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INTRODUCTION

WASTE MINIMIZATION - A WORTHWHILE GOAL

Historically, management of large quantities of produced water, as well as drilling fluids and associated wastes, was perceived as an unavoidable, everyday fact-of-life in the oil field. As a result, environmental protection efforts by both industry and regulators generally concentrated on the most effective methods for treatment and disposal of wastes after the wastes had been generated. Prior to the early 1980's there were relatively few practical incentives to focus on reducing or eliminating wastes in oil field processes and practices.

In the past several years, however, significant changes in environmental regulations and industry perspectives have made an "end-of-pipe" approach to waste management much less desirable. More stringent state and federal waste management regulations have resulted in substantially increased treatment and disposal costs. These new costs, coupled with a heightened awareness of environmental impacts and an expanded emphasis on environmental protection, have provided a greater incentive for operators to improve oil field processes and practices to reduce or eliminate wastes.

WHAT BENEFITS DOES WASTE MINIMIZATION PRODUCE?

The Commission recognizes that about 98% by volume of the oil and gas waste produced in Texas consists of produced water. Drilling fluids and associated wastes make up about 1.6% and 0.4%, respectively, of Texas oil and gas wastes. Although large volume reductions may not be expected for produced water using today's technologies, some waste minimization technologies - predominately recycling by injection in enhanced recovery projects - do exist for produced water. Produced water can also be treated to reduce contaminate concentrations. Many possibilities already exist for reducing the volumes and toxicity of drilling fluids and associated wastes. A voluntary waste minimization program offers the best opportunity for an individual company to reduce the pollution potential of oil and gas wastes.

The Commission can provide oil and gas operators with information and technical assistance that can make it easier for them to identify waste minimization opportunities and, therefore, easier for them to comply with ever-changing, increasingly complex and costly, environmental regulations. Voluntary waste minimization efforts by oil and gas operators can help reduce the call for additional future regulation.

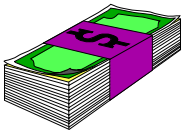
The potential benefits to a company that implements a waste minimization program include:

- increased revenue;
- reduced costs of operating, materials, waste management and disposal, energy, and facility cleanup;
- improved operating efficiency;
- reduced regulatory compliance concerns;
- reduced potential for both civil and criminal liability; and
- enhanced public perception of the company and the industry as a whole.

Numerous waste minimization opportunities exist for oil and gas operations. Initiation of a waste minimization program does not have to be expensive or complicated. With some advance planning and effort, there are many inexpensive, common sense practices that are feasible for even the smallest company.

IS WASTE MINIMIZATION ECONOMICALLY FEASIBLE?

WHAT IS THE POTENTIAL - AND THE INCENTIVE - FOR E&P OPERATORS TO REDUCE THE VOLUME AND TOXICITY OF WASTE THEY GENERATE?



This question is gaining more attention in Texas and the nation, especially as Congress considers reauthorizing the Resource Conservation and Recovery Act (RCRA) Subtitle C and possibly subjecting all oil and gas wastes to hazardous waste regulation. Even if

Congress imposes no additional restrictions on oil and gas waste management options, waste management costs have already risen dramatically, not only in terms of disposal fees, but also in terms of regulatory compliance costs and potential future liability. In many instances source reduction and recycling are cheaper in the long run than treatment or disposal of wastes, particularly when the time and cost of regulatory compliance is considered. In addition, the cost of remediating just one site where improper waste disposal or a spill has occurred can be a significant incentive to reduce or eliminate waste.

Today, many companies are performing detailed internal assessments to identify products that are used, waste generating processes, and waste streams. Wastes are classified and managed according to waste management plans, which are developed by considering environmental conditions in specific geographic areas. A waste minimization program is an important element of any comprehensive waste management plan.

This manual has been prepared as an aid to the oil and gas operator in recognizing effective waste minimization options, and using those options in the development of a waste management plan.

WASTE MANGEMENT HIERARCHY OF PREFERENCE

Today, in order to protect the environment, reduce waste management costs, and increase compliance, our focus on waste management must shift from the end-of-the-pipe to the very beginning.

The first step in shifting our focus on waste management is for individual waste generators to adopt the Waste Management Hierarchy of Preference endorsed in the federal Pollution Prevention Act of 1990. The overriding principle of the hierarchy is the reduction ... if not elimination ... of both the volume and toxicity of waste that is introduced into the environment. From an environmental perspective, disposal is the least preferred waste management option. To the extent practicable, waste management choices should be based upon the following hierarchy of preference:

WASTE MANAGEMENT HIERARCHY

Most Preferred

SOURCE REDUCTION

RECYCLING

TREATMENT

DISPOSAL

Least Preferred

SOURCE REDUCTION

Source reduction is given the highest priority in the waste management hierarchy because avoiding waste generation altogether, or generating the least toxic waste possible, minimizes the problems associated with waste management. Waste that is not generated need not be managed. Waste that is generated, but is of the lowest possible volume and/or toxicity, can be managed most cost-effectively.

RECYCLING

In some cases, reduction at the source will not yet be technically possible or economically feasible. Therefore, recycling opportunities should be investigated for all wastes that are unavoidably generated. Recycling involves reclaiming useful constituents of a waste material, or removing contaminants from a waste so that it can be reused. Recycling may also involve the use or reuse of a waste as a substitute for a commercial product, or as feedstock in an industrial process. Recycling helps to preserve raw materials and reduces the amount of material that requires disposal.

SOURCE REDUCTION AND RECYCLING EQUAL WASTE MINIMIZATION

SOURCE REDUCTION AND RECYCLING MINIMIZE THE QUANTITY OF OIL AND GAS WASTE THAT REQUIRES SUBSEQUENT TREATMENT AND DISPOSAL.

TREATMENT

Treatment should be investigated for any waste that is unavoidably generated and that cannot be recycled in its current form. Treatment is any method, technique, or process that changes the physical, chemical, or biological character of a waste. Treatment renders the waste less hazardous and, therefore, recyclable or safer to transport, store, and dispose of. Note that treatment does not prevent the creation of pollutants. Treatment involves changing the nature of the waste or reducing or eliminating the pollutants in a waste.

DISPOSAL

Waste disposal generally is the discharge, deposition, injection, dumping, spilling, leaking, or placing of any waste into or on land, water, or air. In the waste management hierarchy, disposal is the least preferred waste management option. Disposal also involves the greatest potential liability.

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