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**ACTIVITIES OF THE
TEXAS GROUNDWATER PROTECTION COMMITTEE
REPORT TO THE 75TH LEGISLATURE**



Prepared by the
Texas Groundwater Protection Committee

SFR-47
December 1996

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Texas Groundwater Protection Committee

Committee Membership:

Texas Natural Resource Conservation Commission
Texas Water Development Board
Railroad Commission of Texas
Texas Department of Health
Texas Department of Agriculture
Texas State Soil and Water Conservation Board
Texas Alliance of Groundwater Districts
Texas Agricultural Experiment Station
Bureau of Economic Geology

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EXECUTIVE SUMMARY

This report is prepared and submitted to the 75th Texas Legislature by the Texas Groundwater Protection Committee. The Committee has prepared the report in accordance with §26.405 of the Texas Water Code, describing the Committee's activities for the two preceding years and providing groundwater protection recommendations for the Legislature's consideration.

Seven groundwater protection issues were identified by the Committee and are submitted as recommendations. These issues include:

- ▶ priority for state and regional drought management planning;
- ▶ funding for the development of pesticide-specific state management plans and education programs;
- ▶ clarification and modification of exemptions to water wells permitted by groundwater conservation districts;
- ▶ provision of regional wastewater authority for groundwater conservation districts;
- ▶ simplification of the critical area process;
- ▶ funding for the critical area program; and
- ▶ mandatory continuing education for water well drillers and pump installers.

In addition, the report discusses the Committee's creation and mandate, membership, federal involvement and coordination, meetings and presentations, subcommittees and work groups, and public records. Major Committee accomplishments, including the *Texas State Management Plan for the Prevention of Pesticide Contamination of Ground Water*, the *Texas Ground-Water Data Dictionary*, the *Texas Groundwater Program Directory*, the Ground-Water Nonpoint Source Assessment and Management Plan, educational outreach, actions addressing the well report backlog, the annual *Joint Groundwater Monitoring and Contamination Report*, and the development of a comprehensive state groundwater protection program are also detailed. Information on the Committee's rules, members and representatives, and agency contacts is provided in the form of appendices.

RECOMMENDATIONS TO THE 75TH LEGISLATURE

Groundwater protection has become an increasingly important concern of the general public and local, state, and federal agencies. High-quality groundwater resources are of vital importance to the state's economy and the public health and welfare. As required by §26.405 of the Texas Water Code, the Texas Groundwater Protection Committee submits the following groundwater protection recommendations for legislative action. These recommendations are not listed in any priority order. The Committee recommends the 75th Legislature consider:

- ▶ amending Chapter 16 of the Texas Water Code to make drought response, at both a statewide and regional level, a water planning priority;
- ▶ providing funding during the next biennium for the development of pesticide-specific state management plans required by the EPA for the continued use of certain herbicides;
- ▶ clarifying and modifying §36.117 of the Texas Water Code, which exempts certain wells from groundwater conservation district jurisdiction;
- ▶ providing authority to groundwater conservation districts to establish and operate regional wastewater treatment facilities on a local option basis;
- ▶ amending Chapter 35 of the Texas Water Code to simplify and improve the groundwater conservation district creation process within designated critical areas;
- ▶ providing sufficient appropriations to the Texas Natural Resource Conservation Commission and the Texas Water Development Board to implement and administer the Critical Area Program required under Chapter 35 of the Texas Water Code; and
- ▶ amending Chapters 32 and 33 of the Texas Water Code to establish mandatory continuing education for water well drillers and pump installers.

The Committee also urges the Legislature to carefully consider the legislative appropriations requests of the individual agencies and provide the funds necessary to carry out the existing and recommended groundwater protection programs. If proposed funding for the recommended topics can be addressed, an opportunity may exist to leverage state funds with federal funding from the U.S. Geological Survey, the U.S. Environmental Protection Agency, or other federal agencies.

State-Level Drought Management Plan

Issue: There is a need for a statewide plan to assess and respond to drought.

Recommendations:

The Legislature should consider amending Chapter 16 of the Texas Water Code and make drought response, at both a statewide and regional level, a water planning priority.

Background:

Drought is a normal feature of the Texas climate. Severe droughts have occurred in parts of Texas during every decade of this century. Since about half of the state's water usage is from groundwater, accelerated pumpage during drought threatens the sustainability of our aquifers in terms of both quantity and quality. Diminished quantity of groundwater often leads to a reduction in quality, even to the point of being unfit for some uses. Groundwater mining, resulting from pumpage in excess of recharge, can lead to subsidence, cessation of springflows, saltwater intrusion, loss of wildlife habitat, and aquifer depletion.

In September 1996, the Texas Natural Resource Conservation Commission reported 273 public water supply systems, reliant on 907 public water supply wells, were limiting water use to avoid shortages. In the majority of these cases, the systems that were the most stressed had not conducted contingency planning to consider shortages of groundwater during drought. Some of these systems were located in designated critical areas.

The enormous economic impacts of drought, estimated at over \$6 billion in 1996 alone, suggest the need for a statewide drought plan for the purpose of mitigating some of its associated impacts and conflicts. Such a plan should recognize the hydrologic and hydraulic connections between surface water and groundwater, and provide a framework for coordination of state response with drought mitigation activities at local, regional, and national levels. Regional drought plans, aggregated at the state level, would ensure coordinated, effective response by multiple agencies having varied responsibilities for statewide activities during drought. Currently, Texas does not have such a planning arrangement.

Drought planning has been completed or is in progress in more than 25 states. In most, an orderly process has been adopted to develop and implement plans to improve drought mitigation efforts through more timely, effective, and efficient assessment and response activities. Components of a drought plan may include:

1. A monitoring/early warning system to provide decision-makers at all levels with information about the onset, continuation, and termination of drought conditions and their severity.

2. Assessment programs to reliably determine the likely impact of the drought in a timely manner.
3. An institutional structure for coordinating governmental actions, such as drought declaration and revocation criteria and procedures.
4. A system and structure for coordination of information flow within and between levels of government.
5. Appropriate drought assistance programs, both technical and relief, with predetermined eligibility, implementation and designation criteria, and revocation procedures.
6. Financial resources to maintain operational programs and to support drought assessment and response activities.
7. Educational and public awareness programs designed to promote the adoption of appropriate drought response actions.
8. Post-drought evaluation by an unbiased third party with predetermined procedures for incorporating recommended revisions into the plan.

Development of Pesticide-Specific State Management Plans and Education Program

Issue:

There is a need for funding for the development of pesticide-specific state management plans.

Recommendations:

The Committee recommends that the Legislature provide funding during the next biennium for the development of pesticide-specific state management plans required by the EPA under a proposed rule on pesticide and groundwater state management plans.

Background:

On June 26, 1996, the EPA published proposed rules in the *Federal Register* on pesticides and groundwater state management plan regulation. This is the long-anticipated set of rules that will restrict the use of certain pesticides that have been identified as probable or possible human carcinogens and have the ability to leach to groundwater. Because these are major-use pesticides (used on corn, sorghum, soybeans, peanuts, cotton, and other crops), the rule provides the states with the opportunity to allow continued use within the state by developing and implementing pesticide-specific management plans to protect groundwater.

Alachlor, atrazine, cyanazine, metolachlor, and simazine are the first five pesticides to be identified under this proposed rule, and there is a strong possibility that additional pesticides will be added to the federal list in the future. Pesticide-specific state management plans outline the approach the state will take to facilitate the wise use of a pesticide in a manner that is protective of groundwater resources. These plans will include monitoring of groundwater quality and define and encourage the use of voluntary best management practices. Voluntary best management practices will be encouraged through the development and distribution of educational materials relating to plan implementation and water resource protection. If groundwater contamination still occurs, regulatory best management practices may become necessary to allow continued use of the pesticide within the state.

The proposed federal rule is expected to be issued in a final form some time after the four-month public comment period is concluded on October 24, 1996. Under the proposal, the state will have two years to develop and submit management plans, and the EPA would then have nine months to approve or reject the state's proposed management plans. Upon approval, the state would have to implement the proposed management plans.

Section 26.407 of the Texas Water Code tasks the Texas Natural Resource Conservation Commission (TNRCC), with the advice of the Committee, to develop management plans for agricultural chemicals (e.g., pesticides) that threaten groundwater. Specifically, these plans are for the protection and enhancement of water quality pursuant to federal statute, regulation, or policy, including management plans for the prevention of water pollution by agricultural chemicals and agents. This section was added to the Texas Water Code in 1989 and was specifically intended to cover the plans required by the EPA under its proposed rule.

Funding Requirements and Potential Sources:

The EPA has indicated that federal funding for this program is minimal and will remain so in the future. Even as the federal rule is finalized, federal funding levels, which are currently inadequate to support the full development and implementation of the plans, will not be increased. In the draft rule, the EPA estimates that the average state will require 7,367 hours (4 FTEs) per year to implement the program, with 12,019 hours (6.3 FTEs) required the first year. For the average state, the EPA further estimates an annual cost of \$322,198 per year and a first-year start-up cost of \$399,926. Texas is a major-use state for all five pesticides, is much larger in area than most states, and is hydrologically more complex than most states. As a result, the costs estimated by the EPA may be low. Unless the plans are developed and implemented in an approved manner, the EPA will cancel the use of these pesticides statewide, ultimately affecting a large segment of the state's agricultural community. Without adequate state funding, the development of plans for all five chemicals may not occur in a timely manner or prioritization of which of the five pesticides the state should support will have to be made.

The development and implementation of the state management plans are the main focus of the Committee's Agricultural Chemicals Subcommittee. The subcommittee is currently involved in the preliminary development of a generic plan and will be involved in the development and implementation of the pesticide-specific state management plans. Costs associated with the development of the pesticide-specific state management plans over the next biennium include: geographic targeting, development of preventative measures, pesticide monitoring-network design, and information transfer to affected parties.

The subcommittee is composed of representatives from the Texas Natural Resource Conservation Commission, Texas Department of Agriculture, Texas Water Development Board, Texas State Soil and Water Conservation Board, Texas Agricultural Experiment Station, Texas Agricultural Extension Service, Bureau of Economic Geology, Texas Alliance of Groundwater Districts, and Structural Pest Control Board. These agencies all have a role in developing and implementing plans to preserve the use of these pesticides and ensure that the waters in the state remain pure under the currently proposed program. Additionally, grower and producer groups, chemical manufacturers, and public interest groups have been involved in the planning phase of this program.

Many other states have realized the economic importance of these pesticides and have provided a legislative funding mechanism for development and implementation of pesticide-specific management plans. Potential options for legislative funding of the program would be to allow the Texas Department of Agriculture to collect higher pesticide registration fees and appropriate these monies as funds for its use and as pass-through monies for the participating agencies. Alternate funding options might be available through the TNRCC if federal grant levels for this program increase or if the Legislature establishes a special fee to be collected and distributed by the agency.

Ultimately, a funding mechanism that fairly distributes the cost of implementing the program will need to be identified. Stakeholders potentially affected by possible fee increases should be involved in the development of an appropriate funding mechanism. The Committee estimates that up to \$250,000 will be needed during the 1997-1998 biennium for the development of the pesticide-specific state management plans. If for any reason the state management plan process is not implemented at the federal level, the Committee notes that the proposed funding would not be necessary.

Chapter 36, Texas Water Code: Exempt Wells

Issue:

With regard to small-capacity water wells and rig-supply wells, exceptions from water well permitting under the Texas Water Code limit local management of groundwater resources.

Recommendation:

The Committee suggests the language of §36.117 of the Texas Water Code be clarified and the Legislature consider lowering the exempted production limit of §36.117 to facilitate local groundwater management and possibly encourage local district creation. Alternatively, the Committee suggests that exemptions based on well production capacity could be set locally through district rule-making procedures based on aquifer conditions. This alternative would allow for public hearings and input in determining local pumping exemption needs.

Background:

Most groundwater districts are created by local citizens with the expectation that the district will manage the groundwater resources for the benefit of all within its jurisdiction. Fulfilling this expectation may fall short in any given district because of the exceptions that are provided in §36.117 of the Texas Water Code. This section provides exceptions and limitations to groundwater conservation district authority in permitting certain types of water wells. Exceptions from district permitting generally include wells incapable of producing more than 25,000 gallons per day; domestic wells supplying 10 or fewer households; livestock wells; wells supplying water for exploration, production, and other activities permitted by the Railroad Commission of Texas; and jet wells used for domestic need. This section of the Texas Water Code has been amended over numerous sessions as the powers and duties of groundwater conservation districts have evolved. The resulting language is often ambiguous, and in places, duplicative.

A number of aquifers within the state are not capable of producing this volume of water, and this limit (25,000 gallons per day) often prevents the protective measures for which local districts have been created. This “floor of regulation” has also discouraged the creation of groundwater conservation districts in some parts of the state, as most of the wells would be outside of a potential district’s authority to protect, conserve, and preserve the groundwater resource. The benefits of district oversight regarding spacing and production requirements help prevent local well interference and overdrafting of the groundwater resource.

Section 36.117 allows exemptions for rig-supply wells (wells supplying water for drilling or exploration activities) used for activities under the jurisdiction of the Railroad Commission of Texas (RCT). Rig-supply wells are generally used to extract water for a short time, usually continuously for the duration of the activity. The impact on groundwater resources of these short-term withdrawals is less significant than that of long-term pumping operations. Long-term pumping, such as conversion to use for the landowner or commercial supply, can pose significant impacts to area groundwater resources. The Committee is concerned that long-term pumping operations, if allowed an exemption, can hinder the district’s ability to manage the groundwater resource. The Committee recommends that §36.117 be amended and clarified to make the exemption valid only for short-term water-supply wells, which must be properly plugged and abandoned when drilling activities are completed. The Committee suggests that if a well is constructed with the intent to retain it as a water-supply well following the RCT-permitted

activity, the well should be permitted by the district prior to drilling and should not be allowed an exemption.

In addition, the language in §36.117 needs clarification in regard to the location of rig-supply wells that are allowed an exemption from district permitting. This ambiguity has allowed for the exemption of wells that are drilled by commercial enterprises for the purpose of selling water for the support of mineral extraction, regardless of where the wells may be located. To allow the district to manage the groundwater resource, it is suggested that §36.117 be amended to make the exemption valid only for rig-supply wells supporting mineral exploration or production development occurring on the same property.

Providing Regional Wastewater Authority to Groundwater Conservation Districts

Issue:

Regional wastewater treatment needs are not adequately addressed in areas where a municipality or other provider is not willing, available, or able to provide services.

Recommendation:

The Committee recommends that groundwater conservation districts be given the authority to establish and operate regional wastewater treatment facilities on a local option basis.

Background:

Numerous entities are given the authority to establish and operate wastewater treatment facilities. Among these are water control and improvement districts, municipal utility districts, river authorities, and municipalities. Many of these entities are given the authority to establish and operate wastewater treatment facilities, but are not required to do so. Conversely, entities such as counties and groundwater conservation districts do not have the authority to establish and operate wastewater treatment facilities.

Potential wastewater problems may arise when no entity chooses to address wastewater treatment needs in rural areas, specifically in areas that are determined to be primed for development. The Committee suggests that groundwater districts be given a greater role and an increased capacity to address local groundwater problems in these areas and situations. An identified solution is to allow groundwater districts the authority to establish and operate local, subregional, or regional wastewater treatment facilities. Regional wastewater treatment plants can greatly improve both treatment and disposal of wastewater, and provide services at a lower cost through economies of scale.

Groundwater conservation districts are created by the local citizens to protect, conserve, and preserve groundwater resources. Groundwater districts have a direct interest in monitoring and protecting the quality of the groundwater supply. Wastewater treatment and disposal can have a dramatic impact on groundwater supplies. The failure or improper operation of collection lines, septic tanks, or treatment facilities can release pollutants directly into groundwater supplies. Groundwater districts also have a direct interest in groundwater quantity and use, and generally make all necessary efforts to conserve and preserve groundwater supplies. Some of these efforts may be directed at identifying other potential water supply sources, such as reuse of wastewater, to lessen the dependence on groundwater.

Providing groundwater districts with the authority to implement, own, operate, and construct wastewater treatment facilities provides an additional opportunity to protect groundwater supplies from potential pollution associated with failing septic systems. In some circumstances it could allow the district to acquire an additional source of water, defer some groundwater usage through reuse, or allow industry, which may be able to use a lower quality of water, to utilize treated wastewater provided by the district. It would allow wastewater treatment facilities to go into places where a municipality or other provider is not willing, available, or is not able to provide the wastewater treatment services needed. This authority should not be a required role of the districts, but could be implemented by individual districts on a local-option basis.

Critical Area Process Simplification

Issue:

Chapter 35 of the Texas Water Code requires two sets of resource-intensive studies and evidentiary hearings to be conducted in order to create a groundwater conservation district in a critical area. This requirement is not only expensive and redundant, but interferes with the overall intent: to create groundwater conservation districts in areas where critical groundwater problems exist.

Recommendation:

The Committee recommends that the Legislature amend Chapter 35 of the Texas Water Code to simplify and improve the district creation process within designated critical areas.

Background:

Section 35.007 provides the procedures for identifying and delineating critical areas through the preparation of the Texas Water Development Board's critical area study and the Texas Natural Resource Conservation Commission's executive director's report. The executive director's report includes a delineation of the recommended boundary of the area, the rationale for or against designation of the area, and a recommendation regarding whether a district should be created in the area or whether the area should be added to an existing district. Section 35.008 stipulates that

the Texas Natural Resource Conservation Commission (TNRCC) use the procedures applicable to agency rule-making to designate critical areas.

Immediately following the area's designation, §35.010 allows for the TNRCC to call for evidentiary hearings to consider whether a district should be created over all or part of the critical area or whether all or part of the critical area should be added to an existing district. Under §35.012, if the TNRCC finds the creation of districts, or the addition of area to existing districts, is justifiable, it issues an order stating that the districts are needed. Following the TNRCC's order, landowners within the critical area are given one year after the close of the next regular session of the Legislature to create one or more districts under Chapter 36 of the Texas Water Code, have the area annexed to an adjoining district, or create one or more districts through the legislative process. After this time frame, the TNRCC is allowed to identify the areas subject to the order that have not been incorporated into a district and initiate district creation proceedings in these areas under Chapter 36 of the Texas Water Code. This leads to an essentially identical set of evidentiary hearings under the provisions of Chapter 36. The first of the dual set of hearings can cause polarization among the citizens in a critical area, potentially thwarting the creation of a district. Education, rather than an evidentiary hearing, is needed during the initial phases of this program.

The Committee suggests that the critical area district creation process could be easily simplified through amendment of §§35.010 and 35.012. The Committee suggests §§35.012 (c) and (d) be moved to the beginning of §35.010 and the language amended to reflect the date of critical area designation instead of the TNRCC order. The executive director's report and the actual designation of the critical area (under §§35.007 and 35.008) require sufficient evidence that districts are needed within the area. Further evidence for the actual creation of the district would thence be required through the provisions of Chapter 36, as amended through the proposed move of §35.012 (d). Also, the Committee suggests the language of §35.012 (b) be further amended to provide for the creation of the district.

Critical Area Program Funding

Issue: There is insufficient funding to implement and administer the Critical Area Program.

Recommendation:

The Committee recommends that the Legislature provide sufficient appropriations to the Texas Natural Resource Conservation Commission and the Texas Water Development Board to implement and administer the Critical Area Program as authorized and required under Chapter 35 of the Texas Water Code.

Background:

The 69th Legislature, 1985, recognized that certain areas of the state are experiencing, and will experience in the future, critical groundwater problems. The Legislature established the critical area program, authorizing the state's water agencies to study, identify, and delineate critical areas and to facilitate the creation of locally controlled groundwater conservation districts within these areas. Groundwater districts are charged with planning responsibilities and could contribute to drought response planning. These critical areas were defined as being likely to experience critical groundwater problems, which include water shortages, subsidence, groundwater contamination (including saltwater intrusion), and waste of groundwater supplies. It was the intent of the 69th Legislature to establish a procedure through which the state's water agencies could monitor and study, on a continuing basis, groundwater conditions within these critical areas and aid local citizens in addressing groundwater problems that will arise within the next 20 years.

The state agencies' roles in delineating and designating critical areas are to educate local citizens, encourage them to address critical groundwater issues, and encourage the local creation of groundwater conservation districts. If local initiatives fail to approve the creation of groundwater conservation districts within designated critical areas, Chapter 35 allows the Texas Natural Resource Conservation Commission (TNRCC) to initiate the creation of districts within these areas. In the event of the TNRCC-initiated creation of a district, the local population, through a district confirmation election, is assured the right of managing groundwater resources locally.

In the past, the critical area program has served as a driving force for public awareness in addressing groundwater problems and focusing attention on areas of the state where groundwater resources were most threatened. Sixteen critical area studies were initiated and 15 studies were completed from 1987 through 1991. Four of the study areas were designated as critical areas by the TNRCC, and a fifth proposed designation was placed under advisement. Seven of the remaining 10 study areas were not designated as critical areas, but the Texas Water Development Board (TWDB) and the TNRCC were to continue to monitor groundwater levels and local groundwater management initiatives over the following five years to determine whether groundwater problems were being mitigated.

Through local initiatives since 1987, four new districts have been created by the Legislature (and confirmed through election) in three of the designated critical areas; a fifth district, created through the provisions of Chapter 36 of the Texas Water Code, failed confirmation. Landowners within the majority of the fourth designated critical area have petitioned for and achieved annexation to existing districts. In the seven other study areas, four groundwater conservation districts (two confirmed through election) have been created, and annexations of three areas to existing districts have also taken place.

During the past six years, the critical area process has been placed "on hold." Funding has not been appropriated to support the implementation of the critical area program. Insufficient funding

and resources have prevented the TWDB and TNRCC from administering and implementing the program other than holding an annual meeting. Sufficient funds are required to allow the agencies to:

- ▶ complete the sixteenth critical area study;
- ▶ perform district creation proceedings in the designated critical areas;
- ▶ perform follow-up monitoring in eight previously identified study areas; and,
- ▶ identify and initiate, on a continuing basis, new critical area studies.

The TNRCC estimates that approximately \$75,000 is needed annually to implement and administer the critical area program as envisioned by the 69th Legislature. The TWDB estimates that approximately \$50,000 is needed to conduct a single critical area study. Although critical areas are designated at a local or regional scale, the full program is structured to assess groundwater conditions, on a continuing basis, statewide. The actual designation of local or regional critical areas, the areas where groundwater problems are determined through scientific evaluation to be most severe, is the end product of the process. Designation is the culmination of extensive groundwater research utilizing the expertise of the TWDB and TNRCC. This research considers the entire extent of the state for potential critical area studies.

As the TWDB's census data indicate, the state's population continues to increase at an exponential rate. The demands placed on the state's groundwater resources also continue to increase at an exponential rate. The current drought has emphasized the need for the state to address these critical groundwater issues: water levels are falling, wells are going dry across the state, and poorer-quality water is encroaching into freshwater aquifers. In May 1996, the Texas Agricultural Extension Service reported the statewide economic impact of the drought for Texas agriculture could be more than \$6.5 billion. In September 1996, the TNRCC reported 273 public water supply systems, reliant on 907 public water supply wells, were limiting water use to avoid shortages. The critical area program could facilitate regional drought response planning and strengthen regional and local action.

Mandatory Continuing Education for Drillers and Pump Installers

Issue:

There is a need to amend Chapters 32 and 33 of the Texas Water Code to establish mandatory continuing education requirements that water well drillers and pump installers must satisfy prior to the renewal of their licenses.

Recommendation:

The Committee recommends the Legislature establish mandatory training course requirements before individuals may obtain or renew a license as a water well driller or pump installer.

Background:

The need for continuing education to ensure that wells are constructed and pumps are installed in accordance with the statute and the agency rules is readily apparent. Drillers and pump installers must receive updated training on the latest technology and the importance of public health issues involved in their profession. Through amendment of Section 32 and 33 of the Texas Water Code, continuing education can be made a requirement for the licensing of water well drillers and pump installers. A basic course on water well drilling and pump installation is recommended prior to individuals obtaining a license and additional mandatory training is recommended for individuals to renew their licenses. Training course topics could be determined in conjunction with the Texas Water Well Drillers Advisory Council.

The Texas Natural Resource Conservation Commission (TNRCC) administers the program for the licensing of water well drillers and pump installers. Many of the TNRCC programs related to drinking water have rules that are based on the primary responsibility of providing safe drinking water to the citizens of Texas. Coordination with these other programs is an important consideration of the water well driller and pump installers to remain up to date on the groundwater quality requirements. Disinfection procedures of well and pumps are an important function of providing safe drinking water. These procedures must be a topic for continuing education that is serve as a reminder to each licensee on an annual basis.

This training would include information on the location and proper procedures for plugging of abandoned or deteriorated wells. Abandoned wells that have not been plugged are a major source of pollution and degradation of the state's groundwaters and present many public health problems of major significance. The opportunity to provide training on a continuing basis to water well drillers and pump installers would have a positive impact on the solution to the problem of abandoned water wells.

Continuing education would result in a reduction of the number of enforcement cases for violation of the statutes and rules pertaining to water well drillers and pump installers. All licensees would receive updates, interpretations, and clarifications of the regulations on a regular basis. Continuing education would ensure more knowledgeable drillers and installers, with the benefit going to individuals in this profession and the citizens of Texas.

INTRODUCTION

Groundwater is a vitally important resource in Texas. It is a major source of the water used by Texans for domestic, municipal, industrial, and agricultural purposes. In 1992, Texans used about 13.5 million acre-feet of water, of which 7.6 million acre-feet, or 56 percent, was derived from groundwater sources. About 75 percent of the groundwater used is for irrigation, with the remainder being utilized for municipal supplies, rural and domestic consumption, rural livestock, electric utility, and industry. About 41 percent of municipal water is obtained from groundwater sources.

The major and minor aquifers within the state furnish this vast groundwater resource. These aquifers underlie approximately 76 percent of the state's surface area of 266,807 square miles. Major aquifers are defined as producing large quantities of water in a comparatively large area of the state, whereas minor aquifers produce significant quantities of water within smaller geographic areas or small quantities in large geographic areas. Minor aquifers are very important, as they may constitute the only significant source of water supply in some regions of the state. The major and minor aquifers are composed of many rock types, including limestones, dolomites, sandstones, gypsum, alluvial gravels, and in some parts of the state, igneous rocks. Nine major aquifers and 20 minor aquifers have been delineated within the state. Figures 1 and 2 illustrate the geographic distribution of the state's major and minor aquifers. Other undifferentiated, local aquifers may represent the only source of groundwater where major or minor aquifers are absent. These local aquifers, which provide groundwater that is utilized for all purposes, vary in extent from being very small to encompassing several hundred square miles.

In March 1985, the Texas Department of Water Resources, predecessor to the Texas Natural Resource Conservation Commission and the Texas Water Development Board, received a grant from the U.S. Environmental Protection Agency (EPA) to improve coordination of groundwater protection activities undertaken by state agencies. In response to this federal mandate, the interagency Groundwater Protection Committee was established.

Creation and Mandate

The Texas Groundwater Protection Committee was created by the 71st Texas Legislature in 1989. The Committee was created to bridge the gap between existing state groundwater programs and to optimize water quality protection by improving coordination among agencies involved in groundwater activities. House Bill 1458 (codified as §§26.401 through 26.407 of the Texas Water Code) established the Committee and outlined the powers, duties, and responsibilities of the Committee. The Committee effectively replaced, and continued with the efforts of, the predecessor Groundwater Protection Committee.

The state's groundwater protection policy was also adopted by the Legislature as part of the bill that created the Committee. The policy sets out nondegradation of the state's groundwater resources as the goal for all state programs. The policy recognizes the variability of the state's

Figure 1. Major Aquifers of Texas - insert

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Figure 2. Minor Aquifers of Texas - insert

intentionally blank - back of Minor Aquifers of Texas

aquifers in their potential for beneficial use and susceptibility to contamination; the importance of protecting and maintaining present and potentially usable groundwater supplies; the need for keeping present and potential groundwater supplies reasonably free of contaminants for the protection of the environment and public health and welfare; and the importance of existing and potential uses of groundwater supplies to the economic health of the state. The policy states that discharges of pollutants, disposal of wastes, and other regulated activities be conducted in a manner that will maintain present uses and not impair potential uses of groundwater or pose a public health hazard. The use of the best professional judgment by the responsible state agencies in attaining the goal and policy is also recognized.

The Committee actively seeks to implement this policy by identifying opportunities to improve existing groundwater quality programs and promote coordination between agencies. The Committee also strives to improve or identify areas where new or existing programs could be enhanced to provide additional protection. The major responsibilities of the Committee are listed in Table 1.

Table 1. Major Responsibilities of the Committee

<i>Improve coordination between state and federal agencies in the area of groundwater protection</i>
<i>Develop, implement, and update a comprehensive groundwater protection strategy for the state</i>
<i>Study and recommend to the Legislature new groundwater protection programs, and file with the governor, lieutenant governor, and speaker of the house of representatives a biennial report of the Committee's activities</i>
<i>Publish an annual monitoring and contamination report describing the current status of groundwater monitoring programs of each member agency and groundwater contamination cases documented or under enforcement during the calendar year</i>
<i>Advise the Texas Natural Resource Conservation Commission on the development of state management plans for the prevention of groundwater contamination from pesticides</i>

Committee Membership

The Texas Water Code, §26.403, identifies the individuals listed in Table 2, or their designated representative, for Committee membership. The Texas Natural Resource Conservation Commission is designated as the lead agency, with the Commission's executive director designated as the Committee's chairman. The executive administrator of the Texas Water Development Board is designated as the Committee's vice chairman.

Table 2. Committee Membership

<i>Executive Director of the Texas Natural Resource Conservation Commission</i>
<i>Executive Administrator of the Texas Water Development Board</i>
<i>Representative selected by the Railroad Commission of Texas</i>
<i>Commissioner of Health of the Texas Department of Health</i>
<i>Deputy Commissioner of the Department of Agriculture</i>
<i>Executive Director of the Texas State Soil and Water Conservation Board</i>
<i>Representative selected by the Texas Alliance of Groundwater Districts</i>
<i>Director of The Texas Agricultural Experiment Station</i>
<i>Director of the Bureau of Economic Geology of the University of Texas at Austin</i>

The regulatory protection of groundwater is primarily the responsibility of the Texas Natural Resource Conservation Commission. Certain activities requiring the regulatory protection of groundwater are under the jurisdiction of the Railroad Commission of Texas, the Texas Department of Agriculture, and the Texas State Soil and Water Conservation Board. The Texas Water Development Board has certain monitoring authorities in regard to groundwater but does not possess the statutory authority to regulate activities that may contaminate groundwater. The Texas Alliance of Groundwater Districts, as an organization, has no regulatory or enforcement authority, but individual groundwater districts may have limited authorities for action with regard to groundwater contamination. The Texas Agricultural Experiment Station and the Bureau of Economic Geology conduct research activities related to groundwater. A brief description of groundwater-related responsibilities, protection programs, and research conducted by the agencies represented on the Committee follows.

Texas Natural Resource Conservation Commission

The Texas Natural Resource Conservation Commission (TNRCC) conducts various groundwater protection programs that focus on both prevention of contamination and remediation of existing problems through education, permitting, and enforcement. As the state lead agency for water resources, the TNRCC administers both state and federally mandated programs, including the Resource Conservation and Recovery Act; the Comprehensive Environmental Response, Compensation, and Liability Act; the Clean Water Act; the Safe Drinking Water Act; and the development of state management plans for groundwater under the Federal Insecticide, Fungicide, and Rodenticide Act.

The TNRCC's Office of Waste Management and Pollution Cleanup contains the following groundwater-related programs. The Petroleum Storage Tank Division regulates underground and aboveground product storage tanks and requires groundwater monitoring and remediation at contaminated sites. The Industrial and Hazardous Waste Division has responsibility for preventing groundwater contamination and ensuring remediation at industrial sites through the waste disposal facility permitting program, the Class I and Class III underground injection control programs, and uranium and radioactive waste disposal programs. The Municipal Solid Waste Division monitors activities associated with the collection, handling, storage, processing, and disposal of municipal solid waste to ensure protection of groundwater and requires remediation where these activities have failed. The Pollution Cleanup Division is responsible for both federal and state Superfund activities, the Voluntary Cleanup Program, and spill response. The division conducts remedial investigations and seeks funding for remedial activities based upon a health risk ranking program.

The TNRCC's Office of Water Resource Management contains the following groundwater-related programs. The Water Planning and Assessment Division is responsible for the surface and groundwater quality management and planning programs, the development and implementation of water quality standards, the implementation of the surface and groundwater nonpoint source pollution programs, the Class V underground injection well program, the pesticides in groundwater program, and supporting the Texas Groundwater Protection Committee. The Agricultural and Watershed Management Division is responsible for ensuring that groundwater resources are protected through permitting activities related to concentrated animal feeding operations and municipal and industrial wastewater treatment. The Water Utilities Division monitors public water systems for compliance with state drinking water standards and conducts the Wellhead Protection Program.

Within the TNRCC's Office of Compliance and Enforcement, the Field Operations Division is responsible for the field investigation of contamination complaints and the inspection of permitted and nonpermitted facilities. In addition, primary responsibility for the Edwards aquifer pollution abatement plan review program and the on-site wastewater program are in this division. The Compliance Support Division is responsible for the water well drilling program in which all monitor wells, water wells, and Class V injection wells are subject to the TNRCC's rules regarding driller licensing, reporting, and well construction criteria. The Enforcement Division is responsible for ensuring that groundwater resources are protected during enforcement activities related to the municipal solid waste, industrial and hazardous waste, petroleum storage tank, agricultural and watershed management, water utilities, and public water supply programs.

Railroad Commission of Texas

The Surface Mining and Reclamation Division of the Railroad Commission of Texas (RCT) is authorized to enforce laws and regulations consistent with the Texas Surface Coal Mining and Reclamation Act and the Texas Uranium Surface Mining and Reclamation Act. Groundwater information is required in the regulations, as are monitoring plans for pre-mining and post-mining conditions. Groundwater investigations and monitoring by the Surface Mining and Reclamation

Division is conducted in response to citizen complaints of adverse impact from surface mining activities.

The RCT's Oil and Gas Division is responsible for protecting groundwater from activities related to the drilling, exploration, and production of oil, gas, and geothermal resources, the underground storage of hydrocarbons, and the solution mining of brine. The regulations of the Oil and Gas Division for the well drilling, completion, and plugging focus on the protection of groundwater resources. The RCT administers the EPA-delegated Underground Injection Control Program under the Safe Drinking Water Act for Class II injection wells associated with oil and gas activities. The RCT regulates the handling, storage, treatment, and disposal of oil and gas wastes. The RCT responds to spills from pipelines under its jurisdiction and to other emergencies related to the production and transportation of oil and gas. The RCT responds to citizen complaints regarding alleged groundwater contamination from oil and gas activities and to allegations of unauthorized activities that may endanger groundwater.

Texas Department of Agriculture

The Texas Department of Agriculture has lead authority for pesticide regulation in the state of Texas. Recognizing pesticides as potential groundwater contaminants, and having primary responsibility to prevent unreasonable risk to humans or the environment from the use of pesticides, the TDA performs studies and analyses aimed at assessing health, ecological, and environmental effects of various pesticides. This analysis is performed by the agency's Pesticide Impact Evaluation activity in order to ensure compliance with federal laws and regulations relating to the use of pesticides and eventual protection of groundwater resources. The TDA accomplishes this by independently substantiating and validating claims of pesticide contamination relating to human health and the environment.

Texas Department of Health

The Texas Department of Health's Bureau of Radiation Control (BRC) regulates radioactive materials in Texas under the authority of the Atomic Energy Act of 1954 as amended. The BRC monitors groundwater for radionuclides on a routine basis at two facilities in Texas—Pantex, and the University of Texas System interim storage site. Intermittently the BRC will sample groundwater as a result of an incident, complaint, or situation that leads the BRC to believe there may be groundwater contamination.

Texas State Soil and Water Conservation Board

The Texas State Soil and Water Conservation Board, under Title 7 Chapters 201 and 203 of the Agriculture Code of Texas, is charged with the overall responsibility for administering and coordinating the state's soil and water conservation program with the state's soil and water conservation districts. Section 201.016 gives the agency responsibility for planning, implementing, and managing programs and practices for abating agricultural and silvicultural nonpoint source

pollution. Currently, the agricultural/silvicultural nonpoint source management program includes problem assessment, management program development and implementation, monitoring, education, and coordination.

Texas Water Development Board

The Texas Water Development Board (TWDB) collects data on the state's aquifers, including the occurrence, availability, quality, and quantity of groundwater and the current and projected demands on groundwater resources. This is done through the statewide groundwater level measurement program, groundwater quality sampling program, and groundwater studies.

The purpose of the groundwater quality sampling program is to monitor changes, if any, in the quality of groundwater over time and to establish as accurately as possible the baseline quality of groundwater occurring naturally in the state's aquifers. The groundwater quality monitoring program is accomplished in accordance with procedures established in the TWDB's *Field Manual for Ground-Water Sampling*, in supplemental samples analyzed on Hach instruments, and by obtaining data collected by other entities such as groundwater conservation districts and other state and federal agencies.

Texas Alliance of Groundwater Districts

The Alliance is the umbrella organization composed of groundwater conservation districts within the state (Figure 3). Its membership is restricted to groundwater conservation districts, which have the powers and duties to manage groundwater as defined in Chapter 36 of the Texas Water Code. The districts were created by the Legislature or by the Texas Natural Resource Conservation Commission with the purpose and responsibility of preserving and protecting groundwater. The districts are local or regional in their jurisdiction and have, for the most part, elected boards of directors. Among their legislatively granted authorities is the power to monitor groundwater quality. A number of districts also have the authority to bring civil court proceedings for injunctive relief against an entity causing groundwater contamination.

Texas Agricultural Experiment Station

The Texas Agricultural Experiment Station (TAES) is the official agricultural research agency in Texas. Headquartered at Texas A&M University, the TAES promotes food and fiber production that emphasizes water conservation and the protection of natural resources. Broad goals of the TAES groundwater research program are to protect, preserve, and efficiently use water resources, and to develop sustainable agricultural production systems. Groundwater programs of the TAES stress the development of management strategies, technologies, and educational programs to support sustainable agriculture. TAES groundwater quality research focuses on reductions in chemical use; the control, fate, and transport of agricultural chemicals; and the remediation of contaminated groundwaters.

Figure 3. Groundwater Conservation Districts - insert

Groundwater Conservation Districts - Map Explanation

- 1 **High Plains Underground Water Conservation District No. 1 (1951)**
- 2 **Dallam County Underground Water Conservation District No. 1 (1953)**
- 3 **North Plains Ground Water Conservation District No. 2 (1954)**
- 4 **Panhandle Ground Water Conservation District No. 3 (1955)**
- 5 Hudspeth County Underground Water Conservation District No. 1 (1957)
- 6 **Plateau Underground Water Conservation and Supply District (1955)**
- 7 **Evergreen Underground Water Conservation District (1965)**
- 8 **Harris-Galveston Coastal Subsidence District (1975)**
- 9 **Glasscock County Underground Water Conservation District (1981)**
- 10 **Hickory Underground Water Conservation District No. 1 (1982)**
- 11 **Irion County Water Conservation District (1985)**
- 12 **Permian Basin Underground Water Conservation District (1985)**
- 13 **Coke County Underground Water Conservation District (1986)**
- 14 **Sutton County Underground Water Conservation District (1986)**
- 15 Fox Crossing Water District (1986)
- 16 Collingsworth County Underground Water Conservation District (1987)
- 17 **Barton Springs/Edwards Aquifer Conservation District (1987)**
- 18 **Hill Country Underground Water Conservation District (1987)**
- 19 Anderson County Underground Water Conservation District (1987)
- 20 **Sterling County Underground Water Conservation District (1987)**
- 21 **Lipan-Kickapoo Water Conservation District (1987)**
- 22 Real-Edwards Conservation and Reclamation District (1959)
- 23 **Fort Bend Subsidence District (1989)**
- 24 **Mesa Underground Water Conservation District (1989)**
- 25 **Sandy Land Underground Water Conservation District (1989)**
- 26 **Santa Rita Underground Water Conservation District (1989)**
- 27 Saratoga Underground Water Conservation District (1989)
- 28 **Springhills Water Management District (1989)**
- 29 **Live Oak Underground Water Conservation District (1989)**
- 30 Salt Fork Underground Water Conservation District (1989)
- 31 **Emerald Underground Water Conservation District (1989)**
- 32 **Medina Underground Water Conservation District (1991)**
- 33 Headwaters Underground Water Conservation District (1991)
- 34 **South Plains Underground Water Conservation District (1992)**
- 35 Plum Creek Conservation District (1993)
- 36 **Uvalde County Underground Water Conservation District (1993)**
- 37 **Jeff Davis County Underground Water Conservation District (1993)**
- 38 Gonzales County Underground Water Conservation District (1994)
- 39 Edwards Aquifer Authority (1996)
- 40 Garza County Underground and Fresh Water Conservation District (1996)

Note: Districts listed in **bold type** are members of the Texas Alliance of Groundwater Districts. Districts are numbered in the order in which they were established. Number in parentheses indicates the year of establishment.

Bureau of Economic Geology

The Bureau of Economic Geology is a research entity of the University of Texas at Austin and functions as the state geological survey. Extensive advisory, technical, and informational services relating to the geology and groundwater resources of Texas are provided by the Bureau. In addition, the Bureau conducts basic and applied research projects in energy and mineral resources and in hydrogeology, groundwater resources, and geochemistry. Some projects are conducted jointly with other units of the University of Texas as well as with state, federal, and local agencies, industry associates, and foreign companies.

Federal Involvement and Coordination

In March 1985, the Texas Department of Water Resources, predecessor to the Texas Natural Resource Conservation Commission and the Texas Water Development Board, received a grant from the U.S. Environmental Protection Agency (EPA) to improve coordination of groundwater protection activities undertaken by state agencies. In response to this federal mandate, the interagency Groundwater Protection Committee, predecessor to the Texas Groundwater Protection Committee, was formed. Since that time, the coordination of groundwater protection activities of the various state programs and agencies, and the development of a groundwater protection strategy have been mandated and funded through EPA grants administered under Section 106 of the Clean Water Act.

The Committee maintains an active relationship in providing coordination with federal agencies on several issues that affect the state. Two issues for which the Committee has taken an active leadership role with federal agencies are the development of a comprehensive state groundwater protection program and the development of state management plans for the prevention of groundwater contamination from pesticides. In addition, the Committee has regularly provided input on a national level by participating in the national Ground-Water Protection Council (mainly concerned with wellhead protection and underground injection control issues), the State FIFRA Issues Research Evaluation Group (dealing with pesticide related issues and state management plans), and other state and federal stakeholder and regulatory guidance groups.

COMMITTEE ACTIVITIES 1995–1996

Meetings and Presentations

In accordance with §26.404 of the Texas Water Code, the Committee is subject to the Administrative Procedures and Texas Register Act, the open meetings law, and the open records law. In addition to the public notification of meetings in the *Texas Register*, a notice of meeting, including the proposed meeting agenda, is provided to all individuals which maintain a current address on the Committee's mailing list.

As required by §26.404, the Committee met quarterly during the 1995–1996 biennium for a total of eight meetings. Regularly scheduled items on the Committee's agenda include subcommittee reports, presentations and roundtable discussions, business, information exchange, announcements, and public comment.

During the biennium, the Committee heard numerous presentations discussing new or improved groundwater related activities and initiatives from various agencies and groups. The presentations serve to broaden interagency awareness and coordination. Presentations to the Committee during the 1995–1996 biennium included the following:

- ▶ the Bureau of Economic Geology discussed findings from a one-year study on the regional distribution of permeability in the Edwards aquifer;
- ▶ the U.S. Geological Survey discussed activities being conducted within the Edwards aquifer including freshwater zone/saline water zone research, the evaluation of best management practices in Seco Creek, and the collection of streamwater data for recharge and discharge determinations;
- ▶ the Railroad Commission of Texas gave a presentation discussing activities associated with the oil field cleanup program;
- ▶ the Texas Rural Water Association discussed its role in the promotion of groundwater protection programs, particularly wellhead protection, to rural portions of the state;
- ▶ the Texas Agricultural Experiment Station discussed the TEX-A-SYST Program, a cost-effective, voluntary partnership with rural residents with the overall objective of assisting residents in protecting the quality of drinking water supplies;
- ▶ the Texas Water Development Board discussed the consensus efforts between the Board, the Texas Natural Resource Conservation Commission, and the Texas Parks and Wildlife Department to provide a clearer perspective of the state's long-term water needs through the development of the Texas Water Plan;

- ▶ the Texas Natural Resource Conservation Commission gave a presentation outlining the new Voluntary Cleanup Program, a program to provide a streamlined, incentive-based process for participants to pursue cleanup of contaminated properties as authorized by House Bill 2296 of the 74th Legislature;
- ▶ the Texas Water Development Board, Bureau of Economic Geology, and Texas Natural Resource Conservation Commission discussed various groundwater studies and projects being conducted along the Rio Grande.

Subcommittees and Work Groups

Subcommittees and work groups are created at the call of the chairman, and upon approval of the Committee, to address specific groundwater-related issues or areas of program development. The various subcommittees serve to keep the Committee up to date on current issues and on the status of ongoing projects. The subcommittees report to the Committee at its regularly scheduled meetings. At its meetings, the Committee considers the findings and recommendations of the subcommittees, and after holding discussion, takes action as it finds appropriate for each issue. The public is encouraged to fully participate in the subcommittee process. The Committee used the subcommittees and task forces listed in Table 3 during the 1995–1996 biennium.

Table 3. Active Subcommittees, 1995–1996 Biennium

<p><i>Agricultural Chemicals Subcommittee, consisting of:</i> <i>State Management Plan Task Force</i> <i>Education Task Force</i> <i>Site Selection Task Force</i> <i>Data Evaluation and Interpretation Task Force</i> <i>Best Management Practices Task Force</i></p>
<p><i>Data Management Subcommittee</i></p>
<p><i>Ground-Water Nonpoint Source Subcommittee</i></p>
<p><i>Joint Groundwater Monitoring and Contamination Report Subcommittee</i></p>
<p><i>Legislative Report Subcommittee</i></p>
<p><i>Abandoned Well–Closure Task Force</i></p>

Agricultural Chemicals Subcommittee

The Agricultural Chemicals Subcommittee was created in November 1989 specifically to coordinate the development of the generic state management plan (SMP) for pesticides in groundwater. The subcommittee meets quarterly and is composed of representatives from each agency serving on the full Committee, the Texas Agricultural Extension Service, and the Structural Pest Control Board. A technical advisory group of interested parties such as federal agencies, other state agencies, producer groups, environmental groups, and the agricultural chemistry industry have served the subcommittee to provide expertise and perspective during the development of the generic SMP.

On June 26, 1996, the EPA published proposed rules in the *Federal Register* on pesticides and groundwater state management plan regulation. This long-anticipated set of rules will restrict the use of certain pesticides that have been identified as probable or possible human carcinogens and have the ability to leach to groundwater. Alachlor, atrazine, cyanazine, metolachlor, and simazine are the first five pesticides to be identified under this proposed rule. The proposed federal rule is expected to be issued in a final form after the four-month public comment period. Under the proposal, the state will have two years to develop and submit management plans, and the EPA would then have six months to approve or reject the state's proposed management plans. Upon approval, the state would have to implement the proposed management plans.

The Texas Natural Resource Conservation Commission is tasked, with the advice of the Committee, to develop management plans for agricultural chemicals (e.g., pesticides) that threaten groundwater. Specifically, these plans are for the protection and enhancement of water quality pursuant to federal statute, regulation, or policy, including management plans for the prevention of water pollution by agricultural chemicals and agents. Section 26.407 of the Texas Water Code was added in 1989 and was specifically intended to address the plans required by the EPA under its proposed rule.

The Agricultural Chemicals Subcommittee has designated five work groups: the State Management Plan Task Force, the Educational Task Force, the Site Selection Task Force, the Data Evaluation and Interpretation Task Force, and the Best Management Practices Task Force.

- ▶ The State Management Plan Task Force is responsible for writing and revising generic and pesticide-specific state management plans. The initial generic SMP, *Texas State Management Plan for Agricultural Chemicals in Ground Water* (TGPC, 1991), was developed by the subcommittee and approved by the EPA in June 1991. The revised generic SMP, *Texas State Management Plan for Prevention of Pesticide Contamination of Ground Water* (TGPC, 1996d), culminated a three-year revision effort of the subcommittee and was forwarded to the EPA for approval on March 25, 1996. The generic SMP describes the general policies and regulatory approaches the state will use in order to protect groundwater resources from risk of contamination by pesticides. The

subcommittee is also responsible for the coordination of the future development of pesticide-specific SMPs.

- ▶ The Education Task Force is responsible for developing SMP-related educational information and materials and coordinating educational outreach through public presentations, displays, applicator certification curriculum development, and brochures. The Education Task Force has created an informational brochure (TGPC, 1995b), for distribution through the subcommittee members, and a set of slides and an outlined presentation to familiarize special interest groups and the general public with the generic SMP.
- ▶ The Site Selection Task Force is responsible for identifying and delineating vulnerable geographic areas for conducting pesticide-specific groundwater monitoring. The Site Selection Task Force must also plan groundwater monitoring strategies, and, if contamination is discovered, determine sampling strategies for determining the extent of contamination.
- ▶ The Data Evaluation and Interpretation Task Force will, if monitoring reveals contamination, evaluate the quality of the data and interpret the available information through the use of best professional judgment. The task force will also coordinate the state's response, under the SMP, to groundwater contamination.
- ▶ The Best Management Practices Task Force is responsible for developing the preventive component of the generic SMP and identifying pesticide-specific and area-specific best management practices that can be used to prevent or curtail pesticide contamination of groundwater.

Data Management Subcommittee

The Data Management Subcommittee, formed in 1992, is charged with improving the sharing of data between various levels of government, the academic community, and the private sector. The subcommittee's initial goal was to develop ways of linking and sharing groundwater data and to develop standards or templates to facilitate the sharing of information. Representatives of 10 state, federal, and local agencies, and the private sector spent over two years developing the *Texas Ground-Water Data Dictionary* (TGPC, 1996b). The data dictionary provides groundwater professionals in Texas with specific guidelines to implement recent state and federal requirements and describes a standardized framework for collecting and storing information on groundwater in the state.

Upon completion of its efforts concerning the data dictionary, the Committee formally tasked the Data Management Subcommittee with a new charge. In December 1995, the subcommittee was charged to design and facilitate a formal committee process for the coordination/integration of groundwater data collection and the assessment of the groundwater quality of the state's aquifers

as an integral part of the state's comprehensive groundwater protection program. The subcommittee was further tasked to provide recommendations for the continuing improvement of groundwater data collection and assessment for the state's groundwater protection programs.

Ground-Water Nonpoint Source Subcommittee

The Ground-Water Nonpoint Source Subcommittee was revived by the Committee in February 1995. The purpose of the subcommittee is to further formalize the groundwater nonpoint source (NPS) program in Texas and to provide support and guidance for the groundwater NPS management policy of the state. The subcommittee coordinates and provides input for the annual NPS effectiveness report to the EPA; coordinates, updates, and guides the state NPS assessment of groundwater conditions and NPS management strategy for groundwater resources; and facilitates the review and submission of NPS project proposals for the annual EPA Clean Water Act, Section 319 (h) funding cycle. The subcommittee is co-chaired by the Texas State Soil and Water Conservation Board and the Texas Natural Resource Conservation Commission.

Joint Groundwater Monitoring and Contamination Report Subcommittee

This informal subcommittee is utilized to prepare the Committee's annual groundwater monitoring and contamination report. Representatives of each member agency annually provide information and data to the Texas Natural Resource Conservation Commission for inclusion in the reports. The TNRCC compiles and reviews the content and initiates publication efforts. Two reports were published during the biennium: *Joint Groundwater Monitoring and Contamination Report—1994* (TGPC, 1995a) and *Joint Groundwater Monitoring and Contamination Report—1995* (TGPC, 1996a).

Legislative Report Subcommittee

The Committee established the Legislative Report Subcommittee in May 1996. The subcommittee was charged to facilitate the Committee's efforts in publishing the biennial legislative report required by §26.405 of the Texas Water Code. The subcommittee was specifically charged to review the draft report's contents, revise the scope of the report as needed, and develop, for full-Committee approval, groundwater protection recommendations for the 75th Texas Legislature. This document is the end product of the subcommittee's efforts.

Abandoned Well-Closure Task Force

The Abandoned Well-Closure Task Force has been created as an educational outreach initiative. The purpose of the task force is to develop the necessary procedures, educational, and technical information required to promote the landowner-initiated closure or plugging of abandoned water wells; develop a curriculum for well-closure presentations or workshops; and design well-closure seminars and demonstrations to be conducted throughout the state. The task force is co-chaired

by the Texas Agricultural Experiment Station and the Texas Natural Resource Conservation Commission and works in cooperation with the Texas Water Well Drillers Advisory Council.

Public Records

The Texas Natural Resource Conservation Commission administers the activities of the Committee in accordance with §26.403 of the Texas Water Code. The TNRCC's Water Planning and Assessment Division maintains a mailing list of Committee members, designated and alternate members, subcommittee members, agency staff, and interested parties for meeting notification and correspondence. A list of Committee members is provided in Appendix 2. The TNRCC provides meeting information to the *Texas Register* for public notification, maintains audio tapes of Committee meetings, drafts minutes of Committee meetings, and maintains meeting and correspondence files for the Committee and its subcommittees. The Committee's publications are available through the TNRCC's Agency Communications Division. Information regarding groundwater monitoring programs and groundwater contamination incidents are maintained individually by the agencies or districts. Appendix 3 contains a list of agency and district contacts for obtaining further information.

MAJOR ACCOMPLISHMENTS

Texas State Management Plan for Prevention of Pesticide Contamination of Ground Water

The development of the *Texas State Management Plan for Prevention of Pesticide Contamination of Ground Water* (TGPC, 1996d) is being guided by the EPA's *Ground-Water Protection Strategy* and the *Final Guidance for Pesticides and Ground-Water State Management Plans*. It is an update of the *Texas State Management Plan for Agricultural Chemicals in Ground Water*, published by the Committee in 1991.

The EPA has determined that, due to their groundwater contamination potential, some pesticides commonly used nationwide may pose an unreasonable adverse effect on the environment, unless effective local management measures are developed and implemented through state pesticide-specific management plans. Under its authority granted by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the EPA has released proposed rules for the development and implementation of management plans as a condition for the legal sale and use of identified pesticides. When the rules go into effect, these pesticides will be prohibited for sale and use within a state that does not have an EPA-approved pesticide-specific state management plan (SMP), potentially affecting a large segment of a state's agricultural community who are dependent upon these pesticides.

To preserve the continued use of the EPA-listed pesticides, a state will need to develop pesticide-specific SMPs that address groundwater contamination for each pesticide. The EPA is asking states to develop two different kinds of SMPs: generic and pesticide-specific. Both types must contain 12 components defined by the EPA. Even though the development of a generic SMP is voluntary, it serves an important function since it is to contain the basic underlying framework for managing pesticide use in the state and will serve as a basis for the development of the pesticide-specific SMPs. The pesticide-specific SMPs will contain any specific actions necessary to prevent groundwater contamination by the subject pesticide.

The state of Texas, through the Texas Natural Resource Conservation Commission, with the guidance of the Texas Groundwater Protection Committee, has initiated the process for developing the necessary SMPs. The *Texas State Management Plan for Prevention of Pesticide Contamination of Ground Water* is the generic SMP for the state, and will serve to guide the development of pesticide-specific SMPs as needed.

The goal of the *Texas State Management Plan for Prevention of Pesticide Contamination of Ground Water* is to protect the existing quality of groundwater and to prevent the degradation of state groundwater resources. This goal does not mean zero-contaminant discharge, but that normal use of pesticides be conducted in a manner that will maintain present groundwater uses and not impair potential uses of groundwater or pose a public health hazard. All usable and

potentially usable groundwaters are subject to the same protection afforded by the nondegradation policy goal.

The SMP describes the general policies and regulatory approaches the state will use in order to protect groundwater resources from risk of contamination by pesticides. The document describes a generic coordinating mechanism among all responsible and participating agencies during the implementation of the SMP and provides for specific responses when it is deemed necessary to develop a pesticide-specific SMP. The SMP reflects the state’s philosophy toward groundwater protection and recognizes the importance of agricultural resources to the state’s economy. The seven major principles that govern the development of the SMP are listed in Table 4.

Table 4: Major Principles Governing State Management Plan Development

<i>Agricultural pesticides are beneficial and important to the production of food, fiber supply, and the economy of the state.</i>
<i>State and local governments should be the first line of groundwater protection, with this effort being complemented by federal expertise and information.</i>
<i>The use of pesticides, while important for protection of public safety and health, should not impair any use of groundwater or cause a public health hazard.</i>
<i>Drinking water supplies, including groundwater resources used to supply private wells, should be protected.</i>
<i>Groundwater quality monitoring by state agencies, local government, and other interested parties can be directed, as funds allow, to areas determined by the state to be vulnerable to nonpoint source contamination.</i>
<i>Pesticide use and Best Management Practices (BMPs) should be tailored to prevent contamination of groundwater from pesticides</i>
<i>Education and voluntary implementation of BMPs should be the primary emphasis of the plan.</i>

The Agricultural Chemicals Subcommittee is currently developing a pesticide-specific SMP for the pesticide atrazine. One primary ingredient for each pesticide-specific SMP is to conduct a monitoring program for the targeted pesticide. The atrazine-specific monitoring program is currently being conducted. An initial geographic area to monitor atrazine was chosen based on the combined presence of the following conditions: a relatively high use of atrazine, the presence of leachable soils, and the presence of shallow groundwater conditions and shallow wells suitable for sampling. The selection focused on areas most vulnerable to groundwater contamination by the normal use of atrazine. Using this criteria, the Brazos River alluvium area in Robertson, Brazos, and Burleson Counties has been chosen for the initial atrazine monitoring program. The

monitoring program is presently in the well sampling stage. Because of difficulties in securing permission to sample private wells, only monitoring wells and irrigation wells on Texas A&M property, in the Brazos River bottom, are scheduled for sampling at this time. In the future, it is hoped that permission can be obtained to sample other wells in the area.

Texas Ground-Water Data Dictionary

The *Texas Ground-Water Data Dictionary* (TGPC, 1996b) was developed by the cooperative efforts of the Committee's Data Management Subcommittee. The subcommittee was charged with improving the sharing of data between various levels of government, the academic community, and the private sector. The data dictionary is the product of a two-year collaborative effort by hydrogeologists, computer scientists, geographers, agriculture scientists, hydrologists, information specialists, and civil engineers from nine local, state, and federal agencies in Texas. The effort benefited from the advice and consultation of scientists and engineers at several universities and consulting firms.

The production and development of the data dictionary took a proactive approach to consider data sharing and data quality in view of three recent technological advances: distributed computing, geographic information systems, and widespread data exchange via the Internet. The document provides groundwater professionals in Texas with specific guidelines to implement recent state and federal requirements, such as the USEPA/USGS Minimum Set of Data Elements for Ground-Water Protection, and the Texas Standards and Guidelines for Geographic Information Systems. The data dictionary describes a standardized framework for collecting and storing information on groundwater in the state. The use of 135 data elements contained in the dictionary will make it easier to share information stored in various computer programs and operating systems, and will facilitate processing of information in a geographic information system. The 135 data elements are accompanied by 53 lookup tables with many of the codes and values needed for each data element. The use of the lookup tables can be utilized to improve the quality control and quality assurance of information contained in groundwater databases.

Two important applications of the data dictionary will be to facilitate data exchange as part of the comprehensive state groundwater protection program (CSGWPP), and to assist in the information sharing required by the Texas Clean Rivers Act. Other benefits from utilizing the standards detailed in the data dictionary for the storage and transfer of groundwater information are to:

- ▶ provide information needed for mapmaking with a geographic information system;
- ▶ provide accurate documentation of well construction and ownership to lay the groundwork for future studies;
- ▶ save money by reducing duplication of efforts to collect groundwater information and facilitate the importation of digital information from others;
- ▶ improve documentation of water sampling and analysis, which in turn should improve confidence in decisions regarding groundwater quality data; and
- ▶ allow for more accurate mapping of the water table or artesian potentiometric surface.

Texas Groundwater Program Directory

The *Texas Groundwater Program Directory* (TGPC, 1996c) was designed and produced through the coordinated efforts of the state agencies and organizations represented on the Committee. The directory was compiled to serve as a quick-reference guide for people interested in groundwater-related information and is intended to provide educational and informational material regarding groundwater and the groundwater protection programs within the state. The directory is composed to:

- ▶ familiarize the directory's users with basic groundwater hydrologic principles and terms;
- ▶ provide a subject-reference telephone directory for groundwater-related programs, contacts, etc., to assist the general public in communicating with appropriate state agency personnel;
- ▶ describe the Committee; its creation and mandate, major responsibilities, and membership; and the state's groundwater protection policy;
- ▶ give an abbreviated description of the groundwater protection programs of the agencies and organizations that serve on, or are active participants of, the Committee; and
- ▶ provide supplemental information in the form of appendices.

Ground-Water Nonpoint Source Assessment Report and Management Plan

The Ground-Water Nonpoint Source Assessment Report and Ground-Water Nonpoint Source Management Plan are documents produced by the TNRCC in conjunction with input from members of the Committee and others in Texas that participate in the update process. The documents support the EPA's 319(h) grant program and the state's goals regarding nonpoint source pollution prevention, remediation, and management. A draft update of the groundwater portion of the assessment report was submitted to the EPA in 1991. In 1995, a work plan was submitted to EPA to update the groundwater portion of the report during the 1996 fiscal year. The work plan was not approved until very late in the fiscal year, and work is planned for fiscal year 1997 to complete the update that was started in 1996. It is hoped that annual efforts to update the reports will keep the assessment both pertinent and meaningful with respect to the body of information available to describe water quality and indicators of NPS pollution in Texas.

The management plan describes state programs that address nonpoint source pollution and the state strategy for addressing NPS pollution. As with the assessment report, a draft update was submitted to and approved by the EPA in 1991. Changing priorities for Texas have led to a need to update the management plan on a more regular and frequent basis, and efforts began in late 1995 to formally work on a new version of the management plan. Lack of funding hindered accomplishment of this task, but data were collected and will be assessed in fiscal year 1997.

Both the assessment report and management plan documents will be combined with the surface water portions of the reports to make a comprehensive set of Texas NPS documents. It is

expected that the first NPS assessment report and management plan update with combined groundwater and surface water data will be approved by the EPA in 1997.

Educational Outreach

The Committee published an educational brochure (TGPC, 1994a) in 1994 outlining the Committee's creation and mandate, membership, and major responsibilities. The brochure also discusses the state's groundwater protection strategy and implementation, subcommittee responsibilities, Committee meetings, and the development of a Comprehensive State Groundwater Protection Program. The brochure was initially distributed to the general public and other interested parties during 1995 by the Committee's member agencies.

As previously mentioned, the Agricultural Chemicals Subcommittee's Education Task Force has created an informational brochure (TGPC, 1995b) for distribution through the subcommittee members. In addition, a set of slides and an outlined presentation have been prepared to familiarize special interest groups and the general public with the development and implementation of the generic state management plan.

Actions Addressing the Well Report Backlog

The drilling of water wells, and the data contained on well reports submitted to the state, provide the primary source of information for groundwater throughout the state. Over 16,000 water wells and an additional 8,000 dewatering, injection, and monitoring (DIM) wells are drilled annually statewide. The acquisition, organization, and accessibility of the data contained in these records are of critical importance to all the member agencies represented on the Committee, as well as to the public and private sectors.

As reported to the 74th Texas Legislature (TGPC, 1994b), reduced funding has seriously degraded two components of the state groundwater data system: well location and processing of the well reports submitted to the state. Upon the Committee's recommendation, the TNRCC took action to address the second component, processing of well reports. A backlog of well reports for approximately 80,000 wells, drilled from September 1991 through September 1994, were filed by county name only, making them virtually inaccessible for assessments and other studies. Using summer interns to delineate well locations from information contained on the well reports, the TNRCC processed approximately 75 percent of the backlogged well reports in 1995.

ANNUAL GROUNDWATER MONITORING AND CONTAMINATION REPORTS

Section 26.406 of the Texas Water Code requires the Committee to publish annually a groundwater monitoring and contamination report. The annual report is required to:

- ▶ describe the current status of groundwater monitoring activities conducted by or required by each agency at regulated facilities or associated with regulated activities;
- ▶ contain a description of each case of groundwater contamination documented during the previous calendar year;
- ▶ contain a description of each case of contamination documented during previous periods for which enforcement action was incomplete at the time of issuance of the preceding report; and
- ▶ indicate the status of enforcement action for each case of contamination which is listed.

The Committee produced and published two monitoring and contamination reports during the biennium: *Joint Groundwater Monitoring and Contamination Report—1994* (TGPC, 1995a) and *Joint Groundwater Monitoring and Contamination Report—1995* (TGPC, 1996a). The reports describe the status of groundwater monitoring programs and groundwater contamination cases documented or under enforcement by the participating agencies for the calendar year entitled. Narrative groundwater protection program-specific descriptions for each contributing agency or organization are included. The reports also contain individual groundwater contamination case descriptions, listed by county, for each contributing agency with regulatory groundwater protection authority. The individual case descriptions provide the enforcement status for each case. Appendices are included providing more detailed information supporting or supplementing the reports.

Groundwater Monitoring

The groundwater protection programs of the participating agencies generally fall within one of three categories:

- ▶ regulatory agencies requiring or conducting groundwater monitoring to assure compliance with guidelines and regulations for the protection of groundwater from discharges of contaminants;
- ▶ agencies or entities conducting groundwater monitoring to assess ambient or existing groundwater quality conditions and to track changes in water quality over time; and
- ▶ agencies or entities conducting research activities related to groundwater resources and groundwater conservation.

Each regulatory agency that requires or conducts groundwater monitoring to assure compliance with guidelines and regulations to protect groundwater from discharges of contaminants has its

own monitoring program requirements and procedures. The criteria used to assess the need for groundwater monitoring vary among the regulatory entities. There are 15 programs in three agencies monitoring changes in groundwater quality for permit and operational requirements at approximately 8,840 facilities statewide. Data indicate that an estimated 34,210 monitor and water wells are being used for groundwater monitoring purposes at these facilities. The majority (greater than 98 percent) of the facilities being monitored are under the jurisdiction of the Texas Natural Resource Conservation Commission, with the remainder under the jurisdiction of the Railroad Commission of Texas and the Texas Department of Health (TGPC, 1996a).

Some agencies or entities do not have specific regulatory functions that would be served by groundwater monitoring programs. Agencies or entities such as the Texas Water Development Board and the member districts of the Texas Alliance of Groundwater Districts conduct groundwater monitoring to assess ambient or existing groundwater quality conditions and to track changes in water quality over time. Some monitoring programs are developed for water quality assessment studies that target specific geographic areas, specific contaminants or constituents, or specific activities. Contamination cases discovered by these agencies or entities through groundwater studies or groundwater sampling programs are referred to the regulatory agency with appropriate jurisdiction. Monitoring programs addressing ambient groundwater quality and assessing the occurrence of particular constituents carried out by the Texas Water Development Board and participating organizations involved approximately 1,000 water wells in 1995. In addition, over 900 water wells were reported as being monitored for ambient groundwater quality and changes over time by the member districts of the Texas Alliance of Groundwater Districts during 1995 (TGPC, 1996a).

Groundwater Contamination

Groundwater contamination, as defined by the Committee (Appendix 1) for inclusion in the annual report, is the detrimental alteration of the naturally occurring physical, thermal, chemical, or biological quality of groundwater reasonably suspected of having been caused by the activities of entities under the jurisdiction of the state agencies. The Committee recognizes that groundwater contamination may result from many sources, including:

- ▶ current and past oil and gas production and related practices;
- ▶ agricultural activities;
- ▶ industrial and manufacturing processes;
- ▶ commercial and business endeavors;
- ▶ domestic activities; and
- ▶ natural sources that may be influenced by, or may result from, human activities.

The contamination cases identified in the annual report are primarily those where contaminants have been discharged to the surface, to the shallow subsurface, or directly to groundwater from activities such as the storage, processing, transport, or disposal of products or waste materials (TGPC, 1996a).

There were 5,849 documented groundwater contamination cases addressed in the 1996 report. Approximately 97 percent of the documented cases were under the jurisdiction of the Texas Natural Resource Conservation Commission. The remainder of the cases were under the jurisdiction of the Texas Department of Agriculture, with slightly more than 1 percent, the Railroad Commission of Texas, with slightly more than 1 percent, and the groundwater conservation districts that make up the Texas Alliance of Groundwater Districts, with less than 1 percent (TGPC, 1996a).

Table 5 list the documented groundwater contamination cases by jurisdictional agency. The total number of cases documented during 1994 and 1995 for each agency and program are listed. The percentage of the total number of documented cases for each agency and program are also given for 1994 and 1995. The net change and percentage change from 1994 to 1995 for each agency and program is also shown.

As Table 5 illustrates, the 1994 and 1995 reports have continued to document the large number of groundwater contamination impacts from petroleum storage tanks (both aboveground and underground). In 1995, there were 62,255 facilities containing 153,991 registered underground and 18,681 registered aboveground storage tanks. Approximately 95 percent of the regulated storage tanks contain petroleum products, with the remainder containing regulated hazardous substances. As reported by the TNRCC, the number of documented groundwater contamination cases resulting from petroleum storage tank system failures rose from 4,894 in 1994 to 5,008 in 1995. These cases represent 86.2 percent of the total number of documented contamination cases in 1994 and 85.6 percent of the cases in 1995, a net percentage decline of 0.6 percent. While the number of documented contamination cases from storage tanks is very high, it can be directly linked to the sheer number of regulated facilities and the stringent monitoring requirements in effect for these systems.

Table 5 also documents a significant increase in the number of documented groundwater contamination cases under the jurisdiction of the TNRCC's Pollution Cleanup Division. The division is responsible for both federal and state Superfund activities. From 1994 to 1995, the division saw a net percentage increase of 0.6 percent in the total number of documented groundwater contamination cases. The division reported an increase from 85 documented contamination sites in 1994 to 125 sites in 1995. However, there was only a net increase of six sites in the Superfund program from 1994 to 1995. The remaining 34 new cases are first-time listings under the new Voluntary Cleanup Program. The Voluntary Cleanup Program was established by House Bill 2296 of the 74th Legislature which amended Chapter 361 of the Texas Health and Safety Code. The purpose of the program is to provide a streamlined, incentive-based process for participants to pursue cleanup of contaminated properties. Continued growth of the Voluntary Cleanup Program is anticipated in the future.

In addition, Table 5 seems to indicate a significant change from 1994 to 1995 in the TNRCC's Industrial and Hazardous Waste Division; however, this is a perceived rather than actual decrease. Table 5 indicates a net decrease of 285 cases under the jurisdiction of the division from 1994 to

1995 (from 474 to 189). This indicates a net percentage decrease of 5.2 percent of the total documented contamination cases from 1994 to 1995. Of the 285 cases, jurisdiction for 282 of the cases was transferred to the new Enforcement Division, Waste Section, on September 1, 1995. These cases are listed as such in Table 5 and in the 1995 report.

Table 5. Groundwater Contamination Cases by Jurisdictional Agency, 1994–1995

Agency/Program	Total No. of Cases		Percentage of Total		Net Change	Percentage Change
	1994	1995	1994	1995	1994–1995	1994–1995
<i>Texas Natural Resource Conservation Commission</i>						
Industrial and Hazardous Waste Division	474	189	8.4	3.2	- 285	- 5.2
Municipal Solid Waste Division	27	29	0.5	0.5	+ 2	None
Petroleum Storage Tank Division	4894	5008	86.2	85.6	+ 114	- 0.6
Pollution Cleanup Division	85	125	1.5	2.1	+ 45	+ 0.6
Water Planning and Assessment Division	18	19	0.3	0.3	+ 1	None
Water Utilities Division	16	24	0.3	0.4	+ 8	+ 0.1
Enforcement Division/Waste Section ¹	NA	282	NA	4.8	(+ 282)	NA
Enforcement Division/Water Section ²	NA	5	NA	< 0.1	(+ 5)	NA
Field Operations Division	12	10	0.2	0.2	- 2	None
Subtotal	5526	5691	97.4	97.3	+ 165	
<i>Railroad Commission of Texas</i>	56	64	1.0	1.1	+ 8	+ 0.1
<i>Texas Department of Agriculture</i>	75	75	1.3	1.3	None	None
<i>Texas Alliance of Groundwater Districts</i>	18	19	0.3	0.3	+ 1	None
Total	5675	5849	100	99.9	+ 174	

- Notes: 1. Enforcement Division, Waste Section, was organized on September 1, 1995. The 282 groundwater contamination cases reported under the section for the 1995 calendar year were previously under the jurisdiction of the Industrial and Hazardous Waste Division.
2. Enforcement Division, Water Section, was organized on September 1, 1995. Three of the five groundwater contamination cases reported under the section for the 1995 calendar year were previously listed under the jurisdiction of the Water Planning and Assessment Division. Two of the cases were new in 1995.

The most common contaminants reported in 1995 included gasoline, diesel fuel, and other petroleum products due to the large number of petroleum storage tank related cases. Less common contaminants reported included gasoline constituents, organic compounds (such as phenol, trichloroethylene, carbon tetrachloride, dichloroethylene, and naphthalene), pesticides

(such as alachlor, atrazine, bromacil, dicamba, and prometon), creosote constituents, solvents, heavy metals, and sodium chloride (TGPC, 1996a).

As required by §26.046 of the Texas Water Code, the report indicates the status of enforcement action for each instance of groundwater contamination. For purposes of the report, enforcement action includes any agency action which accomplishes or requires the identification, documentation, monitoring, assessing, or remediation of groundwater contamination. In general, regulatory programs are structured to achieve the desired degree of environmental protection and mitigation with the lowest possible level of agency oversight. Agency actions dealing with contamination incidents are also placed in context of the activities necessary to confront the incidents. This comparison of the level of agency action and the status or level of contamination assessment and mitigation are presented as an enforcement status matrix. The enforcement status matrix allows a one-to-one correspondence between an agency's response and the completion of the discrete phases in the progression of contamination investigation.

Table 6 represents documented groundwater contamination cases during 1995. The table indicates the total number of documented cases by the agency and division or program with jurisdictional authority and indicates the activity status for the cases. Once groundwater contamination has been confirmed, either the regulated entity or the agency will address a groundwater contamination incident following a general sequence of actions until the investigation concludes no further action is necessary.

All of the 5,849 cases listed in the 1995 report have documented groundwater contamination. The activity status for each case is identified in the report's tables. As Table 6 indicates, "no activity" has occurred in 21 reported cases that are awaiting confirmation of contamination. Contamination is confirmed (validated) in 1,481 cases. The largest number of cases (2,153) are involved in ongoing investigations. Additionally, 780 cases are in corrective action planning. Action has been implemented in 743 cases, and 278 cases have an activity status of "monitor action." No further action is necessary for 371 cases that are designated as "action completed." No activity status was given for an additional 22 cases in which information was lacking concerning the 1995 activity status at the site.

Historically, the number of new groundwater contamination cases documented each year is greater than the number of cases in which action was completed during the same year. The number of new cases has decreased each year (with the exception of 1995) while the number of cases where action has been completed has increased each year (with the exception of 1994). The 1995 exception to the decreasing trend in new cases is partially attributed to the 34 new cases that were reported by the recently established Voluntary Cleanup Program of the TNRCC. There were 421 new cases listed in the 1995 report, as compared to 376 new cases listed in 1994.

Action was completed on 371 groundwater contamination cases in 1995, as compared to 226 in 1994. Action on these cases was considered complete when the desired remedy was achieved or when no further regulatory action was required.

Table 6. Documented Groundwater Contamination Cases by Agency/Activity Status, 1995

Agency/Division/Program	Total Cases (1995) ¹	New Cases (1995) ²	Activity Status Code ³							
			0	1	2	3	4	5	6	None
Texas Natural Resource Conservation Commission										
Industrial and Hazardous Waste Division	189	32	7	14	58	33	35	33	6	3
Municipal Solid Waste Division	29	3	1	2	14	2	5	1	4	0
Petroleum Storage Tanks Division	5,008	317	0	1,400	1,842	641	603	164	342	16
Pollution Cleanup Division	125	40	1	29	28	35	23	6	2	1
Water Planning and Assessment Division	19	0	0	6	6	0	1	6	0	0
Water Utilities Division	24	9	1	0	1	1	1	18	2	0
Enforcement Division/Water Section	5	2	0	0	0	3	0	2	0	0
Enforcement Division/Waste Section	282	0	5	23	110	58	56	28	2	0
Field Operations Division	10	0	0	1	4	1	2	0	0	2
Subtotal	5,691	403	15	1,475	2,063	774	726	258	358	22
Railroad Commission of Texas/Oil and Gas Division	64	17	0	4	7	5	16	20	12	0
Texas Department of Agriculture	75	0	0	0	75	0	0	0	0	0
Texas Alliance of Groundwater Districts	19	1	6	2	8	1	1	0	1	0
Total	5,849	421	21	1,481	2,153	780	743	278	371	22

- Notes: 1. Total number of groundwater contamination cases documented or under enforcement during calendar year 1995.
2. Number of new cases documented or under enforcement during calendar year 1995.
3. Activity Status Codes: 0—No Activity; 1—Contamination Confirmed; 2—Ongoing Investigation; 3—Corrective Action Planning; 4—Corrective Action Implementation; 5—Monitoring Action; 6—Action Completed

GROUNDWATER PROTECTION STRATEGY/CSGWPP

Strategy Development, Implementation, and Update

As mandated by §26.404 of the Texas Water Code, the Committee is responsible for developing and updating a comprehensive groundwater protection strategy for the state. The strategy is mandated to provide guidelines for the prevention of groundwater contamination, the conservation of groundwater resources, and the coordination of the groundwater protection activities of the agencies and organizations represented on the Committee.

The *Texas Ground Water Protection Strategy* (GPC, 1988) was developed by the Groundwater Protection Committee, the current Committee's predecessor. The strategy is intended to be a flexible guide for state agencies and others in developing and implementing groundwater protection efforts. The development of the Strategy was preceded and aided by *Texas Ground Water Protection Activities—1986* (GPC, 1986), a compilation by the predecessor committee detailing the existing groundwater protection programs.

The strategy outlines goals, needs, and recommendations in six important areas: interagency coordination, hazardous and nonhazardous materials management, public water supply, rural water supply, research, and legislation. The strategy discusses the following elements for each of the six areas: status of existing programs, gaps or inadequacies in existing programs, areas of currently unaddressed groundwater issues, recommendations for changes or improvements in existing programs, and institution of new programs where needed. The final chapter of the strategy summarizes the important needs and goals for improvement of groundwater protection efforts.

The Committee added contributions to the strategy from the Texas Alliance of Groundwater Districts and the Texas State Soil and Water Conservation Board, two new member agencies, in 1990. Since 1990, the Committee has made two additional efforts concerning the strategy. The Committee developed the report *Texas Ground Water Protection Profiles* (GPC, 1991b) in 1991 at the request of the EPA. This report provided a profile of the state's groundwater protection program. The profile cataloged the current groundwater protection roles of each state agency and identified new efforts and improvements in the state's groundwater protection program. During 1992, the Committee discussed and prepared comments and input on the EPA's efforts and guidance for the development of a state comprehensive groundwater protection program (CSGWPP). Member agencies attended an EPA roundtable discussion and provided subsequent input on the development of the EPA's CSGWPP guidance.

Development of a Comprehensive State Groundwater Protection Program

Final guidance for the development of a comprehensive state ground-water protection program (CSGWPP) was published by the EPA in December 1992. The EPA developed its concept of such a program and encouraged states to further their efforts in developing existing programs into

a more comprehensive approach. CSGWPPs will serve as a working guide for a coherent partnership between EPA, the states, and local governments to achieve efficient protection of groundwater resources. As the catalyst for fundamental changes in the development and implementation of groundwater protection programs at the federal, state, and local levels, the CSGWPP approach provides unique opportunities for the successful implementation of state-directed, resource-based groundwater protection programs. The EPA's guidance first calls for the development of a core protection program, a basic program from which states would work with the EPA over the next few years to build a fully integrated CSGWPP.

Following the EPA's guidance, a CSGWPP consists of a set of six strategic activities. The six strategic activities foster more efficient and effective protection of groundwater through cooperative, consistent, and coordinated operation of all relevant federal, state, and local programs within the state. These six strategic activities are listed in Table 7.

Table 7. Six Comprehensive State Groundwater Protection Program Strategic Activities

<i>Establishing a common groundwater protection goal</i>
<i>Establishing priorities to direct relevant programs</i>
<i>Defining authorities, roles, and resources</i>
<i>Implementing programs to accomplish the state's goal</i>
<i>Coordinating information collection and management</i>
<i>Improving public education and participation</i>

Serving as the coordinator for the state's groundwater protection program, the Committee prepared and submitted the *Texas Core Program Assessment* to the EPA in October 1993. This represented the first step the EPA had identified in developing a comprehensive program. The *Texas Core Program Assessment* has as its basis the state's groundwater protection policy, as established by the Legislature in 1989, and the *Texas Ground Water Protection Strategy*. Information from *Texas Ground Water Protection Profiles* provided an outline of the agencies' responsibilities and described program implementation relative to the basic activities identified by the EPA for a fully integrated CSGWPP. The core assessment compared the Texas groundwater protection program, as strengthened and coordinated through the Committee, to federal CSGWPP guidance.

The Committee believes that the core assessment demonstrated core-program compliance, and thus provides the base from which to develop a fully integrating CSGWPP. The EPA provided comments on the *Texas Core Program Assessment* in February 1995, and noted that portions of the Texas assessment required more detail and clarification to adequately meet core criteria. The Committee feels that the continued development of the core assessment is a worthy commitment

for the state to pursue, and that the components of the Texas program should meet the EPA's criteria for a core CSGWPP. The Texas core assessment represents the initial commitment to work jointly with EPA to move toward a fully integrating CSGWPP. The core assessment provides the means for Texas to demonstrate, and for the EPA to endorse, the state's potential to be the primary decision-maker in groundwater protection efforts.

The Committee is currently updating the core assessment by addressing the EPA's comments of deficiency. The updated Texas core assessment will continue to be based on the state's groundwater protection goal and strategy. Updated groundwater protection roles and responsibilities of the member agencies, chiefly due to reorganizations and recent legislation, have been compiled in conjunction with the preparation the Committee's annual *Joint Groundwater Monitoring and Contamination Report*. The current groundwater protection roles and responsibilities of the member agencies will be incorporated into the revised version of the Texas core assessment. Upon completion, the revised Texas core assessment will effectively update and replace the strategy.

Benefits of a Comprehensive State Groundwater Protection Program

The eventual goal, the attainment of a fully integrating CSGWPP, means that groundwater protection efforts are coordinated and focused across all federal, state, and local programs. Coordination and focus are based on our state's understanding and decisions regarding the relative use, value, and vulnerability of the groundwater resources of Texas, including the relative threat of all actual or potential contamination sources. The adequacy criteria for a fully integrating CSGWPP provide considerable flexibility in what the Texas program can encompass. Thus, Texas can tailor its CSGWPP to emphasize the decision-making responsibilities the state believes are most suited for its own purposes. The EPA is committed to working with the state in a joint effort to gain additional decision-making responsibilities under various federal programs and achieve a fully-integrating CSGWPP.

Through extensive discussions with the states, the EPA has realized that inconsistencies and rigidities among federal groundwater-related programs result in inefficient expenditures of efforts and less cost-effective protection from a total resource-based perspective. The EPA has also realized that federal rigidity stems largely from ignorance or misconceptions regarding state groundwater protection capabilities as well as state needs, priorities, and approaches.

The EPA will provide flexibility to the state based on Texas meeting CSGWPP adequacy criteria. The EPA is using the CSGWPP approach as a catalyst to allow state flexibility while increasing consistency among individual protection programs meeting the adequacy criteria. At a minimum, the approach is intended to reduce the burden on the state in meeting numerous program criteria from several different programs. The EPA will also use the CSGWPP approach as a basis for suggesting appropriate changes to existing federal statutes and regulations to allow states greater flexibility to achieve comprehensive resource-based groundwater protection.

Through the development of the CSGWPP, Texas will be able to better coordinate the expenditure of its limited resources through increased program coordination. Because the CSGWPP approach recognizes the need to set priorities to manage groundwater resources, it allows for a greater focus of financial resources for the variety of functions with statutory constraints presented by federal groundwater protection laws and regulations.

COMMITTEE PUBLICATIONS

Groundwater Protection Committee (GPC), 1986, *Texas Ground Water Protection Activities—1986*; Texas Water Commission (TWC) Report Z-79, October 1986.

___, 1988, *Texas Ground Water Protection Strategy*; TWC Report Z-80, January 1988.

Texas Groundwater Protection Committee (TGPC), 1991a, *Texas State Management Plan for Agricultural Chemicals in Ground Water*; Agricultural Chemicals Subcommittee, June 1991.

___, 1991b, *Texas Ground Water Protection Profiles*; unpublished TWC Report, June 1991.

___, 1994a, *Texas Groundwater Protection Educational Brochure*; Texas Natural Resource Conservation Commission (TNRCC) Publication Number GI-88, November 1994.

___, 1994b, *Activities of the Texas Groundwater Protection Committee, Report to the 74th Legislature*; TNRCC Publication Number SFR-14, December 1994.

___, 1995a, *Joint Groundwater Monitoring and Contamination Report—1994*; TNRCC Publication Number SFR-20, April 1995.

___, 1995b, *Texas State Management Plan for the Prevention of Pesticide Contamination of Groundwater (Educational Brochure)*; TNRCC Publication Number GI-141, June 1995.

___, 1996a, *Joint Groundwater Monitoring and Contamination Report—1995*; TNRCC Publication Number SFR-36, April 1995.

___, 1996b, *Texas Ground-Water Data Dictionary*; TNRCC Publication Number AS-109, August, 1996.

___, 1996c, *Texas Groundwater Program Directory*; TNRCC Publication Number GI-226, October 1996.

___, 1996d, *Texas State Management Plan for the Prevention of Pesticide Contamination of Groundwater*; Draft TNRCC Publication, March 1996.

APPENDIX 1.

TEXAS GROUNDWATER PROTECTION COMMITTEE RULES

General Provisions Relating to
Public Files and Joint Report

Texas Administrative Code, §§601.1 - 601.5

These sections are promulgated under the authority of Texas Water Code §26.406, which authorizes the Texas Groundwater Protection Committee to adopt any rules necessary to carry out its powers and duties under Chapter 26 of the Texas Water Code and to establish and approve general policy of the committee.

§601.1. Purposes of Rules. The purpose of these sections is to implement duties and responsibilities assigned to the committee under Texas Water Code §26.406 relating to the maintenance by certain state agencies of public files containing documented cases of groundwater contamination and the publication by the committee, in conjunction with the commission, of annual groundwater monitoring and contamination reports and to establish general policies of the committee to guide such implementation.

§601.2. Applicability. These rules specifically apply to each state agency having responsibilities related to the protection of groundwater, and include the Texas Water Commission, the Texas Water Well Drillers Board, the Texas Department of Health, the Department of Agriculture, the Railroad Commission of Texas, and the State Soil and Water Conservation Board*.

§601.3. Definitions. The following words and terms, when used in this chapter, shall have the following meanings unless the context clearly indicates otherwise:

Act—House Bill 1458 (71st Regular Session) codified as §§26.401-407 Texas Water Code.

Commission—Texas Water Commission

Committee—Texas Groundwater Protection Committee

Enforcement Action—Any action of the agencies, identified in §601.2 of this chapter, which accomplishes or requires the identification, documentation, monitoring, assessing, or remediation of groundwater contamination.

Groundwater—Water below the land surface in a zone of saturation.

Groundwater Contamination—The detrimental alteration of the naturally occurring physical, thermal, chemical, or biological quality of groundwater. Further, groundwater contamination, for purposes of inclusion of cases in the public files and the joint groundwater monitoring and contamination report, shall be limited to contamination reasonably suspected of having been caused by activities or by entities under the jurisdiction of the agencies identified in

§601.2 of this chapter, except in the case of an underground source of drinking water granted an aquifer exemption by the commission with concurrence from the U.S. Environmental Protection Agency in accordance with 40 CFR Parts 144, 145, and 146 and 31 TAC Chapter 331; and affecting groundwater which contains a concentration of:

- (a) less than or equal to 10,000 milligrams per liter (mg/L) of dissolved solids, or
- (b) greater than 10,000 mg/L if it is
 - (i) currently extracted for beneficial use such as domestic, industrial, or agricultural purposes, or
 - (ii) hydrologically connected with and with the potential for contaminant movement to a surface water body or another zone of groundwater which has a concentration of less than or equal to 10,000 mg/L of dissolved solids.

§601.4. Public File.

(a) Subject to the limitations provided by the act and the Open Records Act, Texas Civil Statutes, Article 6252-17a, information collected, assembled, or maintained by the committee and the agencies subject to the act is public record open to inspection and copying during regular business hours.

(b) Each agency shall maintain a public file of all documented cases of groundwater contamination that are reasonably suspected of having been caused by activities regulated by the agency.

§601.5. Joint Groundwater Monitoring and Contamination Report. In conjunction with the commission, the committee shall publish not later than April 1 of each year a joint groundwater monitoring and contamination report covering the activities and findings of the committee made during the previous calendar year. The report must:

(1) Describe the current status of groundwater monitoring programs conducted by or required by each agency at regulated facilities or in connection with regulated activities.

(2) Contain a description of each case of groundwater contamination documented during the previous calendar year and of each case of groundwater contamination documented during previous years for which enforcement action was incomplete at the time of issuance of the preceding report.

(3) Indicate the status of enforcement action for each case of groundwater contamination that is included in the report.

* Subsequent legislation addressing the reorganization of state agencies has since redefined the agencies that have responsibilities related to the protection of groundwater. Senate Bill 2 (72nd Texas Legislature, 1991) amended §5.001 of the Texas Water Code. Senate Bill 2 mandated certain divisions of the Texas Department of Health with regulatory authority over water and waste, and the Texas Water Well Drillers Board be consolidated within the Texas Water Commission (TWC) effective March 1, 1992, and September 1, 1992, respectively. In addition, Senate Bill 2 combined the TWC and the Texas Air Control Board and named the new agency the Texas Natural Resource Conservation Commission (TNRCC) effective September 1, 1993. Senate Bill 469 of the 73rd Texas Legislature, 1993, amended §26.403 of the Texas Water Code to extend Committee membership to the Texas Agricultural Experiment Station, the Bureau of Economic Geology of the University of Texas at Austin, and the Texas Alliance of Groundwater Districts.

APPENDIX 2.

TEXAS GROUNDWATER PROTECTION COMMITTEE MEMBERSHIP

Chairman—Texas Natural Resource Conservation Commission

Dan Pearson, Executive Director
Texas Natural Resource Conservation Commission
P.O. Box 13087
Building F, Room 4210, MC 109
Austin, Texas 78711-3087
Phone: (512) 239-3900 Fax: (512) 239-3939

Designated Chairman

Mary L. Ambrose
Water Policy and Regulations Division
Texas Natural Resource Conservation Commission
Building F, Room 433, MC 204
Phone: (512) 239-4813 Fax: (512) 239-6195

Vice Chairman—Texas Water Development Board

Craig D. Pedersen, Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, Texas 78711-3231
Phone: (512) 463-7850 Fax: (512) 475-2053

Designated Vice Chairman

Phil Nordstrom
Phone: (512) 936-0838 Fax: (512) 936-0831

Members

Railroad Commission of Texas

Designated Representative

Richard Ginn
Railroad Commission of Texas
P.O. Box 12967
Austin, Texas 78711-2967
Phone: (512) 463-6796 Fax: (512) 463-6780

Texas Department of Health

David R. Smith, MD
Commissioner of Health
Texas Department of Health
1100 West 49th Street
Austin, Texas 78756
Phone: (512) 458-7375 Fax: (512) 458-7477

Designated Representative

Elías Briseño, R.S.
Director, General Sanitation Division
Bureau of Environmental Health
Texas Department of Health
1100 West 49th Street
Austin, Texas 78754
Phone: (512) 834-6635 Fax: (512) 834-6707

Texas Department of Agriculture

Larry R. Soward
Deputy Commissioner
Texas Department of Agriculture
P.O. Box 12847
Austin, Texas 78711
Phone: (512) 463-7567 Fax: (512) 463-1104

Alternate

Donnie Dippel
Assistant Commissioner, Pesticide Programs
Phone: (512) 463-1093 Fax: (512) 475-1618

Texas State Soil and Water Conservation Board

Robert G. Buckley
Executive Director
Texas State Soil and Water Conservation Board
P.O. Box 658
Temple, Texas 76503

Designated Representative

James Moore
Phone: (817) 773-2250 Fax: (817) 773-3311

Texas Alliance of Groundwater Districts

C.E. Williams, President
Texas Alliance of Groundwater Districts
P.O. Box 637
White Deer, Texas 79097
Phone: (806) 883-2501 Fax: (806) 883-2162

Designated Representative

Bill E. Couch, General Manager
Barton Springs/Edwards Aquifer Conservation District
1124-A Regal Row
Austin, Texas 78748
Phone: (512) 282-8441 Fax: (512) 282-7016

Texas Agricultural Experiment Station

Edward A. Hiler, Vice Chancellor, Dean, Agriculture and Life Sciences
Director, Texas Agricultural Experiment Station
The Texas A&M University System
College Station, Texas 77843-2147
Phone: (409) 845-3713 Fax: (409) 862-1637

Designated Representative

Dr. Wayne R. Jordan, Director
Ph # (409) 845-1851 Fax: (409) 845-8554

Bureau of Economic Geology

Noel Tyler, Director
Bureau of Economic Geology
The University of Texas at Austin
University Station, Box X
Austin, Texas 78713-7508
Phone: (512) 471-1534 or 471-7721 Fax: (512) 471-0140

Designated Representative

William Mullican, III
Bureau of Economic Geology
University of Texas at Austin
University Station, Box X
Austin, Texas 78713-7508
Phone: (512) 471-4458 Fax: (512) 471-0140

APPENDIX 3. AGENCY AND DISTRICT CONTACTS

Texas Natural Resource Conservation Commission

Office of Compliance and Enforcement

Compliance Support Division (Texas Water Well Drillers Team)	Warren Samuelson (512) 239-4799
Enforcement Division (Waste Section)	Tom Jecha (512) 239-6660
Enforcement Division (Water Section)	Rick Rasberry (512) 239-4467
Field Operations Division (Water Program)	Jeffie Barbee (512) 239-0400

Office of Waste Management

Industrial and Hazardous Waste Division (Technical Consultants Section)	Richard Anderson (512) 239-2334
Municipal Solid Waste Division	Ada Lichaa (512) 239-6728
Petroleum Storage Tank Division (Responsible Party Remediation)	Tom Lewis (512) 239-2200
Pollution Cleanup Division (State and Federal Superfund Programs)	Gregory Tipple (512) 239-2465
Pollution Cleanup Division (Voluntary Cleanup Program)	Scott Crouch (512) 239-2486

Office of Water Resource Management

Agricultural and Watershed Management Division	Monica Lopez (512) 239-1072
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Water Planning and Assessment Division	Cary Betz (512) 239-4455
Water Utilities Division (Public Water Supply)	Tony Bennett (512) 239-6024
Water Utilities Division (Source Water Protection)	Brad Cross (512) 239-6020
Texas Department of Health	Charles Meyer (512) 834-6688
Texas Department of Agriculture	Jeanette O'Hare (512) 463-7537
Railroad Commission of Texas	
Surface Mining and Reclamation Division	Sergio Garza (512) 463-6900
Oil and Gas Division	Bill Renfro (512) 463-6812
Texas State Soil and Water Conservation Board	James Moore (817) 773-2250
Texas Water Development Board	Phil Nordstrom (512) 936-0838
Bureau of Economic Geology	William Mullican, III (512) 471-4458
Texas Alliance of Groundwater Districts	Lee Arrington (806) 637-7467
Barton Springs/Edwards Aquifer Conservation District	Bill Couch (512) 282-8441
Coke County Underground Water Conservation District	Eph Cummins (915) 453-2232

Dallam County Underground Water Conservation District	Glen Olson (806) 362-4673
Edwards Aquifer Authority	Rick Illgner (210) 222-2204
Emerald Underground Water Conservation District	Dennis Clark (915) 392-5156
Evergreen Underground Water Conservation District	Mike Mahoney (210) 769-3740
Glasscock County Underground Water Conservation District	Rick Harston (915) 354-2430
Harris-Galveston Coastal Subsidence District	Ron Neighbors (281) 486-1105
Hickory Underground Water Conservation District No. 1	Stan Reinhard (915) 597-2785
High Plains Underground Water Conservation District No. 1	Wayne Wyatt (806) 762-0181
Hill Country Underground Water Conservation District	Paul Tybor (210) 997-4472
Irion Country Underground Water Conservation District	Scott Holland (915) 835-2015
Jeff Davis Country Underground Water Conservation District	Albert Miller (915) 467-2971
Lipan-Kickapoo Water Conservation District	Allan Lange (915) 469-3988
Live Oak Underground Water Conservation District	Lonnie Stewart (512) 449-1151
Medina Country Underground Water Conservation District	Luana Buckner (210) 426-3162

Mesa Underground Water Conservation District	Harvey Everheart (806) 872-9205
North Plains Groundwater Conservation District No. 2	Richard Bowers (806) 935-6401
Panhandle Groundwater Conservation District No. 3	C.E. Williams (806) 883-2501
Permian Basin Underground Water Conservation District	Mark Hoelscher (915) 756-2136
Plateau Underground Water Conservation and Supply District	Cindy Cawley (915) 853-2121
Sandy Land Underground Water Conservation District	David Turnbough (806) 456-2155
Santa Rita Underground Water Conservation District	Eugene Vinson (915) 884-2893
South Plains Underground Water Conservation District	Lee Arrington (806) 637-7467
Springhills Water Management District	Cameron Cornett (210) 796-7260
Sterling County Underground Water Conservation District	Gerry Robertson (915) 378-2704
Sutton County Underground Water Conservation District	Mike Smith (915) 387-2369
Uvalde County Underground Water Conservation District	Helen D. Cates (210) 278-8242