GEORGIA'S UNDERGROUND INJECTION CONTROL PROGRAM PROTECTS GROUND WATER FROM IMPROPER WASTE DISPOSAL

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INTRODUCTION

To maintain ground water quality, the Georgia Geologic Survey Branch of the Environmental Protection Division (EPD), Georgia Department of Natural Resources, implements the Georgia Rules for Underground Injection Control. Underground injection of waste fluids is not a viable disposal practice in Georgia. No Underground Injection Control (UIC) Class I (industrial waste disposal wells), Class II (wells for enhanced oil and gas recovery), Class III (subsurface fluid mining), or Class IV (hazardous waste disposal wells) have been issued operating permits in the State.

Several UIC Class V Injection Wells exist in Georgia. Class V Injection wells are injection wells not classified as Class I - Class IV. Two Class V wells that return non-contact cooling water to the aquifer from which it is withdrawn have received operating permits in order to maintain aquifer pressure. Another Class V injection system was permitted in the past to return non-contact ground water to an aquifer to prevent sinkholes from developing. Permitting some Class V injection wells and plugging others contributes to maintaining the overall quality of Georgia's ground water.

PERMITTED INJECTION WELLS

Coastal Georgia

An electric utility was issued two underground injection control permits that expire in 1995. The utility withdraws ground water from the Floridan Aquifer. The ground water is circulated through an elaborate piping system jacketing electrical generating units and cooling oil reservoirs. The ground water absorbs heat as it is circulated through the piping.

EPD and the utility take precautions to ensure that the constituent levels of the injected water do not exceed those established by the Georgia Rules for Safe Drinking Water. This includes testing for metals (arsenic, barium, cadmium, chromium, fluoride, lead, mercury, nitrate, selenium, silver, copper, iron, manganese, and zinc), organic chemicals (endrin, lindane, methoxychlor, toxaphene, 2,4,-D and 2,4,5-TP Silvex), turbidity, volatile synthetic organic chemicals (benzene, vinyl chloride, carbon tetrachloride, 1,2-Dichloroethane, trichloroethylene, 1,1,1 Trichloroethane, para-Dichlorobenzene), color, foaming agents, sulfate and total dissolved solids. The ground water never exits the piping of the cooling system except when it is injected. The withdrawn and injected water are chemically analyzed several times a year and the analysis compared to demonstrate that the injected water has not been polluted.

Other precautions include an annual permit inspection to ensure that the cooling system has mechanical integrity. EPD requires the utility to periodically conduct mechanical integrity tests on the injection wells to ensure that the water is returned to the Floridan Aquifer and not to younger strata. To date, the metal casings of the injection wells have been able to maintain above normal pressure during tests indicating that no casing leaks exist.

North Georgia

A mining company was issued an underground injection control permit in 1988 to withdraw water from a large quarry to allow mining operations to be carried out. The water that enters the quarry is ground water. A majority of the withdrawn quarry water was discharged to a nearby stream and the remainder was injected back into the aquifer by three injection wells to maintain the local potentiometric surface. The water table maintenance helped prevent sinkhole formation in nearby residential and business areas. The system is presently inactive.

EPD took several precautions to ensure that the constituent levels of the injected water did not exceed levels established by the Georgia Rules for Safe Drinking Water. The precautions included maintaining the injected water in a non-contact condition from the point of withdrawal at the quarry to the point of injection. The

quarry and injected water were frequently analyzed by the mining company and EPD. The chemical testing ensured that the injected water was not chemically different than the quarry water.

EPD conducts an annual permit inspection of the injection system and in the past it measured ground water levels in a series of monitor wells in the vicinity of the quarry on a monthly basis. EPD did this to establish a ground water data base prior to issuance of the underground injection permit.

UNPERMITTED UNDERGROUND INJECTION

Agricultural Drainage Wells

Agricultural drainage wells are a variety of Class V wells that were installed in the past to drain wetlands and expand agricultural fields. Such wells form direct conduits for agrichemically laden runoff to reach aquifers without the benefit of soil filtration. For that reason EPD does not issue permits for agricultural drainage wells. The Program maintains an inventory of Class V drainage wells (Adams and Lamade, 1986; Franzen, 1986; Fuller and Shetler, 1989; Fuller and Hunter, 1990; and Shetler et al, 1989) and actively seeks to locate and plug additional drainage wells.

At present EPD maintains an inventory of 34 agricultural drainage wells. Of the 34 wells, 20 have been plugged by the well owner or by EPD. EPD has attempted to asses the impact of this type of Class V injection well on underground drinking water supplies. Prior to plugging an agricultural drainage well, EPD collects a water sample from the well and analyzes it for metals and agricultural chemicals such as fertilizers, pesticides and herbicides. To date, none of the samples collected from the agricultural drainage wells have had any agrichemicals present exceeding the limits specified by the Rules for Safe Drinking Water. Some metals are present at high levels, possibly reflecting soil chemistry or casing corrosion. Despite the analytical results from agricultural drainage well water, EPD's position is that this type of injection well presents a potential threat to Georgia's ground-water resources.

Agricultural drainage wells are mostly located in agricultural areas of southwest Georgia. Most are found in Miller and Mitchell Counties with a few in surrounding counties. Farmers in southwest Georgia realized many years ago that the near surface limestone strata of the region were conducive to accepting surface water. The wells served as a cheap and effective means to clear the land of standing water and put additional acreage into production.

The UIC Program will participate with other State and Federal Agencies to conduct a water quality study of the Gum Creek drainage basin near Cordele, Georgia. The multi-agency study will assess the nonpoint water pollution of the basin and recommend pollution reduction practices. The UIC Program will search the drainage basin for agricultural drainage wells during 1991 and EPD will report the findings to the project administrators.

Sinkhole Ponds

The Program has also located natural sinkholes and modified sinkholes which are receiving run off from agricultural fields or storm water drainage from urban areas. The U.S. EPA considers modified sinkholes to be a form of Class V wells. Natural sinkhole ponds also may act as conduits for agrichemical laden surface water to enter an aquifer without the benefits of soil filtration. EPD collected water samples from twelve natural sinkhole ponds in or adjacent to cultivated fields and analyzed them for metals and agricultural chemicals. The analytical results showed that the sinkhole pond waters contained no detectable levels of fertilizers, herbicides or pesticides, but some elevated metals readings were observed (Fuller and Shetler, 1989).

During the winter of 1990, EPD addressed the water quality issue of using manually altered sinkholes to receive storm water runoff in a southwest Georgia city. EPD representatives visited eleven sinkholes that had been modified by excavated sides, ditches or culverts to direct storm water into the sinkhole pond. EPD notified the city that a potential ground-water quality problem existed in the city. The city will collect water samples from a representative number of manually altered sinkholes and report the analytical results to EPD.

Non-domestic Septic Systems

EPD actively discourages the use of non-domestic septic systems for any wastes other than sanitary wastes. In 1987, EPD interviewed approximately 2,300 non-domestic septic system owners asking them about their disposal practices (Franzen, 1987). All but five septic system owners indicated that only sanitary waste was disposed of into their septic system (Fuller, 1989). EPD has resolved the issue of disposal of non-sanitary waste into non-domestic septic systems with the five facilities. EPD requested that the septic system owners provide EPD with a certified statement notifying EPD that they no longer dispose of non-sanitary waste into their septic system.

Automotive Repair Bay Drainage Wells

UIC personnel surveyed 40 facilities in southern Bibb County to find out if automotive repair bay drainage wells were being used to dispose of waste fluids generated by such facilities. In other parts of the Country, such as New England and California, disposal of spent automotive fluids into this kind of well has resulted in pollution of

ground water. The results of this survey were very encouraging because EPD found that this type of Class V injection well is not used in southern Bibb County and that the facilities inventoried disposed of their spent automotive fluids in a manner acceptable to EPD (Hunter and Fuller, 1990). EPD was able to conclude that the results of the survey are probably representative of the State and auto repair bay drainage wells pose no threat to the underground drinking water resources of southern Bibb County, Georgia.

SUMMARY

EPD is continuing its efforts to protect the State's ground water from possible sources of pollution. At the end of the 1990 growing season, EPD plans to plug ten agricultural drainage wells, thereby reducing the number of known agricultural drainage wells to four. Once EPD plugs the ten wells, it will move to close all the remaining known agricultural drainage wells and will actively solicit information about other wells of this type from citizens and local officials of southwest Georgia.

Finally, EPD will continue to collect UIC complaints from the general public and other State and Federal Agencies. When EPD receives a UIC complaint, it immediately starts an investigation and, if warranted, will immediately inspect the complaint site. EPD is prepared to take action to close any unauthorized injection well in the State.

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