PROGRAM facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

Petroleum Environmental Solutions

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SOIL REMEDIATION AND WASTE MANAGEMENT

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Waste products from the petroleum production and processing create a significant disposal problem for the industry and may be a cause for public concern over health issues. Regulatory controls on proper handling, and disposal of waste streams fall under both Environmental Protection Agency (EPA) and individual state control. The Petroleum Environmental Solutions program focuses on technologies to accomplish waste management and soil remediation in a cost-effective, timely manner. Streamlined regulations can help the industry meet Federal and State requirements.

Soil Remediation Goal

By 2012 reduce the cost of remediating soils contaminated with crude or refined product by 15% compared to 1990 approaches.

Soil Remediation Issues/Barriers

DOE cannot set the clean-up standards for remediation; we can only provide regulators with the scientific information to establish appropriate standards.

Clean-up technologies are fairly mature and the likelihood of a breakthrough that would significantly reduce cost is small.

Oilfield site before remediation.

Same site after remediation.

Soil Remediation Objectives

2006
Work with Petroleum Environmental Research Forum to establish the scientific basis for clean-up parameters.

2012
Provide the tools for States to expand the use of Risk-Based Corrective Action by 25%.

Waste Management Tools

- Thermal treatment
- Biological treatment
- Discharge to the ocean from offshore platforms
- Reuse of solids for fill dirt, road cover
- Offsite landfilling
- Subsurface injection

Soil Remediation Strategy

The overall strategy for soil remediation is to reduce clean-up costs by demonstrating the viability of timely remediation and by establishing ecologically based clean-up targets rather than cleaning to non-detectable levels in every case. DOE will work with PERF and regulators to determine environmentally acceptable end-points for clean-up targets, and develop protocols for ecological risk-assessments. The goal of protocols and risk assessments is to optimize bio-remediation strategies.

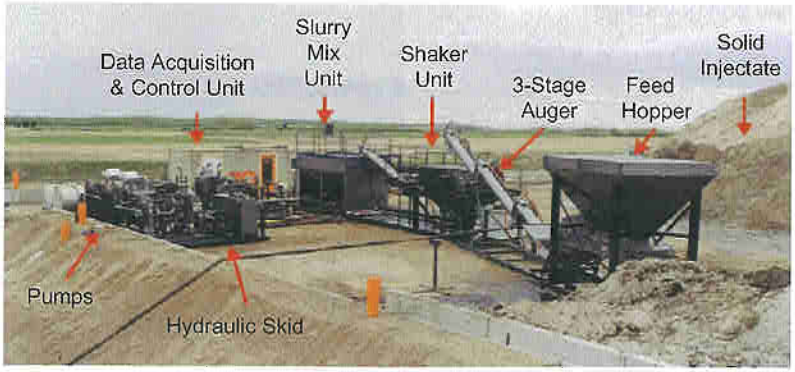
Waste Management

Oil and gas wells drilled to depths of several thousand to more than 20,000 ft generate large quantities of drilling wastes. Drilling fluids (muds) and drill cuttings contain bentonite clay, water, barium sulfate, chemical additives, and hydrocarbon traces. Several thousand barrels of drilling waste may be generated per well, depending on depth and diameter of the wellbore. The fluids and drill cuttings must be disposed of according to EPA regulations.

The cuttings at most onshore wells are placed into a pit near the well. When the drilling is completed, any liquids in the pit are removed and disposed of, and the remaining solids are buried in place or spread out on the land surrounding the well. This process is not approved for some types of drilling muds and cutting or in sensitive environmental areas, such as wetlands, tundra, or areas with a high water table.

Subsurface injection or reinjection technologies are currently the most accepted disposal methods for contaminated drilling muds and cuttings. Underground injection falls into two categories; disposal in salt caverns, and slurry injection into deep, geologically-sealed reservoirs below active aquifers and petroleum producing zones. Salt cavern storage is currently only permitted in Texas, though several other states are investigating the procedure. Slurry injection involves, mechanical grinding of the drilling waste, mixing it with sufficient water to make a slurry and injecting into holding formations through the wellbore.

Offshore disposal and injection regulations differ from EPA approved onshore regulations and are a subject of concentrated research to improve technologies and streamline both regulations and processing.



Slurry processing and injection equipment.