Scott Environmental Services, Inc.

INTERSTATE OIL & GAS COMPACT COMMISSION
Chairman's Stewardship Awards
"Small Company"

- **Provide a brief explanation of the project.**

Scott Environmental specializes in next generation solid drilling waste management for oil and gas exploration and production companies by offering turnkey solutions through expert recycling and treatment technology. Its leading-edge solidification and stabilization techniques and patented technology, developed after years of research, treat freshwater and oil-based drilled cuttings and some saltwater based cuttings.

In 2009, Scott Environmental Services, Inc. partnered with Texas A&M University on the "Pecos Project," a pilot program to test its solidification/stabilization solutions in the Eagle Ford Shale of South Texas. Specifically, it provided solutions that could help alleviate significant damage to surface lease roads caused by increased traffic due to oil and gas production. The research demonstrated that by treating the mud and drilled cuttings waste the solidified and stabilized materials made a durable road that posed no pollution risk.

- **Describe the purpose of the project.**

Drilling and production practices in the continental United States have changed dramatically in the last few years. The expansion of horizontal drilling and multiple well drilling pads has ushered in important changes. While these changes have resulted in lower costs per barrel and higher estimated recoveries for oil and gas industry operators, they have also posed new challenges for treating solid drilling waste.

The American Petroleum Institute (API) estimates that 1.21 barrels of total drilling waste are generated for every foot drilled in the United States. Scott believes that nearly 50 percent of this is solid drilling waste. The volume of solid drilling waste generated yearly is approximately 140 million barrels, or enough to fill almost 9,000 Olympic-sized swimming pools. As increasing demand for energy leads to greater oil and gas drilling, the amount of solid drilling waste will grow in the future,

Because of this, increasing environmental concerns and more stringent national and international government regulations have forced oil and gas operators to implement effective drilling waste management practices across the world. Operators also face pressure from the public and financial partners to manage drilling waste in ways that take advantage of recycling/reuse options that are cost effective. As a result, the oil and gas industry is continuously looking to new technologies and methods for handling solid drilling waste.

By demonstrating that constructing roads with materials recycled from drilling waste could serve both environmental and economic objectives for the oil and gas industry, as well as the communities in which the industry operates, the "Pecos Project" proved that Scott's solidification/stabilization technology is superior to other drilling waste management practices.

- **Explain the process taken to complete the project.**

Overview

For the "Pecos Project," Scott Environmental Services found it could engineer a durable construction material capable of supporting heavy loads from solid drilling waste by improving the well-established solidification/stabilization method of encapsulating contaminants and making them insoluble. Taking into account unique load volumes, weights and other requirements, the end product resembled low-strength concrete, which was used to build a road.

The Problem

Solid drilling waste is made up of drilled cuttings from the well bore and drilling mud that is attached to the cuttings and cannot be removed by the use of traditional solids control equipment. It is classified into three basic types, according to the mud used to drill each section of a well:

- Water-based cuttings (fresh-water cuttings; salt-water cuttings)
- Oil-based cuttings
- Synthetic oil-based cuttings

Solid drilling waste contains chemicals, including salts, metals and hydrocarbons, found in the penetrated natural formations and those found in the drilling mud. The concentrations of the chemicals vary and depend on the type of mud used to drill each section of the hole. For instance, if oil-based mud, rather than water-based mud, was used to drill the horizontal section, far higher hydrocarbon concentrations in the solid drilling waste would be observed. These chemicals – often called "contaminants" – can be cause for concern among state and federal regulators.

The Process

The "Pecos Project" process involved solidification and stabilization, which treated contaminated sediment, sludge and soils by mixing contaminated solid waste materials with treatment re-agents to catalyze physical or chemical changes that reduce or eliminate adverse environmental impact.

The EPA defines each as:

- *Solidification* refers to processes that encapsulate a waste to form a solid material and restrict contaminant migration by decreasing the surface area exposed to leaching and/or by coating the waste with low-permeability materials.
- *Stabilization* refers to processes that involve chemical reactions that reduce the leachability of a waste. Stabilization chemically immobilizes hazardous materials or reduces their solubility through a chemical reaction. The physical nature of the waste may or may not be changed by this process.

In this case, contaminants were entrapped, coated at the molecular level and immobilized so that water could not flush them downstream. The stabilization process bound the waste through chemical transformation of contaminants by precipitation. The solid drilling waste was then converted to a monolith with low hydraulic conductivity.

Scott's Patented Technology

The recycling process provided by Scott's Firmus® technology was applied at the "Pecos Project," which treated the drilling waste taken from a reserve pit in south Texas so it could be reused as construction material for a roadway. Other reuse options include drill pads, compressor station pads, tank battery berms and other load-bearing structures. The Firmus® process is recommended in production areas with high disposal and construction costs.

○ Describe any contributions made to the environment.

Ensuring solid drilling waste is sequestered so it cannot affect the environment is critical. Oil and gas companies must take steps to limit impacts to land, vegetation, water, air, natural habitats and the surrounding community. The solidification/stabilization method of encapsulating contaminants renders them insoluble.

With the "Pecos Project," the waste wasn't added to a landfill or used untreated on area roads where it could leach into soil and groundwater. Instead, the team was left with an environmentally friendly, multipurpose construction material that cost less than traditional materials.

○ Describe what has been accomplished.

The "Pecos Project" proved that Scott's cutting-edge approach to solid drilling waste management supports industry by offering cost-effective, engineered, site-specific solutions that minimizes environmental impact.

Since the "Pecos Project" was initiated, Scott has completed hundreds of projects with its patented technology, which has translated into the elimination of over 500,000 tons of solid drilling waste from the environment. Clients have seen immediate savings of up to two percent or more of the well's cost, depending on the oil and gas play and the cost of the well. The offsite movement of drilling waste has also been reduced, directly lowering the risk of accidental spills as well as the costs of offsite disposal. This has given oil and gas operators more control over waste and has greatly helped to eliminate concerns over liability related to the comingling of waste with that of other operators. Furthermore, companies reduce operational footprints by creatively reusing waste for use in infrastructure improvements, such as drilling pads and roads, benefiting both producers and landowners.