Pollution Control Activities of the Water Pollution Control Board and Texas Water Commission

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During the past three years, regulatory agencies and industry have given increased attention to protection of surface and ground water from all types of pollution. Because of this publicity some may think that water pollution is a new problem. This certainly is not the case. In many instances, the pollution problem has been masked by the geographic size of the State, the availability of water for dilution purposes, and the lack of exploration for and use of ground water. Therefore, more cases of pollution are being identified as greater development of water resources occurs.

Historically, several State agencies had been involved in varying degrees with pollution control activities. These agencies had specific areas of responsibility, and generally worked independently of each other. In an effort to coordinate the pollution control activities of the various State agencies, House Bill 24 (Article 7621d) was passed by the Texas Legislature in 1961 to establish the Water Pollution Control Board. This law represents a new approach to pollution control administration and enforcement.

The new agency is composed of representatives from specific State offices concerned with pollution control, as well as public members appointed by the Governor. The member State units of the Pollution Board are: Texas Department of Health, represented by the Commissioner of Health, Dr. J. E. Peavy; Parks and Wildlife Department, represented by the Executive Director, J. Weldon Watson; and the Texas Water Commission, represented by the Chairman of the Commission, Joe D. Carter. Members of the Water Pollution Control Board appointed by the Governor are: C. M. Shigley, chemical engineer, Dow Chemical Company, representing the manufacturing industry; Sam Wohlford, rancher, Stratford, Texas, representing agriculture; and J. S. Hudnall, geologist, representing the oil and gas industry. The responsibilities of the member State agencies are specified in the Act as follows:

1. The State Department of Health shall continue to perform the research, training, planning, and other functions presently being conducted by it in matters concerning pollution in cooperation with, or as a State agency contributing its services to the Board.
2. The Texas Water Commission is delegated to investigate and ascertain those situations in which the underground waters of the State are being polluted or are being threatened with pollution, and it shall report all findings to the Board together with its recommendations in regard thereto.
3. The Parks and Wildlife Department shall enforce the provisions of this Act insofar as any violation occurs which affects aquatic life, birds, and animals.

As originally introduced, the law included the Railroad Commission as a member agency; however, it was eliminated by amendment during the course of adoption of the bill. Although the Railroad Commission is not a member agency of the Pollution Board, Section 10-c-4 of the Act states, "Notwithstanding the provisions of this Act, the Railroad Commission of Texas shall, and the Texas Water Commission shall continue to exercise the authority granted to them in Article 7621b, V.A.C.S., and the Railroad Commission of Texas shall continue to exercise the authority granted it in Article 6029a". Dr. Gordon McNutt, engineer, attends each meeting of the Board as liaison between the two agencies.

The scope of this paper precludes a description of all phases of the programs of the Water Pollution Control Board. Therefore, this discussion will be limited to programs related to disposal of oil and gas field wastes.

Under the Pollution Control law, everyone having a waste discharge into or adjacent to the waters of the State should have obtained a permit therefor by November 7, 1962. Those having such discharges in operation as of the effective date of the law, which was November 7, 1961, could apply for and receive a statutory permit. This was an automatic, or "grandfather," permit that was issued over the signature of the Executive Secretary without formal action by the Board. Those who began discharging waste after November 7, 1961 must apply for a regular permit that is obtained only after formal action by this Board. Both statutory and regular permits are subject to amendment by the Board through prescribed procedures.

At the time of the enactment of the Pollution Control law there was a question as to whether oil and gas operations disposing of waste are governed by this Statute. There were those who felt that, since permits were required for disposal of waste into or adjacent to the waters of the State, such operations involving waste produced with oil or gas should receive a permit from the Pollution Board. On the other hand, there were those who felt that this area of enforcement was exclusively within the jurisdiction of the Railroad Commission. This conflict of views resulted from an apparent ambiguity of the law, and as a result the Pollution Board requested an opinion from the Attorney General on this question. On October 31, 1962, Attorney General Will Wilson advised in opinion WW 1645 that "discharge into or adjacent to the water of the State of all industrial and municipal waste, including but not limited to waste from the oil and gas industry, by means other than injection wells, must be pursuant to and in accord with a permit issued by the Water Pollution Control Board." This opinion was rendered only eight days prior to the deadline for filing for

statutory permits, therefore placing a tremendous administrative task on the Pollution Board. The oil industry also was concerned in that they had to deal with a permit system to be established and administered by a State agency other than the Railroad Commission.

Following extensive discussions between representatives of the oil and gas industry and the staff and members of the Pollution Board, rules, regulations and modes of procedure were devised and distributed, and a permit system was established. The magnitude of the task required the application of electronic data processing techniques to the handling of these permits. Over 70,000 IBM cards were punched, one for each oil and gas lease in Texas, and early in November, 1963 these cards were mailed to each operator. Because the Pollution Board has no staff members to do the work of that agency, the Board has entered into interagency contracts with member agencies to accomplish various phases of its program. The Board has such a contract with the Water Commission to process the applications for permits for surface disposal of oil and gas wastes.

In addition to establishing a permit system for surface disposal of oil and gas field waste, the Pollution Board has held hearings with respect to usage of unlined surface pits for disposal of wastes. To date, orders outlawing disposal pits that are not impervious have been issued to cover Gaines and Yoakum Counties, and the watershed above Lake Graham and Lake Edelman in Young and Archer Counties. Recently, the Pollution Board has given much consideration to the surface disposal of brines in a 48-county area of the High Plains.

While House Bill 24 (Article 7621d) has been a great step forward in coordinating the pollution control efforts of various State agencies and in setting up a permit system for surface disposal of waste, there still is a critical problem to be solved. That problem is the protection of the ground-water supplies of the State. The magnitude of such a problem can be understood only when it is realized that the surface and subsurface extent of the 7 major ground-water aquifers covers about 65% of the State. The geographic distribution of these 7 major aquifers, which supply about 95% of all the ground water used, is illustrated in Fig. 1. These aquifers, along with some minor aquifers of major local significance, provide annually about 11 million acre-feet, or about 70% of all the water used consumptively in the State.

The potential seriousness of the problem also is apparent when it is realized that a very large number of the oil and gas fields in Texas coexist with the major aquifers. The distribution of areas of oil and gas development and their geographic relationship with the principal aquifers of the State are illustrated in Plate 1. However, the extensive development of oil and gas fields in north and west-central Texas is coincidental with the occurrence of limited water supplies and locally severe water shortages.

Disposal of salt water that is produced with oil and gas is a major problem of the petroleum industry. In January, 1962, the Water Commission and the Railroad Commission cooperated in an inventory of salt water production and disposal for the calendar year 1961. This inventory indicated that a total of about 2,237,000,000 bbl. of salt water were produced in 1961. Of this total, approximately 1,537,000,000 bbl., or 68.7%, was re-injected into the subsurface; about 461,000,000 bbl., or 20.6%, were disposed of into unlined surface pits; approximately 225,000,000 bbl., or 10.1%, were discharged directly into surface water courses; and the remaining 14,000,000 bbl., or 0.6%, were disposed of by miscellaneous methods such as spraying on leases or country roads (Fig. 2). The

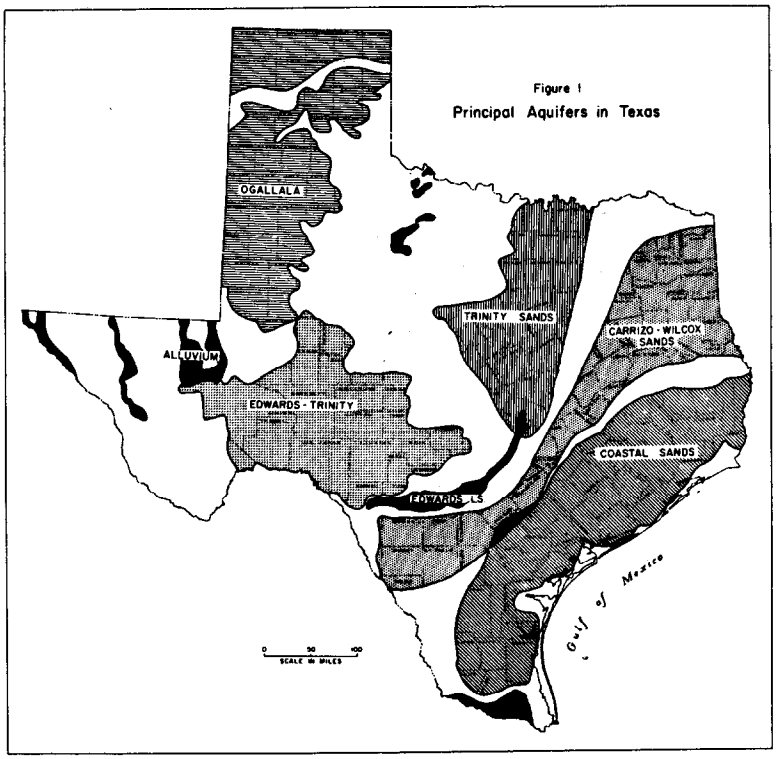
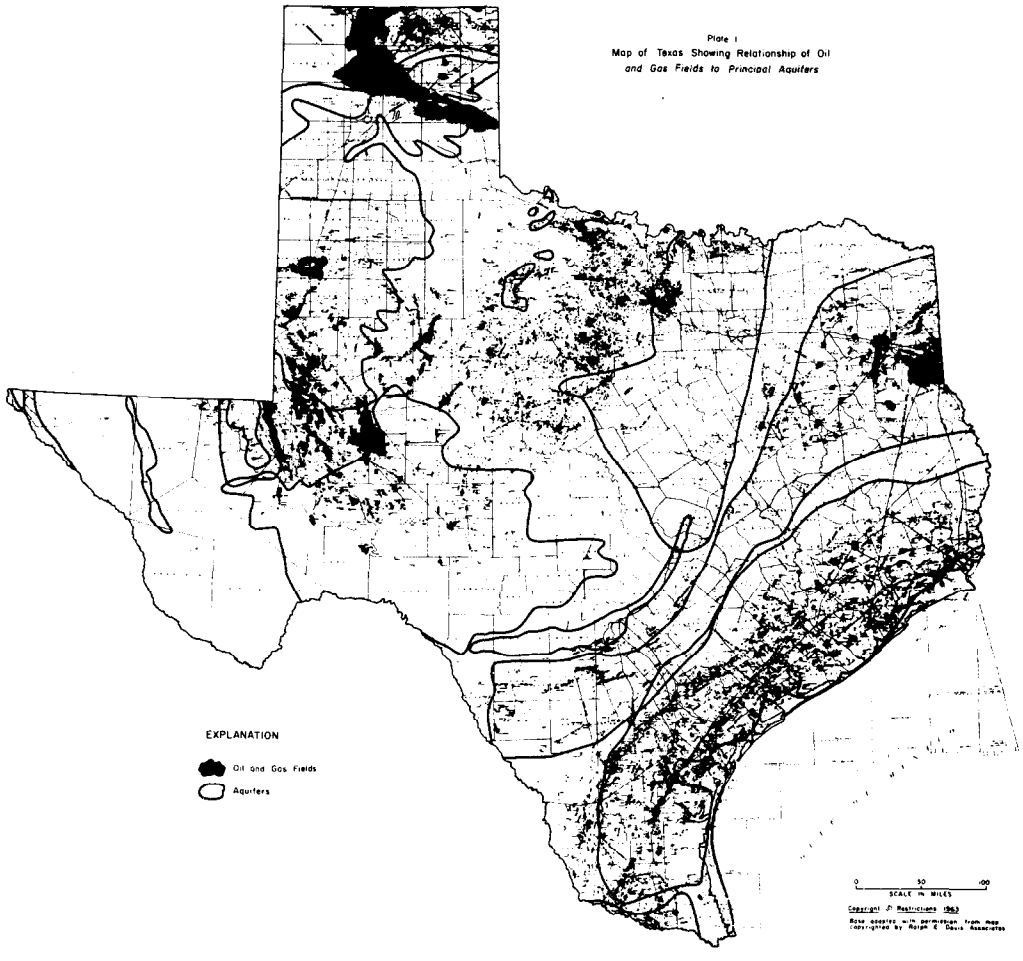


Figure 1
Principal Aquifers in Texas



tremendous volume of salt water produced and the coexistence of oil fields and ground-water aquifers makes it apparent that a staggering pollution problem could face the State and the oil industry if adequate protection is not afforded ground-water supplies.

This existence of oil and ground-water reservoirs in the same area also means that exploratory, production, and injection wells will penetrate the ground-water aquifers. It is necessary, therefore, that adequate provisions be made to protect usable quality ground water from pollution during drilling, production, and disposal operations.

Activities of the Water Commission concerned with protection of ground water of usable quality are under the Quality Control Program of the Ground Water Division. This program consists of the Surface Casing Section and the Waste Disposal Section.

The Surface Casing Section is staffed by 4 geologists whose primary duty is to recommend depths to which ground water of usable quality should be protected during normal drilling and production operations. The participation of the Water Commission in the surface casing program is derived from rules promulgated by the Railroad Commission under authority given that agency by statutes bearing specifically on the drilling and producing activities of the oil industry.

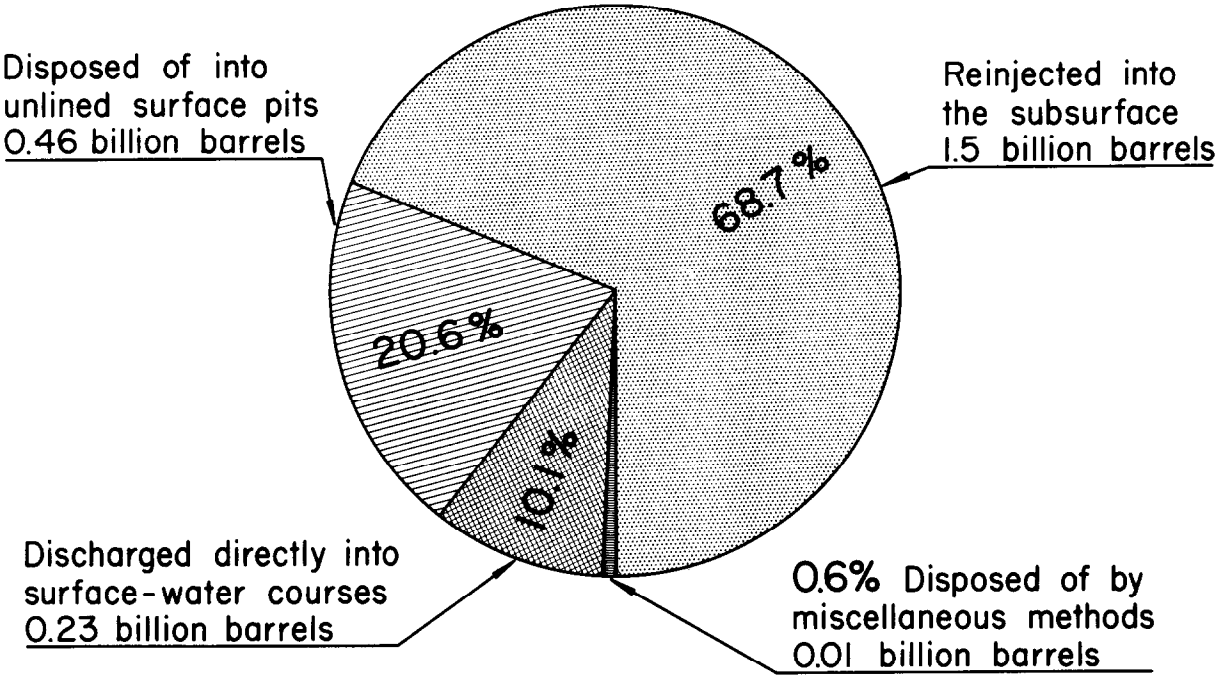
The Water Commission participates in the surface casing program only by recommending depths to which ground water should be protected. Although we do not have authority to determine the protective methods to be used, we are greatly concerned that they will adequately protect the ground water in the area. The types of applications for which recommendations are made by the personnel of the Surface Casing Section include those for drilling individual wells, for setting up field rules in a particular area, and for drilling stratigraphic and core tests in an area. During the calendar year 1963, the Surface Casing Section processed 9,705 individual applications; 160 field rule applications; and 18 stratigraphic or core test applications for a total of 9,883 recommendations to the Railroad Commission and to the oil industry. In preparing each recommendation, the geologist utilizes all available ground-water data. This data includes electrical and radioactivity logs, ground-water bulletins of the Texas Water Commission, other technical reports, and other available information on the occurrence of ground water in the particular area. Data which are taken into account in arriving at a recommendation in a particular area include topographic relief, the geology of the area, the quality of water available, and the use that is or can be made of the available ground water. As additional information is obtained in a particular area, the succeeding recommendations may call for deeper surface casing to protect ground water that was not discovered at the time of the original recommendations, or call for shallower surface casing because of a better definition of the base of usable quality ground water.

On January 4, 1964, the Surface Casing Section files contained 24,897 logs. The personnel of the Section

Figure 2

DISPOSITION OF PRODUCED SALT WATER, 1961

Percentages apply to total of 2,237,000,000 barrels



are also in the process of transferring approximately 40,000 electric logs of oil and gas tests from the Balcones Research Center to the Surface Casing files. A number of large shipments of electric logs also have been received recently from members of the oil industry. These additional logs will give the personnel in the Section much-needed control in recommending to the oil and gas industry and to the Railroad Commission depths to which usable quality ground water should be protected.

The Waste Disposal Section, which is staffed by 4 geologists, has 3 pollution control functions. As previously stated, the Act which created the Pollution Board also charged the Water Commission with the responsibility for investigating and ascertaining those situations in which the underground waters of the State are being polluted or threatened with pollution, and for reporting these incidents to the Pollution Board, together with recommendations. To comply with this Statute, personnel of the Waste Disposal Section conduct field investigations of ground-water pollution problems, and prepare technical reports giving the results of such investigations for presentation to the Pollution Board. Such pollution investigations may originate at the request of the Pollution Board or at the request of individuals who write to the Water Commission seeking assistance in determining the source of a pollution problem.

The second pollution control function of this Section was established by the enactment of Senate Bill 72 (Article 7621b VACS) by the 1961 Legislature. In this bill, the Water Commission was designated as "the permit issuing agency for all injection wells disposing of wastes other than wastes arising out of or incidental to the drilling for or the producing of oil or gas into the subsurface." This statute also designated the Railroad Commission as the permit-issuing agency for subsurface disposal of salt water arising out of, or incidental to, the drilling for, or the producing of, oil or gas. However, Section 2c of the law states that "any person applying to the Railroad Commission for a permit to inject salt water or other waste arising out of or incidental to the drilling for or the producing of oil or gas into the subsurface stratum, shall submit with such application a letter from the Texas Water Commission stating that the drilling of such injection well and the injection of such salt water or other such waste into such subsurface stratum will not endanger the fresh water strata in that area and that the formation or strata to be used for such salt water or other such waste disposal are not fresh water sands."

In compliance with this statute, the Water Commission has established procedures by which an applicant can obtain a permit for a municipal or industrial disposal well project. In addition, the Water Commission has established procedures by which the recommendations to the Railroad Commission and to the oil operators can be issued under Section 2c of the law. When Senate Bill 72 was passed, there was a

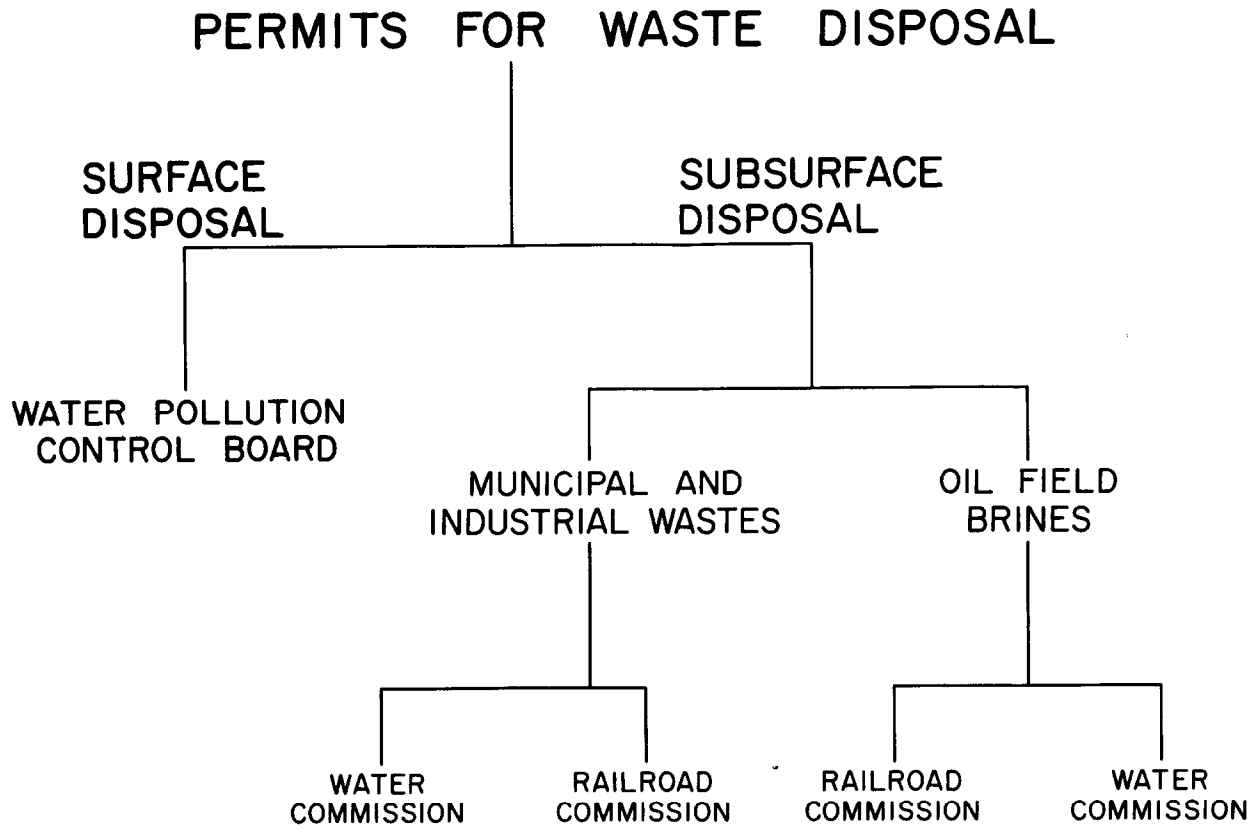
difference of opinion between the 2 agencies regarding its interpretation. The Water Commission felt that the wording of the bill included oil wells used for injection of brine into the subsurface. Regardless of the zone to be used, the injected brine must pass adjacent to fresh water strata. Therefore, the Water Commission wanted to be sure that all injection wells adequately protected fresh water strata. Conversely, the Railroad Commission felt that the law excluded secondary recovery operations, and that a letter from the Water Commission was not necessary on injection wells when the brine was being put into an oil or gas reservoir. In order to clear up this difference of opinion, the Water Commission requested an opinion from the Attorney General of Texas regarding the proper interpretation of Senate Bill 72. The Attorney General, in opinion C-176 rendered on November 13, 1963, stated that "Article 7621b applied only to those wells that are drilled or used for the purpose of disposal and does not include those wells the purpose of which is to increase production from oil or gas-bearing strata." The opinion further stated that, "the determination of the Water Commission is not binding on the Railroad Commission but merely advisory." In compliance with this opinion, in order to obtain a permit for subsurface disposal of oil field brine into a non-oil or gas producing zone, the operator must apply to the Railroad Commission, and also submit with the application a letter from the Water Commission stating that the proposed disposal interval is not a fresh water sand, and that the use of the disposal well for injection of brine will not endanger the fresh water strata in the area.

In summary, the programs of the Water Pollution Control Board and the Texas Water Commission relating to oil field waste are primarily for protection of surface and ground water of usable quality. The Pollution Board is concerned with the protection of surface water and issuance of permits for surface disposal of oil-field brine. The Water Commission is concerned with the protection of ground water, and investigates pollution complaints involving ground water, issues recommendations to the Railroad Commission and to the operators regarding disposal of oil-field brine into the subsurface, and issues recommendations to oil operators and the Railroad Commission regarding the depth to which ground water of usable quality should be protected in areas of oil-field development. Fig. 3 indicates the agencies responsible for issuance of permits for surface and subsurface disposal of waste.

Permits for surface disposal of all types of waste are under the control of the Pollution Board, and are subject to rules and regulations of that Board. Subsurface disposal of waste has been divided into two categories. Permits for subsurface disposal of municipal and industrial waste must be obtained from the Water Commission. In this instance, the Railroad Commission assists the Water Commission by determining whether the proposed injection interval is an oil or gas-bearing reservoir, and whether use of this zone for disposal purposes will adversely affect such reservoir.

Permits for the subsurface disposal of oil field brine must be obtained from the Railroad Commission. In this instance, the Water Commission assists the Railroad Commission by issuing letters to the Railroad

Figure 3



Commission and to the operators advising whether the proposed disposal interval is a fresh water sand, and whether the use of the well will endanger any fresh water strata in the area.

Texas has an abundance of natural resources to provide for tremendous economic growth. We can only enhance this growth, however, if the State's water resources are planned with vision, properly developed, and wisely managed.

Great strides have been made in recent years in relation to water-quality protection, although much remains to be accomplished. If we are to experience continued economic growth and protection of water quality in the State of Texas, we and all parties concerned must work with understanding and cooperation. The Water Commission will provide all possible assistance in this cooperative effort.