states. Available data have been obtained and analyzed concerning site geology and geohydrology, waste character, well construction, surface equipment, and operating programs and regulatory requirements for each well. Brief environmental impact statements for the wells have been developed where sufficient information could be obtained to allow this assessment.

In addition, information concerning the current state laws and programs for regulation of wastewater injection has been obtained and evaluated.

WILSON, W. E., J. S. ROSENSHEIN, and J. D. HUNN, U.S. Geol. Survey, Tampa, Fla.

HYDROLOGIC EVALUATION OF INDUSTRIAL-WASTE INJECTION AT MULBERRY, FLORIDA

An injection well was completed in 1972 at a chemical plant at Mulberry, in central Florida, to inject highly acidic industrial waste into limestone. The plant produces sodium fluosilicate from the reaction of sodium chloride with fluosilicic acid, a byproduct of nearby phosphate processing plants. The resulting liquid waste, which is to be injected into the subsurface, has a high chloride content and a pH that is generally less than 2 and at times less than 1.

The cased injection well is finished as a 6¼-in. open hole in limestone, from 4,040 to 4,984 ft below land surface. The injection-well annulus has two monitor wells, one open near the base of the Floridan aquifer from 1,254 to 1,264 ft, and the other open below the Floridan aquifer from 2,755 to 2,788 ft. Before injection tests were made, geophysical logs and a tracer test were run on the well. The radioactive-tracer test indicated that several permeable zones are exposed in the open hole.

The native fluid, sampled prior to injection, and the waste fluid are markedly different in density, chloride content, and temperature.

Two injection tests were run in the fall of 1972, using the waste fluid. The results of the first test were inconclusive because of inadequately controlled injection rates. During the second test, waste fluid was injected for 118 hours at 270 gpm and pressure readjustment was observed for 5 days. Injection pressure measured at the surface increased for the first 31 hours, and then decreased for the remainder of the injection period. The decrease in pressure after 31 hours is attributed to the net effect of reactions that occurred in the injection zone during the test. Dissolution of limestone by the low pH waste substantially increased the permeability of the rock adjacent to the well bore and increased the density and temperature of the injection fluid as it moved into the injection zone. These changes coupled with the unavailability of direct bottomhole pressure measurements in the injection well and the lack of water-level measurements in an observation well finished in the injection zone complicated the evaluation of test results. As a result, only a general estimate of injection-zone transmissivity could be made.

Where acidic wastes are to be injected into a carbonate zone, evaluation of natural conditions would be facilitated by the use of fresh water as the injection fluid during initial tests, and by measuring bottomhole pressure in the injection well and water levels in observation wells open to the injection zone.

YAMAMOTO, SOKI, Tokyo Kyoiku Univ., Tokyo, Japan

UNDERGROUND WASTE DISPOSAL AND ARTIFICIAL RECHARGE IN JAPAN

Private companies at 3 sites—in Tsuruga, Kanazawa, and Yamagata—have had success with artificial recharge wells. These sites are all on alluvial fan deposits.

In regard to waste disposal into deep zones, some underground treatment of liquid wastes from petrochemical industries in the Setouchi district and other locations in Japan has been done. An experimental study has been made in the Hachimantai and Ootaki geothermal areas, where there has been underground injection of thermal saline water into production wells. Both these geothermal areas are used for electric generation by means of geothermal vapors.

MID-CONTINENT SECTION REGIONAL MEETING
OCTOBER 3–5, 1973
ASSEMBLY CENTER, TULSA, OKLAHOMA
HOST: TULSA GEOLOGICAL SOCIETY

THEME: PETROLEUM EXPLORATIONIST'S CHALLENGE—THE ENERGY CRISIS

General Chairman: MERRILL J. REYNOLDS, Ceja Corp., Tulsa

Program Chairman: MARTIN W. SCHRAMM, JR., Consultant, Tulsa

Key Speakers: W. R. WALTON, Amoco Production Co., Tulsa, Significant properties of sandstones—aids to exploration and exploitation; and K. W. KLEMENT, Univ. Texas at El Paso, El Paso, Texas, Comparative lithostratigraphy of major carbonate reservoirs in the world

For information regarding advertising, exhibitors, hotels, preregistration, *etc.*, contact DON OTT, GeoData Corp., 1420 Thompson Bldg., Tulsa 74103.

TENTATIVE PROGRAM SUMMARY

AMSDEN, T. W.: Porosity and permeability in Silurian carbonate rocks of Hunton Group, Anadarko basin, Oklahoma

BERG, O. R., and J. G. COLE: Stratigraphic analysis of Cherokee Group, Pennsylvanian (Desmoinesian), north-central Oklahoma

FERRIS, C.: Prospecting for reefs by gravity

FROST, J. G.: Algal bank complexes of Mid-Continent

HODGSON, R. N.: Interpretive techniques using exploration data base/application processing systems

KEMPF, J. H.: Structural relations of Arbuckle and Ouachita facies

KRUMME, G. W.: Source changes during Marmaton, northeast Oklahoma

REEDER, L. R.: Liquid industrial waste storage by underground injection

SHELTON, J. W., H. R. BURMAN, JR., and R. L. NOBLE: Depositional and directional features of a braided-meandering stream

STONE, D. G.: Spectrum extrapolation to increase resolution

TAYLOR, J. A.: Hunton fields in Anadarko basin, Oklahoma and Texas

VISHER, G. S.: Reconstructing a Pennsylvanian delta system

AAPG DISTINGUISHED LECTURERS, 1973–1974

GERMAN MÜLLER, Heidelberg University (choice of three papers)

1. Stages of Transformation of Carbonate Sands into