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Inland Oil Spills

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Not even the landlocked parts of Texas are totally immune from the possibility of oil spills or accidents involving other hazardous materials.

Although the most disastrous oil spills have involved dramatic tanker spills or malfunctioning offshore oil rigs, many spills have also occurred in inland areas. In fact, more than half of 12,000-15,000 reported spills in the U.S. each year are inland spills.

The most common accidents occur during the transportation of oil and other hazardous substances. Other incidents include intentional midnight dumping, breaks in overland pipelines, and leaks of materials from hazardous waste dump sites into water systems. The Environmental Protection Agency states that 408 inland spills were reported in Texas during fiscal year 1984. Of those spills, 291 were oil-related.

Oil spills in inland areas, although generally smaller and less publicized than their offshore counterparts, are still serious. Spilled oil, for example, can make water unsuitable for human and animal consumption and irrigation. It can also pass through the soil and contaminate groundwater supplies. Once the oil penetrates into an aquifer, it is difficult to remove. Above ground, oil spills may also cause fish and wildlife kills and can damage vegetation. Of equal danger are chemical spills which, unlike oil, are often more water soluble and may interact with water supplies.

Another problem common to inland oil spills is that many of the spills go unreported, making it impossible to know if they were cleaned up using correct response technology. Experts say many inland oil spills are incorrectly cleaned up by simply bulldozing the oil and burying it underground. This does not clean up the spill, but creates possible future problems of oil contamination of groundwater supplies.

The costs of an oil spill are great. Cleanup costs generally are between five to 10 times greater than the value of the spilled material. The level of environmental and economic damage from a spill may be up to 10 times greater than cleanup costs.

There are, however, some resources which are available to plan to prevent potential spills, and to combat and clean up spills once they have occurred. These resources also serve to reduce cleanup costs and damages.

Governmental agencies in Texas respond to spills and accidental discharges of oil and other hazardous substances, according to a contingency plan. Within that plan, the U.S. Coast Guard responds to oil spills in coastal areas of the state, while the Environmental Protection Agency has jurisdiction for inland spills. The Texas Department of Water Resources has the responsibility for managing industrial solid waste, which includes wastes resulting from industrial, manufacturing, mining or agricultural activities. The Texas Railroad Commission responds to accidents involving oil field production.

A program at Texas A&M University called the Oil Spill Technical Assistance Program (OSTAP) conducts research to establish state of the art techniques in oil spill cleanup technology. It is directed by Dr. Roy W. Hann, Jr.

Although the OSTAP program was originally conceived to deal with offshore oil spills, its focus now includes freshwater and inland spills of oil and other hazardous substances, and will soon expand into spills at hazardous waste sites.

Texas A&M researchers provide assistance in a variety of ways including the development of contingency plans. A site specific plan includes information about which agencies respond in a cleanup situation; inventories detailing likely sources of hazardous spills; mathematical models showing which direction the oil would be likely to flow in a spill situation, and a list of supplies and special technologies needed to combat a spill. It also needs to include a strategy for the acquisition of trained manpower and technical specialized resources when a spill develops. Such a contingency plan is currently being developed for the Golden Triangle-Port Neches Grove area.

The researchers are also looking at adopting a plan independently developed by the Corpus Christi Area training sessions have been put on by the Texas Engineering Extension Service for officials from the Texas Railroad Commission, the Texas Department of Water Resources, the U.S. Coast Guard, and other government, industry, and private organizations.

The training programs are also part of the curriculum for Texas A&M students in the Environmental Engineering Division of the Civil Engineering Department. Training includes specialized information on the transport of spilled oil, evaluation of various cleanup responses, and documentation methods appropriate for a spill situation. Hazardous materials cleanup was added to the curriculum in 1984. OSTAP also has a large audio-visual library with oil spill cleanup information.

Not only do Texas A&M researchers respond to major offshore spills in the Houston Ship Channel and the Gulf of Mexico, they have also been called to the scene of inland spills. OSTAP responded to two spills in the Abilene area in 1979 and 1982, and to a pair of spills near Hearne in 1977 and 1984.

The 1979 spill in the Abilene area impacted surface water and groundwater systems.

Meanwhile, a break in an overland pipeline on New Year's Day 1984 near Hearne sent several thousand barrels of oil into a pond at Camp Arrowmoon, a Boy Scout recreation area. A 1977 spill near Hearne spilled 1200 barrels of oil into the Little Brazos and Brazos rivers.

Although Texas A&M's OSTAP team cannot respond to every spill situation in Texas, it wants to be made aware of and respond to as many spills as possible. Being able to observe cleanup techniques at spill sites, documenting the amount of damage caused at a particular accident, and charting such information as direction of oil flow all help the researchers expand their base of knowledge in the field. At the same time, the Texas A&M researchers are a valuable on-site resource for property owners and oil company officials at a spill site because they bring the latest in cleanup technology to a spill site.

"You cannot create an oil spill just for research purposes," Dr. Hann said, "so you must take advantage of actual spills when they occur. To go out and observe these spills, we had to develop a program that was so good that we would be asked to participate in cleanup operations. We think we've done that. At a spill site, you can't afford to be tourists."

One of the common problems of oil spill cleanup operations is that the most current technologies are not being implemented, according to Dr. Hann. Teams from Texas A&M bring a wide array of resources to a spill site including technical knowledge, reference resources and materials, and response organizations. Among the resources are a Winnebago motor coach which serves as a mobile headquarters, field laboratory and command post for the cleanup crew; an airplane for mapping the extent of the spill; numerous all-terrain vehicles and inflatable rubber rafts called zodiacs. Two University-owned research boats, the 71-foot Excellence 11 and the 48-foot Quest, are available for freshwater spills along the Texas coast.

Texas A&M can also bring considerable manpower to a spill cleanup site. The Environmental Engineering Division at Texas A&M has a staff of 13 full-time academic and research personnel and, as part of the Civil Engineering Department, has access to more than 130 persons engaged in instruction, scientific study, and technical and research support. Additionally, many Environmental Engineering Division graduate students have gained on-site experience by aiding in response efforts in actual spill situations. At the spill at Camp Arrowmoon, for example, seven or eight Texas A&M researchers were at the scene for the better part of a month. They were involved in various activities including documenting the extent of the spill and cleanup activities and recommending cleanup procedures. Because the spill was so close to Texas A&M University, a group of

about 25 Texas A&M students worked on a weekend to remove oil and debris from affected areas. Working at a cleanup site gives the students valuable hands-on experience and can serve as areas for future research.

Dr. Hann said Texas A&M benefits by observing the different cleanup techniques. At Camp Arrowmoon, for example, a large airboat was used to blow spilled oil across a pond. OSTAP later used smaller blowers, similar to those used to clean sidewalks and parking lots, at that spill site.

Still other information gained from on-site observations includes the placement of booms to restrict oil flow and the dredging and cleanup of polluted rivers and lakes.

Although responding to an oil spill is a very serious, scientific matter, that doesn't mean that the Texas A&M researchers find their journeys to these sites tedious. On the contrary, Dr. Hann believes such a response is actually stimulating. "Responding to these spills and observing cleanup operations is exciting," Dr. Hann said. "This is probably as close to field engineering as a person can get. You get a chance to put your theories into practice and immediately find out if they do or do not work."

After a spill has been cleaned up, OSTAP provides documentation of the spill and the cleanup operations. This documentation is essential if any litigation develops, serves as a continuing resource manual, and is helpful in preventing future spills at a site.

Inland spills of oil and other pollutants may become more commonplace in Texas in the future as more materials are transported across the state to keep up with its rapid growth. The dangers involved can be lessened, however, as programs like the OSTAP program at Texas A&M research and develop new cleanup technologies.