Overview

- Drilling Waste and Traditional Management Methods
- Sham Recycling vs. Legitimate Recycling
- Ideal Recycling Program
- Solidification/Stabilization
- Reducing Costs
- Additional Benefits

Jeffrey Tyson - IPEC 2017 - San Antonio, TX
Drilling Waste

- Rock cuttings and fluids that are produced during drilling
- 1.2 barrels of waste generated per foot drilled
  - Average 50% solids / 50% liquids
- 392,000,000 bbls generated in 2014
  - Enough to fill 25,000 Olympic-size swimming pools

Jeffrey Tyson - IPEC 2017 - San Antonio, TX
Contaminants in Drilling Waste

- **Metals**
  - Arsenic
  - Barium
  - Cadmium
  - Chromium
  - Lead
  - Mercury
  - Selenium
  - Silver
  - Zinc

- **Salts**
  - Chlorides

- **Organics**
  - Hydrocarbons
  - Benzene

- **pH**
- **NORM/TENORM**
- **Proprietary / Uncertain additives**
EPA’s Waste Management Hierarchy

- Source Reduction
- Recycling/Composting
- Energy Recovery
- Treatment & Disposal

Most Preferred to Least Preferred
Traditional Disposal Methods

- Landfilling
- Land Spreading/ Land Farming
- Road Spreading (Road Application)
- On-site Burial
Legitimate Recycling – U.S. EPA

- Provides a useful contribution to the recycling process or to a product or intermediate of the recycling process
- Produces a valuable product or intermediate
- Managed as a valuable commodity and in a manner consistent with the management of the raw material
- Must be comparable to a legitimate product or intermediate
  - Must meet widely recognized commodity standards and specifications

The recycled product must meet environmental, geotechnical, and transportation performance criteria.
“Sham recycling may include situations when a secondary material is ineffective or only marginally effective for the claimed use; used in excess of the amount necessary; or handled in a manner inconsistent with its use as a raw material or commercial product substitute.”
Sham Recycling

Insufficient or non-existent specifications

Little to no value created

Jeffrey Tyson - IPEC 2017 - San Antonio, TX
The Best Drill Cutting Recycling Program

- Mobile – moving from site to site
- Saves money and creates value
  - Proper construction positively impacts drilling, completions, production, maintenance, safety, and liability
- Performance specifications are clearly defined
  - Transportation and geotechnical standards and specifications
    - Strength and durability
    - Designed to last the life of the well
  - Environmental standards and specifications
    - Hydraulic conductivity of $1 \times 10^{-6}$ cm/s or less
    - Leachability Criteria
    - Reduces operator’s risk and liability
    - Sequesters contaminants instead of diluting the contaminants
The Best Drill Cutting Recycling Program

- Routine, representative sampling to manage variability
- Physical and chemical analyses using appropriate test methods
- Bench-scale testing prior to processing
- No significant increase in volume
- Creates a valuable asset
- Protects human health and the environment
Solidification/Stabilization (S/S) is the most appropriate and cost effective solution for managing drilling waste.

- Interstate Technology and Regulatory Council (ITRC) Guidance for S/S
- One of the most common in-situ technologies at Superfund sites for source control
- Initially used to dispose of radioactive and nuclear materials
- Produces a strong, concrete or asphalt-like material
- Utilizes both chemical and physical controls
Solidification/Stabilization

- Well rounded technology
  - Treats salts, metals, hydrocarbons and other contaminants known to be present in drilling waste
  - Inherently treats other unknown contaminants as well

- Apply transportation and geotechnical engineering principles
  - Resistant to rutting
  - Load-bearing structure designed for direct traffic
  - Bridges soft underlying soils
  - Turns waste into an asset
Completed Firmus® Process
Reducing Costs

- **Typical Model**
  - Disposal
    - Box Rental
    - Trucking
    - Solidification
    - Disposal
    - Washout
    - Equipment and personnel
  - Construction
    - Labor
    - Equipment
    - Materials

- **Scott’s Recycling Model:**
  - Sampling and Testing
  - Trucking
  - Processing
  - QA/QC
  - Construction
Additional Benefits

- Reduces trucking costs and miles traveled
- Reduces construction costs for lease roads and drill pads
- Reduces the need for raw aggregates to be mined
- Less overall land impacts
- Reduces maintenance costs on lease roads and drill pads
- Reduces environmental risk and liability
- Reduces disposal costs
- Provides a more stable location
  - More efficient operations means saving time
  - Enhanced safety – reduces slips, trips, falls
  - Not effected by inclement weather
- Based on sound Science
About Scott

- Established in 1994
- Pioneers in the drilling waste management industry
- Expert project and waste management
  - Successfully recycled hundreds of thousands of cubic yards of drilling waste from hundreds of oil and gas wells across the U.S.
  - Constructed hundreds of drill pads/lease roads using drill cuttings
- Specially trained employees, professional engineers and strict QA/QC
  - Representative samplings, bench scale testing, and in-house geotechnical lab
- Sustainable practices based solely on sound science
- Patented process for recycling drilling waste
Jeffrey Tyson, P.E.
Corporate Sales Executive
Scott Energy Technologies LLC
www.scottenergy.com
903-663-4635
jntyson@scottenergy.com