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Project Summary

Enforcement of Regulations Governing Ground Water Contamination from Underground Injection or Disposal of Salt Water in Kansas and Texas

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Almost one half of the salt water produced with oil and gas operations in the United States is generated in Texas and Kansas. Much of this produced water is either reinjected into the subsurface in enhanced recovery operations or disposed of through subsurface injection.

The full report describes in detail the Underground Injection Control (UIC) programs relating to Class II wells in Texas and Kansas. The UIC program regulations, the individual agency administrative procedures, and the methods of handling ground water contamination incidents resulting from the injection or disposal of salt water are discussed. In addition, several case studies of contamination caused by Class II wells are detailed.

This Project Summary was developed by EPA's Robert S. Kerr Environmental Research Laboratory, Ada, OK, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

The full report provides a concise description of regulations, administrative procedures, and methods for dealing with ground water contamination incidents in two states with a large number of Class II injection wells. Class II wells are those in which injected fluids are brought to the surface in connection with conventional oil or natural gas production and may be commingled with waste waters from gas plants which are an integral part of production operations, unless these waters are classified as a hazardous waste at the time of injection. The Class II category also contains wells into which fluid is injected for enhanced recovery of oil and natural gas, and for storage of hydrocarbons that are liquid at standard temperature and pressure.

Ground water contamination incidents due to injection operations are not well documented in the literature. This is often the case because alleged contamination incidents are most commonly investigated by state personnel who do not routinely publish information in the literature, although some reports are available in an open file. In other instances, the source of the contamination may only be inferred and not officially documented. Problems with these wells are more easily documented where injection operations cause direct contamination through surface expression such as flow through improperly plugged or abandoned wells.

Results

Rules and regulations governing salt water injection and enhanced recovery

wells in the state of Kansas are administered by the Kansas Corporation Commission (KCC) through the "General Rules and Regulations for the Conservation of Crude Oil and Natural Gas" (effective May 1, 1984). The latest rules combine the enhanced recovery and disposal injection wells into one group. In addition, persons requesting copies of the rules and regulations may also receive a copy of "Fundamental Guide for Salt Water Disposal Wells." This is a practical, readable guide that briefly describes the major considerations for completing and operating a disposal well. The guide includes diagrams of methods of completing injection wells and an example of a completed permit application.

The Kansas Department of Health and Environment (KDHE) is also involved in administering the Underground Injection Control program and has a concern for environmental pollution related to disposal of salt water. In addition to sharing regulatory responsibilities for Class II wells, KCC and KDHE maintain six joint district offices located in Dodge City, Wichita, Chanute, Topeka, Salina, and Hays (Figure 1).

The Railroad Commission of Texas has jurisdiction over Class II wells in that state. The Underground Injection Control Section of the Oil and Gas Division of the Commission is charged with administering a program which processes and issues new permit applications for injection/disposal wells, oversees the operation of injection/disposal wells for which permits have already been issued, and coordinates the protection of fresh water with other state and federal agencies. The division has a central office and ten district offices to oversee the program (Figure 2).

Underground injection procedures and provisions to protect the ground water resources of Texas from such operations are prescribed by statewide rules in these areas: Water Protection, Disposal Wells, Fluid Injection into Productive Reservoirs, and Underground Hydrocarbon Storage.

Conclusions/ Recommendations

Regulatory agencies in Kansas and Texas maintain field staffs who perform routine inspections of injection operations and respond to complaints about alleged violations or actual contamination resulting from injection or disposal of salt water. A search of state records for selected periods indicated that ground water contamination problems were most frequently identified through complaints of salt water in a water well or identification of flowing abandoned wells. Lab analysis for chloride content in water wells and pressure testing of nearby injection wells are the most common methods used to investigate the causes or sources of ground-water contamination.

Although extensive field work may be conducted, few investigations lead to positive identification of a source of contamination. Investigations are frequently complicated by the proximity of abandoned salt water pits and currently operating injection wells, the cost of many of the investigative methods necessary for determining mechanical integrity of injection wells, complicated flow paths in the subsurface, and the logistics of working with industry to determine what is happening in an area without endangering the production of oil or gas.

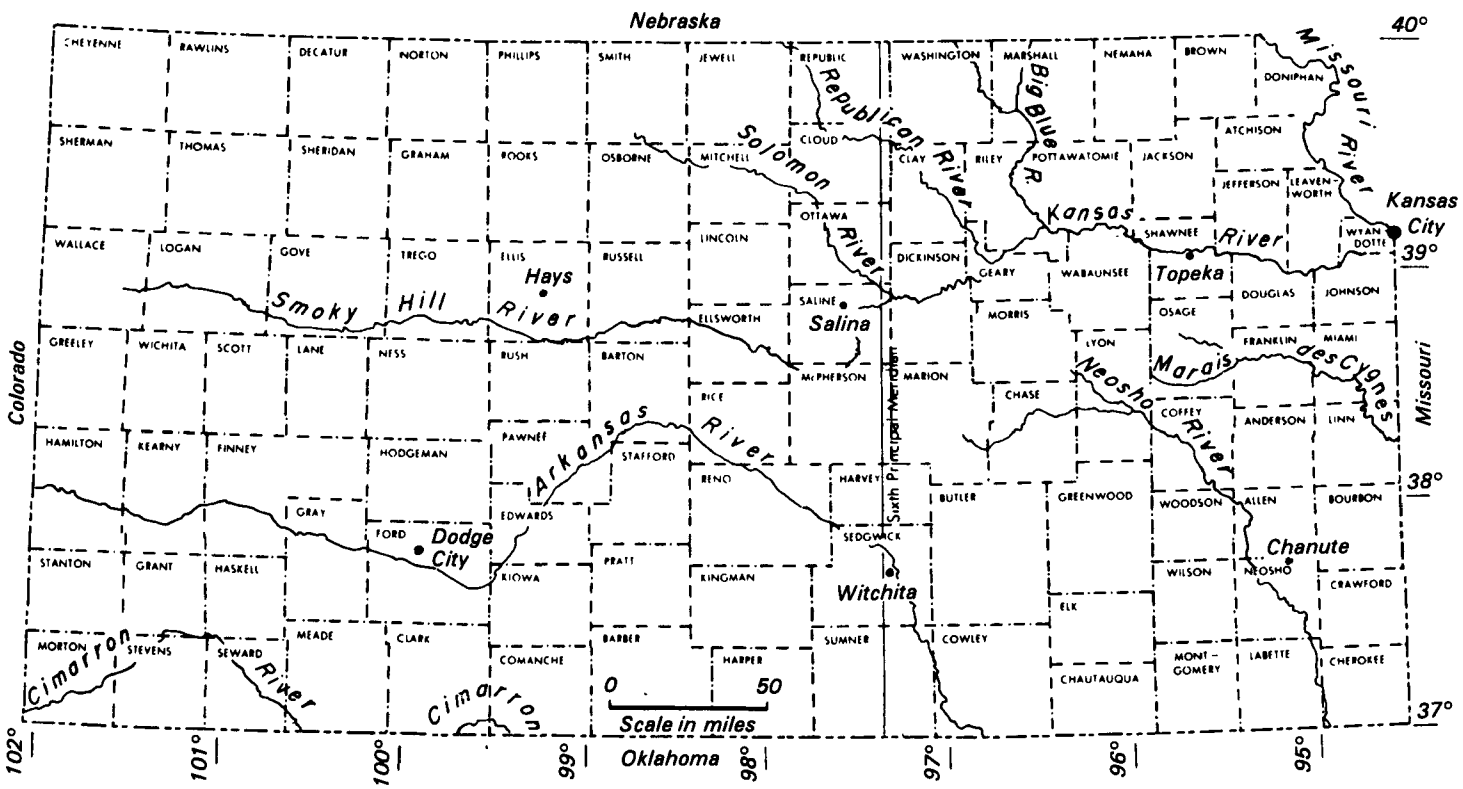

Figure 1. Map of Kansas showing location of district offices.

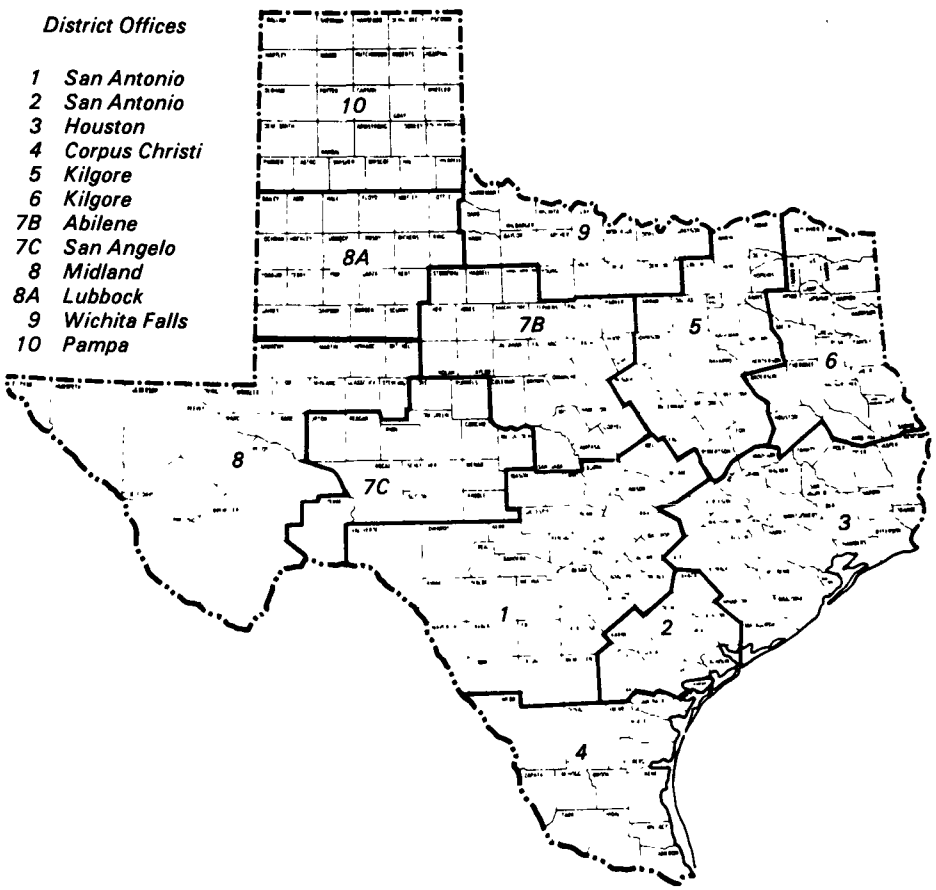

Figure 2. *District map of Oil and Gas Division, Texas Railroad Commission.*

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The complete report, entitled "Enforcement of Regulations Governing Ground Water Contamination from Underground Injection or Disposal of Salt Water in Kansas and Texas," (Order No. PB 85-185 916/AS; Cost: $11.50, subject to change) will be available only from:

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