental  
3801 Carson Avenue  
Evans, Colorado 80620  
Office: (970) 506-9272  
Cell: (970) 381-2019  
Troy.Swain@pdce.com