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Texas Program Recycles Drilling Waste

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HOUSTON–New waste treatment and disposal practices are being used in Texas and Louisiana to reduce, reuse and recycle waste from oil and gas drilling operations. Technologies and programs were developed to convert drilling muds and associated cuttings to beneficial and environmentally friendly road base material to help minimize or eliminate operator liability.

A variety of techniques and methods are used to treat and dispose these wastes with the materials either land applied, injected or landfilled. At one landfill facility, the waste treatment process includes removing the water that decreases the soluble salt content and reducing the oil concentration by recovery or degradation. With this process, the landfill containing the clean treated waste solids can be mined to convert it into a repository of aggregate or "reuse" materials to be utilized in manufacturing road base recyclable products.

Rule changes by the Texas Railroad Commission to reclassify treated cuttings as "reuse material" will allow the industry to convert drilling wastes into a recyclable product. Moreover, laboratory tests of the new road base recyclable product conducted in Texas prove that it meets or exceeds the engineering and environmental criteria required by the regulatory agencies and road construction industry.

Environmental recycling projects will not succeed without market sustainability. The process for reducing, reusing and recycling drilling waste is based on an "engineering first" principle. By following sound business management procedures, complying with stringent regulatory criteria, and maintaining client relations, recycling oil field waste can be a beneficial path forward to current waste management practices.

The oil and gas industry in the Gulf Coast and every other region of the country–whether on land or offshore–is "blowing and going." Operators working through and within Louisiana generate some 700,000 barrels of drilling waste monthly, not including produced water. In Texas, the high level of activity in the Barnett Shale and numerous other plays is also generating a tremendous volume of waste from drilling operations.

In Louisiana, 30-40 percent of the solids in the total drilling waste volume is destined for potential reuse material, mostly for levee construction.

In Texas, the RRC encourages the industry to minimize waste by following a waste management hierarchy of preference, which includes source reduction, recycling, treatment and disposal. For example, during drilling operations, operators seek options to minimize waste generated at the source. One method is using mechanical means to separate undesirable cuttings so that the drilling fluids can be reused. Once wastes are minimized at the source, the remaining solid wastes that meet RRC criteria are treated and disposed of on site (i.e., land application, burial, injection, etc.), or transported to a commercial facility for treatment and disposal. Surprising enough, recycling of waste solids rarely occurs.

Recycling Operations

Waste recycling operations are not new. In fact, companies have been recycling waste since the 1950s. Recyclers permitted by the RRC to process waste materials have had varying degrees of success–mostly in recovering oil for resale–because of the increased oil prices. Like oil, treated waste solids are a nonrenewable resource as well, and in prolific oil and gas areas, they are generated in substantial volumes. At times, these treated waste solids have been used for levees, firewalls, pads and road base materials, often within the generators' facility.

From the perspectives of oil and gas operators and drilling contractors, the most important issue regarding waste disposal is liability. The good news is that recycling initiatives that convert drilling waste materials into recyclable products minimize and even eliminate the generator's liability. What was once waste in a landfill now has the potential to become a repository of aggregate to be mined and used as feedstock for manufacturing commercially viable recyclable road base materials.

The reduce, reuse and recycle process for oil-based drilling muds and cuttings emphasizes reducing waste by properly segregating and separating waste materials, recovering and reusing the oil, and then recycling the treated solid waste into a beneficial product. No matter how environmentally conscientious or noble the intent of any recycling effort, success cannot be achieved without a viable market for the end product.

In terms of the road base manufactured from recycled drilling waste, prospective customers in Texas include the Department of Transportation, counties, cities, oil and gas operators and ranch owners. In fact, market research indicates that the South Texas area is experiencing a shortage of economical "aggregate" road construction materials, escalating rock and asphalt prices, and prohibitive transportation costs, even while the area plans for

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significant road infrastructure growth.

New Recycling Rules

The RRC regulates the treatment and disposal of oil and gas waste as defined in Statewide Rules 8 and 30, as well as the recycling of oil and gas waste. However, state recycling rules lacked definition and were not standardized. Consequently, new recycling rules were adopted in 2006 that provided consistency and uniformity of regulatory criteria, and established clear guidance for oil and waste recycling.

One of the most significant aspects of the proposed rules is the definition of "recyclable product" as a reusable material that has been created from the treatment and/or processing of oil and gas waste as authorized by a RRC permit, and that meets the environmental and engineering standards established by the permit for the intended use as a legitimate commercial product. The rules make it clear that a recyclable product is not a waste, but may become waste if it is abandoned or disposed of rather than recycled. The intent of the language is such that once waste is recycled into a product, the generator's liability is greatly minimized since the recycler becomes responsible for the product it manufactures.

With the markets established and the regulations in place, a road base pilot project was launched in South Texas to lay groundwork a full-scale recycling operation. The key issues in obtaining a permit for the project were to protect the environment, and to manufacture a product that met engineering and environmental specifications. In addition to RRC regulations, the Texas Department of Transportation has an established program for accepting recyclable products for use in road construction that contains engineering and environmental specifications. First, the product must meet applicable department engineering specifications and other engineering evaluations deemed necessary. Second, it must pose an acceptable level of potential environmental risk, following an evaluation of its environmental characteristics.

As part of the recyclable product development effort, bench-scale tests were performed with different design formulations, including comparing various drilling waste/asphalt mixtures with traditional mix designs. The development goal was to meet engineering specifications, comply with environmental criteria and maximize the use of treated waste material in the final recyclable product. After extensive testing, the laboratory results proved that the bench-scale recyclable products met or exceeded the minimum engineering and environmental requirements identified by all regulatory agencies.

Pilot To Full-Scale Project

The pilot project was launched in the fall of 2006 and manufactured a production volume of 3,500 tons of recyclable product. A RRC prerequisite "trial run" was conducted and yielded good results.

However, the Texas DOT requested additional testing to research and document the potential affects of total metals and total petroleum hydrocarbons (TPH) in the product and compare these constituents to the levels in the Texas Commission on Environmental Quality's risk reduction program. The results demonstrated that the recyclable product is protective of human health and the environment, with concentrations below Tier 1 residential protective concentration levels or representative of background concentrations, and the Tier 2 analysis of TPH.

The recycled product has since been utilized on facility roads, county roads, and beginning last fall, on shoulders, farm-to-market roads, road patches, etc., by the Texas DOT.

The purpose of reduce, reuse and recycle technology is to develop processes to manufacture an engineered and environmentally sound recyclable product from treated exploration and production waste, and to encourage recycling for use as road base materials and other purposes. The Texas project is meeting those goals. The pilot project has grown into a full-fledged commercial recycling facility and is fully permitted to manufacture recyclable products, primarily for road base. ❐

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