

FUTURE REGULATION IMPACTS ON EARTHEN
PITS UTILIZED AT PLANT OR PRODUCTION FACILITIES

By

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INTRODUCTION

Earthen pits have been utilized in drilling and producing operations ever since the Petroleum Extraction Industry was originated. Earthen pits are utilized to store waste muds and cuttings during drilling operations. In addition, they are utilized at production facilities for storing hydrocarbon sludges, saltwater, produced sand and well treatment fluids. Utilizing pits to store wastes in many cases causes detrimental effects on soil and subsurface environments. Soils can be contaminated with salts and hydrocarbons such that vegetation cannot survive. Groundwaters can be contaminated when fluids migrate vertically from pits.

The public climate towards use of earthen pits is becoming hostile due to EPA enforcement activities under the Resource Conservation and Recovery Act (RCRA) and the Safe Drinking Water Act (SDWA). Some businesses have been operating pits without regard for protection of soil and groundwater resources. EPA has cleaned up some of these pits at high costs to taxpayers, and evidence show these pits have definitely contaminated soil and groundwater resources. Because of these flagrant violations, certain Congressmen are pushing House Bill 3200 which in effect establishes a no-pit order throughout the Continental limit of the United States. If this Act passes, EPA would issue guidelines for implementing state programs to regulate the use of earthen pits. States would most likely have to issue pit usage regulations in compliance with EPA requirements to assure protection of soil and groundwater resources.

STATE REGULATIONS

State regulatory agencies over the past few years have been making efforts to address the usage of earthen pits. Some states now administer pit permit programs. Under most programs, pits that store saltwater must be lined with an impervious material. Pits used to collect sludge or emergency liquids can be constructed in native soil without liners. These state programs have created some environmental protection but still fall short in effectively protecting the soil and subsurface environment.

The State of Texas recently strengthened its pit regulations by requiring closure of large burn pits and implementing a more

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comprehensive pit permit program. The Texas regulations require the installation of liners for saltwater pits. Further, the operator must submit to the State design plans with leak detection procedures to demonstrate liner integrity. Pit closure requirements are stipulated but fall short in assuring protection of soil and groundwater resources.

The State of Louisiana is attempting to implement pit regulations which will be more stringent than those formulated by Texas. The Louisiana regulations will require the lining of all saltwater pits with leak detection test to demonstrate liner integrity. In addition, pit closure procedures will be incorporated into the regulations for use by operators who intend to discontinue the utilization of pits. These procedures will require operators to reclaim soil so that pit contaminated areas will support vegetation and protect groundwater resources. This will require operators to remove waste materials from pits and either land treat them onsite or remove them for offsite disposal.

Louisiana has reviewed a paper presented by B. D. Freeman and L. E. Deuel titled "Guidelines for Closing Drilling Waste Fluid Pits in Wetland and Upland Areas" and has indicated an interest in using the closure procedures in this report. These procedures will basically restore pit contaminated areas close to their native state, but the procedure will be costly in upland areas where land has been contaminated with salts. All pits utilized in Louisiana will require permits.

If states continue to amend pit regulations along the lines as seen in Texas and Louisiana, costs to utilize pits will become expensive not only to construct, but to monitor and close as well.

REGULATION COSTS

At the White Castle Field in Louisiana, proposed state pit regulations will require construction of a new saltwater backwash pit and closure of the existing pit to prevent groundwater contamination. Cost to install a clay lined pit to collect backwash sand will exceed \$1000M. Cost at other sites to replace existing saltwater pits will in most cases not be this high, but will be significant.

Closing existing production pits under state guidelines will be costly. Costs can range from \$2M to \$350M depending upon the type and location of each pit. For example, closure of the Kings Bayou pit in Cameron Parish, Louisiana will cost in excess of \$322M. We were required to close this saltwater pit because of seepage to adjacent land. The pit is approximately 20 years old and filled with hydrocarbon sludge and saltwater. The adjacent land area cannot be used for treating the wastes because it is surrounded by wetlands. Burial of waste at this site is not possible because groundwater is less than 1-2 feet below the ground surface. Restoring the area will require removal of the sludge for transportation to a state licensed disposal facility. After the sludge is removed from the pit area, new soil must be hauled in, spread,

treated, and leveled. In addition, a \$450M facility modification must be installed to handle future storing of oilfield wastes for proper disposal. As a result, costs to utilize the pit at Kings Bayou has become expensive over the long run, especially after facility modification and pit closure costs are included. It becomes obvious, a production pit should never have been constructed at Kings Bayou. Further, production pits should not be constructed at upland sites in the future especially if saltwater will be stored periodically. Restoring the pit area becomes expensive because soils become salt contaminated and difficult to reclaim. Restoration costs for production pits in upland areas average about \$30-50M in Onshore East Division.

Pit costs not experienced in the past will also result from new regulations. Demonstrating pit liner integrity will either require the installation of subsurface wells to monitor groundwater or underdrain systems beneath liners. The detection of leaks in lined pits will require operators to immediately re-establish integrity. At present we have no history on pit liner performance in our operations. Consequently, we do not know the significance of this cost. Nevertheless, utilizing lined pits under regulations will definitely increase operating costs.

Lastly, whenever leases are ready for abandonment, the operator must close the lined pits to assure protection of the soil and groundwater environment. Lined pits will be expensive to close as the liner material and waste will most likely have to be removed for offsite disposal. It is possible these wastes could be buried onsite if protection of soil and groundwater resources can be demonstrated. However, burying waste onsite to assure protection of resources can be an expensive venture.

LAND DAMAGE LAWSUITS

Utilization of earthen pits by Industry can create land damage lawsuits. If pits are not closed correctly, it does not take long for landowners to discover land damage at sites. If soil in the pit area is heavily contaminated with salt, sludge, and hydrocarbons after closure, the area will not support vegetation and the landowner will become aware of the problem.

Presently, Onshore East is working with one farmer where land damage has occurred at a drilling site. In this case the waste mud was spread too thick and beans would not grow normally. This Spring an effort will be made to help the farmer spread the mud thinner and fertilize the soil so the area will again produce a successful crop. As mentioned previously, the saltwater pit at Kings Bayou is seeping onto adjacent property. The landowner is now threatening to sue Shell because he claims land damage has occurred.

These and other lawsuits are beginning to surface and landowners are becoming more aware of land damage created by production facilities. In

addition, awareness by landowners is being obtained through publicized pollution incidents handled by EPA. Operators must begin to design and close pits properly or lawsuits will become a severe problem in the future.

CONCLUSIONS

State and federal agencies are beginning to recognize that soil and subsurface resources can be contaminated when operators utilize earthen pits. When earthen pits are constructed on small plots of land, the soil in many cases is contaminated with pollutants. This land becomes unavailable for future use by landowners. In fact, it becomes a detriment if the landowner tries to sell land which includes a contaminated pit site.

Therefore, facility engineers should begin to evaluate other oilfield waste storage alternatives. This is because future soil and groundwater protection for pits will demand higher capital, operating and retirement costs. These higher costs will occur because:

1. New governmental regulations will require more stringent pit construction and maintenance standards.
2. Leak detection systems for pits will have to be installed to demonstrate liner integrity. Detection of leaks will require immediate repair of liners resulting in higher operating costs.
3. Abandoned pits will have to be closed utilizing state procedures to assure protection of soil and groundwater resources. Retirement costs will be increased significantly especially if pit waste materials must be removed for offsite disposal.
4. Lawsuits addressing pit damage will increase. Land damage claims will be costly especially if groundwaters are contaminated. At locations where crops are produced, farmers will demand restoration of damaged soils.