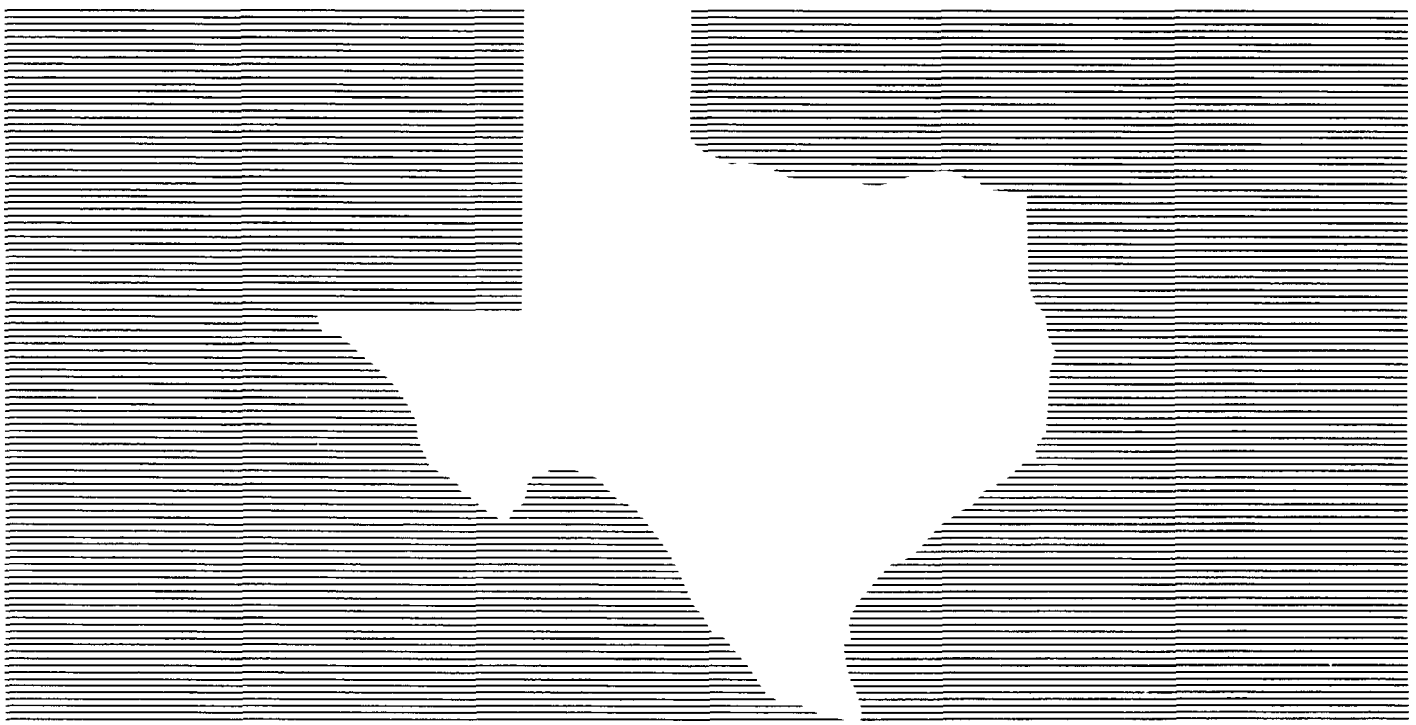
The Texas Railroad Commission Oil and Gas Division Underground Injection Control Program: A Peer Review



A REPORT OF THE
UNDERGROUND INJECTION PRACTICES COUNCIL

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1989

PREFACE

Peer reviews have been applied in various programs and professions for many years as an effective evaluation process. However, to our knowledge, it has never been used to assess the overall effectiveness of state oil and gas environmental programs. In this peer review process, member states of the Underground Injection Practices Council (UIPC), the USEPA and the USDOE have attempted to look at the major ground water protection effort of state regulatory agencies, their underground injection control (UIC) programs. It is the belief of the UIPC that the national UIC program represents one of the oldest, largest and perhaps one of the most effective environmental programs to protect our nations Underground Sources of Drinking Water (USDWs). These programs have been in place for many years. During that time our national commitment to ground water protection and the available technologies to protect it have changed extensively.

In light of these changed commitments and new technologies, the UIPC set out to look at the national Class II UIC program. The first state reviewed was California. This report, regarding the State of Texas, is the second in what will be a series of state peer reviews. Questions asked and answered were, does the state UIC program protect USDWs?; is the state UIC program up to date technically?; does the state UIC program meet all federal requirements?; is the staff well qualified and given adequate resources and training to do their job? These questions were asked by experienced and qualified reviewers. The answers are found herein.

Our special thanks to Mr. Robert Reid, Regulatory Specialist for the California Division of Oil and Gas, and Mr. Carroll Wascom, Assistant UIC Director for the Louisiana Office of Conservation, who reviewed the Texas Railroad Commission UIC program along with Mr. Dick Stamets, UIPC UIC Consultant and Mr. Jeffrey Lynn, UIPC Technical Director. An additional thanks must be extended to the numerous staff members of the Texas Railroad Commission's Underground Injection Control Section who participated in the review process both directly and indirectly. Additionally, staff from the USEPA Region VI office participated in the process as observers. Without all of their efforts this document would not have been possible.

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CLASS II UIC PEER REVIEW INTRODUCTION

The reports included herein and any reports added subsequently are the result of an effort to evaluate the effectiveness of state programs to protect Underground Sources of Drinking Water (USDW) from potential contamination resulting from the operation of injection wells related to the production of oil and gas (Class II injection wells). A USDW is defined as an aquifer or its portion which supplies a public water system, or which contains sufficient water to supply a public water system, or currently supplies drinking water for human consumption, or contains a concentration of less than 10,000 mg/l total dissolved solids (TDS) and which is not otherwise exempted as a USDW. Individual states may have definitions for other waters such as fresh water, potable water, usable quality water, etc. Such waters generally have maximum TDS concentrations less than USDWs. These definitions are often carried over into the UIC regulatory program from preexisting policies, rules, and/or statutes. Where defined waters other than USDWs exist and where they are addressed in the state program, they are highlighted in the General Program Comments and Observations portion of the report. Readers will need to exercise care when using individual state reports to understand specific relationships between USDWs and any waters with a more limited definition. The Review Team's conclusions are in every case based on protection of USDWs.

The programs examined in this study cover wells which are used for the injection of fluids into oil reservoirs for the purpose of stimulating or furthering their production when natural production mechanisms decline or cease (enhanced recovery wells) and for the disposal of waters produced in conjunction with the production of oil and gas (disposal wells). If improperly constructed, operated, maintained, or abandoned, such wells may allow contaminants to enter USDWs potentially depriving the public of needed sources of current or future water supplies.

The programs examined are those where primary enforcement authority has been delegated to the states by the US Environmental Protection Agency (EPA) under provisions of the Safe Drinking Water Act and EPA regulations (See following UIC Development Section of this report). The study was conducted under the auspices of the Underground Injection Practices Council (UIPC). The UIPC is an association of state and federal UIC officials, representatives of the

regulated community, environmental groups and other interested parties. The UIPC promotes and facilitates communication and the exchange of information with regard to the practices and regulation of injection wells. The UIPC further promotes related research and the dissemination and exchange of technical data.

The purposes of the following State Class II UIC reviews are as follows:

1. To determine the effectiveness of state UIC programs to protect USDWs;

2. To increase the knowledge of the member states of the content and operation of the various Class II programs;

3. To assist the states and the UIPC in preparation for the EPA Mid-Course Evaluation of the State Class II UIC Program;

4. To provide states an independent evaluation of their UIC programs and an opportunity to examine and consider the recommendations of this independent review.

The Peer Reviews were conducted and the reports were prepared in the following manner:

1. A Review Questionnaire Workbook was prepared containing numerous questions about the important aspects of a state's Class II UIC program including **(A) permitting and file review** (the process by which new injection well proposals are examined and permitted and preexisting wells are/were examined to assure protection of USDWs), **(B) inspections** (the process by which actual operations in the field are examined and compliance with rules and permit conditions is observed), **(C) mechanical integrity testing** (the process by which wells are tested to assure that injected fluids are confined in the well bore and formation as required), **(D) compliance and enforcement** (the process used to assure that compliance with all state regulations and permitting requirements is achieved and, where appropriate, penalties are sought and enforced), **(E) plugging and abandonment** (the process by which assurance is made that when there is no longer any use for the injection well it can and will be plugged in a manner as to prevent the movement of fluid into a USDW), **(F) inventory and data management** (the process by which important program data

is saved and used to demonstrate program compliance), and (G) **public outreach** (the process by which the public is involved in the state's program).

2. The Peer Review Questionnaire Workbook was furnished to the State and the questions were completed by State program personnel.

3. A Review Team was assembled and given copies of the completed State Workbook. The Review Team consisted of two state UIC program directors or their immediate subordinates, a UIPC contract employee (a former state UIC director) and the UIPC Technical Director. Review Team members are identified at the beginning of each State report and resumes for each will be found in the State report appendix.

4. The Review Team traveled to the State being reviewed and, using the completed Workbook as a guide, questioned employees of the responsible State regulatory agency extensively about the operation of the various program areas. Additionally, the Review Team was given a complete tour of the UIC offices as a demonstration of workflow and output.

5. The Review Team reviewed the written Workbook responses to questions, the oral responses to questions given at the time of the visit, and the various documents supplied by the State and prepared an initial list of program strengths and concerns. These were shared with the UIC Director, his staff and interested parties at an exit interview. Subsequent to the State visits, Review Team members wrote more extensive reports of their findings and conclusions. These reports were then reviewed by the contractor and UIPC staff and submitted to the State for final comment. Where appropriate, corrections supplied by supplemental information furnished by the State were incorporated into the report.

6. The Review Team reports are generally arranged in the same order as the Workbook. Each Workbook section is followed by any strengths or other considerations identified by the Review Team. Any such comments are followed by the Review Team's conclusions relative to the effectiveness of that portion of the State's UIC program in protecting USDWs. Where portions of the report, strengths, other considerations or conclusions did not fit within one of the seven major program areas identified in the Workbook, they were placed in a General Program Comments and Observations of each State report. An Executive Summary precedes each state specific report.

UNDERGROUND INJECTION CONTROL
PROGRAM DEVELOPMENT

The Underground Injection Control (UIC) programs have been developed and implemented as a result of the federal Safe Drinking Water Act (SDWA). Under Part C of the SDWA (Public Law 93-523, as amended by Public Law 96-502; 42 USC 300f et seq.), Congress directed the USEPA to develop regulations for a nationwide UIC program that would control the permitting and operation of injection wells to protect USDWs. The EPA was charged with developing minimum requirements for state UIC programs. States had the option of developing regulations that were more stringent than the federal regulations.

The EPA promulgated the current UIC regulations in 1980. The Congressional intent was for the individual states to administer the UIC program. States could receive the EPA grant money to develop a UIC program and apply to EPA for primary enforcement responsibility ("primacy") for that program. In states which have not sought or have not received primacy, the EPA administers the program directly ("direct implementation" programs).

EPA regulations established five classes of injection wells each defined, in part, by the well's use and physical relationship to a USDW. Class I wells, are those which inject industrial and municipal waste fluids beneath the lowermost formation containing a USDW. Class II wells are those used for injection related to oil and gas activities or hydrocarbon storage. Class III wells are those that inject fluids for the extraction of minerals such as in solution mining operations. Class IV wells, those injecting directly into a USDW, were banned nationwide on May 19, 1980 (40 CFR Part 122.36), and all other Class IV wells were banned on May 11, 1984 (40 CFR Part 144.13). Class V wells are injection wells not covered by Class I through IV, and generally include wells injecting non-hazardous fluids into or above a USDW.

States have the option of applying for primacy for all or only a portion of the injection well classes. For example, in California, the EPA administers the UIC program for Class I, III, IV, and V wells, while the state runs the program for Class II injection wells.

Section 1425 of the SDWA established the method for a state

to obtain primary enforcement authority for its Class II program by substituting the existing state regulatory program for the prescribed EPA program. This alternative program could be approved by the EPA if the state demonstrated a level of USDW protection as defined by the SDWA, specifically subparagraphs (A) through (D) of section 1421 (b) (1), and that such program represented and effective program to prevent injection which endangers USDWs.

The state programs subject to this peer review and of this report are all alternative state Class II primacy programs approved under section 1425.

TEXAS
CLASS II
UIC PROGRAM
PEER REVIEW
EXECUTIVE SUMMARY

TEXAS CLASS II PEER REVIEW

EXECUTIVE SUMMARY

The peer review of the Texas Railroad Commission, Oil and Gas Division, Underground Injection Control Section Class II UIC program was conducted in Austin, Texas, in July, 1988. The Review Team consisted of two state UIC Class II deputy directors, one former state UIC director and the UIPC Technical Director.

The review conducted using a comprehensive questionnaire completed by state UIC personnel, direct questioning of these personnel by Review Team members and review of actual documents and procedures used. Preliminary findings were made and an exit interview was held wherein perceived areas of program strengths and concerns were brought forward for discussion, clarification and/or amplification.

PERMITTING/FILE REVIEWS

All UIC permitting and file reviews are conducted at RRC offices in Austin. There is a high degree of cooperation between the RRC and the Texas Water Commission facilitating the protection of USDWs. In a carry over from pre-primacy, the protection of designated useable quality waters (UQWs) is emphasized. The base of UQWs is commonly the base of the USDW. Casing and cementing requirements are set by rule. Permits generally contain requirements for tubing and packer, injection pressure limits, and gauging injection volumes and pressures. Plugging bonds or other financial assurance is not required for active wells. There is a plugging fund that is maintained at a minimum balance of $1.0 million. Aquifer exemptions have been granted for hydrocarbon producing zones. A file review commitment was not a part of the Texas Primacy application. File reviews are now being expeditiously completed under a special grant.

The Review Team found good permitting and file review procedures and qualified personnel, good cooperation between water protection agencies, and good post permitting oversight. A concern was expressed relative to examination of area of review wells. With this single exception, the Review Team concluded that this portion of the program was protective of USDWs.

INSPECTIONS

Field inspections are preformed by state employees operating from district offices. Each district has a UIC coordinator who monitors UIC field activities. A number of detailed standard forms are used to initiate and document field activities. Inspectors are provided a wide variety of office and transportable aides to facilitate their work and communication in the field. Periodic training and informational meetings are held with inspectors. Photographs are taken as needed to support field reports. Inspectors are provided a manual for conducting ground and surface water investigations. There is prompt response to complaints and emergencies. The field staff has been reduced about 20 percent to 102 inspectors in response to State revenue constraints.

The Review Team concluded that, with the manpower available, the State was performing excellent inspection work facilitating protection of USDWs.

MECHANICAL INTEGRITY TESTING

Texas utilizes the annulus pressure test (APT - 70%) and annulus pressure monitoring (APM - 30%) combined with the review of cementing records for mechanical integrity determinations. These may be supplemented by radioactive tracer surveys, cement bond logging, temperature surveys, or other mechanical tests when required. APTs require pressure stabilization within 10% of test pressure and no decline for a minimum of 30 minutes thereafter. APM data is reviewed by technicians or engineers on annual reports. Engineers review other MI test submittals. Good data processing test notice and follow up procedures are used. Non-standard wells are generally subject to more frequent testing.

The Review Team concluded that this portion of the Texas program was being conducted in a manner protective of USDWs.

COMPLIANCE AND ENFORCEMENT

The RRC has a sophisticated compliance and enforcement program which may begin either from the Austin or district offices. The definitions of what are considered to be minor versus major noncompliance instances are clear. The RRC utilizes a staged enforcement approach designed to achieve voluntary compliance. Computer tracking is used to ensure enforcement time tables. The RRC possesses and uses the

authority to assess fines directly. There is a separate Legal Enforcement Section which handles formal enforcement penalty actions.

The Review Team concluded that this portion of the Texas Class II UIC program is highly effective in achieving compliance with rules and permit conditions and is protective of USDWs.

PLUGGING AND ABANDONMENT

Well plugging must be conducted in a manner approved by the RRC. The plugging requirements of State Rule 14 should result in all wells being plugged in a manner protective of USDWs. Plugging is normally accomplished with cement plugs across or isolating zones of interest with weighted drilling mud separating the plugs. Emphasis is placed on witnessing plugging of injection wells, however, as a result of the reduction of inspectors, witnessed pluggings have declined from 60% to 40% (production and injection wells inclusive). All well pluggings must be completed with a state approved plugging contractor who is required to file an affidavit for each well plugged.

The Review Team concluded that, notwithstanding a desire to see more inspectors and more inspections of plugging operations, this portion of the Texas program is being conducted in a manner protective of USDWs.

INVENTORY/DATA MANAGEMENT

The RRC is in the process of developing one of the most voluminous and sophisticated data management systems in the nation for UIC. A wellbore data system includes significant technical detail on about 40 percent of the estimated one million wells in the State. A computer mapping system will allow almost real time mapping of any of a variety of selected information any where in the State upon completion. UIC and other data systems are used to record, retrieve and monitor permitting, testing, and compliance.

The Review Team concluded that the existing data management system substantially enhances the RRC's ability to protect USDWs.

PUBLIC OUTREACH

The Texas public outreach program is designed to primarily reach the regulated community and those who may be directly affected by injection operations. Notice to county and city clerks of proposed injection well operations is a feature of the Texas UIC program which differs from many other state notification practices and is an excellent outreach element in light of concepts such as the Wellhead Protection programs which are being implemented around the state. While no formal outreach program for other persons is ongoing, staff members have and continue to make presentations to the public or local government on an as needed basis.

The Review Team concluded that the RRC conducts an appropriate, reasonable, and effective public outreach program.

TEXAS
CLASS II
UIC PROGRAM
PEER REVIEW
TEAM REPORT

PEER REVIEW OF THE TEXAS CLASS II UIC PROGRAM

TEXAS RAILROAD COMMISSION

REVIEW TEAM REPORT

REVIEW TEAM COMPOSITION

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GENERAL PROGRAM COMMENTS AND OBSERVATIONS---BACKGROUND

1. Overall responsibility for the Texas Class II UIC program is contained within the Texas Railroad Commission (RRC), Oil and Gas Division (Division), Underground Injection Control Section (Section). The Section is completely responsible for permitting, file review, test scheduling and evaluation, and reporting to the EPA. The Section coordinates with other Division sections on matters related to budgeting, personnel, mapping, records, hearings, and inspections. Even though the primary authority for these latter functions is centered within other Division sections, there is an excellent degree of cooperation and coordination of efforts between all of the sections leading to accomplishment of the ultimate water protection goals of the Section. This cooperation is discussed within the individual sections of this report.

2. The RRC enjoys an excellent degree of cooperation with the Texas Water Commission (TWC). The TWC is the agency in Texas with the primary responsibility for protection of the quality of surface waters and ground water. RRC rules provide that before a permit for injection will be issued, the applicant must obtain a letter from the TWC stating the depth of usable quality water (UQW). Additionally, when the well is to be used for disposal purposes, the TWC must provide a letter supporting the applicant's position that the disposal will

not be into a zone of UQW or into an Underground Source of Drinking Water (USDW). The Section makes an independent review of available data to confirm the TWC's findings.

3. The base of UQWs may or may not be the same as USDWs within the various areas of the State. In general, UQWs have total dissolved solids (TDS) concentrations of 3,000 ppm or less. However, in some areas of Texas, waters of higher TDS concentrations have or are being used. In such areas, the TWC sets the base of UQW at the base of the quality of water used. In these special areas, the bases of UQW and USDW may be the same. Further, in many areas of the State, there is no water with TDS concentrations of between 3,000 ppm and 10,000 ppm below the base of UQW. Nearly 70 percent of the Class II wells in the State are located within such areas. As more fully described elsewhere in this report, UQWs are required to be protected with surface casing set and cemented to the surface and USDWs are, at a minimum, always protected by casing set and cemented well above any producing or injection zones.

4. The Texas UIC program is the largest such program in the country covering over 15,000 operators and 53,000 injection wells.

GENERAL PROGRAM COMMENTS AND OBSERVATIONS---ACCOMPLISHMENTS

The following is a list of a number of the major accomplishments of the Texas program since program Primacy was received from the EPA on April 23, 1982.

1. Statewide Rule 9 was amended in 1982 to require that all disposal wells be equipped with tubing and packer by January 1, 1984.

2. The initial inventory of injection wells and the resultant data base of injection wells was completed in 1981.

3. Public outreach programs were initiated with the completion of an educational UIC reference manual published in 1982. The manual is updated and at least three seminars are conducted each year to educate and inform the regulated community about the UIC program.

4. Monitoring and reporting systems were designed and implemented utilizing automated and manual processes. These systems result in the review of injection data for essentially every injection well each year.

5. From 1985 through 1988, the results of over 37,000 pressure tests have been reviewed for injection well mechanical integrity determinations.

6. Testing requirements were initiated for underground hydrocarbon storage wells including specialized testing methods for storage cavern systems.

7. An automated data system was developed to track violations and compliance and enforcement actions on a per well basis.

PERMITTING/FILE REVIEW

A. OBJECTIVE: UNDERSTAND THE PERMIT FLOW PROCESS

Applications for Class II permits for disposal and injection wells are filed with the RRC UIC Section in Austin. Copies of the application must also be filed with the appropriate RRC district office. The application is made on Commission Form W-14 for disposal into nonproductive zones and on Forms H-1 and H-1A for injection into productive reservoirs. Applicants must also submit a complete electrical log of the well, copies of any other logging or testing data available such as cement bond logs, and a letter from the TWC that provides information on the depth of usable quality water (UQW) and of other intervals containing water that should be protected.

The applicant must submit proof of publication of notice of the application in a newspaper of general circulation in the county where the well is or will be located. The published notice must give technical details of the proposed well (depth of the injection zone, formation name, type of injection, etc) and must advise that requests for public hearing must be filed with the RRC within the allotted time period. The applicant must also certify that a copy of the application has been sent to the surface owner, offset operators, and to the appropriate county and city clerks.

For injection projects (EOR) that will utilize fresh water resources the applicant must provide information on the volume of freshwater available, recharge rates, and the reasons for use of fresh water in lieu of salt water. Other data that must be included with the application includes a listing and status of all wells that are included within the appropriate area of review (AOR) of each well that is proposed for injection or disposal. Texas uses the standard 1/4 mile radius AOR.

The applications are reviewed and evaluated by the technical support unit of the UIC Section staff in Austin. This unit includes the Class II permitting manager (a geologist), administrative technicians and the engineering staff. Internally, applications are forwarded for fee verification to the Permit Manager who in turn assigns them to an administrative technician. There, the applications are checked for administrative completeness. If the proper fee has not been included with the application, the application

is returned to the applicant. When applications are deficient in regard to required data, the applicant is notified of the deficiency and has 90 days to submit the information or the application will be returned.

The administrative technician also checks to see that all the wells within the area of review (AOR) have been listed and their current status shown. Once a complete application is on file and the 15 day waiting period has expired without protest, the administrative technician submits the application and a draft permit, based on standard conditions, to a technical reviewer (engineer). The engineer performs a technical review of the application, including a review of casing and tubing data and preparation of a well sketch to show detail of casing, cementing, plugs, and perforations. The technical reviewer may request additional information as necessary. When the technical review is complete, technical permit requirements (pressure limits, corrective action requirements, etc) will be added to the permit as necessary.

All applications for injection into oil or gas reservoirs are further routed to a UIC engineer for examination of the appropriateness of the proposed enhanced recovery operation. Since the appropriate District office also receives copies of applications, personnel in that office may also provide input regarding the proposal if they feel the necessity or are requested to do so.

Once all reviews are complete, the draft permit is routed back to the Permit Manager for approval. Any draft permits with unusual conditions are routed to the UIC Director before final approval. At this point, Records Control personnel enter pertinent information into the data management system.

Permits subject to administrative action are typically approved within 30 days. The short turn around period can be attributed in part to the use of a checklist process. The permitting checklist (W-14 Review Form) is used by both the administrative and technical reviewers to ensure that all the attachments to the permit application form are included and that all the necessary technical data regarding the well have been reviewed for compliance with the Statewide Rules.

The operator will be notified in writing and given an opportunity to request a hearing if a protest from an affected person or local government is received within 15 days of receipt of the application or of date of publication

or of the date notice is mailed to offset operators and surface owners, whichever is later. Hearings are held in Austin before a legal and technical hearing examiner. The examiners will recommend final action by the Texas Railroad Commission.

Permitting for commercial disposal wells utilizes the same procedures; however, permit conditions related to the surface facilities are more stringent than for non-commercial disposal wells.

B. OBJECTIVE: UNDERSTAND THE FILE REVIEW PROCESS

Wells used for injection into productive reservoirs and for disposal were permitted by the state prior to receiving Class II primacy from EPA. Upon receiving primacy, there were over 43,000 existing Class II wells. As set out in the Primacy Agreement, initial file reviews were conducted on an as needed basis. Last year, Texas received a special grant award to speed up this work and a special file review group was established within the UIC Section. The file review group is comprised of 15.5 positions. File Reviewers are geologists and engineers. They review the well record of each injection or disposal well to assess the adequacy of fluid confinement and ground water protection based upon confining zones present, well construction, and cementing in relation to water zones.

Deficiencies are noted and operators are contacted and requested to submit data to correct deficiencies or to repair, shut-in or plug the well. New permits will be issued for each well at a future date. Reissued permits may contain new provisions that are aimed at bringing the well into conformance with present requirements or imposing additional testing and monitoring requirements. File reviews are generally performed in the order by which permits were initially granted. Exceptions to the systematic review occur when newer wells have been permitted within an older enhanced recovery project or when field observations or compliance or enforcement action call for a file to be reviewed. The file review procedure is expected to be completed in about two years provided that the additional funding is continued.

A high priority is being placed on the completion of the file review project. A quota system was imposed upon the reviewers for the purpose of completing the review in two years. File reviewers are expected to perform one file

review per hour. A file review without complications can be completed in about one half hour. A file review is not considered complete until all pending actions and compliance actions have actually been completed by the operator. The data management system is used to track the progress of file reviews. Sixty percent of file reviews have been completed although documentation only covers two thirds of this number.

C. OBJECTIVE: UNDERSTAND THE TECHNICAL REVIEW AND RELATED ASPECTS OF THE PERMIT/FILE REVIEW PROCESS

The review of applications for new disposal or injection wells and the existing well file review process take into account the depth of UQWs, USDWs, adequacy of the confining zone, the adequacy of casing and cement, the use of tubing and packer, injection depths, injection pressures and volumes and other appropriate data.

Depths of UQWs and of USDWs are determined from the TWC letters that are included as an attachment to injection and disposal applications, respectively, supplemented by the UIC Section's own examinations. The depths and intervals of UQWs are determined by the TWC based upon current information for a particular area. The determinations are made utilizing an extensive library of electrical logs on file with the TWC.

The confining system for disposal wells is judged for adequacy by determining whether there is at least an accumulative thickness of 250 feet of relatively impermeable strata such as clay and shale to separate the injection zone from the base of the UQW. Electric logs are used by the Section from the well in question or from nearby wells to measure the thickness of the clays or shales. Confinement is considered adequate without additional study when injection is into productive intervals for secondary or enhanced recovery since the oil or gas would not be present at such location if there was no confinement.

Casing and cementing requirements have been specifically designed to protect waters that are considered by the TWC to be of usable quality. The depth to the base of the UQW generally coincides with the base of waters containing 3,000 ppm TDS or less. Surface casing for newly drilled wells is required to be set to the base of the UQW. There are no field rules that alter this requirement. Statewide Rule 13 does provide for exceptions on a well by well basis, however, such exceptions are granted only in special situations when

alternate completion practices are desirable to separate zones of varying water quality. For wells that are converted to injection or disposal, it is not a requirement to have casing set and cemented through all USDWs; however, squeeze cementing at the base of UQW may be required for intermediate or production casing if the surface casing had not been originally set to the base of the UQW. USDWs that may be below the base of the UQW are isolated from the disposal zone by cement and mud behind casing. Wells that have unusual casing and cementing programs for which corrective actions are not technologically desirable to protect UQWs will have permit applications denied.

Three different criteria are used to determine whether there is adequate cement above the injection zone to confine the injected fluids. These criteria are: (1) at least 400 feet of cement by volumetric calculations; (2) at least 250 feet of cement as determined by a temperature log; (3) or at least 100 feet of cement with 80% bonding as determined by a cement bond log. If the evidence shows any one of these criteria to be met, isolation is considered adequate. The criteria were established based on empirical evidence. Intervals that are not covered by cement contain drilling mud.

It is noteworthy that the RRC requires a report on the cementing from both the operator and from the cementer. The cementer is required to file a cementer's affidavit attesting as to how the well was cemented. Only cementing companies authorized by the RRC can be used. Cementer's filing false reports can lose their RRC authority. This process is to provide a good cross check against the operator's report of cementing and to help assure that cementing operations are carried out only as approved by the RRC.

Tubing and packer are required for injection. Exemptions to this requirement have been granted for enhanced recovery injection wells that existed before primacy. In most instances, MI tests are required at least annually for wells without tubing and packer.

The maximum surface injection pressure has been limited in Texas to 0.5 psi/per foot of depth. For enhanced recovery projects, an applicant may run a step-rate-test and ask for a higher pressure limit. This information is reviewed by the UIC Section before any exception to the 0.5 psi/ft standard is granted.

Based upon past history, areas within the State have been

identified as having geologic conditions which may not assure confinement of injected fluids. These areas have been mapped and injection therein is precluded or limited. For example, due to highly pressured conditions no disposal is allowed in the Nacatoch Sand of northeast Texas where it is not productive of oil or gas. The Gloyd Lime has also been identified as having pressure and water flow problems. In the Joy-Midway area of north Texas, operators must submit more detailed information than normally required with permit applications including more extensive information on wells completed and plugged within the area of review.

As previously mentioned, an applicant for a permit must include as part of the application, a tabulation of wells, and a map to indicate the wells that are within the area of review (AOR) of the proposed injection or disposal well. The information supplied for these AOR wells includes the operator name, lease name, and well number, the spud date, and the status of the well (P&A, TA, producing oil well, etc.). The UIC administrative reviewer determines if all the wells on the map that penetrated the injection interval are indicated in the tabulation. It was indicated to the Review Team that it is the responsibility of the operator to review the wells in the AOR and to indicate whether there may be any problems with any wells, such as lack of cement behind casing in the injection zone or any wells that might be improperly abandoned. The UIC technical reviewer does not normally independently review the condition of the AOR wells since the plugging and cementing details are not required as a part of the application. If a well is indicated from the public record as being plugged and abandoned it would be indicated as P&A on the AOR tabulation and would be assumed to be plugged in accordance with RRC rules and in need of no further review to determine if the original plugging work meets water protection standards. The same procedure applies to the review of casing and completion data for wells indicated as active or shut in. There is no check of the data submitted by the applicant by the UIC Section to independently determine if these P&A wells and other wells in the AOR are in fact plugged or cemented in a manner that will prevent fluids from entering the wellbore and/or migrating to USDWs or UQWs.

D. OBJECTIVE: UNDERSTAND THE NONTECHNICAL PORTIONS OF THE PERMIT

There are no requirements for bonding or financial assurance

for wells, however, the state does maintain a plugging fund that can be used for well plugging when a responsible party cannot be found. This fund currently stands at approximately $1.3 million. It is supported by a $100 drilling permit fee for new, reentered, or plugged back wells and a $100 annual fee for holding a well in temporarily abandoned status due to economics. Alternatively, either a blanket bond or individual well bond may be required for wells carried as temporarily abandoned. The amount of the blanket bond is the lesser of $250,000 or $1.50 per foot of depth of all wells covered by the bond. One well bonds are based upon an estimate of plugging costs currently calculated at $1.50 per foot of well depth. There are about 50 blanket bonds now in force predominantly for "major" companies. Notwithstanding the above bonding requirements, exceptions to financial assurance may be granted for wells associated with enhanced recovery projects if there is reasonable assurance of the future use of any such well.

In regard to the public notification process, applicants for UIC permits are required to place a notification for one day in a newspaper within the county where the well is located. Also the operator must send a copy of the application to offset operators, city and county clerks, and surface owners. Proof that the proper notification has been performed must be submitted to the UIC section with the application. Fifteen days is provided for anyone that may be affected by the project to register a protest. Public hearings are held in Austin and hearings are held before a technical hearing examiner, who is an engineer or geologist, and a legal examiner. Examiners are not members of the UIC Section. The UIC Section does not normally participate in the hearings; however, they may provide pertinent information. Following the hearing, the examiner makes a Recommendation for Decision to the Commissioners.

E. OBJECTIVE: UNDERSTAND THE PROCESS FOR AQUIFER EXEMPTIONS

Aquifer exemptions for oil and gas producing horizons were included as a part of the original Primacy Agreement. Any future aquifer exemptions would have to meet the strict parameters set out in EPA regulations. This would mean that in order for an aquifer or a portion of an aquifer to be exempt from protection under the program, it must not currently serve as a source of drinking water in the area of injection and cannot serve as such a source because it is

mineral, hydrocarbon, or geothermal energy producing; it is situated at a depth or location which makes recovery of water for drinking water purposes impractical; or it is so contaminated that it would be economically or technologically impractical to render the water contained therein fit for human consumption. Any aquifer exemption proposal would be submitted to EPA for concurrence. There have been no aquifer exemptions in Texas since those that were approved as part of the Primacy Agreement.

PERMITTING AND FILE REVIEW---STRENGTHS

1. One of the significant strengths of this program is the high degree of cooperation that exists between the RRC and the TWC. The TWC possesses expertise in the location and depth of usable quality water and USDWs statewide and provides an independent source of such information. The UIC Section reviews this information and confirms it by utilizing electrical logs from their own records.

2. The Review Team found the UIC Section staff to be fully familiar with the permit and file review processes and highly qualified with respect to the duties they are performing. Many of them are former employees of the TWC.

3. The identification of geographic and geologic areas of the State where injection may present problems and the implementation of special conditions or restrictions should serve to protect USDWs.

4. The geologic and cementing confinement requirements of the rules and the independent review of applications for these factors by the UIC Section should provide strong assurance that the injected water is adequately confined.

5. The requirement to send a copy of the application to all surface owners, offset operators, and city and county clerks assures affected parties are properly notified. Notification of city and county clerks is a particularly good process because it not only provides opportunity for comment, but it also provides a good neighbor policy by informing local jurisdictions of activities occurring in their area.

6. The quota system for file reviews should help assure that this portion of the program is completed as scheduled. This coupled with the requirement that all corrective action be completed before a file review is considered complete will

assist in the early completion of necessary well repairs.

7. The checklists used for permit and file review help assure that all elements of the reviews have been completed.

8. The permit file checked by the Review Team was complete and very easy to follow.

9. The average 30 day permit turn around time is very good.

10. The casing and cementing rules for newly drilled wells provide for significant protection of USDWs. The requirement for the cementer's affidavit combined with the RRC authority to approve cementing companies which may be used should help ensure that all cementing takes place as approved.

PERMITTING AND FILE REVIEW---OTHER CONSIDERATIONS

1. There is concern that financial assurance may not be adequate in the long term. The existing plugging fund could be expected to plug only 100 to 200 wells and the universe of wells that could conceivably be abandoned by their owners and left for the State to deal with is higher by orders of magnitude. Further, the plugging fund is subject to raids by the Legislature. While not considered an imminent problem or threat to USDWs, the Review Team suggests that long term financial assurance issues and options be explored.

2. The Review Team feels that more participation by the UIC Section in the hearing process is warranted. Even though the hearing examiner is an experienced engineer or geologist the UIC Section being more familiar with UIC procedures, issues, and requirements would increase the likelihood that the final order (permit) would include all provisions necessary to protect USDWs.

3. The area of most concern to the Review Team revolves around the technical review of AOR wells. Although the applicant provides a tabulation of wells in the AOR, their status and a map showing such wells, the Review Team is concerned because neither the applicant, in most cases, nor the UIC Section reviewer were examining AOR well construction, cementing or plugging.

The Review Team examined a permit application which only identified the spud date and the status of the wells within the AOR wells as P&A, TA, or producing. Nothing in the

application provided any technical or other detail on well construction or plugging. In this instance, the application indicated a well within the AOR that had been spudded in 1929 and was now P&A. The permit review procedures by the UIC Section do not include an independent review of the records of any AOR well. Therefore, there is no determination that the plugging of the old well had been performed in a manner to be protective of USDWs. If this particular well had been recently abandoned, then the use of appropriate plugging might be assumed, but if the well had been abandoned shortly after the spud date (1929) then there could be reason to believe that the original plugging may not be adequate relative to the proposed injection. This same lack of AOR information and the Review Team's concern also applies to producing wells. It is the feeling of the Review Team that there is not enough information supplied with the application for the UIC section to know, with any degree of certainty, whether the wells in the AOR have been cemented or plugged in a manner that will be protective of USDWs.

Consideration should be given to amending the permit process to require sufficient data with the application to be assured that the applicant has actually examined the condition of wells in the AOR and has evaluated their condition in relation to the proposed injection. A more detailed application would permit the UIC Section permit reviewer to verify the data, at least on a spot basis, without significantly adding to the time for permit review.

CONCLUSIONS

The UIC Section staff are highly qualified, knowledgeable, and dedicated to their work. The techniques and procedures used in the permit and file reviews are highly satisfactory. The fact that the lead agency for water protection and policy, the Texas Water Commission, takes an active part in all UIC permits is a strong reason to believe that Texas is serious in its concern for water protection. The only significant concern of the Review Team relates to the adequacy of the examination of AOR wells. Without more detail supplied by the applicant or without an independent examination of AOR wells by the UIC Section staff, it is difficult to be certain that these wells are completed or plugged in such a manner that injected fluid will not find in them an avenue for escape into other zones where it may be a threat to a USDW. With this single exception, the Review Team believes that the permitting and file review portions of the

Texas program are assuring the protection of USDWs.

Texas has more production wells and more injection wells than any other State (about one million wellbores and over 50,000 injection wells) and must deal with them at a time of limited State and industry resources. The Review Team found that essentially all of the work currently being performed by the UIC Section is needed and that there seems to be little flexibility in shifting resources with existing staffing levels to take on additional work. Nevertheless, the Review Team believes that AOR examinations are such a critical portion of the permitting process that Texas should give consideration to amending permit application requirements to provide more AOR data. Perhaps placing the responsibility for assembly and examination of AOR data on the operator with a requirement for sufficient information in the application for at least spot checks by the Section staff could alleviate our concerns in this area without unduly adding to the permitting work.

INSPECTIONS

A. OBJECTIVE: UNDERSTAND HOW FIELD OPERATIONS ARE CONDUCTED AND MANAGED FROM THE STATE OFFICE

Essentially all inspections are performed by district office field inspectors under the supervision of a district office engineer or geologist. District office operations are under the supervision of a district director who, through an assistant director of Regulatory Enforcement in Austin, is responsible to the Director of Regulatory Enforcement. This is a staff position at the same level as the Director of Underground Injection Control. Each district office is assigned the responsibility for all oil and gas inspections, inclusive of UIC, in its specific geographic area. Usually, each inspector is assigned a county(ies) or field(s) and is expected to perform all oil and gas related inspections in this area. There is some specialization in the areas of well plugging (carried out by the State), oil theft investigations, hydrogen sulfide gas problems, etc. though even such specialized inspectors are expected to keep their eyes open for violations of any RRC rules.

Each district office has a "UIC coordinator" who is responsible for directing UIC related inspections and activities. The coordinator may be an engineer or an inspector. Some districts have a full time UIC inspector. All inspectors are employees of the RRC and are generally retired or experienced oil field workers along with a few engineers and geologists who are recent college graduates. Following the loss of 28 inspectors due to budget constraints, the ten (10) district field offices now employ approximately 102 inspectors. RRC inspectors performed about 175,000 "lease" inspections in 1987. Lease inspections include the full array of possible inspections that may be performed at a lease including, for example, inspections of drilling operations, producing wells, injection wells and surface facilities, flow lines, automatic custody transfer equipment, tanks, signs, and pits. A single "lease" inspection could include no wells or it might cover 200 or more. The UIC Section estimates that one injection well is inspected for each four lease inspections performed.

Inspectors generally work out of the district office but may work partially from their homes as in the Houston area where excessive time would be lost in commuting through city traffic. Some supervisors closely direct the daily work of

their field staff while others may simply place the "Call Ticket" for inspections in the inspector's box and allow the inspector to select the highest priority work. The quality of all field work is assured by a variety of activities including periodic trips by the supervisors with inspectors to observe and evaluate their work, taking a previous day's inspection reports and backtracking the inspector to verify the same, and a new experimental peer review procedure where inspection personnel from one district review and evaluate the procedures and work of another. About half of the RRC inspectors are covered by the Fair Labor Standards Act severely limiting their use in overtime inspection situations.

Inspection priorities generally are as follows:

1. Blowouts/fires and other conditions threatening the public safety;
2. Active pollution of any kind;
3. Citizen complaints;
4. Reinspection of on-going problems; and,
5. Routine inspections.

Frequency of well inspections vary in each district office depending upon such factors as an operator's compliance history, the age and condition of the wells, "paperwork" violations and citizen complaints. Some districts perform well inspections at random while other districts schedule inspections on a yearly basis. All districts attempt to inspect commercial Class II wells monthly. Communication of the results of field work is continuous with the Austin office through correspondence, the State telephone network, and computer terminals and modems.

Field inspectors make every effort to prepare complete and accurate reports since such reports are instrumental in developing enforcement cases and can eventually find their way into records of administrative and judicial hearings. Inspection reports are filed by various means in each district office. Pending files are maintained until subsequent reinspections document compliance with enforcement letters.

Inspectors receive on the job training in RRC procedures and forms, proper precautions to take around high pressure equipment, sour gas operations and the use of related safety equipment. Training may take place at service company or RRC seminars. Additionally, there are monthly staff meetings

where any new rules, policies, procedures, or directives are covered. Inspectors have an unusual amount of resources available to them in conducting their work. Each inspector has a microfiche file and reader that he carries with him. This file contains listings of operators and corporate officers, lease information, gas and oil proration schedules, and maps which are updated yearly. Field cars are equipped with radios to facilitate rapid communications and each district office has a computer terminal which may be used to obtain information such as UIC permit data.

Most requests for specific UIC inspections are made directly to the district office by the UIC Section. Extraordinary or very important requests for inspections are made through the Regulatory Enforcement Division Director's office in order to take advantage of its elaborate follow up system to be certain that the matter is expeditiously handled.

B. OBJECTIVE: UNDERSTAND THE ROUTINE/PERIODIC INSPECTIONS PERFORMED IN THE STATE

Average time for the typical RRC "whole lease inspection" is approximately two (2) hours per lease including travel time. Each inspector performs approximately 100 monthly inspections of which 25% are UIC related. Initial and routine inspections are unannounced to prevent operators from altering existing operating conditions. If problems are discovered, operators may be contacted and requested to meet inspectors at a lease or well site. Reinspections are usually scheduled ahead of time by informing the operator in writing or in a notice of violation.

Routine inspections are documented on one or more district forms. The lease inspection form, (Form D-2), has a checklist and detailed instructions. The inspector looks for violations of any RRC rules and regulations and records observed conditions on the appropriate form. The description of major violations is documented on Form D-3, including information concerning affects on the ground surface as well as surface water contamination. Photographs are taken as needed to supplement the written reports and then attached to each report upon filing at the district office. Operators are not routinely given a copy of the inspection reports, however, copies can be obtained from the district office.

Field inspectors are required to utilize gauges provided by the Commission to test Class II wells. These gauges are

calibrated when deemed necessary by the inspector to assure accuracy. Flow meters are not provided to inspectors, however, they may monitor and record data from operator's flow meters.

Samples are not routinely collected during inspections, however, inspectors are trained to test the chloride content of fluids with field testing kits provided by the Commission. This procedure is used to check water quality and the potential for pollution when problems are discovered and enforcement action is anticipated. Inspectors or other district personnel may be required to sample "contaminated" water wells and nearby wells when contamination by oil, gas or Class II injection operations is suspected or alleged. Guidelines for conducting such investigations are described in a manual prepared for the district offices by the UIC Section. This manual, Procedures for Performing Hydrologic Investigations, sets forth guidelines for performing ground water and surface water investigations. The manual outlines procedures for water well and surface water sampling, sample preservation, chain of custody, field determination of water quality, and interpretation of data. This excellent manual is a part of the EPA approved Quality Assurance Plan.

Complaint investigations may be referred to the Texas Health Department and/or the Texas Water Commission for study if contamination from non oil or gas or UIC sources is suspected. Many complaints of water wells "gone bad" are reported to be resolved by the discovery that septic systems are the cause for contamination rather than oil, gas or injection operations. The RRC has and utilizes its own laboratory for performing analyses. The full balance analyses performed by the RRC results in few determinations that Class II wells are the cause of contamination of drinking water.

C. OBJECTIVE: TO UNDERSTAND THE EMERGENCY AND CITIZEN COMPLAINT RESPONSE PROCEDURES

Each of the ten Texas Railroad Commission district offices and the main office in Austin has a 24 hour answering service to receive reports of emergency field conditions or citizen complaints. District and UIC personnel rotate "phone duty" to receive and initiate action on such calls. Response to emergency calls or complaints will either be immediate or within 24 hours depending upon the seriousness of the situation reported. All complaints are given top priority in

all districts.

Examples of significant emergency conditions reported include blowouts, fires, oil spills, pipeline leaks and salt water breakouts. Examples of significant citizen complaints are reports of unauthorized injection, surface salt water/oil spills, leaks, use of wells for commercial disposal, disposal of unauthorized fluids, surface breakouts of salt water and suspected water well contamination. Of approximately 3000 complaints received annually, 80 percent are related to alleged pollution of the land surface, surface water, or ground water. Approximately 1,400 complaints are related to old, shallow, marginal wells in two areas.

Inspections of emergency conditions and citizen complaints are documented on the appropriate district form. The district informs the Austin office of the results of such inspections. The operator may be notified of any required remedial action by correspondence, telephone calls or, when necessary, an operator representative may be summoned to a well site during the actual emergency or complaint inspection to begin immediate remediation activities. Following the inspection, the district office sends a memo to the Austin Field Operations Office to summarize the inspection, any violations found, and any enforcement actions taken. The operator and complainant are sent copies of the memo which includes a date for any reinspection to be conducted.

D. OBJECTIVE: UNDERSTAND THE OUTPUT FROM THE FIELD INSPECTIONS

UIC inspectors employed by the Commission receive on the job training as well as periodic instructions during staff meetings concerning the correct procedures for performing and documenting investigations of all oil, gas, and UIC related activities. All types of inspections are initiated with or documented on "D" (District) forms. Each form is utilized for documentation of a specific type of inspection. The following is a listing of such forms and a brief description of the purpose or use for each:

> D-0: Otherwise known as the "call ticket", this form is used to document reports of violations, complaints, requests for inspections, or any other telephone calls received by district offices and the Austin office. Form D-0 is used to provide a detailed description of

the location of a facility or site to be inspected. On the form, special instructions may be given to the inspector assigned to carry out the investigation.

D-1: This form is used to document the results of a complaint inspection.

D-2: This routine lease inspection form contains a checklist of the compliance status of each facility inspected. Violations discovered are described on the form.

D-3: When serious pollution violations are discovered during inspections, Form D-3 is used to provide a detailed description of each violation and the apparent cause of each violation. Serious pollution violations include discharge of salt water or other material onto land or into streams, lakes, rivers, etc.

D-4: Form D-4 is used for documenting oil or gas well production tests (this form does not relate to UIC inspections).

D-5: This miscellaneous inspection form is used for documenting any other inspections such as drilling rigs, salt water haulers, surface/production casing cementing, plugging, salt water disposal/injection wells, pit permitting, etc.

D-6: Reports of well blowouts and/or fires are documented and assigned to the appropriate personnel through use of Form D-6.

In addition, inspectors keep a personal log/tickler file for their own use.

Photographs are taken with Polaroid cameras as needed to supplement written reports. If samples are collected, chain of custody forms/tags are completed. After analytical work is complete, tags are kept on file at the Commission laboratory. All inspections are written up on location on the appropriate form at the time of the inspection. All districts do not file the inspection reports in the same manner. Some are filed by lease, some by inspector, some by type of inspection, or in whatever manner meets their needs. Austin is working to make the inspection form filing system uniform.

Reports are reviewed and appropriate action is initiated by

the technical staff (engineers/geologists) of each district office. Active pollution incidents result in immediate telephone calls to the responsible operator with confirming correspondence mailed soon thereafter. Compliance letters for minor violations are written and mailed within a week of inspection.

INSPECTIONS PROGRAM---STRENGTHS

1. The 24 hour answering services used, the phone network, the radio equipped cars, the transportable microfiche files and readers, the call ticket system and the field inspectors' pagers provide good methodologies and facilities for receiving notices of tests, activities or conditions requiring inspection and excellent resources for preparing for and conducting inspections.

2. Complete and accurate documentation of inspection activities on excellent forms provide the necessary detailed information to carry out appropriate enforcement actions.

3. Excellent quality assurance is provided for field inspections by having supervisors periodically accompany inspectors in the field and by performing actual field follow-up verification of inspections previously completed and reported. The field peer review efforts recently begun by the RRC should also help in this area. The use of the variety of standard inspection forms and instructions enhances the quality of the field work and the output. Inspector schedules are adjusted to provide for coverage on weekends and nights. The appointment of a person knowledgeable in the program and its policies and goals as UIC coordinator in each district should also enhance the quality of UIC field activities. This person should be an excellent resource for the UIC Section in all matters related to UIC activities in the district.

4. Though the districts seemingly have different procedures for initiating inspections all are logical and included good checks by the supervisors on the work done. Inspection priorities vary somewhat between districts based upon the numbers and types of wells therein but all seemed appropriate.

5. Response time to emergencies and complaints is very good.

6. RRC legal counsel has reviewed agency inspection

procedures and documentation for sufficiency for enforcement.

7. Despite the organization of the RRC field inspection program in a division totally outside the UIC Division. There appears to be an excellent degree of cooperation between the two divisions in initiating and completing UIC inspections.

INSPECTIONS PROGRAM---OTHER CONSIDERATIONS

1. The Review Team was concerned that a greater number of UIC inspections, particularly related to plugging and abandonment activities, were not being witnessed. Additional field inspectors would appear to be needed to adequately accomplish this task. At the present time about 25 percent of the field inspection staffs' time is spent on UIC work. This translates into an injection well to field man ratio of 1720 to one which the Review Team believes is much to high for adequate coverage.

2. Gauges utilized by field inspectors are not calibrated on a regular basis. A schedule for calibration of gauges should be implemented.

CONCLUSIONS

The Review Team believes that within the realm of available manpower and resources, the RRC is doing an excellent job of enforcing UIC regulations and protecting USDWs through an effective inspection program. However, the Review Team was unanimous in its opinion that more field inspectors are needed to enhance the inspection program.

The RRC is charged with the responsibility of regulating and monitoring approximately 15,000 oil and gas operators and 53,000 Class II wells. If inspecting Class II wells were the only work the inspectors were required to do, the 102 field inspectors currently employed in the ten district offices would have no problem performing high rates of very detailed UIC inspections each month and over the five-year MIT cycle. Added to and preexisting this program, however, are the broad ranging required field activities of a typical oil and gas agency in the areas of drilling, production, lease maintenance, plugging, gas plant operations, pipeline operation, pollution prevention and/or investigation, oil theft, fires and blowouts, citizen complaints and more.

Considering the vast size of the State and the large number of wells and regulatory responsibilities the RRC must deal with, it is difficult to imagine that any simple reordering of inspection priorities would permit additional UIC inspections to be performed without negatively impacting some other important field activity.

The only answer to the problem of increasing UIC inspections appears to be in increasing staff size. Given current economic conditions in the State, this seems unlikely.

MECHANICAL INTEGRITY TESTING

A. OBJECTIVE: UNDERSTAND THE TYPES OF MECHANICAL INTEGRITY TESTS PERFORMED

For part 1 of the mechanical integrity test (leak test) Texas requires operators to perform annulus pressure tests (APT). Operators may use annulus pressure monitoring (APM) in lieu of the pressure test. About 30 percent of the injection wells in the State utilize APM. MI testing is normally required every five years. Special circumstances will call for more frequent tests. For a well to have integrity of casing, tubing, and packer the annulus pressure test must not reflect a pressure loss greater than 10 percent of the initial test pressure and must show a 30 minute period of constant pressure stability. Operators that use annulus pressure monitoring must file an annual report providing monthly casing-tubing annulus pressure and average and maximum injection pressures. This information is submitted annually to Austin on Form H-10 and is evaluated by an engineering technician. If there are any apparent anomalies in the data, Austin notifies the district office and an APT may be scheduled as necessary to more fully evaluate mechanical integrity. Reporting is staggered by district to permit a more even work flow. Pre-primacy fluid injection wells that were not required to be equipped with tubing and packer and the relatively few post primacy wells with exceptions to the tubing and packer requirement are tested utilizing radioactive tracer surveys, temperature surveys or pressure tests after setting of a temporary bridge plug.

Cementing records, including cement bond logs, are the most common method used for part two of the MIT (lack of fluid movement behind the casing to a USDW). RATS and temperature surveys are used infrequently. The surveys are evaluated by the technical staff of the UIC Section in Austin. Coordination of the two parts of the tests is accomplished by entering test information and dates for each part of the test into the UIC data management system.

Every well is required to have an initial pressure test before being placed on injection. Operators are required to notify district offices 48 hours prior to the running of any APT. If the well fails the APT it is not considered to have mechanical integrity and district inspectors are authorized to order any such well to be immediately shut-in. Remedial action, such as plugging, cement squeeze jobs, or the

resetting of tubing and packer are required within 60 days. A manual tickler system is used to check progress toward completion of the work. Since districts can enter information directly into the data management system regarding MI testing, retests can easily be monitored by Austin personnel.

B. OBJECTIVE: UNDERSTAND THE IMPLEMENTATION OF MIT

Notification of operators of required MI pressure testing is by computer generated letter. These letters are prepared and mailed out quarterly. The letters tell the operator which wells are to be tested and specifies a three month time frame for completion of the test. The operator must notify the district office of the time a well is to be tested more than 48 hours prior to such test. This is to provide the RRC inspector sufficient time to arrange to witness the test if desired. About 20 percent of MITs are witnessed by RRC inspectors. Pressure testing is automatically scheduled for five years after the last test of record unless the permit requires more frequent testing. The initial round of testing was by taking the oldest wells first. Tracking of compliance is by computer with follow up letters going out about 60 days after the due date. Continued failure to file the required test data then begins the enforcement cycle within 150 days of the required test date.

No special notice is needed for annulus pressure monitoring. As a matter of routine, the UIC data management system sends a computer generated annual reporting form, Form (H-10), to well operators. This is the annual injection/disposal report required for all injection. Reports of annulus and injection pressures are required to be recorded on a monthly basis for the annual reporting cycle. Because of the large number of disposal and injection wells in Texas, the reporting cycle is staggered according to district. For instance the district 3 schedule is February through January and district 8 is July through June. This procedure allows the data management and MI technicians to evaluate the reports in more reasonably sized batches. Annulus pressure monitoring data is not reviewed by the districts as Form H-10 is filed by the operator directly to UIC in Austin. Some major operators are filing this information on magnetic tape.

One engineer and one geologist are assigned full time to evaluating the MITs at Austin. The disposal/injection well pressure test reports (Form H-5) are filed with the district

offices then routed to the UIC Section in Austin. The annulus pressure monitoring forms are filed with the UIC section in Austin. If the test is not witnessed by the RRC the operator must also submit a copy of the recording chart generated during the test. When the district determines the tests are complete, the report is sent to Austin for evaluation by the UIC Section MIT personnel. All successful parts of the MIT are entered into the UIC computer system. Part 1 and Part 2 of the test can be coordinated in this manner although each part is performed at a different time.

Wells failing their MIT are required to be shut in and repaired. Repair work is generally required within 60 days. Retests of repaired wells are usually witnessed.

C. OBJECTIVE: UNDERSTAND THE PROCEDURES OF WITNESSING A MIT

As noted above, approximately 20 percent of the MITs are witnessed by RRC inspectors. Tests take approximately 45 minutes. Field inspectors record pressure information on a Form D-5 which is filed at the district office. Also Form H-5 is utilized to record pressure data. This form is submitted to Austin for review by the engineers assigned to the MIT group. At the well, inspectors record and witness the pressuring of the annulus. They also inspect the wellhead for leaks and verify the accuracy of gauges. If the inspector witnesses an obvious MIT failure, he will notify the operator to shut the well in at that time. Inspectors are randomly checking injection wells to determine if all required fittings are installed and to independently check annulus pressures that may indicate lack of well integrity.

MECHANICAL INTEGRITY TESTING---STRENGTHS

1. Field inspectors have the authority to immediately shut-in wells failing mechanical integrity tests and such shut-ins are standard practice. The operator is required to perform remedial action before the well may resume injection.

2. The computerized scheduling and tracking system combined with the requirements that wells be repaired or plugged within a relatively short period of time (60 days) should bring wells into compliance in a very reasonable time period. It should be noted that longer periods before completion of repairs may be allowed but only if it is assured that UQWs are not endangered. Fluid level shots would generally be

required in these cases to verify that the fluid level is below the base of UQW.

3. The use of the 30 minute stabilized pressure in addition to the 10 percent pressure drop limit further assures that tested wells have mechanical integrity.

4. The random checks for proper fittings and equipment and the independent gathering of annulus pressure data should further compliance.

MECHANICAL INTEGRITY TESTING---OTHER CONSIDERATIONS

1. Twenty percent of test are witnessed rather than the 25 percent set out in EPA guidance. This reflects the shortage of field inspectors which is discussed elsewhere in this report.

CONCLUSIONS

The Review Team concludes that the Texas MIT program is protective of USDW's in that the tests conducted in Texas are essentially those called for in the EPA requirements both in regard to type of tests and frequency. Although the actual process may seem somewhat disjointed because of the different roles that the District and Austin play, the procedure seems to be working satisfactorily. Computers provide the means for tracking schedules and tests. Follow through on wells failing the MIT is prompt and complete.

COMPLIANCE/ENFORCEMENT

A. OBJECTIVE: UNDERSTAND ENFORCEMENT PROCEDURES IN THE STATE

The RRC has a sophisticated compliance and enforcement program which includes many elements to enhance its effectiveness. The RRC has independent legal authority to impose substantial penalties, including fines, for violations of its rules, orders and permits. Enforcement may begin at the district level for violations found in the field or at Austin for violations resulting from failure to file or from violations found during examination of reports filed. There are RRC guidance documents including example photographs to show what should be considered minor versus significant violations. A review procedure was developed to assure that comparable violations would receive comparable penalties. The RRC has a separate Legal Enforcement Section to handle compliance matters when voluntary compliance cannot be achieved through informal enforcement action.

In general, the RRC enforcement procedures create the needed incentive for operators to voluntarily comply with injection well rules and regulations. Inspection reports of field activities are reviewed by the District Directors. The Directors are authorized to initiate appropriate enforcement action with the concurrence of the Assistant Director of Field Operations in Austin. Inspectors are authorized to conduct informal enforcement activities on site such as sealing an injection or disposal well that fails a mechanical integrity test.

There are no rule authorized wells in Texas to separately track for compliance. Each well was previously permitted according to applicable rules and regulations.

The following is a list of informal and formal RRC enforcement mechanisms:

Informal Enforcement Procedures:

1. MIT Failure - District inspectors are authorized to immediately shut-in and seal injection or disposal wells that fail a mechanical integrity test.

2. Enforcement (noncompliance) letter - the operator is informed by letter of specific violations discovered

by field inspectors. The letter instructs the operator to correct each violation by a specific date. The letter may warn that additional enforcement measures may be taken if violations are not corrected in a timely manner.

3. Pipeline severance - The gatherer is directed by letter to disconnect the pipeline or other carrier connection on the lease in violation. No oil or gas may be moved while the severance is in effect. Generally, pipeline severance follows the operator's failure to respond to a noncompliance letter or other informal enforcement notice. However. if the violation is serious and the operator obviously is or should be aware of the violation and should have taken steps to remediate, a pipeline severance may be issued immediately without a prior enforcement letter. In repeat violation situations, a pipeline severance may also be issued immediately.

4. Zero allowable - An oil well allowable may be set at zero in conjunction with or following a pipeline severance. The allowables on a lease are set at zero when an operator has a high storage tank capacity in relation to daily production and, therefore could continue producing for a weeks or longer without having to move any oil.

5. Seal - A well may be physically sealed upon issuance of a seal-in letter to stop the operation of a specific well but allow lease production. A seal order is also issued when a pipeline severance is not appropriate as in the case of gas wells, disposal wells, and some injection wells.

6. The "P-4 hold" - When a Form P-4 is filed for approval to change an operator of a specific lease or well and a "hold" code appears on the computer, it alerts the Oil and Gas Division that problems exist or some enforcement action is pending. The transfer of ownership will not be processed or approved until the matter is resolved. This "hold" process is used when injection wells have delinquent MI tests or other significant problems.

Formal Enforcement Procedures:

1. Permit modification, suspension or termination - The UIC Section may modify, suspend or terminate a permit for just cause, including rule or permit violations. The operator may request a hearing to show cause why a permit should not be modified, suspended or terminated.

2. Administrative penalties - the Commission may assess an administrative penalty of up to $10,000 per day for a violation of a statute, rule, permit, or order pertaining to pollution prevention.

3. Civil penalties - The Commission may request the Attorney General to seek injunctive relief or a civil penalty when Commission action has not resolved a violation. Civil penalties are available in amounts of up to $10,000 per day for violations of Commission statutes, rules and orders pertaining to pollution prevention.

UIC Section staff members indicate that compliance is usually achieved through one or more of the above-listed informal enforcement actions. However, in a few cases, administrative penalties have been issued. Examples include a $45,000 penalty assessed for unauthorized injection, $15,000 for a packer set too far up the hole, and $15,000 for installation of a blind flange to prevent proper testing. Because there are many more oil and gas wells and related operations when compared to the number of injection wells, most RRC enforcement activities are conducted by the Field Operations Division rather than the UIC Section.

As referenced earlier, formal administrative penalty actions are handled by the Legal Enforcement Section. The following procedures apply to actions taken by the Section:

1. When the district office makes a preliminary determination that penalty action is warranted, the investigation report is sent to the Director of Field Operations with a request for penalty action. Upon approval of the request, the Director forwards the file to the Enforcement Section of the RRC Legal Division.

2. The Enforcement Section reviews the request, collects any necessary additional information,

schedules any necessary conferences and prepares an enforcement summary listing the alleged violations and setting forth technical and legal recommendations, including the recommended administrative penalty. Copies of the enforcement summary are sent to the Director of the Oil and Gas Division and the Director of Field Operations for review and approval.

3. After approval of the enforcement summary, the Legal Enforcement Section prepares and issues the charging instrument (request for action) and arranges for a hearing. The Enforcement Section may negotiate with the alleged violator prior to the hearing in an effort to arrive at an Agreed Order. An Agreed Order is comparable to a consent decree wherein the operator agrees to correct the violation within a set time frame and pay a cash penalty. Agreed Orders must be approved by the Commission. No Agreed Order is submitted to the Commission until after compliance is achieved.

4. If no Agreed Order can be negotiated, a hearing examiner for the Legal Division holds a hearing at which the operator is given an opportunity to appear and respond to the alleged violations. The hearing is conducted in accordance with the Administrative Procedure and Texas Register Act and the Commission's General Rules of Practice and Procedure. Based on the hearing record, the examiner recommends final action by the Commission in a Proposal for Decision. The recommendation may include corrective action, permit modification, suspension or termination, and an administrative penalty.

5. Field Operations and the UIC Section assist the Legal Division in monitoring compliance with the Commission's Final Order. If the operator does not comply with the order, the Legal Enforcement Section refers the case to the Attorney General for institution of a suit to collect the administrative penalty and obtain civil penalties and injunctive relief.

6. Appeal of a final order in a penalty action is to the appropriate district court. The Oil and Gas Division staff provides support to the Legal

Division and the Attorney General during appeals.

For purposes of reporting to the EPA, UIC violations are separated into minor and significant non compliance (SNC). If groundwater has been contaminated or the last protective barrier (casing or confinement) has been breached, the situation is considered to be endangerment and a significant noncompliance. Also, any unauthorized injection is a significant noncompliance (per EPA definition).

The RRC has sole regulatory authority at the state level for protecting water resources from pollution resulting from oil, gas, geothermal and related injection activities. Nevertheless, the RRC does cooperate with other Texas water protection and environmental agencies. Technical information is obtained from the Texas Water Commission concerning the depth of usable quality water in a particular area. Referrals and inquiries are periodically received from various state and local agencies. The Oil and Gas Division notifies the Texas Department of Health concerning radioactive logging tools that are lost downhole. In addition, the RRC has a memorandum of agreement with both the Texas Water Commission and the Texas Department of Health which clarify jurisdictional lines and interpret statutes relative to injection/disposal well related matters. This MOA is beneficial in assuring administrative and regulatory jurisdiction is clear and understood by all parties involved.

COMPLIANCE/ENFORCEMENT---STRENGTHS

1. Informal and formal enforcement procedures for compliance with permits and rules are logical, well defined, and effective. The Field Operations Section, UIC Section, and the Legal Division have identifiable responsibilities in achieving operator compliance. The burden for carrying out enforcement activities does not lie with one department. Having a separate Legal Division with the power and willingness to carry out severe administrative enforcement activities improves the effectiveness of the program.

2. Informal enforcement actions can be initiated by field personnel, District Directors, or the UIC Section. Most violations are handled in this manner.

3. The Field Operations Division has a written Pollution Abatement Policy which provides district personnel with specific enforcement procedures. Additional information is

periodically disseminated to field offices to improve or clarify enforcement policy.

4. The Director of the Oil and Gas Division and the Director of Field Operations are given an opportunity to review and comment on recommendations for administrative enforcement actions made by the RRC Legal Division. Coordination with the Legal Division on enforcement matters is accomplished according to established guidelines.

5. Each District Director has an open door policy. This gives district inspectors as well as the UIC Director and personnel the opportunity to discuss enforcement issues and compliance monitoring. This communication tool contributes to an effective enforcement program by the RRC.

COMPLIANCE/ENFORCEMENT---OTHER CONSIDERATIONS

The Peer Review Team did not have any concerns with any aspects of the RRC enforcement program.

CONCLUSIONS

The enforcement and compliance procedures conducted by the Texas Railroad Commission are highly effective in achieving compliance with Commission rules on the informal level. Only in cases where an operator does not respond to informal enforcement actions by the District Director or where the operator has demonstrated an unwillingness to comply is a violation referred to the Legal Division for formal enforcement action. In some cases, violators are referred to the Attorney General for civil penalty assessment or other appropriate action. The Review Team concludes that the RRC has and carries out an excellent compliance and enforcement program that is considered to be highly effective in achieving compliance with its water protection rules and permit requirements.

PLUGGING AND ABANDONMENT

As this section of the report is relatively short, the OBJECTIVES have been combined into a single section.

A. & B. OBJECTIVES: UNDERSTANDING AND DOCUMENTING THE TECHNICAL ASPECTS OF P & A and UNDERSTANDING NON-TECHNICAL ASPECTS OF P & A AND HOW THIS ACTIVITY IS INTEGRATED WITH THE REMAINDER OF THE PROGRAM

A plugging plan is not required as a part of the original permit application and approval process.

The Commission's plugging requirements are detailed in its Rule 14. Briefly, this rule generally provides for:

1. Written notice to the Commission and approval prior to beginning operations (generally 5 days prior to the commencement of work);
2. Notice to the surface owner and the owner(s) of offset producing leases;
3. Four hours notice to the district office prior to beginning of actual plugging operations;
4. All plugs are to be placed through tubing or drill pipe;
5. The placing of cement plugs (minimum 100 feet plus 10% per 1000 feet of depth) across the top and bottom of zones of usable quality water, oil, gas, or geothermal resources, and where water qualities or hydrostatic pressures justify the same;
6. The placing of 9 1/2 pound per gallon mud between plugs;
7. The use of Commission approved cementing companies;
8. The filing of a record of the well plugging operation by the operator within 30 days accompanied by an affidavit by the cementer attesting to how the well was plugged.

In general, the plugs are set a minimum of 50 feet above and below the top and bottom of the zone to be protected. The plugs will be set in open hole or cemented casing as set out above and/or will be squeezed behind uncemented casing where such conditions exist. Plugs to protect usable quality water are tagged whenever such plugs are set in open hole sections.

About 40 percent of all well pluggings statewide are witnessed by Commission inspectors. This is down from 60

percent in response to recent budget constraints and the resultant loss of 28 field inspectors (about 20 percent of the field staff). Districts place emphasis on inspection of injection well plugging and the percent witnessed would exceed the statewide average. To help compensate for the reduced number of inspectors, a policy has been implemented to randomly select a certain number of plugging and cementing operations in each district each month for a detailed beginning to end inspection. Such comprehensive witnessing is not noticed to any party prior to arrival of the State inspector. The memorandum prescribing these new procedures sets out in detail important aspects of the operation to be witnessed and verified. For example, cement slurry weight is to be checked using the Commission's own test equipment. A copy of the memorandum is included in the appendix of this report. Plugged wells are integrated into the UIC Section's data system and are reported to EPA quarterly.

PLUGGING AND ABANDONMENT---STRENGTHS

1. The plugging requirements of Rule 14 should result in all wells being plugged in such a manner as to isolate and/or protect all usable quality water zones; oil, gas and geothermal zones; and USDWs. The rule is comprehensive yet gives the flexibility needed to deal with individual situations and conditions.

2. The use of affidavits by cementers to confirm the manner in which the well has been plugged in addition to the operator's plugging report combined with the Commission's authority to withdraw approval for the use of any cementing company should help assure the plugging operations not witnessed by the State are carried out as prescribed.

3. The new procedures requiring a number of unannounced beginning to end inspections of plugging operations should further help assure compliance with the Commission's plugging rules.

4. The districts' emphasis on the witnessing of the plugging of injection wells is well placed to protect usable quality water and USDWs.

PLUGGING AND ABANDONMENT---OTHER CONSIDERATIONS

1. Even though the witnessing of plugging of injection wells

receives priority, there has been a decline in the percentage actually witnessed by the State inspectors resulting from the decline in the number of inspectors. Assurance of proper plugging of injection wells is necessary to preclude their serving as a potential source of contamination for usable quality waters and USDWs. The Review Team understands the real world of budget constraints faced by oil and gas States but would hope that additional inspections of plugging of injection wells might be achieved through the addition of field inspectors as discussed elsewhere in this report.

CONCLUSIONS

While the Review Team would like to see the number of injection well pluggings witnessed by State inspectors increased, it concludes that the Commission's plugging program is protective of usable quality water and USDWs. This conclusion is based upon:

1. The strong technical framework provided in Rule 14 for plugging all wells, regardless of construction, in such a manner as to prevent fluid movement between zones;

2. The use of the cementer's affidavit to verify the operator's plugging report;

3. The power to require the use of only Commission approved cementers coupled with the authority to withdraw approval of cementers caught abetting violations of rules or making false reports;

4. The good cooperation enjoyed with the Texas Water Commission in determining the location of usable quality water and the UIC Section's determination of the location of USDWs; and,

5. The judicious use of available field inspectors as represented by the concentration on inspection of injection well pluggings relative to oil and gas well pluggings and the detailed unannounced beginning to end witnessing of a number of pluggings.

INVENTORY/DATA MANAGEMENT

A. OBJECTIVE: UNDERSTAND THE PROPER USE OF DATA

The Commission is in the midst of developing one of the most complete and sophisticated data management systems in the nation. Data management programs relative to UIC include "wellbore", mapping, and UIC systems.

The wellbore data system has been under development from the mid 1970s. This on line system is designed to give the inquiring party complete technical data on a well's identification, construction (including workovers), completion, use, and status. Terminals in the Commission's Austin and district offices may be used to access current technical information for wells in the data bank. The system now contains approximately 600,000 wells of which nearly 400,000 have complete technical information. It is estimated that there are approximately one million wellbores in Texas. All new regular completions and UIC completions are incorporated into the system. There are currently no plans to complete the wellbore data for the remaining wells except as individual wells are examined in the course of routine work.

The computer mapping system is designed to provide the Commission with maps of the entire State with the capability of showing a wide variety of selected information including well identification, depth, status, depth of usable quality water, ownership surveys, geography, etc. The system can be used to select and display classes of wells as by depth, use, ownership, etc. Maps used by the staff and the public are updated on a scheduled basis. The mapping system is integrated with the wellbore system and all the data can be used in selecting what will be displayed on the map. The Commission is cooperating with other agencies such as the Land Office and Texas Water Commission to allow the completed system to be used to display their data as well. The mapping system, when completed, will be highly useful for routine operations such as Area of Review determinations and for projects such as mapping of special classes of wells. For example, all wells injecting below or above a particular depth or injecting a particular mix of fluids could be readily displayed and mapped using this system. Eleven counties and several selected areas of interest are currently incorporated into the mapping system. Final completion of all counties is scheduled for 1994.

The UIC system is designed to provide ready access to permit and well data without the need to refer to individual permit and well files. The system is being completed as wells are permitted, file reviewed, and tested. The types of data in the UIC system include:

1. Well identification by district, county, operator, field, lease identification number, well number, API number, and location;
2. Well identification by injection type (disposal/ enhanced recovery/hydrocarbon storage);
3. Well authorization date(s), docket number, permit number, and special permit conditions;
4. Well technical data including base of usable quality water, pressure and volume limits, fluid source, authorized injection interval, casing and cementing data including cement tops and packer depth;
5. Well authorized test method frequency and cycle;
6. Current mechanical integrity test information including whether or not the test was witnessed by the Commission;
7. Wells out of compliance due to failure to pass or submit an MI test and wells returned to compliance and any work done to achieve the same.

The UIC data system is used in conjunction with other Division data systems by the UIC Section for the following purposes:

1. To update the Class II inventory as required by EPA;
2. To complete required quarterly EPA reports summarizing MITs (passed/failed), well repairs, enforcement, permitting activities, etc.;
3. To notify operators of required MI test periods and to monitor for receipt of completed tests;
4. To write follow up letters for tests not received and to generate lists of wells requiring enforcement for failure to respond to initial and subsequent MI test notices (if approximately 150 days pass after the due date and the operator ignores the two follow up notices, formal enforcement procedures begin);
5. To put a "hold" on the transfer of ownership of any injection well for which any required MI test information has not been submitted until the new proposed owner is made aware of the delinquency and the necessity for compliance; and,
6. To record and access the compliance history of a well or operator.

Additionally, the district offices can access the system to determine the status of or any special conditions applicable to any injection well to be inspected.

INVENTORY/DATA MANAGEMENT---STRENGTHS

1. The UIC Section has a highly sophisticated UIC data system that provides an excellent method of handling data from over 50,000 injection wells without loss or oversight of significant permit requirements or well or operator history.

2. The UIC system is providing an excellent management tool as exemplified by the "hold" on transfers of wells with delinquent test and the computer generated letters for delinquent tests.

3. The well bore and mapping systems will provide unparalleled access to general and specific well and area data.

INVENTORY/DATA MANAGEMENT---OTHER CONSIDERATIONS

1. The sheer volume of data (monthly injection pressures, injection volumes, annulus pressure monitoring and well specific information for over 50,000 wells) contained in the annual injection reports proved impossible to enter into the system because of data entry problems and system priorities. This results in the limitation to manual systems for examination of such reports for research and investigative purposes and for checks that could be done by computer such as permitted injection pressure versus reported pressure.

A machine readable form H-10 could be considered in the future.

2. It is unfortunate that the Wellbore Data System is not scheduled to include all wells of record. Full usefulness of this system will be compromised as a result.

CONCLUSIONS

The Commissions's data management system is well into transition to a state of high sophistication. Even in transition, it is used extensively in the monitoring of permitted operations, providing automated follow up when

required reports or mechanical integrity testing results are not submitted to the UIC Section, for spot checking well construction, and for preparation for inspection of well sites among others. The system is also used for completion of required periodic EPA reports.

The Review Team believes that existing data management system substantially enhances the Commission's ability to protect usable quality water and USDWs. The completed system will even further enhance that ability.

PUBLIC OUTREACH

A. OBJECTIVE: UNDERSTAND HOW THE STATE USES PUBLIC OUTREACH

The Commission's public outreach program is primarily designed to reach and inform the regulated community. They have prepared an Underground Injection Control Reference Manual. This manual is a very readable and comprehensive guide to the processes, policies, rules, and procedures for the permitting and operation of Class II injection wells. The regulated community is kept informed of current and/or changing requirements through mailouts to individual companies and industry associations. In addition, the Commission conducts "water protection seminars" in various parts of the State. The UIC staff participates in these seminars explaining applicable Class II procedures and technical requirements.

The public is informed of permit applications through the Commission's public notice requirements. Copies of applications must be furnished to the landowner, offset operators, the clerk of the county in which the well is located and to the appropriate city official when a well is to be located therein. Additionally, publications of notice of the proposed injection well must be made by the operator in a newspaper of general circulation within the county. The applicant must furnish proof that notice has been given. If an "affected person" protests the application, it is set for hearing before a Commission examiner. Affected persons are those who have suffered or will suffer actual injury or economic damage other than as a member of the general public and includes the surface owner(s) and adjoining operators. UIC staff have responded to the concerns of others either in writing or by actual community visits.

Staff from the UIC Section and from district offices have talked with local organizations and local regional governmental agencies about the operation of individual injection wells and/or the Commission's UIC regulatory program on an as needed basis. They are currently working with the TWC in development of an interagency ground water protection seminar. This seminar is proposed for Austin later this year (1988). Attendance by 200 or so interested parties from governmental agencies is expected.

PUBLIC OUTREACH---STRENGTHS

1. The UIC Reference Manual is an excellent guide for well operators and any other party desiring to understand general program permitting and operational requirements and procedures.

PUBLIC OUTREACH---OTHER CONSIDERATIONS

The Review Team did not have any concerns with this portion of the Texas program.

CONCLUSIONS

The Commission has established a reasonable and effective public outreach program in the area of notice to landowners, offset operators, and to the public of injection well proposals. The Commission has been responsive to specific public concerns by direct visits with the concerned party or community by appropriate staff. The regulated community is effectively kept up to date with proposed regulatory changes and procedures through formal notification procedures and training and information "schools" put on by Commission staff at locations throughout the State.

The RRC UIC public outreach program, as conducted to date, has been one which has responded to well specific issues or specific public concerns and has promoted industry awareness. This may be contrasted to programs which may seek to inform the general public about the UIC program without reference to any particular case or issue. The agency has not found that the level of public interest warrants a more vigorous program at this time. This perception may or may not be subject to change depending on the results of the current work with the TWC on their interagency ground water protection seminar. The Review Team does not believe that the current public outreach program of the Commission in any way diminishes the protection of USDWs.

TEXAS
PEER REVIEW
STATE WORKBOOK

PLEASE COMPLETE THE FOLLOWING GENERAL QUESTIONS CONCERNING THE STATE'S UIC PROGRAM

1. Attach an agency organization chart and identify UIC positions in permitting and file review, inspections, mechanical integrity testing, compliance and enforcement, data management, and public outreach. The positions identified would include those primarily responsible for the work and all field personnel whether full or part time.

   Included as attachment to the Workbook.

2. The total number of FTE's (full time equivalent employees) for the Oil and Gas Division in the current fiscal year is 444.4 (budgeted).

3. The total division budget for the current fiscal year is $11,355,098.

4. The total agency UIC budget for the current fiscal year is $1,695,364, of which 61% are federal monies including $106,983 in carry over money.

5. Estimated UIC expenditures and numbers of FTE's by category for the current fiscal year as follows:

	BUDGET	FTEs
PERMITTING and FILE REVIEW	537,464	17.3
INSPECTIONS	(Included in Compliance & Enforcement)	
MECHANICAL INTEGRITY	197,778	7.1
COMPLIANCE and ENFORCEMENT	601,138	13.6
DATA MANAGEMENT	66,854	1.1
PUBLIC OUTREACH	1,840	0.1
ADMINISTRATION and PROGRAM DEVELOPMENT	252,224	6.6
TRAINING and TECHNICAL ASSISTANCE	38,066	1.0
TOTALS	1,695,364	46.8

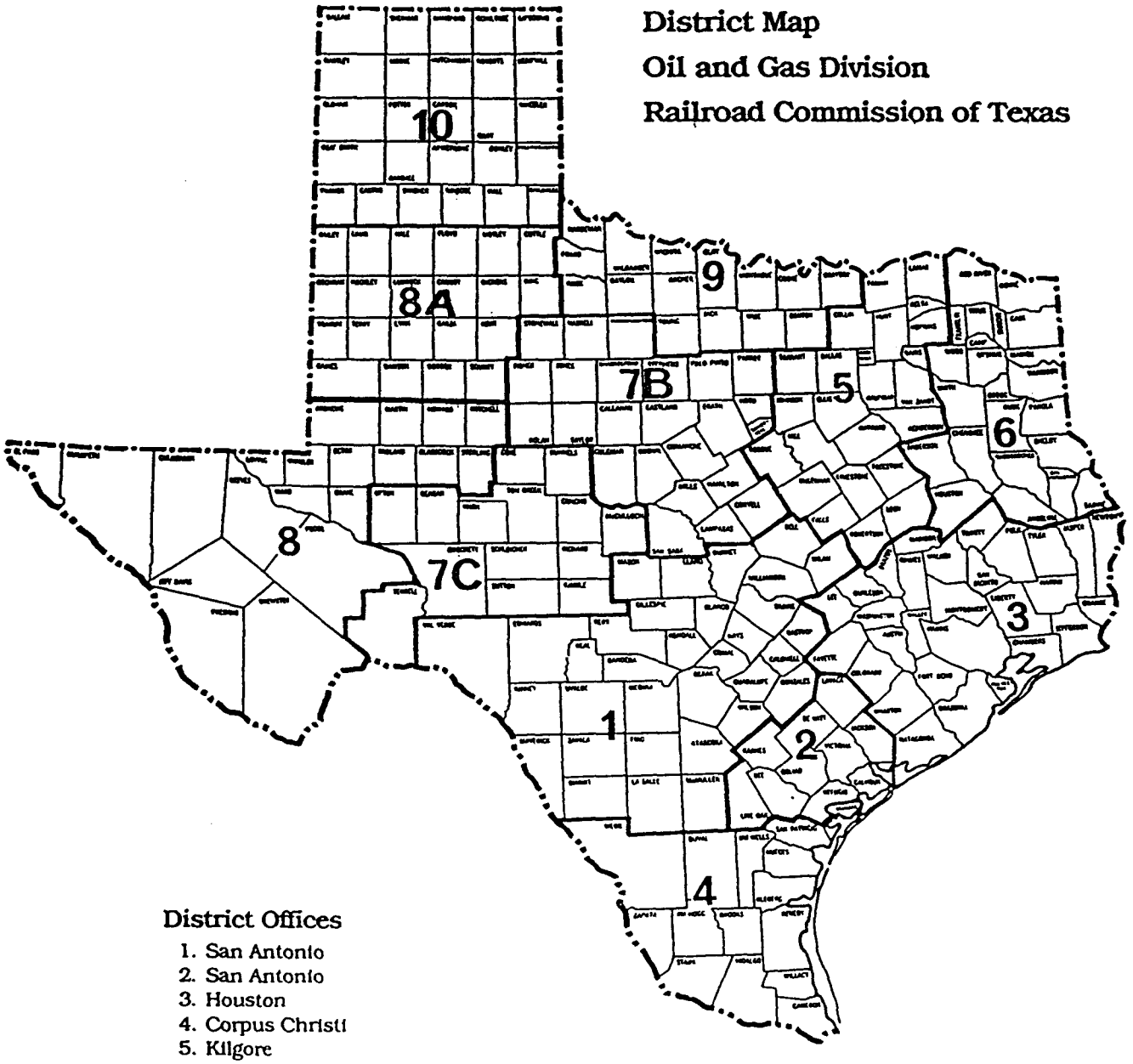
6. The following is our current Class 2 inventory:

DISPOSAL WELLS	6,841
ENHANCED RECOVERY WELLS	45,457
HYDROCARBON STORAGE WELLS	590

7. Attach a map (preferably 8 1/2 by 11 inches) showing the state and the agency's main and district offices.

   Included in the Underground Injection Control Manual.

District Map
Oil and Gas Division
Railroad Commission of Texas



District Offices

1. San Antonio
2. San Antonio
3. Houston
4. Corpus Christi
5. Kilgore
6. Kilgore

7B. Abilene

7C. San Angelo

8. Midland

8A. Lubbock

9. Wichita Falls
10. Pampa

UNDERGROUND INJECTION CONTROL

STATE PROGRAMS VISIT WORKBOOK

T A B L E O F C O N T E N T S

I. PERMITTING/FILE REVIEW

A. OBJECTIVE: Understand the permit flow process in the State.

1. How does the operator initiate a permit application?

The operator files the appropriate injection well permit application (Form W-14), for disposal into a non-productive formation; Form H-1, H-1A, for injection into a productive reservoir and required attachments to the UIC Section with a copy to the district office.

2. Who receives the application from the Operator?

An application received by UIC is delivered to the Class II well permitting manager for fee verification then to the administrative technician who is assigned the district where the proposed well is located. There are four administrative technicians.

3. How are permit applications screened for completeness?

The administrative technician reviews the application for administrative completeness then gives the application to the technical reviewer (engineer) for a technical overview to determine any significant technical deficiencies.

4. Exactly what happens when an application is found to be incomplete?

The applicant is advised by form letter of the items that are needed to complete the application. The application is then place into a pending file. The applicant will be sent subsequent notices if the application remains incomplete. If not completed in 90 days, the application will be returned to the operator.

5. How is the permit routed and concurred upon?

After the application is both technically administratively complete and the required public notice period has transpired and no protest has been received, a draft permit is prepared by the administrative technician. The draft permit and application file is given to the technical reviewer who does a final review, and adds special permit conditions as necessary. Fluid injection applications (injection into productive formations) are then routed to the UIC engineer for review. After review a fluid injection project number is assigned and the application is routed to the Class II well permitting manager for approval. Disposal well applications (injection into a non-productive formation) are routed directly to the permitting manager. All nonstandard permits are taken to the UIC Director for his approval.

6. Who are the individuals responsible for reviewing the different aspects of the permit application? technical issues? administrative issues? financial assurance?

   Technical issues - Review and oversight is by the technical reviewer, an engineer; the fluid injection project manager, an engineer; the Class II well permitting manager, a geologist; the technical programs manager, a geologist; and the UIC Director. Any or all of these personnel may be involved in decisions regarding technical issues.

   Administrative issues - All supervisory staff in the Class II program may be involved in administrative decisions including the UIC Assistant Director, an attorney - geologist.

   Financial assurance - Financial assurance is not a part of the Class II well permitting program.

7. How is permit flow tracked to ensure that permits are issued in a timely manner?

   Each administrative technician maintains a manual log to track the stages in the permitting process. Pending files are checked on a weekly basis and calendars are used to track key dates.

8. Are permits called in for existing wells? What condition or criteria prompt such a call?

   Injection wells were required to be permitted prior to primacy.

9. How are commercial facilities handled for permits?

   The same application forms are used for commercial disposal wells; however, more stringent permit requirements are included to prevent pollution from activities and surface facilities, and to prevent unauthorized access. (A commercial disposal well is a well for which a fee is charged to dispose of saltwater or other oil and gas waste that is partially or totally transported by truck to the well site.)

10. How are the official copies of the permits stored and protected from loss? How are they used in enforcement actions?

    Disposal well permits are stored in file cabinets in UIC. Fluid Injection permits that are expansions to existing projects are added to the project file and returned to Central Records. New project files are built and filed in Central Records. Copies of permits are also sent to the

District offices. All vital information regarding the permit conditions is entered into the main-frame computer when the permit is issued.

B. OBJECTIVE: Understand the file review process.

1. What percent of file reviews have been completed?

   + 60 Percent

2. What technical criteria are/were reviewed and documented in a file review and were they evaluated for pass/fail?

   Wellbore construction is reviewed for adequacy of injected fluid confinement and groundwater protection. This criteria is evaluated for compliance with current permitting requirements.

3. Who perform(s)(ed) the file review and what are their qualifications?

   Reviews are performed by engineering technicians. Almost all technicians are petroleum engineers or geologists.

4. How (is)(was) the quality of file review assured?

   Two Graduate Engineers supervise the file review technicians, and clerks.

5. In the event of deficient "file reviews," what actions (are)(were) taken?

   a. Due to incomplete information
      - request data

   b. Inadequate completions
      - correct deficiencies, discontinue injection, or request exception to requirement

   c. Undocumented authority
      - shut in and apply for new permit

6. How (is)(are) such actions tracked to satisfactory completion?

   Tracking compliance is done by technicians - verified by supervisors.

7. What is the file review strategy (i.e. how are/were wells selected for order of file review)? Is the compliance history of an operator a factor?

   UIC control numbers issued to each injection/disposal well. These were issued in sequenced order and 43,259 had been assigned at time of primacy. Each clerical worker is assigned to a district and gets a computer listing of wells by UIC No. - to be pulled for technical review.

Operator history is not a factor is permitting. Districts may inspect more often.

8. How long does it take to do an average file review of a well without complications? What are complications?

Without out complications - about 1/2 hour.

Complications are:
1. missing dates
2. inadequate wellbore construction
3. violation of permit conditions

C. OBJECTIVE: Understand the technical review and related aspects of the permit/file review process.

1. How are the locations of USDWs determined?

Statewide Rule 9 (for disposal into a nonproductive formation) requires that an applicant must submit a letter from the Texas Water Commission (TWC) stating that the proposed well will not endanger freshwater strata and that the formation does not contain freshwater. Statewide Rule 46 (for fluid injection) application requirements provided that the applicant must include a letter from the Texas Water Commission stating the depth to which usable-quality groundwater occurs. Such a letter is mandated for all types of wells under the Oil and Gas Division's regulation. Statewide to Rule 13 (Casing, Cementing, Drilling, and Completion Requirements) include that surface casing shall be set and cemented to protect all usable quality water strata, as defined by the Texas Water Commission.

The determination of the base of usable quality water is the responsibility of the TWC, which has generally considered water with a total dissolved solids concentration of 3,000 ppm, or less, as usable-quality however, water of worse quality is protected based on current or expected use in some areas.

2. How is the adequacy of the confining system determined?

For applications under Statewide Rule 9, the TWC reviews the adequacy of formations to separate the proposed disposal formation from the base of usable quality water. The general guideline is that 250 feet of relatively impermeable strata such as clay or shale is adequate to confine.

For applications under Statewide Rule 46, the fact that hydrocarbon is entrapped in the formation is significant evidence that confinement existed under original formation pressure conditions. Normally, prior to fluid injection, formation pressure has been significantly reduced by production of fluids. Therefore, geological confinement is not a concern.

3. What are considered to be adequate casing and cementing (surface, production, etc.) requirements new well (depth, thickness, material, etc.)? Is casing set and cemented through all USDWs? If not, how are USDWs otherwise protected?

The casing and cementing requirements for all wells regulated by the Oil and Gas Division are set forth in Statewide Rule 13. In summary, all new Class II wells

must have surface casing set and cemented through the base of usable quality water unless the total depth of the proposed well is 1000 feet or less in which case the long string must have cement circluated to the surface. Surface casing cannot be set deeper that 200 feet below the depth recommended to protect usable quality water without RRC approval. The rule specifies steel casing and sets forth testing procedures for material strength.

Field rules for surface casing depths have been rescinded which means that casing must be set to the depth recommended by the Texas Water Commission for each well.

USDW's with total dissolved solids concentrations of less than 10,000 ppm but greater than 3,000 ppm are not required to be protected by surface casing in newly drilled wells. Strata containing water with greater than 3000 ppm TDS and less than 10,000 ppm is isolated by long string or both intermediate and long string. For newly drilled wells, Rule 13 casing and cementing requirements must be met; however, typically long strings are cemented to at least above the surface casing shoe if no intermediate has been set. Operators frequently inquire and review their new well proposals with UIC technical staff.

4. What are considered to be adequate casing and cementing requirements for converted wells? Is casing required to be set and cemented through all USDWs? If not, how are all USDWs protected?

   For wells converted to disposal or fluid injection, casing is not required to be set and cemented through USDW's. USDW's are protected by cemented production casing. The adequacy of cement above the disposal zone is required to be demonstrated by the following guidelines:

   1. at least 400 feet by volumetric calculations
   2. 250 feet from temperature survey
   3. 100 feet of 80% bonding from cement bond log.

   Rule 13 requires that production casing be cemented to at least 600 feet above the casing shoe. Therefore, production wells converted to waterflood use generally have adequately cemented casing. When cemented casing is not adequate, cement squeeze operations will be a permit condition.

5. Packer/tubular goods requirements:

   a. Do permits specify use of a packer? Yes
   b. Do permits specify type of packer? No
   c. Do permits specify use of tubing? Yes
   d. Do permits specify use of lined tubing? No

No

e. Do permits specify weight, grade, material, internal coating?

No

6. Are dual completions accepted? What types?

Dual completeness are acceptable. There are several combinations such as dual injection into two productive formations and dual production/injection (two formations) Most arrangements are dual tubing strings with straddle packers because injection must be down tubing and oil production must be up tubing.

7. What type of monitoring systems are required or approved (flow rate and cumulative volumes, tubing pressure, annuli pressures, etc.)?

Operators are required to monitor tubing pressure and injection volume at least once per month. Annulus pressure monitoring is optional in lieu of testing unless specifically included as a permit condition.

8. How is the geological setting evaluated (faults, unique geological conditions which could affect the well or containment of injected fluids, etc.)?

Unique geologic conditions are evaluated with the assistance of the TWC in identifying areas where lack of geologic confinement is a concern. Areas and formations that have been determined unacceptable or conditionally acceptable have been documented.

9. Has the compatibility of injectant/cement and injectant/fluid formation been a problem?

No. Compatible tests are not a program requirement and have not been a concern.

10. How are the maximum injection pressure and rate established?

Maximum surface injection pressure is limited to 0.5 psi/ft. to the top of the disposal or injection interval based on the assumption that overburden pressures generally approximate 1.0 psi/ft. and the hydrostatic pressure of a column of produced water averages about 0.46 psi/ft. In enhanced recovery projects, an applicant may request a surface injection pressure of greater than 0.5 psi/ft. In so, a step rate test must be performed on the well to determine the fracture pressure.

11. How is the area of review determined for enhanced recovery wells and salt water disposal wells?

    A 1/4 - mile radius for area of review is used. An applicant has an option to calculate a lesser affected area for review.

12. If area permits are issued, how is their area of review determined?

    Area permits are issued for fluid injection projects but an area of review must be done for each well. 1/4 mile radii often will overlap to the extent that a review is completed throughout and 1/4 mile outside the boundary of a fluid injection project.

13. How is corrective action handled?

    Corrective action for improperly plugged or unplugged wells within the area of review generally will become a permit condition but is contingent on the proximity and ownership of the well. If the well needing corrective action is on the applicant's lease, the well will be required to be plugged prior to beginning injection. Otherwise, the permit may be restricted as to pressure and volume or time, and the operator responsible for the well or the State, if a responsible owner does not exist, will plug the well.

D. OBJECTIVE: Understand the nontechnical portions of the permit.

1. What types of financial assurance mechanisms are used?

   "Up-front" financial assurance is not a requirement of UIC rules. Financial assurance with regard to inactive wells will be described in a later section.

2. How is adequate coverage per well determined?

   NA

3. Under what conditions is blanket financial coverage allowed?

   NA

4. Prior to permit issuance, what is the public notification process for permits?

   The applicant is required to send a copy of the application to the surface owner, offset operators, and to the county and city clerks of the county and city in which the well is located. For an initial application for fluid injection in a reservoir, copies of the application must be sent to all operators in the reservoir. A notice of the application must be published for one day in a newspaper of general circulation in the county where the well(s) will be located. There is a 15-day waiting period after published notice, notice to offsets and surface owner(s) and the date which the application is received in UIC. A permit will not be issued administratively until the latest of the three periods has passed and no protest by an affected person as defined by rule has been received.

5. When and where are public hearings held?

   Public hearings are held in Austin and are scheduled by the Docket Services Section who provides notice to all interested parties.

6. How are the public hearings conducted (formal, informal, transcript, qualifications, etc.)?

   All hearings are conducted formally in accordance with the Administrative Procedure and Texas Register Act (Texas Revised Civil Statutes, art. 6252-13a) and the Commission's General Rules of Practice and Procedure. All parties to a hearing are given reasonable notice of not less than 10 days and are afforded opportunity to present evidence and arguments on all issues. The proceedings are transcribed upon request of any party. A team of legal and technical examiners conduct the hearing and

subsequently present their proposal for decision to the Commission.

7. What criteria, conditions, or circumstances would prompt a public hearing on a permit?

   A hearing is held on a permit application for a disposal or injection well if an affected person or local government protests the application or if the Director of UIC determines that a hearing is in the public interest. Otherwise, the Director of UIC may issue the permit administratively. An affected person is defined by rules as "a person who has suffered or will suffer actual injury or economic damages other than as a member of the general public and includes surface owners of property on which the well is located and adjoining offset operators."

   The applicant has a right to a hearing upon request if the Director of UIC denies administrative approval.

8. How often have public comments altered the content of the final permit?

   We do not have the statistics to answer this question precisely, but the number of permits in which special conditions have been included solely on the basis of public comments has been relatively small.

9. How are complaints related to the proposed permit or applicant recorded and filed?

   All written inquires (complaints) from persons that are "unaffected" on pending applications are responded to in writing. Phone calls are documented by a summary of the conversation placed in the application/permit file. Often, the response is an explanation of the technical requirements and measures taken to protect water and is satisfactory to the inquirer.

E. OBJECTIVE: Understand the process for aquifer exemptions.

1. How many aquifer exemptions have been requested?

   None since EPA program approval in April, 1982.

2. How many have been granted/denied and what criteria were used to evaluate the requests?

   NA

3. Are minor aquifer exemptions granted? How many have been granted/denied?

   NA

4. Are exempted aquifers limited to Class II use only?

   If an aquifer exemption were requested, it would be limited to Class II wells.

II. INSPECTIONS

A. OBJECTIVE: Understand how field operations are conducted and managed from the State Office.

1. Are inspectors State employees or are they contractors?

   Inspectors are State employees.

2. Do inspectors work out of an office, their homes, or other setting?

   Inspectors are based out of District offices, and are assigned to all inspections in a specific area. Some inspectors partially work out of their homes.

3. Do supervisory personnel periodically accompany inspectors:

   (a) to observe and critique their work (please explain how often and the process)?

   Supervisors typically have an assigned "Field Day" (s). They either ride with a field inspector all day or drive the pool cars to various areas to personally check difficult or problem areas.

   (b) for other purposes (please explain how often and for what purpose(s)?

   Field inspector evaluations-Back checks supervisor (District Director and/or Assistant District Director and/or Supervising Technician). Take the previous days field inspection reports for a particular inspector and "follow them around" - to check quality of inspections, time and mileage, etc.

4. Do all inspectors perform all types of inspections or is there specialization? If so please explain.

   Organization varies by District office due to varying conditions statewide. Usually an inspector is assigned a county or counties (or fields) and conducts all inspections.

   Each district has a state plugger (in charge of state funded pluggings), an oil theft investigator, engineering specialist (the Lead/Senior Inspector), and Hydrogen Sulfide Specialist.

5. Is there an inspection policy/strategy? Is it written? How close is the program to achieving the goals of the strategy? How are inspection priorities determined?

Inspections Are Prioritized

1. Blowouts/fires or other dangerous conditions (to public safety.
2. Active pollution of any kind/source.
3. Citizen complaints.
4. Reinspection of on-going problems.
5. Routine/random inspections of leases, drilling rigs, disposal facilities, water haulers etc. with the intent of inspecting all leases periodically.

6. Is operator compliance history and selection of wells inspected coordinated?

   Operator compliance history is a factor in selecting inspections. Primarily due to reinspections continuing until lease is full compliance. Random lease inspection selection is usually up to the inspector. "Paperwork" violations will also trigger an inspection.

7. How often are the different classes of wells (ER/SWD) inspected?

   Frequency of inspection varies by district:

   - Some districts inspect leases at random (regardless of injection/disposal wells)
   - Some districts schedule UIC wells for yearly inspections
   - All districts attempt to inspect commercial salt water disposal wells monthly

8. Who communicates with inspectors and directs the field operations?

   Field inspectors are directed by District office engineer and/or geologist, who are in turn supervised by the Assistant District Director and ultimately the District Director.

9. How is the communication between the field and central office handled?

   Communication between districts and Austin office is continuous. Communication is through daily copies of correspondence, telephone (statewide long distance network) and computer terminals (mainframe tie-in).

10. What role do inspectors play in developing enforcement cases and how are they involved in the hearing or judicial process?

    Field inspectors do most of those inspections. They are typically the first to inspect a lease/problem area.

Inspectors gather legal enforcement, plug hearing data (with or without engineer/geologist assistance).

11. What training have the inspectors received?

    Field inspectors are either engineers or geologists (hired just out of college) or "old oilfield hands" - which typically have between 5-15 years of oilfield experience. Hydrogen sulfide gas safety, plugging/completion calculations, on the job procedures training.

12. Do inspectors receive training in safety procedures? What types of safety equipment do inspectors have?

    Yes, typically these primarily involve "sour gas" (H_2S) operations, and high pressure equipment precautions. Air packs for H_2S areas.

13. Are inspectors assigned to geographic areas? Where are they located? What are their qualifications?

    Inspectors are typically assigned to a specific county (or counties). Some districts operate on a "field" rather than county basis.

B. OBJECTIVE: Understand the routine/periodic inspections performed in the State

1. What is the average length of time needed for a routine inspection? Include the amount of time that is needed for preparation, travel time, and on location time. Is the preparation performed by the inspector and or others?

   Average time per inspection is approximately 2 hours (including travel time). This average, however, should be considered in the context of the wide ranges of time required. For example, single-well leases which are adjoining each other and having no (or minor) violations can be inspected at a rate of 2 to 4 per hour. A 1200 well unit on the other hand, may take weeks.

2. What does the inspector look for during a routine inspection? Is there a checklist (if so please supply a copy)?

   Inspector looks for any violations of Railroad Commission rules. A checklist is part of the lease inspection form (Form D-2).

3. How many inspections are conducted in an average month? Discuss seasonal variations.

   Approximately 100 inspections per inspector per month. Number of inspections is reasonably constant due to increases in "partial" inspections under bad weather conditions.

4. Is the operator given advance notice of inspections? How much?

   Initial and routine inspections are typically unannounced. Reinspections (after violation notices) are stated in correspondence.

5. Does the operator receive a copy of the completed inspection record?

   The operator does not get a copy of the inspection report (but it is a public record). Correspondence is issued stating violations noted, needed corrective action, and reinspection date. "No violation" inspections are typically unknown to operator. Complaint related inspections are always documented by correspondence-regardless of violations.

6. Are photographs taken during the inspection? How does the inspector log photographs?

Photographs are taken as needed to supplement written report. Photos are identified in the report and are turned in attached to the report.

7. Are samples taken during all/some inspections? How are samples documented, preserved, and transported?

   Samples are not routinely collected during inspections. If there are spills or leaks, chloride content checks with field kits are used for a quick check of water quality and the potential for pollution. Samples are often collected when inspections find major problems resulting from violations for which enforcement actions will be taken.

   Sampling procedures are set forth in a manual; "Procedures For Performing Hydrologic Investigations" which was prepared for the Districts by UIC. This manual is a part of the EPA - approval Quality Assurance Plan.

8. Are Analyses performed by State or private laboratories?

   Analyses performed by the Commission's laboratory.

9. Are chain of custody procedures and forms used? Have inspectors received training in this area?

   Chain of custody tags are used on all samples. Inspectors receive instructions on all sampling procedures including the importance of documentation. Photos of sampling points are commonly taken.

10. Do inspectors carry their own gauges and flow meters?

    Inspectors use gauges provided by the Commission to check tubing and annulus pressures.

11. How and how often are gauges and meters calibrated? How is this documented?

Commission issued gauges are calibrated at the discretion of the inspector-this depends on the accuracy needed. For example; a routine inspection vs. a minimum production test.

C. OBJECTIVE: Understand the emergency and citizen complaint response procedures.

1. What types of "emergencies" have been reported? How is the State notified of emergencies?

   The Railroad Commission has ten district offices as well as the central Austin office. Each office has a 24 hour answering service and personnel on "stand by" or "phone duty". All types of "emergencies" are reported: blowouts, fires, oil spills, pipeline leaks, salt water breakouts, and other problems that the caller considers "emergencies."

2. Who responds?

   An Railroad Commission inspector responds within 24 hours.

3. How is the emergency response documented?

   Form D-1 is used to document the complaint inspection. Correspondence is issued (copies to operator and complainant) to Austin Office. Telephone calls are made as appropriate.

4. What is the follow-up to emergency responses?

   Follow up inspections are conducted until all violations are corrected. An inspector may be present 24 hours a day in some cases such as blowouts/fires.

5. What types of significant citizen complaints have been received? What are the priorities to respond to complaints?

   Complaints of unauthorized injection, surface spills, leaks, use of wells for commercial disposal, disposal of unauthorized fluids, surface breakouts of saltwater and suspected water well contamination have been reported. All complaints are given top priority in all districts.

6. Is the operator notified of the complaint?

   The District Office prepares a memo to Field Operations in Austin that summarizes the investigation results, any violations found, and enforcement action. The operator is sent a copy of the memo.

7. Is the citizen contacted and notified of the results of the complaint investigation?

   The complainant is also sent a copy of the memo which also will inform when a follow-up investigation is scheduled.

8. What is the typical response time to complaints?

Typical complaint response time ranges from immediate (blowouts/fires) to within 24 hours for non-pollution or non-jurisdictional inspections.

D. OBJECTIVE: Understand the output from field inspections.

1. How are the types of inspections documented and sorted?

   All inspections are documented on "D" Forms. Each form is used for a specific type of inspection. Sorting is easily accomplished by forms.

2. Do inspectors take field notes? Are these notes kept or destroyed? If kept, where?

   All "Notes" are documented on "D" Forms, which are filed in District Offices.

3. What are the elements of such inspection form? Is there a standard inspection form or forms?

   Forms D-0 "Call Ticket" to document who called, about what, who received it, who it was assigned to, and what it was about.

   D-1 Complaint inspection form. To identify the complaint/complainant free-form report area.

   D-2 Lease inspection form (routine) contains checklist and writing area.

   D-3 Pollution form - For serious pollution - very detailed checklist

   D-4 Production test form

   D-5 Miscellaneous inspection form for other types of inspections (such as drilling rigs, salt water hauler inspection, surface/production casing cementing, etc.)

4. What is the lag time between the inspection and write up?

   The lag time to the write up depends on the nature of the violation. Active pollution gets an immediate telephone call and confirming correspondence. Minor violations are written up within a week.

5. Has State Counsel reviewed typical inspection procedures to assure the results may be used for formal enforcement actions?

   Inspection procedures were reviewed by Commission Counsel in the early 1980's when the Commission received statutory authority to issue administrative penalties. The review of inspection procedures and documentation were to assure data would support formal enforcement actions.

6. Who reviews inspectors' reports? Where are they located? What is the lag time between write up and review?

   Inspector's reports are reviewed and appropriate action is initiated by the district technical staff (engineer/geologists). See #4 for timing.

7. What is the inspector's access to information in the field such as permit information, letters to operators, etc.?

   Inspector's have radio contact with the district office. They also have mobile microfiche viewers for lease names, operators, proration schedules and royalty/well location maps.

8. Are photographs ever taken? When? How are photos identified and filed? How are negatives filed?

   Photographs are taken, as needed, to supplement written report. Polaroid cameras are used (no negative or processing delays).

9. How are chain of custody and sample analysis forms filed?

   After analytical work is completed, the tag is kept on file at the Commission's laboratory.

III. MECHANICAL INTEGRITY TESTING

A. OBJECTIVE: Understand the types of mechanical integrity tests performed.

1. What are the types of MIT used for the leak test for the different classes of wells (Part 1 MI)?

   Annulus pressure tests and annulus pressure monitoring records are used in all but a few cases. Wells without tubing and packer are tested by radioactive tracer survey or temperature survey.

2. What criteria (is)(are) used for the pass/fail of a pressure test? Why were these criteria selected?

   The tubing/casing annulus pressure must not reflect a loss greater than 10% of the initial test pressure, and must show a 30 minute period of constant stability for the test to be considered successful. This percentage was derived from Statewide Rule 13 governing casing integrity.

3. Is the volume of fluid loss a factor in the determination of a failure?

   Yes, the greater the fluid loss over the test period, the faster the decrease in the testing medium pressure. This effect is much more evident with a liquid testing medium than with gas.

4. Is annular pressure monitoring (APM) used to determine MI? How is an MI failure utilizing APM determined?

   Yes, (APM) is used to determine mechanical integrity. A failure is determined by a review of of tubing/casing annulus pressures. If unreasonable pressures in the tubing/casing annulus appear without explanation a mechanical failure is suspected.

5. How often is APM recorded? What is reviewed? Who reviews it?

   APM is recorded as optional monitoring in Item 15 of the Form H-10. The maximum and minimum annulus pressures observed over a one month period are each recorded once a month for a 12 month cycle. for the purposes of determining MI, an engineering technician evaluates both injection and annulus pressure recorded.

6. Do wells using APM have an initial pressure test?

   Yes, all wells are required to pass an initial pressure test prior to beginning injection unless mechanical

constraints require another method of determining mechanical integrity.

7. If other monitoring records are reviewed for MI purposes how are failures determined?

   No other monitoring records are reviewed.

8. What is the most prevalent type of MIT used for fluid migration test (Part 2 MI)?

   Cement record reviews are by far the most common method. Temperature logs, cement bond logs, or radioactive tracer surveys are used but relatively infrequently.

9. If cement records are reviewed, what criteria is used to determine pass/fail?

   Cement records are reviewed as part of the file review, and permitting process. These are also reviewed as the result of "problem areas." Standard criteria are used to insure injection fluid confinement and groundwater protection.

10. Identify any logs used for determination of MI.

    Radioactive tracer and differential temperature logs are used as alternative M.I.T.'s

11. Who interprets the logs?

    Technical staff review the logs.

12. For each of the different types of logs used, what is considered to indicate a failure?

    Radioactive tracer surveys - log interpretation that shows fluid are not confined to the injection zone.

    Differential temperature logs - if loss of fluids through casing holes are indicated (usually additional testing will be done to confirm results).

13. What are the most common remedial actions for MIT failures?

    The remedial action taken is dependent upon which part of the well is the cause of the failure. The most common failure recorded is the casing failure, which is usually repaired by a cement squeeze. Packer and tubing failures are the next most common and are corrected by replacement and/or repair.

B. OBJECTIVE: Understand the implementation of MIT.

1. How are operators called in to demonstrate MI? Are tests scheduled at operator's or state's convenience?

   Operators are notified by a computer-generated letter identifying which wells are to be tested and in what time frame this must occur. Operators are required to notify the Railroad Commission District Office 48 hours in advance of the test to allow for a witness to be present to observe the test. The State selects the test period in which the well is to be tested. The operator selects the actual date and time within that test period in which to test the well.

2. What is the priority schedule of wells to be tested?

   The date of the injection authority sets the priority for placing wells on the 5 year pressure test schedule. Those wells which are reported to have begun injection without having been tested are scheduled on the initial pressure test schedule. And, those wells which have been required to test by special conditions of their permit, are scheduled to test on the permit-specified (or annual) pressure test schedule as often as the permit requires. These schedules are generated once every 3 months.

3. How are operators tracked to compliance?

   All successful MITs are entered into the UIC computer system. Programs are run periodically to generate computer lists of those wells which have not yet had successful tests. Operators are informed of delinquent status wells by computer-generated letter. Only by completing a successful MIT will a well be removed from delinquent status.

4. How are the pressure test and fluid migration test (Part I and Part II MIT) test coordinated?

   The two parts of MIT determination are coordinated through the automated data system. The parts may be reviewed at different times by different persons unless a radioactive tracer survey is accomplishing both parts. Data system call-up of information will verify both parts have been successfully completed.

5. What are the resources required for MIT?

   Two engineers and one clerk are assigned full time to the MIT program. In addition, the lead UIC engineer has supervisory responsibility over the program. See the general questions No. 5 for fiscal resources. These resources do not include the district offices.

6. How are the MIT results filed and managed?

The Disposal/Injection Well Pressure Test Reports (Form H-5) are filed with the District Offices. If the District determines that the test and report were complete according to the instructions, the report is sent to Austin. After evaluation and separation of problem H-5s, key information is entered into the data system and successful tests are filed by their schedule date and test type first, then by the operator name, and last the well's UIC Control No. Inquiries for these records are then handled by one of three people who manage the program in Austin. In addition, the District Offices also maintain their own filing systems.

7. (a) What are current MI failure rates for enhanced recovery and disposal wells?

The current (first half FY 88 failure rate was 6 percent).

(b) Are corrective measures instituted for each well failing MI?

Wells that fail MIT are shut-in (or sealed-in) and must be repaired or comply with Statewide Rule 14 plugging requirements.

(c) How long is the operator given to complete repairs?

The standard procedure is to allow the operator 60 days to repair and retest the well. This may be altered depending on the circumstances.

(d) Are repairs witnessed (what percentage)?

Very few repairs are witnessed however, the retests for repaired wells are usually witnessed. No percentage of witnessed retests is available.

C. OBJECTIVE: Understand the procedures of witnessing a mechanical integrity test.

1. How and who witnesses MI demonstrations and what percentage of MI tests are witnessed by State inspectors?

   The operators are required to notify the District Office 48 hours prior to testing. Field inspectors are dispatched to witness tests at the discretion of the supervisor in charge and the priorities at the time. Approximately 20% of MI tests are witnessed.

2. How is the witnessing documented?

   The field inspector records his observations on the test on a Form D-5 which is kept on file at the District Office. In addition item 22 on Form H-5 allows the operator to document the name of the RRC representative present at the test. This is cross referenced with the field inspectors report when the H-5 is received at the District Office.

3. What do inspectors look for during an MI demonstration?

   Inspectors look for faulty equipment or improper test procedures. They inspect the wellhead for leaks and verify the accuracy of the pressure recording device (if present) against the pressure indicated by the tubing/casing pressure gauge.

4. How much time is spent witnessing an average MI test?

   The average time taken to witness a pressure test once begun is approximately 45 minutes to one hour, not including driving time and preparations.

5. How does the inspector evaluate tampering with the well?

   Examination of the well head will disclose some evidence of tampering. The pressure buildup rate on the H-5 test will also show evidence of a packer near surface.

6. In the event of failure how is the operator notified to shut the well in? If all wells failing MI are not shut in, please elaborate.

   If the test was witnessed, the inspector at the site will instruct the operator to shut the well in immediately. Otherwise, the operator is instructed to shut the well in by letter from either the District Office or Austin once the Form H-5 has been received. Some wells are not shut-in immediately in cases where the operator has requested a delay for reasonable economic and operational

reasons and it is evident there is no immediate hazard to fresh water.

IV. COMPLIANCE/ENFORCEMENT

A. OBJECTIVE: Understand enforcement procedures in the State.

1. What types of enforcement and actions (formal and informal) are available to the State?

The following is a list of enforcement mechanisms used by the Commission:

(a) Enforcement letter--The operator receives a letter explaining the violation and instructing the operator to correct it by a specified date. The letter may warn that additional enforcement measures may be taken if the violation is not corrected

(b) Pipeline severance--The gatherer is directed by letter to disconnect the pipeline or other carrier connection on the lease in violation. No oil or gas can be moved while the severance is in effect. When the violation is serious and the operator obviously is or should be aware of the violation, a pipeline severance may be issued immediately without a prior enforcement letter. A pipeline severance may also be issued immediately in a repeat violation situation.

(c) Zero allowable--An oil well allowable may be set at zero in conjunction with or following a pipeline severance. The allowables on a lease are set at zero when an operator could continue producing for a long period of time without having to move any oil (many storage tanks).

(d) Seal--A well may physically sealed. A seal order is issued when an operator continues to produce despite a zero allowable. A seal order is also issued when a pipeline severance is not effective or appropriate as in the case of gas wells, disposal wells, and some injection wells.

(e) Permit modification, suspension, or termination--A permit may be modified, suspended, or terminated for just cause, including rule or permit violations.

(f) Administrative penalties--The Commission may assess an administrative penalty of up to $10,000 per day for a violation of a statue, rule, permit, or order pertaining to pollution prevention.

(g) Civil penalties--The Commission may request the Attorney General to seek injunctive relief or a civil penalty when Commission action has not resolved a violation. Civil penalties are available in amounts of up to $10,000 per day for violations of Commission

statutes, rules, and orders pertaining to pollution prevention.

2. What sorts of formal enforcement actions have been taken?

Generally compliance has been achieved through informal enforcement action, but the Commission has taken administrative penalty action in some egregious cases. In one case, for example, the Commission assessed a $45,000 penalty for unauthorized injection.

3. Is there a difference in procedures when penalties are to be imposed?

Whereas most enforcement actions are handled by the Oil and Gas Division, administrative penalty actions are handled by the Legal Division. The following procedure applied to administrative penalty actions:

Upon making a preliminary determination that penalty action is warranted, the district office forwards the investigation report to the Director of Field Operations with a request for penalty action. Upon approval of the request for penalty action, the Director of Field Operations forwards the file to the Enforcement Section of the Legal Division.

The Legal Enforcement Section reviews the request, collects any necessary additional information, schedules any necessary conferences, and prepares an enforcement summary listing the alleged violations and setting forth technical and legal recommendations, including the recommended administrative penalty. Copies of the enforcement summary are sent to the Director of the Oil and Gas Division and the Director of Field Operations for review and approval.

After approval of the enforcement summary, the Legal Enforcement Section prepares the charging instrument and arranges for a hearing. The alleged violator receives a notice of hearing, which includes the charging instrument. The Legal Enforcement Section may negotiate with the alleged violator prior to the hearing in an effort to arrive at an Agreed Order.

If no Agreed Order can be negotiated, a hearings examiner for the Legal Division holds a hearing at which the alleged violator is given an opportunity to appear and respond to the alleged violations. The proceedings are conducted in accordance with the Administrative Procedure and Texas Register Act and the Commission's General Rules of Practice and Procedure. Based upon the testimony and evidence brought forth at the hearing, the examiner recommends final action by the Commission in a proposal

for decision. The recommendation may include corrective action, permit modification, suspension, or termination, and an administrative penalty.

With the assistance of Field Operations and UIC, the Legal Enforcement Section monitors compliance with the Commission's final order. In the event, the operator does not comply with the order, the Legal Enforcement Section refers the case to the Attorney General for institution of a suite to collect the administrative penalty and obtain civil penalties and injunctive relief.

4. What is the nature of any appeals process? Does the UIC staff get involved in the appeals?

   Appeal of a final order in a penalty action is to the district court. The Oil and Gas Division staff provides support to the Legal Enforcement Section and the Attorney General during appeals.

5. Who evaluates field reports for violations and possible enforcement actions?

   The District Director reviews the field reports and initiates the appropriate enforcement action with clearance from the Assistant Director of Field Operations in Austin.

6. Are there any rule authorized wells in the State? How are they tracked for compliance?

   No.

7. How is significant non-compliance determined? What is considered to be "endangerment"?

   Violations (non-compliance) are evaluated on a case by case basis. If the groundwater has been contaminated or the last productive barrier (casing or confinement) has been breached the situation is considered endangerment and significant non-compliance. Also by EPA definition any unauthorized injection in a SNC.

8. How and who develops formal enforcement cases?

   See answer to #3.

9. Who drafts the required documents?

   See answer to #3.

10. Who reviews the proposed action?

    See answer to #3.

11. Who is responsible for issuance of the various types of formal enforcement actions?

    See answer to #3.

12. What are the follow-up procedures?

    See answer to #3.

13. How and when are formal enforcement actions escalated?

    The district offices request administrative penalty action action for all of the following types of violations:

    (a) major violations that are deliberate or caused by negligence;

    (b) violations that are not corrected within the time period requested by the district office;

    (c) repeat or long-term violations on the same lease; and

    (d) violations by an operator who has a history of disregarding Commission rules and directives.

14. Is there coordination with other State or local agencies (RCRA, NPDES, etc.)?

    At the state level, the Commission has sole regulatory responsibility for protecting the State's water resources from pollution that might result from activities associated with the exploration, development, and production of oil, gas, or geothermal resources. The Commission does obtain technical information from the Texas Water Commission, such as information concerning the depth of usable-quality water in a particular area. The Commission also receives referrals and inquiries from various state and local agencies. The Division notifies the Texas Department of Health concerning radioactive logging tools that are lost downhole.

15. What penalties have been assessed and collected?

    Most violations are corrected without resort to penalty action. When warranted, however, penalties have been assessed and collected for various types of violations, including unauthorized injection and failure to plug.

16. What actions have operators taken in response to enforcement actions?

    Most violations are quickly resolved without penalty action. The Commission has authority to shut down operations for violations through pipeline severances, zero allowables, and seals. These mechanisms have proven

highly effective because shutting down an operation imposes a financial hardship on an operator.

17. Identify and list the more prevalent problems faced by the State in providing adequate enforcement.

The Commission has effective enforcement procedures and mechanisms.

V. PLUGGING AND ABANDONMENT

A. OBJECTIVE: Understanding and documenting the technical aspects of P & A

1. For each prominent type of well construction, what techniques of plugging are approved? (Give detail on minimum plug size or length; use of mud between plugs and weight; use of bridge plugs; standard plugs at the pay zone, base of fresh water, or casing stubs; etc.)

   Plugging requirements for all types of wells are prescribed in Statewide Rule 14. The rule addresses concisely all the general situations that might exist for abandoned injection or disposal wells. The goal is that all formations bearing usable quality water, oil, gas, or geothermal resources be isolated by casing and cement and cement plugs. Plugs shall have a slurry volume to fill 100 feet of hole, plus ten percent for each 1000 feet of depth. Portions of the well not filled with cement are to be filled with mud-laden fluid. Mud shall be at least 9 1/2 lbs/gal.

2. Are there wells with no surface casing cement? How are they plugged?

   No wells are known to exist that have no surface casing cement. There are wells that have minimal cement ("tack-in") at the casingshoe. Assuming that the surface casing is set to the base of usable quality water, a plug shall be required across the shoe of the surface casing with 50 feet of cement in and 50 feet out of the casing.

3. If pipe is pulled (surface, intermediate or otherwise) what special plugging procedures are followed?

   Surface casing is not allowed to be pulled. If intermediate or production string is pulled plug, placement is as described above.

4. Are plug locations verified? When and how? Are inspectors present for the plug tagging?

   Plug locations are verified (tagged) when the plug is set in open hole and is set to protect usable quality groundwater. Cased hole plugs or plugs set downhole (below usable quality water) are not tagged.

5. What control is exercised over unwitnessed pluggings?

   Plugging reports with attached cementer's affidavits must be filed within 30 days whether the plugging was witnessed or not.

B. OBJECTIVE: Understand non-technical aspects of P & A and how this activity is integrated with the remainder of the program.

1. How are P & A requirements coordinated with the permitting/file review process?

   Plugging and Abandonment requirements are set out in Statewide 14 and administered by District Offices. Plugging reports are checked in the District Offices and sent to Austin for data entry. Well status/plugging data is available at any computer terminal.

2. What percentage of UIC Class II P & A's are witnessed?

   An average of 15% of pluggings are witnessed.

3. Is P & A information incorporated into the data management/tracking system? How?

   Yes, P & A information is in the data base.

VI. INVENTORY/DATA MANAGEMENT

A. OBJECTIVE: Understand the program use of data.

1. What is the method and frequency of updating FURS?

   After each well application is approved and the permit is issued, the wells are then added to our inventory master. This occurs daily on a continuous basis.

2. Is there a data management system in place or planned which may provide management with program oversight?

   There are data systems on line that provide information on the permitting, monitoring, testing, and compliance history. These systems are not intended for program oversight purposes, but can be used for that purpose. The EPA regional UIC program manager has utilized information from some of these systems for oversight activities.

3. What financial and personnel resources are committed to and/or needed for this system?

   The main work groups that update and/or add to this system are the four administrative technicians involved in the permitting process, the records control group (5) and the H-5 pressure test group (4). All other UIC personnel have the capability to add remarks to existing wells.

4. What are the elements in the system? Is the system used primarily for EPA required reporting or State program needs or management? Please elaborate.

   Data elements are used for both State program statistical summaries and EPA reporting requirements. The systems are not used primarily for either but for ready access to all the vital information about a well without need for reviewing files. Information that can be accessed includes well completion, authorized injection interval, authorized volume and pressure, permit date, special permit conditions, operating conditions such as injection volume, maximum and average injection pressure, annulus pressure, if monitored, test date, test results (pass, fail, retest), types of violations, types of enforcement actions, and compliance dates.

5. What significant problems are being experienced with meeting EPA's reporting requirements?

   Not all of the reporting elements can be completed nor do they seem necessary for determining if the program is effective. The tracking of some items, such as remedial actions, are resource prohibitive. Separate totals for SWD and ER well types in in the enumeration of compliance

evaluation (Part II) and Inspections-Mechanical Integrity Testing (Part III) seem unnecessary and are difficult. Changes in the reporting forms require changes in the compilation methods. There appears to be no perception as to the problems involved in gathering information for 53,000 wells and that the tracking of information on a well by well basis is impossible.

6. Are significant non-compliance events being reported to EPA? If yes, please outline the system used to tract SNCs from identification to correction. If not, please outline the problems preventing such reporting.

Significant non-compliance situations are being reported to EPA. The enforcement data system is being used to track SNCs as they are identified from District office reports.

B. Contamination/Alleged Contamination resulting from injection practices in the last ten years.

The purpose of these questions is to determine the extent of reports of alleged and proven USDW contamination resulting from "current" UIC practices.

1. Estimate the number of alleged USDW contaminations reported to the State in the past ten years.

   Alleged contamination cases over the last ten years cannot be enumerated.

2. What actions are taken by the State when such a report is received?

   All complaints of alleged groundwater contamination from oil and gas activities are investigated by the District Offices. Whenever injection wells are considered a possible source, the UIC Section assists by reviewing injection well records and at times assists in the investigation and development of conclusions as to the source of the contamination. Some cases are resolved by one investigation and district memorandum report. Other cases require months of study, records research, sampling, well tests, and other investigative techniques.

3. How many of such contamination cases were found to be actual and were proved to be as a result of failure of an injection well or wells?

   Four cases of confirmed contamination have been reported to EPA since reporting requirements began in 1984. In addition, there were no confirmed cases of USDW contamination found as a result of complaints received in 1982.

4. To the degree possible, briefly describe the well failure, the extent of contamination, and any remedial and/or enforcement actions taken.

   Case 1 - A 250-foot water well, which was 300 feet from a disposal well, was reactivated after being abandoned for 10 years and was found to produce saltwater. Salt water was entering the well though an apparent casing leak at a depth of about 40 feet. The disposal well was found to have pressure (100 psi on the tubing-casing annulus). The well failed a pressure test required by the District. The well was shut-in and sealed. A workover was performed after which a retest was successful. The water well was plugged. Because saltwater was reaching the water well through the casing holes above the aquifer, the extent of contamination was presumably very limited.

Case 2 - A water well with an estimated depth of 1600-1800 feet became contaminated. A 6-hour test of pumping time vs water quality was run. Analyses showed an increase of chloride content from 5,802 mg/l to 7,045 mg/l. Baseline groundwater quality was 500 mg/l chloride. A disposal well 300 feet from the water well was required to be tested and failed due to casing leaks. The well was shut-in then plugged within two months after the complaint was received. The disposal well was not completed as permitted and a completion report had not been filed as required. The matter was referred for formal enforcement action and the possible assessment of administrative penalties. The case is pending.

Case 3 - A water well (depth unknown) 600 feet from a disposal well began flowing. The water contained 1,200 mg/l chloride and 2,300 mg/l TDS. The background quality was unknown. Injection water contained 26,000 mg/l chloride. The tubing-casing annulus was under pressure and the surface injection pressure was exceeding the permitted pressure. The well was shut-in and sealed. The water well ceased flowing three hours after the shut-in. A witnessed workover found the tubing had parted one joint below the tree. The repairs were completed and the well was successfully pressure-tested. A witnessed radioactive tracer survey was performed and no channeling was evident. The well remained sealed. A records search found evidence that a well had been drilled and plugged in 1962 about 700 feet from the disposal well location. An attempt to locate the abandoned well to reenter and replug it was unsuccessful. The well was considered a likely source of communication between the disposal zone at 1400 feet and the contaminated well because it had only 118 feet of surface casing. The disposal well was sealed-in until plugged.

Case 4 - A water well located 300 feet from a fluid injection well began flowing salt water (13,000 mg/l chloride). The injection well was also backflowing and workover activities were underway. Testing determined that a casing leak existed at 308 feet. Squeeze cementing was attempted but was unsuccessful. Further workover was considered uneconomical by the operator and the well was plugged. The operator was directed to remediate the water well contamination problem. The well was flowed, then pumped over a 10-month period until the water had been returned to acceptable quality.

VII. PUBLIC OUTREACH

A. OBJECTIVE: Understand how State uses public outreach.

1. How is the public informed about UIC issues?

   The public is informed of permit applications by the notice procedures. Rule-making requires publication in the Texas Register. Public-interest organizations such as the League of Women Voters and environmental groups such as the Sierra Club are cognizant of rule changes issues through this method.

2. How is the regulated community identified and informed about UIC requirements?

   The regulated community is informed of requirements through mailouts to all oil and gas operators. There are monthly mailouts of production reports and information on changes is included. Water protection seminars are held each year in various parts of the State and UIC staff explain UIC procedural and technical requirements. Information packets including-copies of the rules, forms, notice instructions, etc. are mailed to operators upon request. Many operators are informed through telephone conversations whenever they call.

3. If used, are mailing lists kept up to date?

   Mailing lists based upon the Commission Form P-5, Organization Report, are updated automatically whenever a company files or amends their organization or address.

4. Please indicate any local, regional, or national interest groups included in the mailing lists.

   Texas Mid-Continent Oil and Gas Association, Texas Independent Producers and Royalty Owners Association, and the American Petroleum Institute are advised of proposed and actual changes in regulations. Local or regional water districts are sent copies of permits if they have expressed an interest in receiving them.

5. Which of these groups have shown an active interest in UIC issues?

   All, depending on the issue.

6. What UIC issues have attracted attention from interest groups?

   There is no overriding issue. Local groups are concerned particularly with commercial disposal wells.

7. Is there coordination with any other State programs in public outreach?

Not solely on UIC regulations.

TEXAS
PEER REVIEW
REVIEW TEAM
RESUMES

PEER REVIEW TEAM MEMBER RESUME

PARTICIPANT: Robert A. Reid, California Division of Oil and Gas, 1416 Ninth Street, Room 1310, Sacramento, CA 95814, (916) 445-9686

EDUCATION: BA Geology 1964, San Jose State University, San Jose, CA

EXPERIENCE: Employed by the State of California since 1964, starting as an engineering geologist with the Department of Water Resources. In 1970, transferred to the Division of Oil and Gas district office in Coalinga. The Division of Oil and Gas regulates the drilling, operation, maintenance, and the plugging and abandonment of all oil, gas, and injection wells in California. Duties included: (1) review and evaluation of proposals to drill, rework, and abandon; (2) field inspection of wells and facilities; and, (3) witnessing mechanical integrity test on injection wells.

Served for the past 15 years in the Headquarters office of the Division of Oil and Gas as the Regulatory Specialist for the Division. Duties include the coordination of several Division programs and activities such as: (1) the UIC Program; (2) performing environmental review and analysis; (3) preparing, reviewing, and analyzing proposed State laws relating to oil, gas, and geothermal operations and to waste disposal and environmental issues; (4) developing regulations to implement mandated responsibilities; and, (5) coordinating the program for natural gas price determinations under provisions of the Natural Gas Policy Act of 1978.

UIC EXPERIENCE:

(1) State Class II UIC Program Manager since the passage of the Safe Drinking Water Act.

(2) Served as lead person in the preparation of the Division's Application for Primacy for Class II wells.

(3) Maintains State statutes and regulations pertaining to Class II injection wells.

(4) Prepares grant applications for UIC grants.

(5) Responsible for developing and maintaining budgetary control of the UIC program.

(6) Liaison to the EPA and the Bureau of Land Management regarding UIC matters; and prepared MOU with BLM regarding coordination of UIC program on federal lands.

(7) Coordinates UIC activities and responsibilities with six district offices to ensure consistent approach to responsibilities and requirements.

(8) Serves on Division's Injection Surveillance Committee. The committee meets on a regular basis to discuss technical and administrative issues and requirements.

December 22, 1988

Biographical Summary
of
Carroll D. Wascom

Carroll D. Wascom [redacted]
He lived most of his early life in Covington, Louisiana. He entered Louisiana State University (LSU) in 1968 and received a professional degree (B.S.-Geology) from LSU in 1972.

He began his career as a public servant in early 1973 by accepting a position as Geologist with the Louisiana Department of Transportation and Development (DOTD). Working in the Soils Laboratory, Carroll was responsible for all geological evaluation of soil samples taken from statewide boring operations and performed geotechnical laboratory testing of soils. As Soils Geologist, he also was responsible for the cross-sectional correlation of geologic strata and the investigations of such problems as landslide control. While with DOTD, Carroll became a member of the Association of Engineering Geologists (AEG).

In 1981, Carroll transferred to the Louisiana Department of Natural Resources, Office of Conservation and was responsible for preparation of an application to the Environmental Protection Agency (EPA) for primary enforcement authority of the Louisiana Underground Injection Control (UIC) Program. He assisted in the implementation of the program after EPA approval in April 1982.

Since 1981, Carroll has gained valuable experience in the environmental and regulatory aspects of produced salt water and hazardous waste disposal by deep well injection. In 1982, he also became responsible for the permitting and regulation of commercial offsite oilfield waste disposal facilities.

Carroll was promoted to Assistant Director of the Injection and Mining Division in 1984, shortly after the Division was formed by combining the UIC and Surface Mining responsibilities of the department. He was intimately involved in the drafting and promulgation of the first Louisiana oil and gas industry pit regulations, which became effective January 20, 1986.

TEAM MEMBER RESUME

PARTICIPANT: R. L. (Dick) Stamets 201 W. San Mateo, Santa Fe, N. M. (505) 982-1680 UIPC Contractor

EDUCATION: BS Geology 1956 Ohio State University, Columbus, Ohio

EXPERIENCE: Staff geologist for the NM Oil Conservation Division in Santa Fe (2 years) and Artesia (12 years); Technical Support Chief for the OCD in Santa Fe (13 years) and Director OCD (2 years).

The Oil Conservation Division regulates the drilling for and production of oil and gas in New Mexico. They also permit and regulate all Class 2 wells and Class 5 geothermal wells in the State with the first injection wells being approved in 1952. As staff geologist I reviewed geological information submitted by industry in support of requests for pool creation, spacing, casing and cementing proposals and more. I developed casing and cementing programs or standards for fresh water protection in the district. I spent considerable time in the field conducting inspections of drilling, production, and injection operations. I learned the Division's paperwork processes and interrelationships. As Technical Support Chief, I supervised the data processing section and Central Records. I was a Hearing Examiner hearing from 20 to 30 cases monthly for exceptions to the rules and for approval of those matters requiring a hearing. As an examiner, I heard an estimated 12 to 15 UIC cases annually. In this capacity I worked directly for the Division Director. As Division Director, I was responsible for the operation of a 62 person division with a budget of approximately $2.5 million.

UIC EXPERIENCE: I served as the primary State EPA liaison for development of the UIC regulations from 1974 through 1980. I also took a leading role in the Interstate Oil Compact Commission's efforts in this same period to influence the eventual shape of the final regulations. I testified before the House Subcommittee on Health and Environment relative to the need for what has become Section 1425 of the Safe Drinking Water Act. I served on the National Drinking Water Advisory Council from 1979 to 1980. I developed and testified in support of the rule changes and changes in the statutes needed for primacy in New Mexico and, with other staff, developed the primacy document. New Mexico was the second state to receive primacy for its Class 2 program. I served as UIC Director for the Division until my appointment as Director in late 1984. I was one of the founding fathers of the UIPC. In 1987, I participated in the EPA' peer review of their direct implementation programs in Regions 3, 4, 5, and 8.

TEAM MEMBER RESUME

PARTICIPANT: Jeffrey S. Lynn 525 Central Park Dr. Ste., 304, Oklahoma City, OK (405) 525-6146 UIPC Technical Director

EDUCATION: BA Geology Miami University, Oxford, Ohio, 1973; MS Geology Miami University, Oxford, Ohio, 1975; Post graduate work in Hydrogeology, Oklahoma State University, 1988.

EXPERIENCE: Geologist for the Oxford Oil Company in Zanesville, Ohio, responsible for all aspects of the exploration and development program inclusive of geologic mapping, data collection and evaluation, and well site geology (2 years). Staff Geologist for Mitchell Energy Corporation in Columbus, Ohio, and Oklahoma City, Oklahoma, with exploration responsibilities in the Appalachian, Michigan, Illinois, Anadarko and Arkoma Basins (9 years). Responsible for the initiation of over 200 drilled prospects with field development still ongoing.

UIC EXPERIENCE: Prior to serving as the Technical Director for the UIPC, I was involved with the siting, permitting, and drilling of Class II injection wells. As the Technical Director of the UIPC my responsibilities are UIC specific with interests in all classes of injection wells. I have been involved in the development of UIC data management seminars, taught mechanical integrity seminars, written numerous UIC brochures, edited the UIPC bibliography on injection wells, supervised ongoing research projects through the UIPC Research Foundation, and coordinate the technical symposiums which UIPC sponsors.

TEXAS CLASS II UIC PROGRAM RULES AND REGULATIONS

§3.9 RULE 9. DISPOSAL WELLS.

Form

Any person who disposes of saltwater or other oil and gas waste by injection into a porous formation not productive of oil, gas, or geothermal resources shall be responsible for complying with this rule, Chapter 27 of the *Texas Water Code*, and Title 3 of the *Natural Resources Code*.

(a) **General.** Saltwater or other oil and gas waste, as that term is defined in Chapter 27 of the *Texas Water Code*, may be disposed of, upon application to and approval by the Commission, by injection into nonproducing zones of oil, gas, or geothermal resources bearing formations that contain water mineralized by processes of nature to such a degree that the water is unfit for domestic, stock, irrigation, or other general uses. Every applicant who proposes to dispose of saltwater or other oil and gas waste into a formation not productive of oil, gas, or geothermal resources, must obtain a permit from the Commission authorizing the disposal in accordance with this rule. Permits from the Commission issued before the effective date of this rule shall continue in effect until revoked, modified or suspended by the Commission.

(b) **Geological requirements.** Before such formations are approved for disposal use, the applicant shall show that the formations are separated from fresh water formations by impervious beds which will give adequate protection to such fresh water formations. The applicant must submit a letter from the Texas Department of Water Resources, Austin, Texas, stating that the use of such formation will not endanger the fresh water strata in that area and that the formations to be used for disposal are not fresh water bearing.

(c) **Application.** The application to dispose of saltwater or other oil and gas waste by injection into a porous formation not productive of oil, gas, or geothermal resources shall be filed with the Commission in Austin. On the same date, one copy shall be filed with the appropriate district office. W-14

(d) **Notice and opportunity for hearing.**

(1) The applicant shall give notice by mailing or delivering a copy of the application to the surface owner of the tract on which the well is located, to each adjoining offset operator, to the county clerk of the county in which the well is located, and to the city clerk or other appropriate city official of any city where the well is located within the municipal boundaries of the city, on or before the date the application is mailed to or filed with the Commission.

(2) In order to give notice to other local governments, interested, or affected persons, notice of the application shall be published once by the applicant in a newspaper of general circulation for the county where the well will be located in a form approved by the director of underground injection control (hereinafter "director"). The applicant shall file with the Commission in Austin proof of publication prior to the hearing or administrative approval.

(3) **Protested applications.**

(A) If a protest from an affected person or local government is made to the Commission within 15 days of receipt of the application or of publication, or if the director determines that a hearing is in the public interest, then a hearing will be held on the application after the Commission provides notice of hearing to all affected persons, local governments, or other persons, who express an interest in writing in the application.

(B) For purposes of this rule, "affected person" means a person who has suffered or will suffer actual injury or economic damage other than as a member of the general public and includes surface owners of property on which the well is located and adjoining offset operators. Form

(4) If no protest from an affected person is received by the Commission, the director may administratively approve the application. If the director denies administrative approval, the applicant shall have a right to a hearing upon request. After hearing, the examiner shall recommend a final action by the Commission.

(e) **Subsequent Commission action.**

(1) A permit for saltwater or other oil and gas waste disposal may be modified, suspended, or terminated by the Commission for just cause after notice and opportunity for hearing, if:

(A) a material change of conditions occurs in the operation or completion of the disposal well, or there are material changes in the information originally furnished;

(B) fresh water is likely to be polluted as a result of continued operation of the well;

(C) there are substantial violations of the terms and provisions of the permit or of Commission rules;

(D) the applicant has misrepresented any material facts during the permit issuance process; or

(E) injected fluids are escaping from the permitted disposal zone.

(2) A disposal well permit may be transferred from one operator to another operator provided that:

(A) written notice of the intended permit transfer is submitted to the director at least 15 days prior to the date the transfer is to take place; and P-4

(B) the director does not notify the present permit holder of an objection to the transfer prior to the transfer date stated in the above notification.

(f) **Area of review.** The applicant shall review the data of public record for wells that penetrate the proposed disposal zone within a one-quarter (¼) mile radius of the proposed disposal well to determine if all abandoned wells have been plugged in a manner that will prevent the movement of fluids from the disposal zone into fresh water strata. Alternatively, if the applicant can show by computation that a lesser area will be affected by pressure increases, then the lesser area may be used in lieu of the one-quarter (¼) mile radius area of review. The applicant shall identify in the application any wells which appear from such review of public records to be unplugged or improperly plugged and any other unplugged or improperly plugged wells of which the applicant has actual knowledge.

(g) **Casing.** Disposal wells shall be cased and the casing cemented in compliance with §3.13 (051.02.02.013) in such a manner that the injected fluids will not endanger oil, gas, geothermal resources or fresh water resources.

(h) **Special equipment.**

(1) **Tubing and Packer.** New wells drilled or converted for disposal after the effective date of this rule shall be equipped with tubing set on a mechanical packer. Packers shall be set no higher than 100 feet above the top of the permitted interval. Existing disposal wells shall be so equipped at the time of the first workover but no later than January 1, 1984. Form

(2) **Pressure valve.** The wellhead shall be equipped with a pressure observation valve on the tubing and for each annulus of the well. Operators of existing disposal wells shall comply with this requirement by no later than January 1, 1983.

(3) **Exceptions.** The director may grant an exception to any provision of this paragraph upon proof of good cause. If the director denies an exception, the operator shall have a right to a hearing upon request. After hearing, the examiner shall recommend a final action by the Commission.

(i) **Well record.** Within 30 days after the completion or conversion of a disposal well, the operator shall file in duplicate in the district office a complete record of the well on the appropriate form which shows the current completion. W-2, G-1

(j) **Monitoring and reporting.**

(1) The operator shall monitor the injection pressure and injection rate of each disposal well on at least a monthly basis.

(2) The results of the monitoring shall be reported annually to the Commission on the prescribed form. H-10

(3) All monitoring records shall be retained by the operator for at least five years.

(4) The operator shall report to the appropriate district office within 24 hours any significant pressure changes or other monitoring data indicating the presence of leaks in the well. The operator shall confirm this report in writing within five working days.

(k) **Testing.**

(1) Before beginning disposal operations, the operator shall pressure test the long string casing. The test pressure must equal the maximum authorized injection pressure or 500 psig, whichever is less, but must be at least 200 psig. H-5

(2) Each disposal well shall be pressure-tested in the manner provided in paragraph (k)(1) at least once every five years to determine if there are leaks in the casing, tubing, or packer. The director may prescribe a schedule and mail notification to operators to allow for orderly and timely compliance with this requirement. H-5

(3) As an alternative to the testing required in paragraph (k)(2), the tubing-casing annulus pressure may be monitored and included on the annual monitoring report required by paragraph (j) provided that there is no indication of problems with the well. The director may grant an exception for viable alternative tests or surveys such as monitoring of injection rate/injection pressure relationships. H-10

(4) The operator shall notify the appropriate district office at least 48 hours prior to the testing. Testing shall not commence before the end of the 48-hour period unless authorized by the district office.

(5) A complete record of all tests shall be filed in duplicate in the district office on the appropriate form within 30 days after the testing. Form H-5

(l) **Plugging.** Disposal wells shall be plugged upon abandonment in accordance with Statewide Rule 14.

(m) **Penalties.**

(1) Violations of this rule may subject the operator to penalties and remedies specified in Chapter 27 of the *Texas Water Code* and Title 3 of the *Natural Resources Code*.

(2) The certificate of compliance for any oil, gas, or geothermal resource well may be revoked in the manner provided in §3.68 (Rule 73) for violation of this rule.

§3.46 RULE 46. FLUID INJECTION INTO PRODUCTIVE RESERVOIRS.

Form

(a) **Permit Required.** Any person who engages in fluid injection operations in reservoirs productive of oil, gas, or geothermal resources must obtain a permit from the Commission. Permits may be issued when the injection will not endanger oil, gas, or geothermal resources or cause the pollution of fresh water strata unproductive of oil, gas, or geothermal resources. Permits from the Commission issued before the effective date of this rule shall continue in effect until revoked, modified, or suspended by the Commission.

(b) **Filing of application.** An application to conduct fluid injection operations in a reservoir productive of oil, gas, or geothermal resources shall be filed in Austin on the form prescribed by the Commission. On the same date, one copy shall be filed with the appropriate district office. The form shall be executed by a party having knowledge of the facts entered on the form. The applicant shall file the fresh water injection data form if fresh water is to be injected.

H-1, H-1A

H-7

(c) **Notice and opportunity for hearing.**

(1) The applicant shall give notice by mailing or delivering a copy of the application to the surface owner of the tract on which the well is located, to each adjoining offset operator, to the county clerk of the county in which the well is located, and to the city clerk or other appropriate city official of any city where the well is located within the corporate limits of the city, on or before the date the application is mailed to or filed with the Commission.

(2) In order to give notice to other local governments, interested, or affected persons, notice of the application shall be published once by the applicant in a newspaper of general circulation for the county where the well will be located in a form approved by the director of Underground Injection Control (hereinafter "director"). The applicant shall file with the Commission in Austin proof of publication prior to the hearing or administrative approval.

(3) **Protested applications.**

(A) If a protest from an affected person or local government is made to the Commission within 15 days of receipt of the application or of publication, or if the director determines that a hearing is in the public interest, then a hearing will be held on the application after the Commission provides notice of hearing to all affected persons, local governments, or other persons, who express an interest in writing in the application.

(B) For purposes of this rule, "affected person" means a person who has suffered or will suffer actual injury or economic damage other than as a member of the general public and includes surface owners of property on which the well is located and adjoining offset operators.

(4) If no protest from an affected person is received by the Commission, the director may administratively approve the application. If the director denies administrative approval, the applicant shall have a right to a hearing upon request. After hearing, the examiner shall recommend a final action by the Commission.

(d) **Subsequent Commission action.**

(1) An injection well permit may be modified, suspended, or terminated by the Commission for just cause after notice and opportunity for hearing, if:

(A) A material change of conditions occurs in the operation or completion of the injection well, or there are material changes in the information originally furnished; Form

(B) Fresh water is likely to be polluted as a result of continued operation of the well;

(C) There are substantial violations of the terms and provisions of the permit or of Commission rules;

(D) The applicant has misrepresented any material facts during the permit issuance process; or

(E) Injected fluids are escaping from the permitted injection zone.

(2) An injection well permit may be transferred from one operator to another operator provided that: P-4

(A) Written notice of the intended permit transfer is submitted to the director at least 15 days prior to the date the transfer is to take place; and

(B) The director does not notify the present permit holder of an objection to the transfer prior to the transfer date stated in the above notification.

(e) **Area of review.** The applicant shall review the data of public record for wells that penetrate the proposed injection zone within a one-quarter (¼) mile radius of the proposed injection well to determine if all abandoned wells have been plugged in a manner that will prevent the movement of fluids from the injection zone into fresh water strata. Alternatively, if the applicant can show by computation that a lesser area will be affected by pressure increases, then the lesser area may be used in lieu of the one-quarter (¼) mile radius area of review. The applicant shall identify in the application wells which appear from such review of public records to be unplugged or improperly plugged and any other unplugged or improperly plugged wells of which the applicant has actual knowledge.

(f) **Casing.** Injection wells shall be cased and the casing cemented in compliance with Statewide Rule 13 in such a manner that the injected fluids will not endanger oil, gas, or geothermal resources and will not endanger fresh water formations not productive of oil, gas, or geothermal resources.

(g) **Special equipment.**

(1) **Tubing and packer.** New wells drilled or converted for injection after the effective date of this rule shall be equipped with tubing set on a mechanical packer. Packers shall be set no higher than 200 feet below the known top of cement behind the long string casing but in no case higher than 150 feet below the base of usable quality water.

(2) **Pressure valve.** The wellhead shall be equipped with a pressure observation valve on the tubing and for each annulus of the well. Operators of existing injection wells shall comply with this requirement by no later than January 1, 1983.

(3) **Exceptions.** The director may grant an exception to any provision of this paragraph upon proof of good cause. If the director denies an exception, the operator shall have a right to a hearing upon request. After hearing, the examiner shall recommend a final action by the Commission.

(h) **Well record.** Within 30 days after the completion or conversion of an injection well, the operator shall file in duplicate in the district office a complete record of the well on the appropriate form which shows the current completion. Form W-2, G-1 GT-1

(i) **Monitoring and reporting.**

(1) The operator shall monitor the injection pressure and injection rate of each injection well on at least a monthly basis.

(2) The results of the monitoring shall be reported annually to the Commission on the prescribed form. H-10

(3) All monitoring records shall be retained by the operator for at least five years.

(4) The operator shall report to the appropriate district office within 24 hours any significant pressure changes or other monitoring data indicating the presence of leaks in the well. The operator shall confirm this report in writing within five working days.

(j) **Testing.**

(1) Before beginning injection operations, the operator shall pressure test the long string casing. The test pressure must equal the maximum authorized injection pressure or 500 psig, whichever is less, but must be at least 200 psig. H-5

(2) Each injection well shall be pressure-tested in the manner provided in paragraph (j)(1) at least once every five years to determine if there are leaks in the casing, tubing, or packer. The director may prescribe a schedule and mail notification to operators to allow for orderly and timely compliance with this requirement. H-5

(3) As an alternative to the testing required in paragraph (j)(2), the tubing-casing annulus pressure may be monitored and included on the annual monitoring report required by subsection (i) provided that there is no indication of problems with the well. The director may grant an exception for viable alternative tests or surveys such as monitoring of injection rate/injection pressure relationships. H-10

(4) The operator shall notify the appropriate district office at least 48 hours prior to the testing. Testing shall not commence before the end of the 48-hour period unless authorized by the district office.

(5) A complete record of all tests shall be filed in duplicate in the district office within 30 days after the testing. H-5

(k) **Plugging.** Injection wells shall be plugged upon abandonment in accordance with Statewide Rule 14.

(l) **Penalties.**

(A) Violations of this rule may subject the operator to penalties and remedies specified in Title 3 of the *Natural Resources Code* and any other statutes administered by the Commission.

(B) The certificate of compliance for any oil, gas, or geothermal resource well may be revoked in the manner provided in §3.68 (051.02.02.073) for violation of this rule.

§3.13 RULE 13. CASING, CEMENTING, DRILLING AND COMPLETION REQUIREMENTS.

(As amended, effective January 1, 1983)

(a) **General.**

(1) The operator is responsible for compliance with this section during all operations at the well. It is the intent of all provisions of this section that casing be securely anchored in the hole in order to effectively control the well at all times, all usable-quality water zones be isolated and sealed off to effectively prevent contamination or harm, and all potentially productive zones be isolated and sealed off to prevent vertical migration of fluids or gases behind the casing. When the section does not detail specific methods to achieve these objectives, the responsible party shall make every effort to follow the intent of the section, using good engineering practices and the best currently available technology.

(2) **Definitions.** The following words and terms, when used in this chapter, shall have the following meanings, unless the context clearly indicates otherwise:

"Stand Under Pressure" — To leave the hydrostatic column pressure in the well acting as the natural force without adding any external pump pressure. The provisions are complied with if a float collar is used and found to be holding at the completion of the cement job.

"Zone of Critical Cement" — For surface casing strings shall be the bottom 20% of the casing string, but shall be no more than 1,000 feet nor less that 300 feet. The zone of critical cement extends to the land surface for surface casing strings of 300 feet or less.

"Protection Depth" — Depth to which usable-quality water must be protected, as determined by the Texas Department of Water Resources, which may include zones that contain brackish or salt water if such zones are correlative and/or hydrologically connected to zones that contain usable-quality water.

"Productive Horizon" — Any stratum known to contain oil, gas, or geothermal resources in commercial quantities in the area.

(b) **Onshore and Inland Waters.**

(1) **General.**

(A) All casing cemented in any well shall be steel casing that has been hydrostatically pressure tested with an applied pressure at least equal to the maximum pressure to which the pipe will be subjected in the well. For new pipe, the mill test pressure may be used to fulfill this requirement. As an alternative to hydrostatic testing, a full length electromagnet, ultrasonic, radiation thickness gauging, or magnetic particle inspection may be employed.

(B) Wellhead assemblies shall be used on wells to maintain surface control of the well. Each component of the wellhead shall have a pressure rating equal to or greater than the anticipated pressure to which that particular component might be exposed during the course of drilling, testing, or producing the well.

(C) A blowout preventer or control head and other connections to keep the well under control at all times shall be installed as soon as surface casing is

set. This equipment shall be of such construction and capable of such operation as to satisfy any reasonable test which may be required by the Commission or its duly accredited agent.

(D) When cementing any string of casing more than 200 feet long, before drilling the cement plug the operator shall test the casing at a pump pressure in pounds per square inch (psi) calculated by multiplying the length of the casing string by 0.2. The maximum test pressure required, however, unless otherwise ordered by the Commission, need not exceed 1,500 psi. If, at the end of 30 minutes, the pressure shows a drop of 10% or more from the original test pressure, the casing shall be condemned until the leak is corrected. A pressure test demonstrating less than a 10% pressure drop after 30 minutes is proof that the condition has been corrected.

(2) **Surface Casing.**

(A) **Amount Required.**

(i) An operator shall set and cement sufficient surface casing to protect all usable-quality water strata, as defined by the Texas Department of Water Resources. Before drilling any well in any field or area in which no field rules are in effect or in which surface casing requirements are not specified in the applicable field rules, an operator shall obtain a letter from the Texas Department of Water Resources stating the protection depth. In no case, however, is surface casing to be set deeper than 200 feet below the specified depth without prior approval from the Commission.

(ii) Any well drilled to a total depth of 1,000 feet or less below the ground surface may be drilled without setting surface casing provided no shallow gas sands or abnormally high pressures are known to exist at depths shallower than 1,000 feet below the ground surface; and further, provided that production casing is cemented from the shoe to the ground surface by the pump and plug method.

(B) **Cementing.** Cementing shall be by the pump and plug method. Sufficient cement shall be used to fill the annular space outside the casing from the shoe to the ground surface or to the bottom of the cellar. If cement does not circulate to ground surface or the bottom of the cellar, the operator or his representative shall obtain the approval of the district director for the procedures to be used to perform additional cementing operations, if needed, to cement surface casing from the top of the cement to the ground surface.

(C) **Cement Quality.**

(i) Surface casing strings must be allowed to stand under pressure until the cement has reached a compressive strength of at least 500 psi in the zone of critical cement before drilling plug or initiating a test. The cement mixture in the zone of critical cement shall have a 72 hour compressive strength of at least 1,200 psi.

(ii) An operator may use cement with volume extenders above the zone of critical cement to cement the casing from that point to the ground surface, but in no case shall the cement have a compressive strength of less than 100 psi at the time of drill out nor less than 250 psi 24 hours after being placed.

(iii) In addition to the minimum compressive strength of the cement, the API free water separation shall average no more than six milliliters per 250 milliliters of cement tested in accordance with the current API RP 10B. Form

(iv) The Commission may require a better quality of cement mixture to be used in any well or any area if evidence of local conditions indicates a better quality of cement is necessary to prevent pollution or to provide safer conditions in the well or area.

(D) **Compressive Strength Tests.** Cement mixtures for which published performance data are not available must be tested by the operator or service company. Tests shall be made on representative samples of the basic mixture of cement and additives used, using distilled water or potable tap water for preparing the slurry. The tests must be conducted using the equipment and procedures adopted by the American Petroleum Institute, as published in the current API RP 10B. Test data showing competency of a proposed cement mixture to meet the above requirements must be furnished the Commission prior to the cementing operation.

To determine that the minimum compressive strength has been obtained, operators shall use the typical performance data for the particular cement used in the well (containing all the additives, including any accelerators used in the slurry) at the following temperatures and at atmospheric pressure:

(i) For the cement in the zone of critical cement, the test temperature shall be within 10° F of the formation equilibrium temperature at the top of the zone of critical cement.

(ii) For the filler cement, the test temperature shall be the temperature found 100 feet below the ground surface level, or 60° F, whichever is greater.

(E) **Cementing Report.** Upon completion of the well, a cementing report must be filed with the Commission furnishing complete data concerning the cementing of surface casing in the well as specified on a form furnished by the Commission. The operator of the well or his duly authorized agent having personal knowledge of the facts, and representatives of the cementing company performing the cementing job, must sign the form attesting to compliance with the cementing requirements of the Commission. W-15 W-15

(F) **Centralizers.** Surface casing shall be centralized at the shoe, above and below a stage collar or diverting tool, if run, and through usable-quality water zones. In nondeviated holes, pipe centralization as follows is required: a centralizer shall be placed every fourth joint from the cement shoe to the ground surface or to the bottom of the cellar. All centralizers shall meet API spec 10D specifications. In deviated holes, the operator shall provide additional centralization. W-15

(G) Exceptions and Alternative Surface Casing Programs.

(i) An exception may be granted upon written application to the appropriate district director. The operator shall state the reason (economics, well control, etc.) for the requested exception and outline an alternate program for casing and cementing through the protection depth for strata containing usable-quality water. Exceptions for setting more

than specified amounts of surface casing for well control purposes may be requested on a field or area basis. Exceptions for setting less than specified amounts of surface casing will be granted on an individual well basis only. The district director may approve, modify, or reject the proposed program. If the proposal is modified or rejected, the operator may request a review by the director of field operations. If the proposal is not approved administratively, the operator may request a public hearing. An operator shall obtain approval of any exception before commencing operations.

(ii) Any alternate casing program shall require the first string of casing set through the protection depth to be cemented in a manner that will effectively prevent the migration of any fluid to or from any stratum exposed to the wellbore outside this string of casing. The casing shall be cemented from the shoe to ground surface in a single stage, if feasible, or by a multi-stage process with the stage tool set at least 50 feet below the protection depth.

(iii) Any alternate casing program shall include pumping sufficient cement to fill the annular space from the shoe or multi-stage tool to the ground surface. If cement is not circulated to the ground surface or the bottom of the cellar, the operator shall run a temperature survey or cement bond log. The appropriate district office shall be notified prior to running the required temperature survey or bond log. After the top of cement outside the casing is determined, the operator or his representative shall contact the appropriate district director and obtain approval for the procedures to be used to perform any required additional cementing operations. Upon completion of the well, a cementing report shall be filed with the Commission on the prescribed form.

(iv) Before parallel (nonconcentric) strings of pipe are cemented in a well, surface or intermediate casing must be set and cemented through the protection depth.

(3) **Intermediate Casing.**

(A) **Cementing Method.** Each intermediate string of casing shall be cemented from the shoe to a point at least 600 feet above the shoe. If any productive horizon is open to the wellbore above the casing shoe, the casing shall be cemented from the shoe up to a point at least 600 feet above the top of the shallowest productive horizon or to a point at least 200 feet above the shoe of the next shallower casing string that was set and cemented in the well.

(B) **Alternate Method.** In the event the distance from the casing shoe to the top of the shallowest productive horizon makes cementing, as specified above, impossible or impractical, the multi-stage process may be used to cement the casing in a manner that will effectively seal off all such possible productive horizons and prevent fluid migration to or from such strata within the wellbore.

(4) **Production Casing.**

(A) **Cementing method.** The producing string of casing shall be cemented by the pump and plug method, or another method approved by the

Commission, with sufficient cement to fill the annular space back of the casing to the surface or to a point at least 600 feet above the shoe. If any productive horizon is open to the wellbore above the casing shoe, the casing shall be cemented in a manner that effectively seals off all such possibly productive horizons by one of the methods specified for intermediate casing in paragraph (b)(3) of this section.

(B) **Isolation Of Associated Gas Zones.** The position of the gas-oil contact shall be determined by coring, electric log, or testing. The producing string shall be landed and cemented below the gas-oil contact, or set completely through and perforated in the oil-saturated portion of the reservoir below the gas-oil contact.

(5) **Tubing and storm choke requirements.**

(A) **Tubing Requirements For Oil Wells.** All flowing oil wells shall be equipped with and produced through tubing. When tubing is run inside casing in any flowing oil well, the bottom of the tubing shall be at a point not higher than 100 feet above the top of the producing interval nor more than 50 feet above the top of a liner, if one is used. In a multiple zone structure, however, when an operator elects to equip a well in such a manner that small through-the-tubing type tools may be used to perforate, complete, plug back, or recomplete without the necessity of removing the installed tubing, the bottom of the tubing may be set at a distance up to, but not exceeding 1,000 feet above the top of the perforated or open-hole interval actually open for production into the wellbore. In no case shall tubing be set at a depth of less than 70% of the distance from the surface of the ground to the top of the interval actually open to production.

(B) **Storm Choke.** All flowing oil, gas, and geothermal resource wells located in bays, estuaries, lakes, rivers, or streams must be equipped with a storm choke or similar safety device installed in the tubing a minimum of 100 feet below the mudline.

(c) **Texas Offshore Casing, Cementing, Drilling, and Completion Requirements.**

(1) **Casing.** The casing program shall include at least three strings of pipe, in addition to such drive pipe as the operator may desire, which shall be set in accordance with the following program:

(A) **Conductor Casing.** A string of new pipe, or reconditioned pipe with substantially the same characteristics as new pipe, shall be set and cemented at a depth of not less than 300 feet TVD (true vertical depth) nor more than 800 feet TVD below the mud line. Sufficient cement shall be used to fill the annular space back of the pipe to the mud line; however, cement may be washed out or displaced to a maximum depth of 50 feet below the mud line to facilitate pipe removal on abandonment. Casing shall be set and cemented in all cases prior to penetration of known shallow oil and gas formations, or upon encountering such formations.

(B) **Surface Casing.** All surface casing shall be a string of new pipe with a mill test of at least 1,100 pounds per square inch (psi) or reconditioned pipe that has been tested to an equal pressure. Sufficient cement shall be used to fill the annular space behind the pipe to the mud line; however, cement may be washed out or displaced to a maximum depth of 50 feet below the mud line

to facilitate pipe removal on abandonment. Surface casing shall be set and cemented in all cases prior to penetration of known shallow oil and gas formations, or upon encountering such formations. In all cases, surface casing shall be set prior to drilling below 3,500 feet TVD. Minimum depths for surface casing are as follows:

(i) Surface Casing Depth Table.

Proposed Total Vertical Depth of Well	Surface
to 7,000 feet	25% of proposed depth of well
7,000 - 10,000 feet	2,000 feet
10,000 and below	2,500 feet

(ii) Casing test. Cement shall be allowed to stand under pressure for a minimum of eight hours before drilling plug or initiating tests. Casing shall be tested by pumping a drop of less than 100 psi after 30 minutes is proof that the condition has been corrected.

(C) Production Casing Or Oil String. The production casing or oil string shall be new or reconditioned pipe with a mill test of at least 2,000 PSI that has been tested to an equal pressure and after cementing shall be tested by pump pressure to at least 1,500 psi. If, at the end of 30 minutes, the pressure shows a drop of 150 psi or more, the casing shall be condemned. After corrective operations, the casing shall be tested in the same manner. Cementing shall be by the pump and plug method. Sufficient cement shall be used to fill the calculated annular space above the shoe to protect any prospective producing horizons and to a depth that isolates abnormal pressure from normal pressure (0.465 gradient). A float collar or other means to stop the cement plug shall be inserted in the casing string above the shoe. Cement shall be allowed stand under pressure for a minimum of eight hours before drilling the plug or initiating tests.

(2) Blowout Preventers.

(A) Before drilling below the conductor casing, the operator shall install at least one remotely controlled blowout preventer with a mechanism for automatically diverting the drilling fluid to the mud system when the blowout preventer is activated.

(B) After setting and cementing the surface casing, a minimum of two remotely controlled hydraulic ram-type blowout preventers (one equipped with blind rams and one with pipe rams), valves, and manifolds for circulating drilling fluid shall be installed for the purpose of controlling the well at all times. The ram-type blowout preventers, valves, and manifolds shall be tested to 100% of rated working pressure, and the annular-type blowout preventer shall be tested to 1,000 psi at the time of installation. During drilling and completion operations, the ram-type blowout preventers shall be tested by closing at least once each trip, and the annular-type preventer shall be tested by closing on drill pipe once each week.

(3) Kelly Cock. During drilling, the well shall be fitted with an upper kelly cock in proper working order to close in the drill string below hose and swivel, when necessary for well control. A lower kelly safety valve shall be installed so that it can

be run through the blowout preventer. When needed for well control, the operator shall maintain at all times on the rig floor safety valves to include:

(A) full opening valve of similar design as the lower kelly safety valves.

(B) inside blowout preventer valve with wrenches, handling tools, and necessary subs for all drilling pipe sizes in use.

(4) **Mud Program.** The characteristics, use, and testing of drilling mud and conduct of related drilling procedures shall be designed to prevent the blowout of any well. Adequate supplies of mud of sufficient weight and other acceptable characteristics shall be maintained. Mud tests shall be made frequently. Adequate mud testing equipment shall be kept on the drilling platform at all times. The hole shall be kept full of mud at all times. When pulling drill pipe, the mud volume required to fill the hole each time shall be measured to assure that it corresponds with the displacement of pipe pulled. A derrick floor recording mud pit level indicator shall be installed and operative at all times. A careful watch for swabbing action shall be maintained when pulling out of hole. Mud-gas separation equipment shall be installed and operated.

(5) **Casinghead.**

(A) **Requirement.** All wells shall be equipped with casingheads of sufficient rated working pressure, with adequate connections and valves available, to permit pumping mudladen fluid between any two strings of casing at the surface.

(B) **Casinghead Test Procedure.** Any well showing sustained pressure on the casinghead, or leaking gas or oil between the surface casing and the oil string, shall be tested in the following manner: The well shall be killed with water or mud and pump pressure applied. Should the pressure gauge on the casinghead reflect the applied pressure, the casing shall be condemned. After corrective measures have been taken, the casing shall be tested in the same manner. This method shall be used when the origin of the pressure cannot be determined otherwise.

(6) **Christmas Tree.** All completed wells shall be equipped with Christmas tree fittings and wellhead connections with a rated working pressure equal to, or greater than, the surface shut-in pressure of the well. The tubing shall be equipped with a master valve, but two master valves shall be used on all wells with surface pressures in excess of 5,000 psi. All wellhead connections shall be assembled and tested prior to installation by a fluid pressure equal to the test pressure of the fitting employed.

(7) **Storm Choke and Safety Valve.** A storm choke or similar safety device shall be installed in the tubing of all completed flowing wells to a minimum of 100 feet below the mud line. Such wells shall have the tubing-casing annulus sealed below the mud line. A safety valve shall be installed at the wellhead downstream of the wing valve. All oil, gas, and geothermal resource gathering lines shall have check valves at their connections to the wellhead.

(8) **Pipeline Shut-off Valve.** All gathering pipelines designed to transport oil, gas, condensate, or other oil or geothermal resource field fluids from a well or platform shall be equipped with automatically controlled shut-off valves at critical points in the pipeline system. Other safety equipment must be in full working order as a safeguard against spillage from pipeline ruptures.

(9) **Training.** Effective January 1, 1981, all tool pushers, drilling superintendents, and operators' representatives (when the operator is in control of the drilling), shall be required to furnish certification of satisfactory

completion of a U.S.G.S. approved school on well control equipment and techniques. The certification shall be renewed every two (2) years by attending a U.S.G.S. approved refresher course. These training requirements apply to all drilling operations on lands which underlie fresh or marine waters in Texas.

§3.14 RULE 14. PLUGGING. Form

(As amended, effective January 1, 1983).

(a) **Application To Plug.**

(1) Notification of intention to plug any well or wells drilled for oil, gas, or geothermal resources or for any other purpose over which the Commission has jurisdiction, shall be given to the Commission prior to plugging. Notification shall be made, in writing, to the district office on the appropriate **form.** W-3A

(2) This written notification must be received by the district office at least five days prior to the beginning of plugging operations and shall show the proposed procedure as well as the complete casing record. The work of plugging the well or wells shall not commence before the date set out in the notification for the beginning of plugging operations unless authorized by the district director. The operator shall call the district office at least four hours before commencing plugging operations and proceed with the work as outlined, unless the proposed plugging procedure is not approved by the district director. Exceptions may be granted at the discretion of the district director when either a workover or drilling rig is already at work on location, ready to commence plugging operations. Operations shall not be suspended prior to plugging the well unless the hole is cased and casing is cemented in place in compliance with Commission rules.

(3) The landowner and the operator may file an **application** to condition an abandoned well located on the landowner's tract for usable quality water production operations, provided the landowner assumes responsibility for plugging the well and obligates himself, his heirs, successors, and assignees as a condition to the Commission's approval of such **application** to complete the plugging operations. The application shall be made on the form prescribed by the Commission. In all cases, the operator responsible for plugging the well must place all cement plugs required by this rule up to the base of the usable quality water strata, as determined by the Texas Department of Water Resources. P-13 P-13

(4) Before plugging any well, notice shall be given to the surface owner of the well site tract, or the resident if the owner is absent, and the operators of all offset producing leases. If they so desire, representatives of the surface owner and offset operators, in addition to the Commission representative, may be present to witness the plugging of the well. Plugging shall not be delayed because of the inability to deliver notices to adjoining operators, surface owners, or resident.

(b) **Plugging Report And Commencement Of Operations.**

(1) A plugging record shall be completed, duly verified, and filed, in duplicate, on the appropriate **form** in the district office within 30 days after plugging operations are completed. A cementing report made by the party cementing the well shall be attached to, or made a part of, the plugging **report.** W-3 W-15

(2) Plugging operations on each dry or inactive well must be commenced within a period of 90 days after drilling or operations have ceased and shall proceed with due diligence until completed. For good cause, a reasonable extension of time in which to start the plugging operations may be granted pursuant to the following procedures:

(A) The director of field operations may administratively grant an exception if the well is not a pollution hazard; and

(I) The operator has presented a viable plan for utilizing the well within a reasonable time; or

(II) The operator posts a performance bond or other form of financial security in an amount acceptable to the staff to ensure that the Commission will not have to plug the well with state funds.

(B) Any administratively granted exception is subject to review by the director of field operations at any time.

(C) If the director of field operations declines administratively to grant, to continue, or to extend an exception, the operator shall plug the well or request a hearing on the matter. After hearing, the examiner shall make a recommendation for final action by the Commission.

(c) **General Plugging Requirements.**

(1) In plugging wells, it is essential that all formations bearing usable quality water, oil, gas, or geothermal resources be protected. Proper plugging is the responsibility of the operator of the well. All cementing operations during plugging must be performed under the direct supervision of the operator or his authorized representative, who shall not be an employee of the service or cementing company hired to plug the well. Direct supervision means supervision on location at the well site.

(2) Cement plugs shall be set to isolate each productive horizon and usable quality water strata. A "productive horizon," as used in this rule, is defined as any stratum known to contain oil, gas, or geothermal resources in commercial quantities in the area.

(3) Cement plugs must be placed by the circulation or squeeze method through tubing or drill pipe.

(4) All cement for plugging shall be an appropriate API oil well cement without volume extenders and mixed in accordance with API standards. Slurry weights shall be reported on the cementing report. The district director may require specified cementing compositions to be used in special situations; for example, when high temperature, salt section, or highly corrosive sections are present.

(5) Operators shall use only cementers approved by the director of field operations. Cementing companies, service companies or operators can qualify as approved cementers by demonstrating that they are able and qualified to mix and pump cement in compliance with this rule. If the director of field operations refuses to administratively approve a cementing company, the company may request a hearing on the matter. After hearing, the examiner shall recommend final action by the Commission.

(6) The district director may require additional cement plugs to cover and contain any productive horizon or to separate any water stratum from any other water stratum if the water qualities or hydrostatic pressures differ sufficiently to justify separation. The tagging of any such plugs and respotting may be required.

(7) For onshore or inland wells, a 10-foot cement plug shall be placed in the top of the well, and the casing shall be cut off three feet below the ground surface.

(8) Mud-laden fluid of at least 9½ pounds per gallon shall be placed in all

portions of the well not filled with cement. The hole must be in static condition at the time the plugs are placed.

(9) Non-drillable material that would hamper or prevent re-entry of a well shall not be placed in any wellbore during plugging operations, except in the case of a well plugged and abandoned under the provisions of 16 TAC 3.35 (051.02.02.035). Pipe and unretrievable junk shall not be cemented in the hole during plugging operations without prior approval by the district director.

(10) All cement plugs, except the top plug, shall have sufficient slurry volume to fill 100 feet of hole, plus ten percent (10%) for each 1,000 feet of depth from the ground surface to the bottom of the plug.

(11) After plugging work is completed, the operator must fill the rat hole, mouse hole, and cellar, and must remove all loose junk and trash from the location. All pits must be backfilled within a reasonable period of time.

(d) **Plugging Requirements For Wells With Surface Casing.**

(1) When insufficient surface casing is set to protect all usable quality water strata and such usable quality water strata are exposed to the wellbore when production or intermediate casing is pulled from the well or as a result of such casing not being run, a cement plug shall be placed from 50 feet below the base of the deepest usable quality water stratum to 50 feet above the top of the stratum. This plug shall be evidenced by tagging with tubing or drill pipe. The plug must be respotted if it has not been properly placed. In addition, a cement plug must be set across the shoe of the surface casing. This plug must be a minimum of 100 feet in length and shall extend at least 50 feet above and below the shoe.

(2) When sufficient surface casing has been set to protect all usable quality water strata, a cement plug shall be placed across the shoe of the surface casing. This plug shall be a minimum of 100 feet in length and shall extend at least 50 feet above the shoe and at least 50 feet below the shoe.

(3) If surface casing has been set deeper than 200 feet below the base of the deepest usable quality water stratum, an additional cement plug shall be placed inside the surface casing across the base of the deepest usable quality water stratum. This plug shall be a minimum of 100 feet in length and shall extend from 50 feet below the base of the deepest usable quality water stratum to 50 feet above the top of the stratum.

(e) **Plugging Requirements For Wells With Intermediate Casing.**

(1) For wells in which the intermediate casing has been cemented through all usable quality water strata and all productive horizons, a cement plug meeting the requirements of subsection (c)(10) of this rule shall be placed inside the casing and centered opposite the base of the deepest usable quality water stratum, but extend no less than 50 feet above and below the stratum.

(2) For wells in which the intermediate casing is not cemented through all usable quality water strata and all productive horizons, and if the casing will not be pulled, the intermediate casing shall be perforated at the required depths to place cement outside of casing by squeeze cementing through casing perforations.

(f) **Plugging Requirements For Wells With Production Casing.**

(1) For wells in which the production casing has been cemented through all usable quality water strata and all productive horizons, a cement plug meeting the requirements of subsection (c)(10) of this rule shall be placed inside the casing and centered opposite the base of the deepest usable quality water stratum and across any multi-stage cementing tool. Form

(2) For wells in which the production casing has not been cemented through all usable quality water strata and all productive horizons and if the casing will not be pulled, the production casing shall be perforated at the required depths to place cement outside of the casing by squeeze cementing through casing perforations.

(3) The district director may approve a cast iron bridge plug to be placed immediately above each perforated interval, provided at least 20 feet of cement is placed on top of each bridge plug. A bridge plug shall not be set in any well at a depth where the pressure or temperature exceeds the ratings recommended by the bridge plug manufacturer.

(g) **Plugging Requirements For a Well With Screen or Liner.**

(1) If practical, the screen or liner shall be removed from the well.

(2) If the screen or liner is not removed, a cement plug in accordance with subsection (c) (10) this rule shall be placed at the top of the liner.

(h) **Plugging Requirements For Wells Without Production Casing and Open-Hole Completions.**

(1) Any productive horizon or any formation in which a pressure or formation water problem is known to exist shall be isolated by cement plugs centered at the top and bottom of the formation. Each cement plug shall have sufficient slurry volume to fill a calculated height as specified in subsection (c) (10) above.

(2) If the gross thickness of any such formation is less than 100 feet, the tubing or drill pipe shall be suspended 50 feet below the base of the formation. Sufficient slurry volume shall be pumped to fill the calculated height from the bottom of the tubing or drill pipe up to a point at least 50 feet above the top of the formation, plus ten percent (10%) for each 1,000 feet of depth from the ground surface to the bottom of the plug.

(i) The district director shall review and approve the "Notification of Intention to Plug" in a manner so as to accomplish the purposes of this rule. The district director may approve, modify, or reject the operator's "Notification of Intention to Plug". If the proposal is modified or rejected, the operator may request a review by the director of field operations. If the proposal is not administratively approved, the operator may request a hearing on the matter. After hearing, the examiner shall recommend final action by the Commission. W-3A

RAILROAD COMMISSION OF TEXAS

OIL AND GAS DIVISION

JAMES E. (JIM) NUGENT, Commissioner
JOHN SHARP, Commissioner
[illegible]ENT HANCE, Commissioner

JIM MORROW, P.E.
Director
WILLIS C. STEED, P.E.
Director, Field Operations

1701 N. CONGRESS | CAPITOL STATION — P. O. DRAWER 12967 | AUSTIN, TEXAS 78711-2967

December 21, 1987

MEMORANDUM TO: District Director

FROM: Willis C. Steed, Director
Field Operations

SUBJECT: Witnessing Programs for Casing and Plugging Jobs

Attached is an outline for improved witnessing programs on casing and plugging jobs. Please implement these programs in your district as soon as possible. These programs should improve the quality of our witnessing and should make operators and cementers more aware of the requirements of Rules 13 & 14.

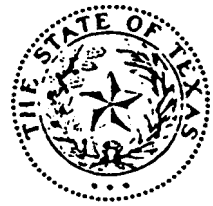
Please ensure that all of your personnel are sufficiently trained to use the equipment and do the calculations necessary to properly witness a job. We realize all of our people do not have cementing tables, so for the time being, it may be necessary to make copies of the capacity and displacement tables to provide to your personnel.

for Willis C. Steed

BRH:bw

Attachment

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION



1701 N. CONGRESS | CAPITOL STATION — P. O. DRAWER 12967 | AUSTIN, TEXAS 78711-2967

November 3, 1987

MEMORANDUM TO: Jim Morrow, Director
Oil and Gas Division

FROM: Bill R. Holl, Assistant Director
Oil and Gas Division

Re: Committee on Improved Witnessing of Cementing Operations on Casing and Plugging Jobs

SUBJECT: Proposal For Witnessing Program

Due to the demands on field personnel and time restrictions, the number of casing and plugging jobs witnessed by Commission personnel are decreasing. To compensate for this, we propose to improve the quality of witnessing for the jobs that are witnessed. This should accomplish the following:

1. Ensure that jobs witnessed are correct in all aspects from start to finish.

2. Make operators more aware of all provisions of Rule 13 and 14.

3. Increase likelihood that future jobs will be planned better by operator.

4. Improve the protection of usable water.

To accomplish the above, the following program is recommended:

1. Be selective in jobs that will be witnessed. Priority will be given to casing strings that are being cemented to protect usable water, whether it be surface casing or production casing.

2. Select the more sensitive areas where there is usable water to be protected.

3. Select a cross section of operators whose jobs will be witnessed.

4. Set minimum number of jobs to be completely witnessed in detail. If possible, each technician should do at least one complete detailed witness per month.

5. Select jobs at hours other than between 8 A.M. and 5 P.M.

6. Ensure that proper training is provided to field technicians, including the use of special equipment and the required calculations to evaluate jobs.

7. Ensure that personnel have all necessary equipment and cementing tables.

8. Provide technicians with a check list or special "D" Form to ensure that all aspects of casing cementing and plugging are covered.

In addition to the complete detailed witnessing program, the routine witnessing of casing cementing and well plugging will be enhanced to improve the quality. To accomplish this, a condensed checklist will be provided to use when Commission personnel are not able to be on a job from start to finish. The checklist will make operators more aware of our concerns and requirements even if a Commission witness cannot be present during the entire job. Attached is a copy of the guidelines that will be provided to the district offices.

Bill R. Hall

BRH:bw

Attachment

Witnessing of Surface Casing Setting
(Complete Detailed Witnessing)

1. This is for jobs where sufficient surface casing is set to protect all usable water.

2. Arrange to arrive at location before casing is started in hole.

3. Check surface casing program:

   A. Depth to be set and the size and amount of casing on location.

   B. Amount of cement to be used and type - both in critical zone and filler zone. (Critical zone - bottom 20% of casing string, but not less than 300 feet or more than 1000 feet).

   C. Check load ticket for types of cement to be used and check technical data for compressive strength of each mixture. (Critical cement - 500 psi at drill out and 1200 psi after 72 hours. Filler cement - 100 psi at drill out and 250 psi after 24 hours).

      (1) If the compressive strength data is not available at locations, request operator and/or cementer to submit the data to the district office. Operator should be aware that they proceed at their own risk if the cement quality is not sufficient.

      (2) If compressive strength data has not been determined for a cement mixture, the operator and cementer should be advised that it will be necessary to conduct the required tests and submit the results to the district office. Operator will also be proceeding at their own risk in this situation.

4. Check number and placement of centralizers. Centralizers should be at shoe and on every 4th joint from shoe to ground surface.

5. Check on amount of water to be mixed and check weight of slurry.

6. Collect sample of slurry. Sample should be left in district office.

7. Collect sample of dry (unmixed) cement for each type cement. These samples should be left in district office.

8. Check on size of hole.

9. Calculate amount of cement required to circulate cement from shoe of casing to ground surface.

10. Watch to determine if cement circulates. If you are not sure that returns are cement or colored mud, weigh return sample.

11. Check on time waiting on cement before drill-out to determine if this time is sufficient to give the required compressive strength of the cement.

12. If cement does not circulate to surface, determine top of cement using log. Depending upon the results, it may be necessary to perforate and pump cement to surface, circulate cement on log string, or one (1") inch from top of cement to ground surface. In some cases, it may be possible to just one (1") inch the surface casing without running a log if sufficient cement was pumped to circulate the calculated volume and there were no loss of returns during pumping and there is reason to believe that the top of the cement is near surface such as observing cement colored water in the returns.

Witnessing of Alternate Program
For Usable Water Protection

1. Need to require the operator to file a complete casing and cementing program prior to approving an alternate program for the protection of usable water. The program should include the amount and type of cement to be used.

2. Check data for compressive strength of the cement slurries to be pumped. If cement is to be circulated from total depth to ground surface, the minimum acceptable compressive strength of the cement must meet the standards for filler cement. If a multi-stage tool is used at the base of the usable water, the cement used across the critical zone must meet the requirements for critical zone cement.

3. Check number and placement of centralizers. The casing string will need to be centralized at the multi-stage tool depth or base of usable water and every 4th joint from there to ground surface.

4. Check amount of casing to be set, also size of casing and hole.

5. Calculate amount of cement required to circulate from total depth or multi-stage tool, which ever is applicable.

6. If multi-stage tool is to be used, check placement depth of the tool.

7. Check total amount of cement used.

8. Collect samples of slurries and dry, unmixed cement.

9. Watch for circulation and check returns to ensure it is cement.

10. If cement does not circulate, it will be necessary to run a log to determine the top of cement. If the top of the cement is inside the surface casing, this will be sufficient. If not, it will be necessary to contact the district office for the appropriate remedial actions. The following are some suggested guidelines to determine the appropriate remedial action:

    A. If the T.O.C. is below the base of usable water, it will be necessary to 1" if possible or perforate and pump cement to cover usable water.

    B. If the T.O.C. is above the base of the usable water, but not inside the surface casing, it may be possible to 1" or pump cement down the annulus, depending on the T.O.C. relative to the base of usable water.

    C. If the Texas Water Commission recommends separation of usable water zones, this will need to be taken into consideration when determining the appropriate remedial action.

Witnessing of Well Pluggings

1. Verify plug procedure before starting.

2. Check mud weight and viscosity. Weight must be at least 9.5 lbs per gallon and funnel viscosity must be at least 35 seconds.

3. Ensure hole is full of mud.

4. Check amount of tubing being run.

5. Check volume of cement to be pumped and calculate fill-up.

6. Check weight of cement slurry. Should be at least 15.6 lbs per gallon. If cementer is using a jet mixer, it may be necessary to increase the length of the plugs if the first of the slurries are too light. It would be permissible to allow a slurry weight of less than 15.6 lbs per gallon if a well is to be filled with cement from total depth to ground surface.

7. Watch returns during the pumping of the plugs for any indications of loss or problem.

8. Include all of above data on witnessing report.

When to Tag a Plug

1. Rule 14 requires that the plug at the base of the usable water be tagged if plug is set in open hole.

2. Other than the plug or plugs under Item 1, there should be a specific reason if a district requires tagging of any other zone.

3. Tagging of a particular plug may be warranted if there are any problems during the plugging operations that might indicate a plug has fallen. The indications could be a loss of returns, excessive amounts of mud to circulate hole, loss of fluid level in hole, etc.

Condensed Witnessing Program

When a Commission witness is present during the entire casing or plug job, the previous guidelines should be followed. If, however, it is not possible or practical to be present during the entire operation, the following condensed procedure should be followed.

1. Collect all of the information previously specified except for the collection of samples.

2. Do all parts of the previous duties specified that would be applicable for the portion of the job that is witnessed.

3. Enter all information and data on inspection report or form. Indicate source of information or data if it is not possible to verify during the portion of the job witnessed.

4. If a job is left prior to completion, always indicate that you may return if possible. In cases where Commission personnel are working in a general area, rechecks on the progress of a job should be made when possible.

TEXAS
PEER REVIEW
MISCELLANEOUS
MAPS, CHARTS
& FORMS

Railroad Commission of Texas
Austin, Texas

James E. (Jim) Nugent
Chairman

Kent Hance
Commissioner

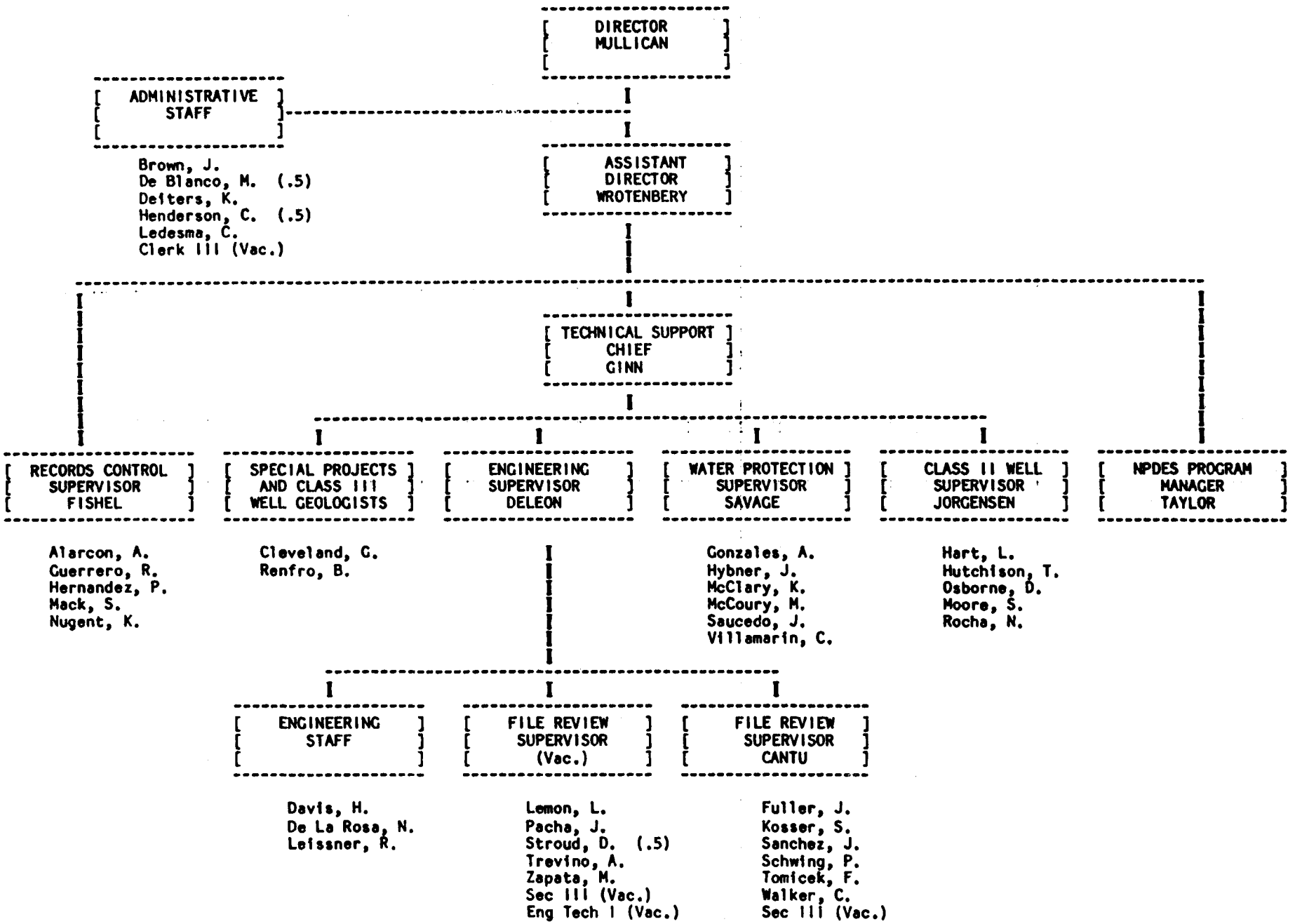
John Sharp
Commissioner

Oil and Gas Division

Jim Morrow	Director	512 463-6893
Willis Steed	Director of Field Operations	512 463-6830
Bill Hall	Assistant Director, Regulatory Enforcement	512 463-6832
Paul Stagg	Assistant Director, Regulatory Enforcement	512 463-6833
Jim Walker	Director, Production & Proration	512 463-6838
David Garlick	Director, Planning & Administration	512 463-6889
Jerry Mullican	Director, Underground Injection Control	512 463-6790
Lori Wrotenbery	Assistant Director, Underground Injection Control	512 463-6794
Richard Ginn	Geologist, Underground Injection Control	512 463-6796
Leslie Savage	Geologist, Underground Injection Control	512 463-6799
David Jorgensen	Geologist, Underground Injection Control	512 463-6791
Fernando De Leon	Engineer, Underground Injection Control	512 463-6814

District Offices and Directors

Districts 1 & 2 San Antonio 78205-1689	Richard R. Igau, District Director Robert P. Goulas, Assistant District Director 1610 Milam Building	(512) 227-1313
District 3 Houston 77040-6008	Guy M. Grossman, Acting District Director 13201 Northwest Freeway, Suite 701	(713) 460-0631
District 4 Corpus Christi 78410-0307	Fermin Munoz, Jr., District Director Bernard C. Eikel, Assistant District Director P. O. Box 10307	(512) 242-3113
Districts 5 & 6 Kilgore 75662-5998	Randy Earley, District Director Carl Gardner, Assistant District Director 619 Henderson Blvd.	(214) 984-3026
District 7B Abilene 79604-1681	Joe S. Mayorga, Jr., Acting District Director Joe Cress, Assistant District Director P. O. Box 1681	(915) 677-3545
District 7C San Angelo 76902-2141	Alvin J. Raschke, District Director Randall Ross, Assistant District Director P. O. Box 2141	(915) 653-6776
District 8 Midland 79702-2110	Ronald L. Strong, District Director Hank H. Krusekopf, Assistant District Director P. O. Box 2110	(915) 684-5581
District 8A Lubbock 79452-2089	Karl Thiel, District Director Barry Wood, Assistant District Director P. O. Box 12089	(806) 744-6944
District 9 Wichita Falls 76307-1511	Fred McNeel, District Director Mark Henkhaus, Assistant District Director P. O. Box 1511	(817) 723-2153
District 10 Pampa 79066-0941	Bob G. Blakeney, District Director Gil Bujano, Assistant District Director P. O. Box 941	(806) 665-1653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De Blanco, M. (.5)
Deiters, K.
Henderson, C. (.5)
Ledesma, C.
Clerk III (Vac.)
ASSISTANT DIRECTOR
WROTENBERY
TECHNICAL SUPPORT CHIEF
GINN
RECORDS CONTROL SUPERVISOR
FISHEL
Alarcon, A.
Guerrero, R.
Hernandez, P.
Mack, S.
Nugent, K.
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Renfro, B.
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DELEON
ENGINEERING STAFF
Davis, H.
De La Rosa, N.
Leissner, R.
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(Vac.)
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Pacha, J.
Stroud, D. (.5)
Trevino, A.
Zapata, M.
Sec III (Vac.)
Eng Tech I (Vac.)
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Schwing, P.
Tomicek, F.
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McClary, K.
McCoury, M.
Saucedo, J.
Villamarin, C.
CLASS II WELL SUPERVISOR
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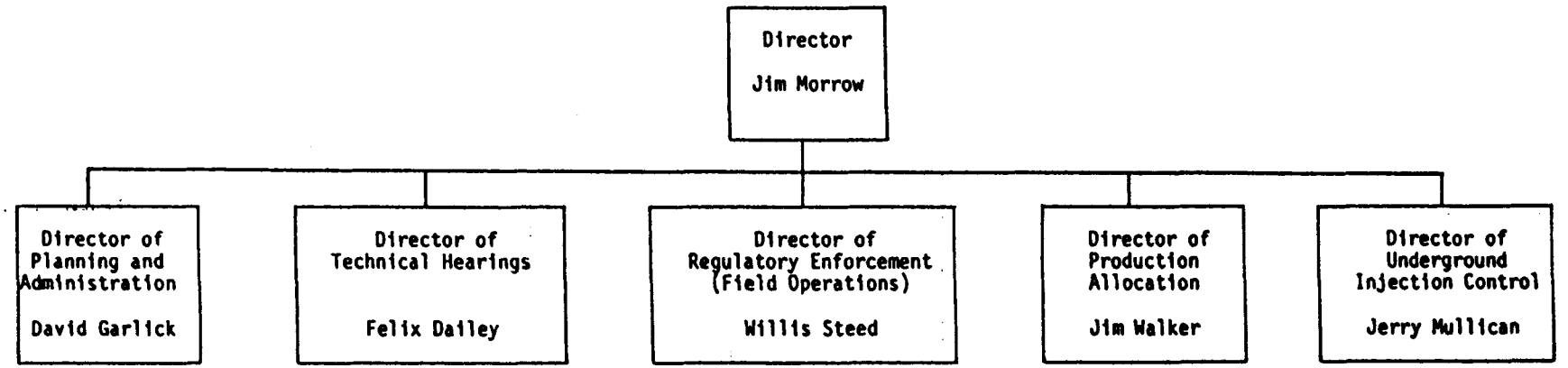
Hutchison, T.
Osborne, D.
Moore, S.
Rocha, N.
NPDES PROGRAM MANAGER
TAYLOR

RAILROAD COMMISSION OF TEXAS

OIL AND GAS DIVISION



Budget Control
Personnel matters
Systems & PC Support
Mapping
Central Records

Process and conduct technical hearings.
Assist in most legal hearings.
Process complaints directed to Oil & Gas Division.
Process all Rule 37 applications.
Respond to questions from industry regarding rule interpretation and application process.

Rule enforcement
10 District Offices* assist well and lease operators in complying with our rules and regulations by inspecting installations & operations in the field.

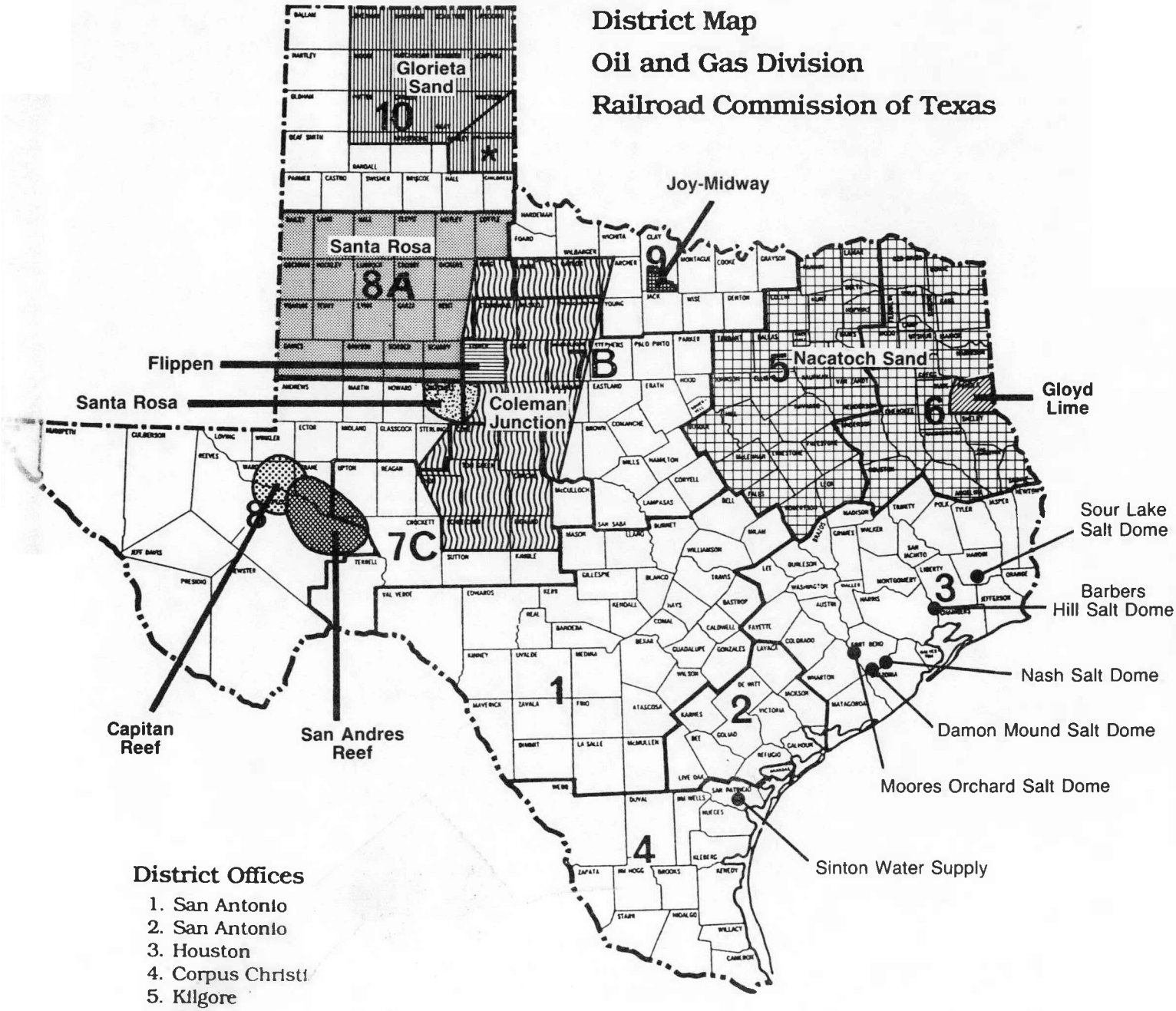
*District

No.	Location
1,2	San Antonio
3	Houston
4	Corpus Christi
5,6	Kilgore
7B	Abilene
7C	San Angelo
8	Midland
8A	Lubbock
9	Wichita Falls
10	Pampa

Assign monthly allowables to 254,000 producing wells in Texas
Monitor production
Natural Gas Policy Act
Technical Permits
Audit
Data Entry

Injection, Disposal, Hydrocarbon Storage, and Brine Mining Well Permitting, Monitoring and Testing.
Salt Water Hauler Permitting
Pit Permitting and Rule 8 Administration
Assist other Sections in Environmental Matters
Coordinate with State and Federal Agencies on Environmental Matters.

Geologic Formations and Geographic Areas Where Injection is Restricted or Prohibited



District Offices

1. San Antonio
2. San Antonio
3. Houston
4. Corpus Christi
5. Kilgore
6. Kilgore
7B. Abilene
7C. San Angelo
8. Midland
8A. Lubbock
9. Wichita Falls
10. Pampa

*Deep as possible/Gravity only
Nacatoch Sand — No Disposal
Gloyd Lime — Pressure & waterflow problems
Sour Lake — Special Order requirements for all permits.
Joy Midway — Area of Review requires completion and plugging reports
All Santa Rosa disposal applications in District 8A must have detailed areas of review

Protection of USDWs to 10,000 PPM TDS
Railroad Commission of Texas

The Safe Drinking Water Act (SDWA) of 1974 mandated the protection of Underground Sources of Drinking Water (USDW). State agencies granted primacy under §1425 of the SDWA were given primary enforcement authority by EPA over Class II wells by demonstrating that their existing Underground Injection Control (UIC) programs met the requirements of §1421(b)(1)(A) through (D) and also that their programs were effectively protecting USDWs. The purpose of this paper is to review the Railroad Commission (RRC) program as it relates to the protection of USDWs and to discuss the level of protection that is provided by the existing program.

The RRC was granted UIC primacy for Class II wells on April 23, 1982, under §1425 of the Safe Drinking Water Act. This allowed all existing Class II wells in Texas as of the date of primacy to be authorized by their existing permits. New Class II wells were to be authorized by new permits. In order to ensure that newly permitted Class II wells would not endanger any underground source of drinking water the RRC agreed to protect all water with less than 10,000 PPM total dissolved solids (TDS) by considering casing, cementing, and geological factors delineated in their program description. The RRC program description provided protection of water with less than 10,000 PPM TDS by requiring that each newly permitted Class II well be constructed such that:

1. Surface casing is set and cemented, in accordance with Rule 13, through the base of usable quality water (UQW) as determined by the Texas Water Commission (TWC).

2. The injection or disposal interval is isolated by adequate casing and cement, in accordance with Rule 13.

3. Injection or disposal is not into a formation with less than 10,000 PPM TDS unless the formation is productive of oil and gas.

4. The disposal interval is adequately separated from strata that contain water with less than 10,000 PPM TDS.

Statewide rules 9, 13, 46, and 74 specify the necessary requirements of owners or operators of Class II wells to comply with the above criteria. The implementation of the statewide rules is carried out by a combined effort between the RRC and the TWC. A detailed description of each criterion as it relates to the statewide rules, and the method by which each agency carries out the requirements mandated by the statewide rules is given below:

1. Surface casing and cementing requirements are prescribed in statewide rule 13(b)(2). The rule requires that:

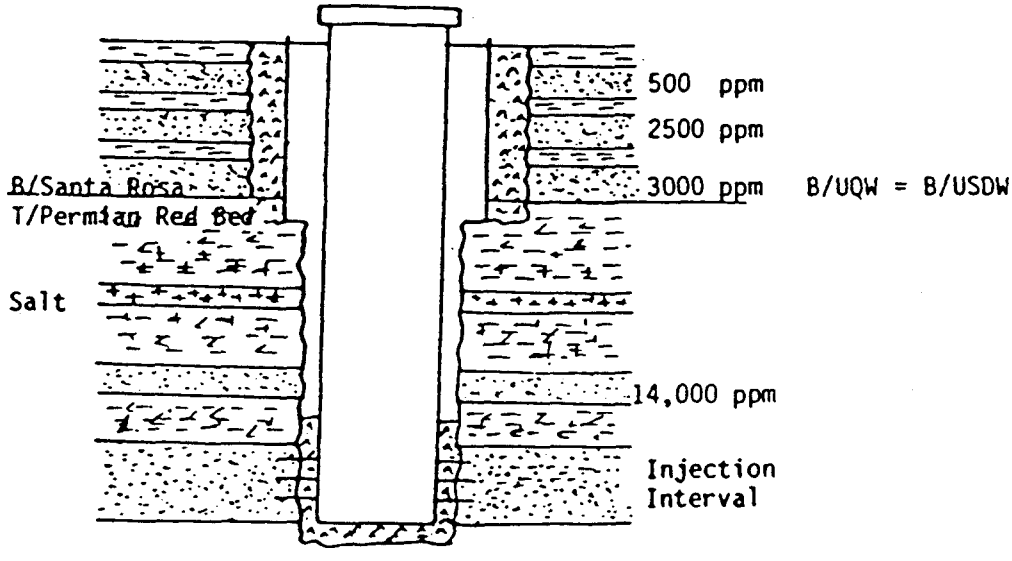
- Surface casing be set and cemented to protect all UQW strata, as defined by the TWC.

- An operator shall obtain a letter from the TWC stating the protection depth.

° Sufficient cement shall be used to fill the annular space outside the surface casing from the shoe to the ground surface, and cementing shall be by the pump and plug method.

The determination of the depth to the base of usable quality water (UQW) is the primary responsibility of the TWC, since all applicants for Class II Injection Permits must obtain a letter from the TWC stating the depth.

Usable quality water as defined by the TWC generally has a TDS concentration of 3,000 PPM or less. In certain areas of Texas, particularly West Texas, groundwater in excess of 3,000 PPM is used for irrigation. In these areas the TWC picks the base of UQW, on the basis of historical and expected water usage, in which case UQW may contain as much as 10,000 PPM TDS. In addition, to take into account local hydrologic variations, the TWC often adds 50 feet to the base of UQW.



(Usable quality water determination for injection well in NW Crockett Co.)

The determination of UQW is made by reviewing representative electrical logs of the subject well. In addition, the TWC maintains an inventory of over 200,000 electrical logs in their log library for correlation and comparison, and reviews published and/or file data on the occurrence, usage, and quality of UQW. The base of UQW may be picked at a specific TDS concentration (3,000 PPM or higher, depending on usage) or may be picked at the base of the formation containing the aquifer with the specific TDS concentration.

Once an operator has obtained the TWC letter, he must submit it with his application to the RRC UIC Section for administrative and technical review. The UIC staff verifies that the application is complete and

that the well is adequately cased and cemented to protect UQW as per the TWC determination. The RRC also reviews the electrical log of the well or a nearby well and references published groundwater reports to verify the base of UQW.

To understand how the RRC program relates to the protection of USDWs it is important to recognize how UQW relates to USDW. USDW is generally defined as an aquifer or its portion that contains groundwater with less than 10,000 PPM TDS in sufficient quantity to supply a public water system. As was mentioned previously UQW generally has a TDS concentration of less than 3,000 PPM but in some cases may contain up to 10,000 PPM. Certainly when UQW is defined as 10,000 PPM it is equivalent to USDW. This situation occurs in limited areas and only represents a small percentage of the Class II wells in respect to the State as a whole. However, due to hydrologic and geologic conditions several significant situations exist where the base of UQW is equivalent to the base of USDW. In certain areas, there is no transition between fresh to slightly saline water (less than 3,000 PPM) and very saline water (greater than 10,000 PPM). In these situations, water from 3,000 PPM to 10,000 PPM (moderately saline) is not present, and UQW is equivalent to USDW.

Various geologic and hydrologic conditions can result in the absence of a transition zone. One condition is where the freshwater zone is underlain by a thick shale section. In this case, due to the thickness of the shale, the vertical depth to the next lower aquifer is very large. Since salinity generally increases with depth, the underlying aquifer has a salinity greater than 10,000 PPM. This is further enhanced if geologic contacts are crossed whereby the characteristics of the formations change with depth. An excellent example where this occurs over a large area is in Cochran, Hockley, Lubbock, Yoakum, Terry, and Lynn counties of West Texas where the Cretaceous (open-marine) aquifers overlie the Permian (evaporitic) red beds. In these counties the TWC picks the limit of UQW at the base of the Cretaceous. In general, the Cretaceous aquifers contain fresh water with low concentrations of TDS. In contrast, the underlying Permian strata are heavily mineralized and contain abundant quantities of salt, gypsum, and anhydrite. As a result, there is no transition between freshwater and saline water, and UQW is equivalent to USDW. This is of particular significance since approximately 15% of Texas Class II wells are present in these counties. Similar hydrologic and geologic conditions exist in other areas of the State. Figure No. 1 is a map of Texas showing the general areas where UQW is equivalent to USDW. These colored areas encompass approximately 70% of the total Class II wells in the State. Thus as a result of geological and hydrological conditions, UQW as defined by the TWC, is equivalent to USDW over large areas of the State of Texas. Additionally, there are areas of the State where there is little or no groundwater of protectable quality including large parts of Wichita, Wilbarger, Foard, Stonewall, Throckmorton, Kent, Garza, Borden, and Schackelford counties. Nevertheless, the TWC recommends that surface casing be set to a depth of 100 feet as a precautionary measure.

2. Statewide rules 9, 46, and 74 require that disposal, injection, and hydrocarbon storage wells be cased and cemented in compliance with statewide rule 13 in such a manner that:

- The casing be cemented by the pump and plug, or another method approved by the RRC, with sufficient cement to fill the annular space in back of the casing to the surface or to a point at least 600 feet above the shoe. If any productive horizon is open to the wellbore above the casing shoe, the casing shall be cemented in a manner that effectively seals off all such possibly productive horizons by cementing up to a point at least 600 feet above the shallowest productive horizon or by using the multi-stage cementing process in a manner that will effectively seal off all such possible productive horizons and prevent fluid migration to or from such strata within the wellbore.

The RRC UIC section reviews the permit application and available cement bond logs to ensure that the well is adequately cased and cemented to isolate the injection interval, and that production zones are isoloated by adequately cemented casing. Isolation of the injection interval is necessary to prevent injection fluids from migrating out of the injection interval and thus endangering USDW and oil and gas producing formations.

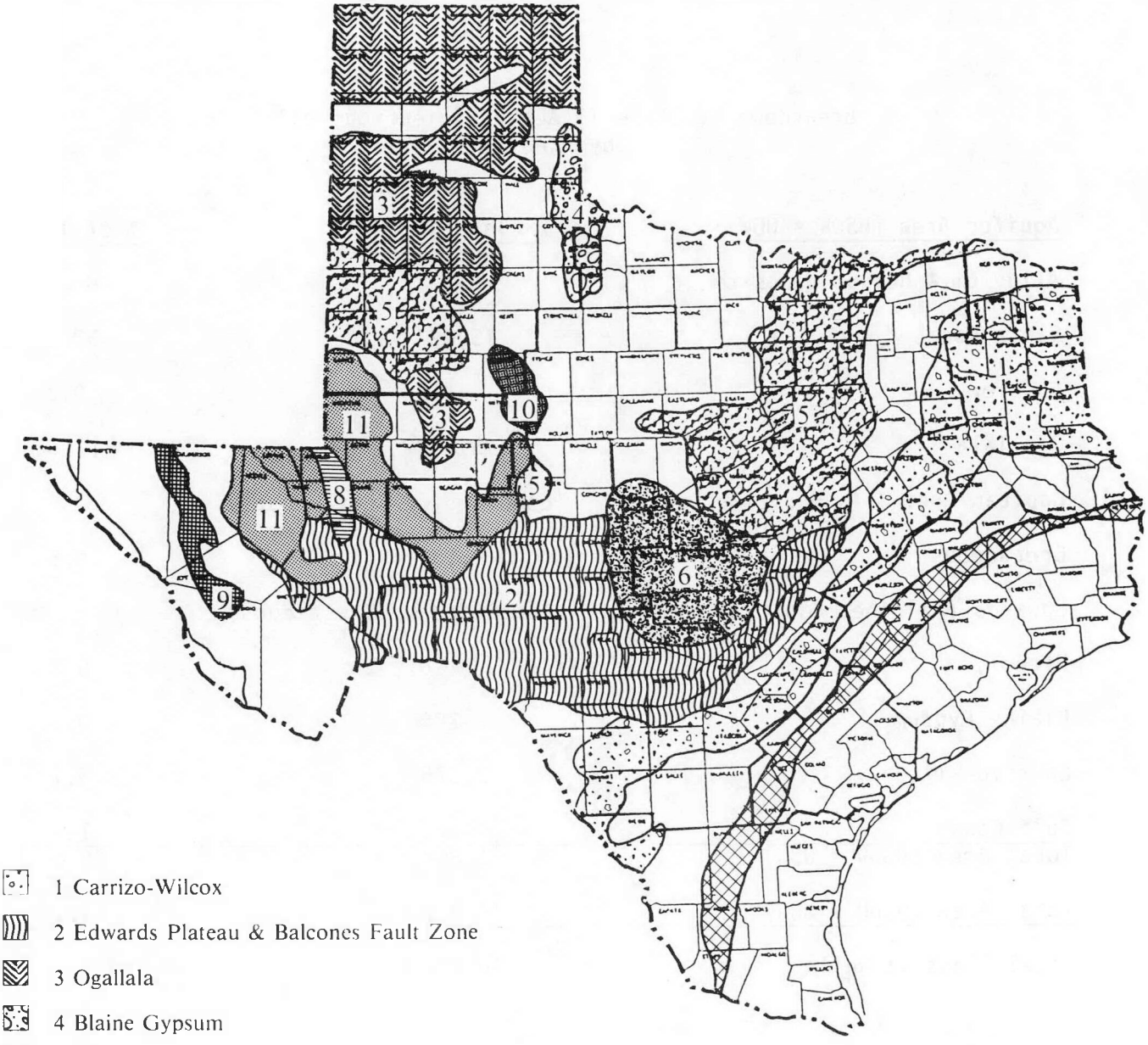
3. Statewide Rule 9 (for disposal wells) states that an applicant must submit a letter from the TWC stating that the well will not endanger freshwater strata in that area and that the formation used for disposal does not contain freshwater. The program description further states that a well is considered to endanger freshwater strata if the proposed disposal zone contains water with less than 10,000 PPM TDS. As part of their UQW review (described in 1) the TWC evaluates the nature of the disposal interval to ensure that it has a TDS concentration greater than 10,000 PPM. Fluid injection wells (Statewide Rule 46) cannot inject into any formation unless that formation is productive of oil, gas, or geothermal resources. The proposed injection well must be within one-half mile of a productive well. As part of the RRC's primacy approval the RRC agreed to submit maps to EPA of productive zones within the State of Texas. These productive zones were granted aquifer exemptions under the initial program approval so that all existing producing intervals regardless of TDS concentration, are acceptable for injection. Aquifer exemptions for new production intervals are to be submitted to EPA for concurrence. Injection into an interval that contains less than 10,000 PPM TDS is prohibited unless the interval is productive of oil, gas, or geothermal resources, and the interval has been previously accepted by EPA as exempted.

4. A geological requirement, (as outlined in the program description) of 250 feet of clay or shale between the disposal/injection interval and the base of usable quality water is the standard for determining that the disposal/injection interval is adequately separated. In the case of disposal wells, the TWC reviews a representative log of the well and checks to ensure that the disposal zone is adequately separated from aquifers

containing groundwater with 10,000 PPM TDS. If the disposal zone is not adequately separated, the TWC sends a letter to the applicant with a copy to the RRC. The RRC will not issue a permit for disposal if the disposal zone is not adequately separated from water containing 10,000 PPM. Injection wells are reviewed by the RRC to ensure that the injection interval is adequately separated from the base of usable quality water. In addition, geologic information is reviewed to make sure that the injection/disposal interval is isolated from faults, fractures, structure or other geologic factors that might jeapordize the integrity of the proposed interval.

By working with the TWC, the RRC has developed a multi-faceted program for protection of USDW that focuses on containment of the injection/disposal interval and geological and hydrological separation from UQW. Through their rules, the RRC requires surface casing and cement through the base of UQW, which in most cases, is analogous to USDW. The RRC feels that their program effectively protects USDW.

Generalized areas where the base of UQW is equivalent to the base of USDW.



1 Carrizo-Wilcox
2 Edwards Plateau & Balcones Fault Zone
3 Ogallala
4 Blaine Gypsum
5 Cretaceous
6 Hickory & Precambrian Granite
7 Gulf Coast
8 Capitan Reef & Assoc. Limestones
9 Alluvium & Bolson Deposits
10 Santa Rosa
11 Rustler

Breakdown of Class II Active Injection Wells
by Area

Aquifer Area (USDW = UQW)	# Class II Wells	% of Total
Alluvium & Bolson Deposits	-0-	-0-
Santa Rosa	15,097	32.4
Rustler	305	0.7
Ogallala	3,562	7.6
Capitan Reef & Assoc. Limestones	(combined w/ Santa Rosa)	
Cretaceous	9,133	19.6
Edwards (Balcones Fault Zone)	(combined w/ Cretaceous)	
Hickory	18	0.0
Blaine Gypsum	286	0.6
Carrizo-Wilcox	2,675	5.7
Gulf Coast	778	1.7
Total Area (USDW = UQW)	31,854	68.3
Total Area (USDW ≠ UQW)	14,770	31.7
Total Class II Wells	46,624	100.0

RAILROAD COMMISSION OF TEXAS

OIL AND GAS DIVISION

JAMES E. (JIM) NUGENT, Commissioner
JOHN SHARP, Commissioner
KENT HANCE, Commissioner

JIM MORROW, P.E.
Director
JERRY W. MULLICAN
Director of Underground
Injection Control

1701 N. CONGRESS | CAPITOL STATION — P. O. DRAWER 12967 | AUSTIN, TEXAS 78711-2967

NOTICE INSTRUCTIONS - RULE 9

The Texas Water Code, the Natural Resources Code, and the Statewide Rules of the Railroad Commission of Texas require that you provide copies of the application, by mail or delivery, to the surface owner, to each adjoining offset operator, and to the county and city clerk of the county and city in which the well is located, on or before the date the application is mailed to or filed with the Commission.

In addition, the attached notice must be published for one day, at your expense, in a newspaper of general circulation for the county where the well will be located. The date of publication must be no less than fifteen (15) days prior to the date the permit is to be issued.

You must furnish a clipping of the published notice, plus a sworn affidavit from the newspaper giving the date on which the notice was published and the pertinent county in which the newspaper is of general circulation. It is recommended that the affidavit of publication form provided herewith be utilized for this purpose. Failure to produce the affidavit may result in withholding of action on the application pending its receipt, and the application may be dismissed if the affidavit is not received within a reasonable time.

NOTICE OF APPLICATION FOR OIL AND GAS WASTE DISPOSAL WELL PERMIT

_____

(Company Name / Address)

has applied to the Railroad Commission of Texas for a permit to dispose of produced salt water or other oil and gas waste by well injection into a porous formation not productive of oil or gas.

The applicant proposes to dispose of oil and gas waste into the _____

_____, _____,
(Formation) (Lease)

Well Number _____. The proposed disposal well is located _____

_____in the _____
(Direction / Miles To Nearest Town)

_____in _____ County.
(Field)

The waste water will be injected into strata in the subsurface depth interval from _____ to _____ feet.

LEGAL AUTHORITY: Chapter 27 of the Texas Water Code, as amended, Title 3 of the Natural Resources Code, as amended, and the Statewide Rules of the Oil and Gas Division of the Railroad Commission of Texas.

Requests for a public hearing from persons who can show they are adversely affected, or requests for further information concerning any aspect of the application should be submitted in writing, within fifteen days of publication, to the Underground Injection Control Section, Oil and Gas Division, Railroad Commission of Texas, Drawer 12967, Capitol Station, Austin, Texas 78711 (Telephone 512/463-6790).

AFFIDAVIT OF PUBLICATION

STATE OF TEXAS
COUNTY OF _____

Before me, the undersigned authority, on this day personally appeared _____ (Name),

the _____ (Title) of the _____ (Name of Newspaper),

a newspaper having general circulation in _____ County, Texas, who being by me duly sworn, deposes and says that the foregoing attached notice was published in said newspaper on the following date(s), to wit: _____.

_____

Subscribed and sworn to before me this the _____ day of _____, 19___, to certify which witness my hand and seal of office.

_____
Notary Public in and for

_____ County, Texas.

CL1110
1/87

Return To:
DIRECTOR, Underground Injection Control
Oil and Gas Division
Railroad Commission of Texas
Capitol Station-P.O. Drawer 12967
Austin, Texas 78711

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

Form W-14
1/82

APPLICATION TO DISPOSE OF OIL AND GAS WASTE BY INJECTION INTO A POROUS FORMATION NOT PRODUCTIVE OF OIL OR GAS

1. Operator Name — 2. Operator No.

3. Address (Street, City, State and Zip Code) — 4. RRC Dist.

5. Lease Name — 6. RRC Lease/ID No. — Oil ☐ Gas ☐ — 7. Well No.

8. Field Name — 9. RRC Field No. — 10. County

11. (a) Location (Sec., Blk., Survey-Give perpendicular location from two designated survey lines.)

11. (b) This well is to be located _____ miles _____ direction from _____, (nearest post office or town.)

CASING AND TUBING DATA

NAME OF STRING	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY	HOLE SIZE	CASING WEIGHT
12. Surface Casing							
13. Intermediate							
14. Long String							

15. Tubing (Size and Depth) — 16. Name, Model and Depth of Tubing Packer — 17. Total Depth of Well

18. Injection Interval Top Bottom — 19. Name of Formation — 20. Is Injection through ☐ Tubing or ☐ Casing — 21. Fracture Gradient

22 Is Injection through ☐ Perforations or ☐ Open Hole — 23. Date Well Drilled — 24. API No. — 25. Ground Surface Elevation

26. List All Cement Squeeze Operations, Giving Interval and Number of Sacks of Cement

27. Depth to Base of Deepest Fresh Water Zone — 28. Depth of Shallowest Zone Productive of Oil or Gas in this Field — 29. Anticipated Daily Injection Volume (Bbls) Average Maximum

30. Is Injection System ☐ Open or ☐ Closed — 31. Is Injection by Gravity or Pressure — 32. Injection Pressure (Psi) Average Maximum

33. Will it be necessary for water to be filtered or chemically treated? ☐ Yes ☐ No

34. Is this well so cased and completed that water can enter no other formation than the above set out injection zone? ☐ Yes ☐ No

35. Name and Address of Surface Owner

36. (a) Source of Fluids (Geological Name of Formation and Depth)

(b) Are Fluids produced from sources other than Applicant's? ☐ Yes ☐ No

(c) If answer is Yes to Question 36(b) attach a list of other sources identifying operators, sources, and types of waste.

37. Have notices of this application been mailed or given to all Offset Operators? ☐ Yes ☐ No

38. Are there any other Salt Water Disposal Wells using this same Zone in this Field? ☐ Yes ☐ No

39. If answer is Yes to Question 38, name one such well.
Name of Operator — Lease Name — Lease or I. D. No. — Well No.

CERTIFICATE

I declare under penalties prescribed in Sec. 91.143, Texas NaturalResources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

Signature

Name of Person (type or print) — Title

Telephone _____ Date _____
Area Code Number

FOR RRC USE ONLY

APPLICANT MUST COMPLY WITH THE INSTRUCTIONS ON REVERSE SIDE

INSTRUCTIONS (W-14)

1. File the original application, including all attachments, with the Director of Underground Injection Control, Railroad Commission of Texas, P. O. Drawer 12967, Capitol Station, Austin, Texas 78711. File one copy of the application and its attachments with the appropriate District Office.

2. Attach complete electrical log of this well or log of a nearby well. Attach any other logging and testing data available for the well such as cement bond logs.

3. Attach a letter from the Texas Department of Water Resources stating that the well will not endanger the usable quality water strata in the area and that the formation or stratum used for disposal does not contain usable quality water. To obtain this letter, submit two copies of Form W-14, a plat with surveys marked, and a representative electrical log to the Texas Department of Water Resources, P. O. Box 13087, Capitol Station, Austin, Texas 78711.

4. Attach a map showing the location and depth of all wells of public record within one quarter (¼) mile radius of the wellbore with surveys marked. For those wells which penetrate the top of the injection interval, attach a tabulation of the wells showing the dates the wells were drilled and the present status of the wells. Identify any abandoned well that is indicated to be unplugged or improperly plugged. The Director of Underground Injection Control may adjust or waive this data requirement in accordance with provisions of the "Area of Review" section of Statewide Rule 9.

5. (a) Attach a plat of leases showing the location of the disposal well lease and ownership of offsetting leases.

   (b) (1) Send a copy of the application, including both sides of the form, to the surface owner, the offset operators, and to the county and city clerk of the county and city in which the well is located. Attach a signed statement indicating the date the copies of the application were mailed or delivered and the names and addresses of the persons to whom copies were sent.

   (2) Attach an affidavit of publication signed by the publisher that notice of the application has been published in a newspaper of general circulation in the county where the wells will be located. Notice instructions and forms may be obtained from the Commission's Austin Office or the District Offices.

   (c) No public hearing will be held on this application unless an affected person or local government requests a public hearing. Any such request for a public hearing shall be in writing and contain: (1) the name, mailing address, and phone number of the person making the request; and (2) a brief description of how the protestant would be adversely affected by the granting of the application. If the Commission determines that a valid protest has been received, or that a public hearing would be in the public interest, a hearing will be held after the issuance of proper and timely notice of the hearing by the Commission. If no protest is received within fifteen (15) days of publication or receipt in Austin of the application, the application may be processed administratively.

W-14 REVIEW FORM

ADMINISTRATIVE REVIEW

YES/NO 1. Form W-14
YES/NO 2. Electrical Log
YES/NO 3. Texas Water Commission Letter
YES/NO 4a. Map of wells of public record
YES/NO 4b. Table of wells penetrating top of injection interval or
YES/NO 4c. Pressure increase calculations
YES/NO 5. Plat of leases
YES/NO 6a. Signed statement confirming copy of application sent and
YES/NO 6b. List of: Offset Operators Surface Owner
County Clerk City Clerk
YES/NO 7a. Affidavit of publication
YES/NO 7b. Newspaper clipping
8. Other:

Received _____
Date Issuable _____
Admin. _____
Tech. _____

UILI
FORM P-4
FORM P-5
LOG
CALENDAR
LETTER

TECHNICAL REVIEW

Texas Water Commission Letter
Date _____

Overview _____
Tech. review _____

Base of UQ Water _____
Injection Interval _____
Endangers UQ Water YES/NO

Log SP - Induction, GR-Neutron, Sonic, Other _____
Top of Logged Interval _____ Log (this well) (offset)

Injection
Interval _____ Pressure(max.) _____ Pressure(permit) _____ Volume _____

Confinement

Casing	Size & Depth	Top of Cement	Determined by
Surface			
Intermediate			
Long String			
Liner			
Squeezes			

Tubing _____ Packer Type _____ Packer Depth _____
Productive Zones _____ Bridge Plugs _____

YES/NO 1. Exception to Statewide Rule 13(b)(2)(A)
YES/NO 2. Area of review _____
YES/NO 3. Complete map and table _____
YES/NO 4. Pressure increase calculations _____
YES/NO 5. Other:

SPECIAL PERMIT CONDITIONS

Annual pressure tests _____
Annual radioactive tracer _____
Tbg-Csg annulus monitoring _____
Cement squeeze _____
Other:

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

Form H - 1
(Rev. 4-82)

APPLICATION TO INJECT FLUID INTO A RESERVOIR PRODUCTIVE OF OIL OR GAS

1. Field Name (as per current proration schedule - including reservoir, if applicable.)	2. RRC District
3. Operator 3a. Address	4. County
5. Lease Name(s) and RRC Lease Number(s)	6. Reservoir Discovery Date

7. Have any injection permits been granted previously to any operator in this reservoir? ☐ Yes ☐ No
If answer to this question is "NO", ALL OPERATORS IN THE RESERVOIR MUST BE NOTIFIED of this application, and copies of notification attached hereto.

8. Check the Appropriate Block(s):
☐ New Project or ☐ Expansion of Previous Authority to Add Either: ☐ New Lease(s) or ☐ Additional Well(s) on Same Lease(s)
Initial Authority Dated _____ by ☐ Administrative Action or ☐ Hearing, Special Order No. _____

RESERVOIR AND FLUID DATA ON ENTIRE RESERVOIR

9. Name of Reservoir	10. Estimated Productive Area of Entire Reservoir (acres)
11. Composition (sand, limestone, dolomite, etc.)	12. Type of Structure (Include cross-section and structural maps.)
13. Subsea Depth of Oil-Water Contact (ft.)	14. Subsea Depth of Gas-Oil Contact (ft.)
15. Original Bottom Hole Pressure (psig)	16. Current Bottom Hole Pressure (psig)
17. Was a Gas Cap Present Originally?	18. Is a Gas Cap Present Now?
19. Ratio of Gas Cap Volume to Oil Zone Volume	20. Saturation Pressure (psig)
21. Formation Volume Factor Original: _____ Current: _____	22. Type Drive During Primary Production

RESERVOIR AND FLUID DATA

23. Number of Productive Acres in Lease(s) within Project Area	24. Average Depth to Top of Pay (ft.)	25. Average Effective Pay Thickness (ft.)
26. Average Horizontal Permeability (mds.)	27. Range of Horizontal Permeability (mds.)	28. Connate Water Saturation (% of pore space)
29. Average Porosity (%)	30. Gravity of Oil (deg. API)	31. Viscosity (cps. @ ° F)

PRODUCTION HISTORY OF RESERVOIR

32. Date First Well Completed on Lease(s)	33. Stage of Primary Depletion of Project Area
34. Current Average Gas-Oil Ratio (SCF/bbl.)	35. Current Water Production (% of total fluid production or bbls./day)
36. Current Number of Producing Wells on Each Lease in Project Area	37. Current Average Daily Oil Production per Well (bbls./day/well)
38. Cumulative Oil Production to Date from Lease(s) (bbls.)	39. SUBMIT ATTACHED SHEET(S) GIVING THE OIL, GAS, & WATER PRODUCTION BY YEARS SINCE DISCOVERY & TOTALS. FOR THE LAST 3 YEARS, GIVE THESE FIGURES BY MONTHS.

DATA ON PROPOSED PROJECT AREA

TYPE OF INJECTION PROJECT AND RESULTS EXPECTED

40. Type of Injection Project (Check the appropriate block(s):)
☐ Waterflood, ☐ Miscible Displacement, ☐ Thermal Recovery, ☐ Pressure Maintenance, ☐ Other _____ (specify)

41. Current Estimated Oil Saturation (% of pore space)	42. Estimated Residual Oil Saturation at Abandonment (% of pore space)
43. Estimated Original Oil-In-Place (bbls.)	44. Estimated Ultimate Additional Oil that will be Recovered as a Direct Result of Injection (bbls.)

INJECTION DATA

45. Type of Injection Fluid (Check the appropriate block(s):)
☐ Salt Water, ☐ Brackish Water, ☐ Fresh Water, ☐ Gas, ☐ Air, ☐ LPG, ☐ Other _____ (specify)

46. Source of Injected Fluid(s) (formation(s) and depth(s) in ft.)	47. Injection Pattern and Spacing
48. Total Number of Injection Wells to be Approved in this Application	49. Estimated Maximum Daily Rate of Injection per Well (bbls./day/well)
50. Total Estimated Maximum Daily Rate of Injection for All Wells in this Application. (bbls./day)	51. Maximum Injection Pressure to be Used. (psig)

52. LIST COMPLETE INJECTION WELL DATA ON FORM H-1A AND ATTACH.

APPLICANT MUST COMPLY WITH THE INSTRUCTIONS AND SIGN CERTIFICATION ON REVERSE SIDE

INSTRUCTIONS (H-1)

1. File the original application, including all attachments, with the Director of Underground Injection Control, Railroad Commission of Texas, P. O. Drawer 12967, Capitol Station, Austin, Texas 78711. File one copy of the application and its attachments with the appropriate District Office.

2. Attach complete electrical log or similar well log of one of the proposed injection wells. Attach any other logging and testing data available for the well such as cement bond logs.

3. (a) For a new project, attach a map with surveys marked showing the location and depth of all wells of public record within a one-quarter (¼) mile radius of the project area.

   (b) For an expansion of a previous authority, attach a map with surveys marked showing the location and depth of all wells of public record within one-quarter (¼) mile radius of the additional wells, unless such data previously has been submitted for the project.

   (c) For those wells in 3(a) or 3(b) that penetrate the top of the injection interval, attach a table of wells showing the dates drilled and their present status. Identify any abandoned well which available data indicate is unplugged or improperly plugged. The Director of Underground Injection Control may adjust or waive this data requirement in accordance with provision of the "Area of Review" section of Statewide Rule 46.

4. Attach a letter from the Texas Department of Water Resources for a well within the project area stating the depth to which usable quality ground water occurs.

5. Attach Form H-1A showing each injection well to be used in the project. Up to three wells can be listed on each H-1A Form.

6. Attach Form H-7, Fresh Water Data Form, for a new injection project that includes the use of fresh water. An updated H-7 must be attached to Form H-1 for an expansion of a previously authorized fresh water injection project unless the fresh water is purchased from a commercial supplier, public entity, or from another operator.

7. (a) Attach a plat of lease(s) showing producing wells, injection wells, offset wells, and identifying ownership of all surrounding leases.

   (b)(1)Send a copy of the application to the surface owner, the offset operators, and to the county and city clerk of the county and city in which the well is located. If this is the initial application for fluid injection authority for this reservoir, send copies of the application to all operators in the reservoir. Attach a signed statement indicating the date the copies of the application were mailed or delivered and the names and addresses of the persons to whom copies were sent.

   (2) Attach an affidavit of publication signed by the publisher that notice of the application has been published in a newspaper of general circulation in the county where the wells will be located. Notice instructions and forms may be obtained from the Commission's Austin Office or the District Offices.

   (c) No public hearing will be held on this application unless an affected person or local government requests a public hearing. Any such request for a public hearing shall be in writing and contain: (1) the name, mailing address, and phone number of the person making the request; and (2) a brief description of how the protestant would be adversely affected by the granting of the application. If the Commission determines that a valid protest has been received, or that a public hearing would be in the public interest, a hearing will be held after the issuance of proper and timely notice of the hearing by the Commission. If no protest is received within fifteen (15) days of publication or receipt in Austin of the application, the application may be processed administratively.

CERTIFICATE

I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

Signature

Name of Person (type or print) Title

Telephone Area Code Number Date

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

FORM H-1A
4-82
INJECTION WELL DATA
(Attach to Form H-1)

1. Operator Name | 2. Lease Name | 3. RRC Lease/ID No.

4. Field Name | 5. RRC Field No. | 6. Depth to Base of Deepest Fresh Water Zone

7a. Location (Sec.-Twp. or Block and Survey) | 7b. County | 8. This lease is located _____ miles _____ direction from _____, (nearest post office or town.)

9. WELL NO.	WELL CASING AND TUBING						
	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY	HOLE SIZE	CASING WEIGHT
10. Surface Casing.							
11. Intermediate							
12. Long String							

13. Tubing (Size and Depth) | 14. Name, Model and Depth of Tubing Packer

15. Total Depth of Well | 16. Date Well Drilled | 17. API No. | 18. Ground Surface Elevation | 19. Perforation or Open Hole ☐ ☐

20. List All Cement Squeeze Operations, Giving Interval and Sacks of Cement

21. Injection Interval Top / Bottom | 22. Name of Reservoir | 23. Injection System Open or Closed ☐ ☐

24. Anticipated Daily Injection Volume (Bbls) Average / Maximum | 25. Injection Pressure (Psi) Average / Maximum | 26. Is this well so cased and completed that water can enter no other formation than the above set out injection zone? ☐ Yes ☐ No

9. WELL NO.	WELL CASING AND TUBING						
	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY	HOLE SIZE	CASING WEIGHT
10. Surface Casing.							
11. Intermediate							
12. Long String							

13. Tubing (Size and Depth) | 14. Name, Model and Depth of Tubing Packer

15. Total Depth of Well | 16. Date Well Drilled | 17. API No. | 18. Ground Surface Elevation | 19. Perforation or Open Hole

20. List All Cement Squeeze Operations, Giving Interval and Sacks of Cement

21. Injection Interval Top / Bottom | 22. Name of Reservoir | 23. Injection System Open or Closed ☐ ☐

24. Anticipated Daily Injection Volume (Bbls) Average / Maximum | 25. Injection Pressure (Psi) Average / Maximum | 26. Is this well so cased and completed that water can enter no other formation than the above set out injection zone? ☐ Yes ☐ No

9. WELL NO.	WELL CASING AND TUBING						
	SIZE	SETTING DEPTH	SACKS CEMENT	TOP OF CEMENT	TOP DETERMINED BY	HOLE SIZE	CASING WEIGHT
10. Surface Casing.							
11. Intermediate							
12. Long String							

13. Tubing (Size and Depth) | 14. Name, Model and Depth of Tubing Packer

15. Total Depth of Well | 16. Date Well Drilled | 17. API No. | 18. Ground Surface Elevation | 19. Perforation or Open Hole

20. List All Cement Squeeze Operations, Giving Interval and Sacks of Cement

21. Injection Interval Top / Bottom | 22. Name of Reservoir | 23. Injection System Open or Closed

24. Anticipated Daily Injection Volume (Bbls) Average / Maximum | 25. Injection Pressure (Psi) Average / Maximum | 26. Is this well so cased and completed that water can enter no other formation than the above set out injection zone? ☐ Yes ☐ No

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

JAMES E. (JIM) NUGENT, Commissioner
JOHN SHARP, Commissioner
KENT HANCE, Commissioner

JIM MORROW, P.E.
Director
JERRY W. MULLICAN
Director of Underground
Injection Control

1701 N. CONGRESS | CAPITOL STATION — P. O. DRAWER 12967 | AUSTIN, TEXAS 78711-2967

NOTICE INSTRUCTIONS - RULE 46

The Texas Water Code, the Natural Resources Code, and the Statewide Rules of the Railroad Commission of Texas require that you provide copies of the application, by mail or delivery, to the surface owner, to each adjoining offset operator, and to the county and city clerk of the county and city in which the well is located, on or before the date the application is mailed to or filed with the Commission.

In addition, the attached notice must be published for one day, at your expense, in a newspaper of general circulation for the county where the well will be located. The date of publication must be no less than fifteen (15) days prior to the date the permit is to be issued.

You must furnish a clipping of the published notice, plus a sworn affidavit from the newspaper giving the date on which the notice was published and the pertinent county in which the newspaper is of general circulation. It is recommended that the affidavit of publication form provided herewith be utilized for this purpose. Failure to produce the affidavit may result in withholding of action on the application pending its receipt, and the application may be dismissed if the affidavit is not received within a reasonable time.

NOTICE OF APPLICATION FOR FLUID INJECTION WELL PERMIT

_____

(Company Name / Address)

has applied to the Railroad Commission of Texas for a permit to inject fluid into a formation which is productive of oil or gas.

The applicant proposes to inject fluid into the _____,
(Formation)

_____, Well Number _____. The proposed injection
(Lease)

well is located _____,
(Direction/ Miles To Nearest Town)

in the _____, in _____ County.
(Field)

Fluid will be injected into strata in the subsurface depth interval from _____to _____feet.

LEGAL AUTHORITY: Chapter 27 of the Texas Water Code, as amended, Title 3 of the Natural Resources Code, as amended, and the Statewide Rules of the Oil and Gas Division of the Railroad Commission of Texas.

Requests for a public hearing from persons who can show they are adversely affected, or requests for further information concerning any aspect of the application should be submitted in writing, within fifteen days of publication, to the Underground Injection Control Section, Oil and Gas Division, Railroad Commission of Texas, Drawer 12967, Capitol Station, Austin, Texas 78711 (Telephone 512/463-6790).

AFFIDAVIT OF PUBLICATION

STATE OF TEXAS
COUNTY OF _____

Before me, the undersigned authority, on this day personally appeared _____ (Name),

the _____ (Title) of the _____ (Name of Newspaper),

a newspaper having general circulation in _____ County, Texas, who being by me duly sworn, deposes and says that the foregoing attached notice was published in said newspaper on the following date(s), to wit: _____.

_____

Subscribed and sworn to before me this the _____ day of _____, 19___, to certify which witness my hand and seal of office.

_____
Notary Public in and for

_____ County, Texas.

CL1110
1/87

H-1 REVIEW FORM

ADMINISTRATIVE REVIEW

Date Received_____
Date Issuable_____
Admin._____
Project F- _____

YES/NO 1. Forms H-1 and H-1A
YES/NO 2. Electrical log
YES/NO 3. Texas Water Commission letter
YES/NO 4a. Map of wells of public record
YES/NO 4b. Table of wells penetrating top of injection interval or
YES/NO 4c. Pressure increase calculations
YES/NO 5. Plat of leases
YES/NO 6a. Signed statement confirming copy of application sent and
YES/NO 6b. List of: Offset Operators Surface Owners
County Clerk City Clerk
All operators in reservoir
YES/NO 7a. Affidavit of publication
YES/NO 7b. Newspaper clipping
8. Other:

UILI
FORM P-4
FORM P-5
LOG
CALENDAR
LETTER

TECHNICAL REVIEW

Overview_____
Tech. review_____

YES/NO 1. Form H-7
YES/NO a) Chemical analysis
YES/NO b) FW rights plat
YES/NO 2. Fresh water questionnaire; Date sent_____
YES/NO 3. File sent to Texas Water Commission; Date_____
YES/NO 4. Exception to Statewide Rule 13(b)(2)(A)
YES/NO 5. Area of review_____
YES/NO 6. Complete map and table_____
YES/NO 7. Pressure increase calculations_____
YES/NO 8. Completion data
YES/NO 9. Other:

SPECIAL PERMIT CONDITIONS

Annual pressure tests_____
Annual radioactive tracer_____
Tbg-Csg annulus monitoring_____
Cement squeeze_____
Other:

CL1111
11/86

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

Form H-7
(Eff. 3/1/68)

FRESH WATER DATA FORM

Date:

1. RRC District
2. Field Name (as per current proration schedule)
3. County
4. Reservoir (into which fresh water is to be injected)
5. Operator
6. Lease Name(s) and RRC No(s). (on which fresh water is to be injected)
7. Name of Fresh Water Formation or Source
8. Depth to Top of Fresh Water Formation (Feet)
9. Gross Thickness of Fresh Water Formation (Feet)
10. Net Thickness of Fresh Water Formation (Feet)
11. Total Number of Acres in Project Area where Applicant has Exclusive Use of Fresh Water Rights for Subject Project. Include Land Description. (Also furnish plat. See "Required Attachments" on back.)
12. Volume of Recoverable Fresh Water-in-Place beneath Applicant's Water Rights Acreage (Barrels)
13. Rate of Recharge of Fresh Water Formation beneath Subject Water Rights Acreage (Barrels/Day)
14. Total Volume of Fresh Water to be Used in Injection Project (Barrels)
15. Fresh Water Withdrawal Rates for Project (Barrels/Day)
16. Other Uses and Withdrawal Rates in Project Area for the same Fresh Water Formation or Source

USES (Specify each.)	RATES (Barrels/Day)

17. Names of and Distances to Municipal Water Supplies Utilizing Same Fresh Water Formation or Source (within 20 mile radius)

CITY/TOWN	DISTANCE AND DIRECTION

18. Name of Shallowest Salt Water or Brackish Water Supply Zone
19. Depth of Shallowest Salt Water or Brackish Water Supply Zone (Feet)
20. Rate of Salt Water or Brackish Water Available from All Sources for Project (Barrels/Day)

(OVER)

21. **Reason for Use of Fresh Water**
(Explain necessity of using fresh water rather than salt water.)

REQUIRED ATTACHMENTS:

1. WATER QUALITY ANALYSIS REPORT ON FRESH WATER FORMATION.
2. PLAT(S) SHOWING FRESH WATER RIGHTS ACREAGE (AS PER ITEM II) AND LOCATION AND DENSITY OF FRESH WATER SUPPLY WELLS.

I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

DATE _____ SIGNATURE _____

OPERATOR _____ NAME OF PERSON (TYPE OR PRINT) _____

ADDRESS _____ TITLE _____

_____ ZIP CODE: _____ TELEPHONE: AREA CODE _____ _____

ORIGIN (RRC)	ORIGIN (OUTSIDE RRC)	INSTRUCTIONS	D-0
☐ Field ☐ Austin (section: _____) ☐ District Office Date _____ Time _____ Name _____	☐ Industry or ☐ Public ☐ Call or ☐ Letter Name _____ Title/Co. _____ Phone No. ( ) _____	☐ Must Witness ☐ Area Info ☐ Office Only Return by _____ Routing — ☐ Radio to field ☐ Place in box	ASSIGNMENT January 1, 1985

I. IDENTIFICATION

Docket No. _____

Operator _____ Field Name _____

Lease Name _____ Well No.(s) _____

County _____ ☐ Drilling Permit No., ☐ Gas ID No., or ☐ Oil Lease No. _____

Facility *(if not associated with a lease)* _____ Permit/Registration No. _____

Site *(if other than lease or facility)* _____

Location Nearest Town _____ Survey _____

Block _____ Section _____

Directions _____

Complainant Name _____ Company _____

Address _____ Phone No. ( ) _____

Contact Date _____ Time _____ Place _____

II. ASSIGNMENT CATEGORY

☐ Form D-1. Complaint
(Complaint No. _____)
☐ Form D-2. Lease Inspection
☐ Form D-3. Non-Compliance With Pollution Rules
(HC Spill No. _____)
☐ Form D-4. Well Production Test

Field Inspector is to complete and attach appropriate form(s).

☐ Form D-5. Other Field Activities

☐ A. Drilling Rig
☐ B. Saltwater Hauler
☐ C. Plant
☐ D. Surface Casing
☐ E. Cementing Long String
☐ F. Deviational Survey
☐ G. Plugging
☐ H. Plugging (State Funds)
☐ I. Tank Cleaning
☐ J. Status Check Requested
☐ K. Theft Investigation
☐ L. Oil Movement
☐ M. Seal Well
☐ N. Saltwater Disposal/Injection Well Related Jobs
☐ O. Pit Permitting (H-11)
☐ P. Landfarming
☐ Q. Fire/Blowout Report
☐ R. Office
☐ S. Other _____

III. ASSIGNMENT DESCRIPTION/SPECIAL INSTRUCTIONS

Assigned to		Field Inspector: Check Here If	District No.
Name _____	No. _____	☐ NOT WITNESSED	_____

INSPECTION

☐ Initial - Office Assignment ☐ Initial - Field Initiated ☐ Backcheck/ Follow-up
☐ Form D-0 ☐ Radio

OFFICE REVIEW

By _____
Date _____

D-1

COMPLAINT
January 1, 1985

I. IDENTIFICATION

Person Contacted _____ Contact Date _____ Time _____
Complainant _____ Complaint No. _____
Operator _____ Field Name _____
Lease Name _____ Well No.(s) _____
County _____ ☐ Drilling Permit No., ☐ Gas ID No., or ☐ Oil Lease No. _____
Facility/Site (if not associated with a lease) _____ Permit/Registration No. _____

II. RESULTS OF CONTACT OR INSPECTION

YES NO

☐ ☐ Non-Compliance with Pollution Rules. If YES, consult guidelines on back of D-3 (A.1.) to see if D-3 should be completed also.

☐ ☐ Injection/Disposal Wells(s) Involved. If YES, circle type (number of wells _____).

_____ Total Number of Statewide Rules Violated.

:rtify that this data is true and complete:

Signature _____

Number _____ Date _____

	MILEAGE	TIME
START		
END		

INSPECTION	INSTRUCTIONS	OFFICE REVIEW	D-2 Lease Inspection
☐ Initial — Office Assignment ☐ Initial — Field Initiated ☐ Backcheck/Follow-up	1. Follow procedures as outlined in FIELD INSPECTION HANDBOOK. 2. Fill out separate Form D-2 for each lease and/or grouping of pits, as well as for any return trip. 3. See back of form for additional instructions.	By _____ Date _____	January 1, 1985

I. IDENTIFICATION

Operator _____ Field _____

Lease Name _____ Well No.(s) _____

County _____ ☐ Drilling Permit No., ☐ Gas ID No., or ☐ Oil Lease No. _____

Facility *(if not associated with a lease)* _____ Permit/Registration Number _____

II. STATUS

Compliance	Non-Compliance	Not Inspected		Compliance	Non-Compliance	Not Inspected	
☐	☐	☐	1. Access to Lease (SWR 2)	☐	☐	☐	5. Injection/Disposal Wells (SWRs 9, 46) Number of wells inspected: * _____ Injection _____ Disposal
☐	☐	☐	2. Signs Posted (SWR 3)				
☐	☐	☐	3. Gas to be Measured (SWR 27)	☐	☐	☐	6. Statewide Rule 8
☐	☐	☐	4. Unplugged, Inactive Wells. (SWR 14). Number found _____.	☐	☐	☐	7. Other Statewide Rules _____

Total number of statewide rules violated _____

III. VIOLATION DESCRIPTIONS

* If UIC well(s) inspected, give approximate percent of total inspection time spent on UIC activity: _____ %

I certify that this data is true and complete:		MILEAGE	TIME
Signature _____	START		
Number _____ Date _____	END		

IDENTIFICATION REFERENCE

No.(s) _____ ☐ Gas ID ☐ Oil Lease (Well# _____) ☐ Drilling Permit ☐ Permit/Registration (Type _____) ☐ Complaint ☐ Hydrocarbon Spill

_____

Attached to Form D - _____

Operator _____

INSPECTION

☐ Initial - Office Assignment
☐ Initial - Field Initiated
☐ Backcheck - Continuing Violation

OFFICE REVIEW

_____ (Name)

_____ (Date)

D-3

Non-Compliance With Pollution Rules

January 1, 1985

I. TYPE OF VIOLATION

☐ Discharge ☐ Seepage ☐ Overflow ☐ Leak ☐ Other _____

II. A. DESCRIPTION

(Number of photos attached _____. Attach sketch.)

1. Source

☐ UIC Well ☐ Non-UIC Well ☐ Pit ☐ Plant ☐ Firewalls ☐ Flowline ☐ Pipeline ☐ Vehicle ☐ Lease Equipment. Piece _____ ☐ Other _____

2. Type of material

☐ Crude ☐ BS & W ☐ Salt Water ☐ Drilling Fluid ☐ Other _____

3. Status ☐ Active ☐ Inactive

4. Estimation of Volume

Total volume of material involved _____

Flow rate, if still active _____

5. Occurrence

Estimation of when violation first occurred _____

Conditions and events you witnessed leading to this estimation _____

IF MATERIAL AFFECTS GROUND SURFACE ONLY, COMPLETE SECTION II.B; FOR SURFACE WATER ONLY, SECTION II.C; IF GROUND SURFACE AND SURFACE WATER ARE AFFECTED, COMPLETE BOTH SECTIONS.

II. B. GROUND SURFACE AFFECTED

1. Area Affected

Size _____ Ft. X _____ Ft. Soil Type _____

Land Use ☐ Grazing ☐ Timber ☐ Agriculture ☐ Business ☐ Residential ☐ Other _____

2. Tests at source (Report other tests on sketch)

Field Chloride? ☐ No ☐ Yes (_____ ppm)

Samples? ☐ No ☐ Yes (Custody Tag _____)

3. Describe terrain and path of material.

II. C. SURFACE WATER AFFECTED

1. Location

☐ Lake ☐ Gulf ☐ Bay ☐ Other _____ ☐ River ☐ Pond/Tank ☐ Estuary ☐ Flowing Creek ☐ Dry Creek ☐ Drainage Ditch

Name (if available) _____

2. If material has reached water, how far has it spread from the point of entry? _____

3. In the TABLE below, data is to compare the normal condition of the body of water with the effects of the material. For STILL BODIES OF WATER, Column (1) data should come from a distance sufficient to show normal conditions (if the entire body is affected, note this); Column (2) should be at the point where the material entered the water; and Column (3) data should be from a distance adequate to indicate the spread of the material. For FLOWING BODIES OF WATER, the data should be taken at points in the flow to show comparable information.

☐ Still Water ☐ Flowing Water	1. _____ Ft. From Entry Point _____ Ft. Upstream From Entry Point	2. At Entry Point At Entry Point	3. _____ Ft. From Entry Point _____ Ft. Downstream From Entry Point
a. Field Chloride	ppm	ppm	ppm
b. Sample (tag #)			
c. Surface Water Appearance (Oil Sheen, turbidity, etc.)			
d. Aquatic Life Observations (Fish, Plants, etc.)			

III. APPARENT CAUSE OF VIOLATION.

Describe events and conditions you witnessed which indicate who and/or what caused the violation to occur. _____

I certify that this data, the photos, sketches, and other attachments are true, complete, and reflect actual conditions.

Signature _____

Number _____ Date _____

	Mileage	Time
Start		
End		

I. IDENTIFICATION

Operator _____ Company Representative _____

Lease Name _____ ☐ Oil Lease No., or ☐ Gas ID No. _____

County _____ Field _____ Well No. _____

OFFICE REVIEW

_____ (Name)

_____ (Date)

D-4

WELL PRODUCTION TEST

January 1, 1985

II. TEST INFORMATION

Type Test: ☐ Oil ☐ Gas ☐ Min. Flow

Type Well: ☐ A. Flowing ☐ B. Artificial Lift

- ☐ Pumping
- ☐ Gas Lift
- ☐ Plunger Pump
- ☐ Submer. Pump
- ☐ Other _____

Pump Size _____

Length Stroke _____

Strokes/min. _____

Tank No. _____

Size _____

bbl/in. _____

Tank No. _____

Size _____

bbl/in. _____

Tap: ☐ Flange ☐ Pipe

Line Size _____

Orifice Size _____

Verified by Inspection? ☐ YES ☐ NO

Type Chart* _____

Chart Range _____

Pen Ranges:

Pressure _____

Differential _____

Temperature _____

Average Pen Readings: **

Pressure _____

Differential _____

Temperature _____

Shut-in Pressure _____

Is gas compressed? ☐YES ☐ NO

Intake Pressure _____

Discharge Pressure _____

Gas Gravity _____

Gas Temperature _____

24-Hour Gas Vol. _____

GOR _____

* *See instructions on back*

** *Individual readings for minimum production test should be noted in comments below*

III. TEST DATA

Trip No.	Date Time	Hours	Choke Size	Tubing Press.	Cas. Press.	Oil/Cond. Read./Gauge	Water Read./Gauge	Oil Prod.	Water Prod.	Gas Prod.	GOR	Comments
1.												
2.												
3.												
4.												
5.												
6.												

This test data ☐ is complete ☐ is continued on an additional D-4 ☐ is a continuation from another D-4

ACTIVITY

- ☐ A. Drilling Rig
- ☐ B. Saltwater Hauler
- ☐ C. Plant
- ☐ D. Surface Casing
- ☐ E. Cementing Long String
- ☐ F. Deviational Survey
- ☐ G. Plugging
- ☐ H. Plugging - (State Funds)
- ☐ I. Tank Cleaning
- ☐ J. Status Check Requested
- ☐ K. Theft Investigation
- ☐ L. Oil Movement
- ☐ M. Seal Well
- ☐ N. Saltwater Disposal/ Injection Well Related Jobs
- ☐ O. Pit Permitting (H-11)
- ☐ P. Landfarming
- ☐ Q. Fire/Blowout Report
- ☐ R. Office
- ☐ S. Other _____

INSTRUCTIONS

1. Follow procedures for specific activity as given in FIELD INSPECTION HANDBOOK.
2. If pollution exists, consult back of D-3 (A.1) to see if D-3 should be completed also.

INSPECTION

- ☐ Initial - Office Assignment
- ☐ Initial - Field Initiated
- ☐ Backcheck/Follow-up

OFFICE REVIEW

by _____

date _____

D-5
OTHER ACTIVITIES

January 1, 198

I. IDENTIFICATION
FILL OUT THIS SECTION IF FIELD INITIATED

Operator _____ Field _____

Lease _____ Well No.(s) _____

County _____ ☐ Drilling Permit No., ☐ Oil Lease No., or ☐ Gas ID _____

Facility (if not associated with a lease) _____ Permit/Registration No. _____

Site (if other than lease or facility) _____

II. REPORT

Injection/Disposal Well(s) involved? ☐ YES ☐ NO; If YES, circle type (number of wells _____).

Number of Statewide Rules Violated _____ .

I certify that this data is true and complete:		MILEAGE	TIME
Signature _____	START		
Number _____ Date _____	END		

D-6
Blowout and/or Fire Assignment

January 1, 1985

INSTRUCTIONS

OFFICE	FIELD
1. Fill out completely with information given by person calling in notification.	1. Fill out completely with information from radio call.
2. Immediately radio information to field.	2. Make report on Form D-5: Other Activities and attach to this form.
Person Calling _____	Name _____
Taken By (Initials) _____	Notified By _____
Date _____ Time _____	Date _____ Time _____
Radioed To _____ Time _____	

I. IDENTIFICATION

Operator: _____ Field: _____

Lease: _____ Well No.: _____

County: _____ ☐ Drilling Permit No., ☐ Oil Lease No., or

Facility/Site: _____ ☐ Gas ID No. _____

(If not associated with a lease) Permit/Registration No.: _____

Location: Nearest Town _____ Survey _____

Block _____ Section _____

Directions: _____

_____

_____ .

Contact: _____ Phone: _____

☐ IIa. BLOWOUT

1. Date of blowout: _____
   Time of blowout: _____
2. H_2S danger? ☐ Yes ☐ No; H_2S precautions: _____
3. Mud weights:
   When well blew out _____ lb.
   Current: in _____ lb; out _____ lb.
4. Blowout is:
   ☐ through drill pipe ☐ around drill pipe
   ☐ through casing ☐ around casing
5. Casing String — Size — Amount
   Surface _____ _____
   Intermediate _____ _____
   Long String _____ _____
   Other (_____) _____ _____
   Total Depth _____ ft.
6. Length of drill string now in hole: _____
7. Formation and depth of kick or blowout: _____
8. Under control on choke? ☐ Yes ☐ No;
   Manifold pressure: _____ Pump pressure _____
9. Immediate danger of cratering? ☐ Yes ☐ No
10. Are well fluids contained? ☐ Yes ☐ No

If YES,
How _____

If NO,
☐ Oil: vol. _____ disposal _____
☐ Gas: vol. _____ disposition _____
☐ Water: vol. _____ disposal _____

☐ IIb. FIRE

1. Date of fire: _____
   Time of fire: _____
2. Estimated height _____
3. Extinguished? ☐ Yes Date _____
   ☐ No Time _____

III. RESPONSES

1. Public danger and precautions _____
2. Immediate action underway or planned and equipment on location _____
3. Well control company _____ . DISTRICT
4. Remarks _____ NO.
   _____ . _____

D-7
MANIFEST AUDI
REPORT
March 1, 1985

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

Date _____ Time _____

Run Ticket Number _____ Location Audit Made _____

District Number _____

Company Name _____

Address _____ Zip _____

Driver's Name _____ Texas Driver's License Number _____

Tractor License Number _____ Trailer License Number _____

Water Hauler Permit Number *(if applicable)* _____

Origin:

Operator _____

Lease or Facility _____ Number _____

Field _____ County _____

Run Ticket Gauge: Open _____ Close _____

Material Description _____ Volume _____

Destination:

Company Name _____

Location _____

_____ _____ _____
Driver Signature Technician Signature Num

Sample Taken? ☐ Yes ☐ No (Tag No.? _____) Truck Properly Identified? ☐ Yes ☐

Comments _____

_____

_____

Distribution: White - Technician
Canary - Austin
Pink - Attach to D-5 Form
Golden Rod - Driver

Form H-5
06/03/85

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

READ INSTRUCTIONS ON BACK

PLEASE TYPE OR PRINT

Disposal/Injection Well
Pressure Test Report

UIC CONTROL NO. _____

Type _____

FOR RRC USE ONLY

1. OPERATOR'S NAME | 2. RRC OPERATOR NO.

3. ADDRESS | 4. RRC DISTRICT NO. | 5. COUNTY

6. FIELD NAME (Exactly as shown on proration schedule) | 7. FIELD NO. | 8. API NO.

9. LEASE NAME | 10a. OIL LEASE NO. | 10b. GAS ID NO. | 11. WELL NO.

12. REASON FOR TEST

- ☐ Initial Test Prior to Injection
- ☐ After Workover
- ☐ Annual Test Required By Permit
- ☐ Five-Year Test Required By Rule
- ☐ Other (Specify) _____

13. DATE OF TEST

14. RETEST? ☐ YES ☐ NO
If YES, see Instruction No. 5

15. WELL COMPLETION

	size	depth set
Surface Casing		
Long String Casing		
Tubing		

16a. PACKER MAKE AND MODEL | 16b. DEPTH SET

17. AUTHORIZED INJECTION PRESSURE (PSIG): _____

18a. PERMITTED INJECTION INTERVAL
Top _____ Bottom _____

18b. COMPLETED INJECTION INTERVAL
Top _____ Bottom _____

19. TEST PRESSURE (PSIG) [see Instructions 4(c) and 4(d)]

TIME	TUBING	CASING	SURFACE CSG.	TIME	TUBING	CASING	SURFACE CSG.
Initial							
15 min.							
30 min.							

20. CHARACTERISTICS OF INJECTION FLUID
[see Instruction 4(e)]

21. CHARACTERISTICS OF ANNULUS FLUID
[see Instructions 4 (e) and 4(f)]

22. TEST WITNESSED BY RRC? ☐ YES ☐ NO
If NO, see Instruction 4(a)
If YES, Name of RRC Representative _____

23. WERE OTHER TESTS/SURVEYS PERFORMED AT THIS TIME? ☐ YES ☐ NO. If YES, List:

24. OPERATOR COMMENTS ON TEST (attach separate sheet if necessary)

25. WELL STATUS: ☐ Active ☐ Temporarily Abandoned ☐ Other (Specify) _____

CERTIFICATE:

I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated herein are true, correct, and complete, to the best of my knowledge.

_____
Signature

_____
Name of Person (type or print) Title

Telephone No. ( ) _____ Date _____

INSTRUCTIONS

Form H-5: Disposal/Injection Well Pressure Test Report

NOTICE: This form is NOT to be used for underground hydrocarbon storage wells regulated under Statewide Rule 74.

1. **WHO TO NOTIFY** - The appropriate District Office must be notified at least 48 hours prior to any pressure test. Testing shall not commence before the end of the 48-hour period unless authorized by the District Office.

2. **WHEN TO FILE** - File within 30 days after the date of any pressure test.

3. **WHERE TO FILE** - File in duplicate, including any attachments, with the appropriate District Office.

4. **TEST REQUIREMENTS** -

   (a) A pressure recorder must be used for all tests. The pressure recording chart must be signed by the operator's field representative. The pressure recording chart must be filed with this form for any test not witnessed by a Railroad Commission representative. The maximum range of the pressure recording chart must be such that the casing test pressure falls within 30-70% of full scale. If a circular pressure recording chart is used, the clock on the pressure recorder must not exceed 24 hours.

   (b) A pressure gauge must be used when taking pressure readings to be entered in Item 19. The maximum range of the pressure gauge must be such that the casing test pressure falls within 30-70% of full scale. The precision of the pressure gauge must be such that the minimum pressure increment is no more than 5% of the test pressure required by instruction 4(c).

   (c) The casing test pressure must be at least equal to the maximum authorized injection pressure or 500 psig, whichever is less, but no less than 200 psig. For wells equipped for injection through tubing and packer, a pressure differential of at least 200 psig must exist between the tubing-casing annulus pressure and any tubing pressure.

   (d) The test must be conducted for a period of no less than 30 minutes. A longer test may be required at the discretion of the District Office. For longer tests, pressure readings must be taken at least every 30 minutes. Pressure readings must be entered in Item 19.

   (e) If any pressure anomaly occurs during the pressure test, list the characteristics (such as temperature and specific gravity) of the injection fluid (Item 20) and the fluid in the annulus (Item 21) necessary to explain the anomaly.

   (f) If the annulus is not loaded with fluid for the test, explain in Item 21.

5. **RETEST REQUIREMENTS** - If a retest is being performed as a result of a previous test failure, give the date of last unsuccessful test and explain any remedial action that was taken to prepare the well for retest (casing repair, tubing and/or packer replacement, etc.). Explain in Item 24.

REFERENCE: Statewide Rules 9 and 46

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

READ INSTRUCTIONS ON BACK

ORGANIZATION REPORT

FORM P-5
(Rev. 01/01/87)

1. Purpose of Filing ☐ New Filing ☐ Address Correction ☐ Change of Officers or Resident Agent ☐ Annual Refiling

2. RRC Operator No. (if assigned)

3. ORGANIZATION Name and Mailing Address

To change organization name, submit new P-5

Street Address

4. Current Plan of Organization (if application is new or organization has changed, select one) ☐ A. Corporation ☐ B. Limited Partnership ☐ C. Sole Proprietorship ☐ D. Partnership ☐ E. Trust ☐ F. Joint Venture ☐ G. Other

5. RESIDENT AGENT

Name
Street Address
and, if different
Mailing Address

6. THREE PRIMARY OFFICERS (Read instructions on back carefully)

(1) Name (Full Legal)
Title
Street Address
Mailing Address
☐ Driver's Lic
☐ State ID State No. State: No.:

(2) Name (Full Legal)
Title
Street Address
Mailing Address
☐ Driver's Lic
☐ State ID State No. State: No.:

(3) Name (Full Legal)
Title
Street Address
Mailing Address
☐ Driver's Lic
☐ State ID State No. State: No.:

7. If a reorganization, give name and address of previous organization and previously assigned operator number

Previously assigned operator number

8. If the organization listed in No. 3 is a subsidiary or an assumed name (dba), give name and address of associated company and its operator number, if assigned

Operator number of associated company

FOR RRC USE ONLY

Approved by
Date
Remarks

Signature Title

Name Area Code Telephone No. Date

Certificate: I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction and that the data and facts stated therein are true, correct, and complete, to the best of my knowledge.

INSTRUCTIONS

Form P-5: Organization Report

Reference: Statewide Rule 1, revised February 1986

WHO IS TO FILE FORM P-5: any entity, i.e., person, firm, partnership, joint stock association, corporation, or any other organization, domestic or foreign, operating wholly or partially within this state, acting as principal or agent for another, for the purpose of performing operations within the jurisdiction of the Commission, as shown in Statewide Rule 1.

WHEN TO FILE FORM P-5:

- INITIAL FILING — the initial Form P-5 must be filed prior to beginning the first operation that is within Commission jurisdication or when an organization name is being changed. This initial filing will cover all subsequent operations.
- RENEWAL FILINGS — the Form P-5 must be refiled annually. The Commission will notify you before your refiling date by mailing you a computer-generated Form P-5. The current information carried in your organization report file will be pre-printed on the form. Review the information carefully; update any recent changes by entering them in the color-coded areas. However, if your organization name has changed, follow instructions given in the following paragraph. Sign the P-5 and return it to the Commission in Austin by the date shown on the P-5 in No. 1.
- CHANGES — If changes occur between annual refilings, a Form P-5 reflecting those changes must be sent within 15 days to the Commission in Austin. For changes other than that of an organization name, check the type of change being made in No 1, give the operator number in No. 2 and show the organization name and address(es) as currently carried by the Commission in No. 3 (white area). Then, for the items which are changing, give the current information in the white area and the new information in the color-coded area. If your organization name is being changed, proceed as with an initial P-5 filing; do not give your previously assigned operator number in No. 2 as you will be assigned a new operator number; cross reference to your old organization is made by filling out No. 7.

NAME AND ADDRESS INSTRUCTIONS: each name and address line is limited to 32 spaces in length. Each name is limited to one line while each address is limited to three lines. Use abbreviations when necessary to conform to these limits. The street address including city, state, and zip code MUST be given and, if it is different, the mailing address as well. See No. 6 below for the only exception to the street address requirement.

SPECIFIC ITEMS ON FORM P-5

No. 1 Check the proper block to show the purpose of filing. More than one block may be checked.

No. 2 Your permanent RRC operator number is assigned after the initial filing of your P-5. If you have more than one operation under the same organization name, this number will be used for all of them. If you change your organization name, a new number will be assigned. Your operator number will be required on most reports and forms you file with the Commission.

No. 3 This is the official name of your organization as carried on Commission records. Unless we are directed otherwise, all Commission correspondence will be directed to this mailing address. If you want information on oil and gas allowables and related information to be mailed to a different address, request this through separate correspondence; changes in these additional addresses should be made in the same way.

No. 4 Check the appropriate plan of organization on all new filings and, if it has changed, on refilings. Select only one.

No. 5 If your organization is located outside of the state of Texas, as indicated by the street address in No. 3, you must designate and maintain a resident agent within the state. The resident agent may also be used as provided for in No. 6.

No. 6 List ONLY the THREE highest ranking officers, partners, joint venturers, or trustees of the organization and give their full legal name. Do not attach a listing of any others. The street address given for each officer MUST be different from that shown for the organization in No. 3. However, the name and street address of a resident agent may be given in No. 5 in lieu of these street addresses. A mailing address must be given if it is different from that shown for the organization in No. 3. The driver's license identification of each individual must be given. If the individual has no driver's license and a state identification card has been issued in its place, the issuing state and the number are to be given.

No. 7 If you have reorganized and changed your organization name, give the previous name and address of the organization as well as the previously assigned operator number.

No. 8 If your organization listed in No. 3 is a subsidiary or an assumed (doing business as) name, show the name and address of the parent or associated company and its operator number if one has been assigned.

Mail to Railroad Commission of Texas
Oil and Gas Division
Production Allocation Section
Capitol Station - P. O. Drawer 12967
Austin, Texas 78711-2967

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

READ INSTRUCTIONS ON BACK

PRODUCER'S TRANSPORTATION AUTHORITY AND CERTIFICATE OF COMPLIANCE

FORM P-4
(Rev. 12/01/87)

1. Field name exactly as shown on proration schedule	2. Lease name		
3. Operator name exactly as shown on P-5 Organization Report	4. Operator P-5 no.	5. Oil lease no.	6. RRC district no.
7. Operator address including city, state, and zip code	8. County in which oil lease or gas well is actually located	9. Gas ID no.	10. Gas well no.
		11. Effective date	

12. GAS WELL GAS OR CASINGHEAD GAS. Additional space and example on reverse side.

Type Operation			Name of gatherer, purchaser, and/or nominator as indicated in type operation columns NOTE: For each purchaser, give its RRC-assigned system code and identify the market. If applicable, place an "X" in the full-well stream column for the gatherer.	RRC USE ONLY	Purchaser's RRC Assigned System Code	Purchaser's Market		Percent of Take	Full-well stream
gatherer	purchaser	nominator		G/P/N Code		inter-state	intra-state		

13. NAME OF OIL OR CONDENSATE GATHERER List highest volume gatherer first	Percent of Take	RRC USE ONLY Gath. code

14. PURPOSE OF FILING
Remarks:

a. ☐ New oil lease ☐ New gas well
☐ Reclassification (oil to gas or gas to oil)
☐ Consolidation, unitization or subdivision

b. CHANGE ☐ Gatherer ☐ Nominator ☐ Purchaser ☐ Purchaser's system code

RRC USE ONLY Approved:
Oper. No. _____
Field No. _____
Remarks:

c. CHANGE FROM
☐ Operator _____
☐ Field Name _____
☐ Lease Name _____

15. OPERATOR CHANGE. Being the PREVIOUS operator, I certify that operating responsibility for any and all wells located on the subject property has been transferred in its entirety to the above named current operator.

Previous Operator _____ Date _____
Signature _____ Name (Print) _____
Title _____ Phone ( ) _____
Address with city/state/zip _____

16. CURRENT OPERATOR'S CERTIFICATION

Signature _____ Name (Print) _____
Title _____ Date _____ Phone ( ) _____

I, the current operator, certify that the above agent is authorized to transport the above specified percentage of the allowable oil or gas produced from the above described property in accordance with the regulations of the Railroad Commission of Texas, and that this authorization will be valid until further notice or until cancelled by the Railroad Commission of Texas, and further certify that the conservation laws of the State of Texas and all rules, regulations and orders of the Railroad Commission of Texas have been complied with in respect to the property covered by this report.

☐ check if listings are continued on reverse side

Additional Listings for Gas Well Gas and Casinghead Gas

Type Operation			Name of gatherer, purchaser, and/or nominator as indicated in type operation columns NOTE: For each purchaser, give its RRC-assigned system code and identify the market. If applicable, place an "X" in the full-well stream column for the gatherer.	RRC USE ONLY	Purchaser's RRC Assigned System Code	Purchaser's Market		Percent of Take	Full-well stream
gatherer	purchaser	nominator		G/P/N Code		Interstate	Intrastate		
			Example						
X			All-Tex Gathering Company					25.00	
X	X	X	Trans-Tex Pipelines, Inc.		001		X	75.00	X
	X		All-Tex Oil and Gas Company		003	X		25.00	
		X	All-Tex Gasco					25.00	

INSTRUCTIONS
Form P-4: Producer's Transportation Authority and Certificate of Compliance
Reference: Statewide Rule 58

Who Files The operator of any oil, gas well gas, condensate, and/or casinghead gas producing property in the State must file a P-4 for each such property

Purpose of Filing **The P-4 must be filed to**

- Identify all gatherers, purchasers, purchasers' RRC-assigned system codes, and nominators authorized for each oil lease or gas well. **NOTE Except during initial testing, no production may leave the oil lease or gas well until the P-4 has been filed and a letter of approval from th Railroad Commission received by all parties** . If, during initial production testing, large quantities of oil or condensate are produced application may be made on Form P-8: Request for Clearance of Storage Tanks prior to potential test to the appropriate district office fo issuance of temporary transportation authority. For initial test purposes, a gas well may produce into a pipeline without a P-4 authorization n more than 30 days.
- Certify that production from the subject property is in accordance with the laws of Texas and the rules, regulations, and orders of th Commission.
- Establish status on Commission records as operator of the subject property.
- Notify the Commission of changes in

  Operator (see No. 6, below) — Field Name (see No. 7, below) — Nominator — Lease Name
  Gatherer — Purchaser System Code — Purchaser — Reclassification (oil to gas or gas to oil)

  or when consolidations, unitizations, or subdivisions take place (see No. 5, below).
  NOTE: When filing a P-4 for changes, the form must be completed in its entirety, not just in areas being changed.

What and Where to File The original only of the P-4 is to be filed with the Railroad Commission in Austin

Oil and Gas Division
P. O. Drawer 12967 — Capitol Station
Austin, Texas 78711-2967

Revocation This authorization may be revoked by the Commission at any time for failure to comply with the oil and gas laws of the State of Texas and the rule regulations, and orders of the Railroad Commission of Texas.

DETAILED INSTRUCTIONS

1. An effective date is required only when the P-4 is filed for changes.
2. For split connections, percentages of take must be given to no more than two decimal points. Combined percentages for gas or liquid gatherers must equ 100 percent; combined percentages for gas purchasers must equal 100 percent; and, combined percentages for gas nominators must equal 100 percen
3. An RRC-assigned system code and market identification must be given for each purchaser listed in No. 12. If gas is going full-well stream to a processir plant, an "X" is to be placed in the last column on the line naming the gatherer of that gas.
4. If additional space is required for listings, use an attachment in the same format as Items 12 and 13, including blank areas for Railroad Commission us
5. The following attachments must be filed for a consolidation, subdivision, or unitization:
   - Form P-6
   - Before and after plats showing changes, distances to lease line and between wells, and, if acreage is in the field's allocation formula, proration uni assigned.
   - A letter certifying that there is no overproduction on the subject leases at the time of application.
6. For changes of operator:
   - The previous operator must complete Item 15. If impossible, leave blank and attach a letter of explanation and supporting documentation.
   - The current (new operator) must have a Form P-5 Organization Report on file with the Commission.
   - If a SWR 14(b)(2) plugging extension has already been granted or is required on the subject property or any well on that property, the current (ne operator must make arrangements for a new extension before the P-4 change can be approved.
   - Responsibility for ALL wells on an oil lease is to be transferred. Otherwise, the lease must be subdivided.
7. Field name changes, that is, transfers, must be reviewed by technical staff. If supporting documents are required, the operator will be notified.
8. To change a gas well number, submit a Form G-1 or a letter of request; do not use Form P-4.

Make [redacted]eck or money order payable to the State Treasurer of Texas. Address to:
Railroad Commission of Texas
Oil and Gas Division, Drilling Permits
P. O. Drawer 12967, Capitol Station
Austin, Texas 78711

▶ File a copy of W-1 and plat in RRC District Office.

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

Application for Permit to Drill, Deepen, Plug Back, or Re-Enter

▶ Read Instructions on Back

Form W-1
Rev. 9/1/83
483-060

Purpose of filing (mark appropriate boxes):
☐ Drill ☐ Deepen (below casing) ☐ Deepen (within casing) ☐ Plug Back ☐ Re-Enter
☐ Directional Well ☐ Sidetrack ☐ Amended Permit (enter permit no. at right & explain fully in Remarks)

Enter here, if assigned: API No. ▶ 42-
Permit No. ▶
Rule 37 Case No. ▶

1. Operator's Name (exactly as shown on Form P-5, Organization Report)
3. RRC Operator No.
4. RRC District No.
5. County of Well Site
2. Address (including city and zip code)
6. Lease Name (32 spaces maximum)
7. RRC Lease/ID No.
8. Well No.
9. Total Depth

10. Location
• Section _____ Block _____ Survey _____ Abstract No. A- _____
• This well is to be located _____ miles in a _____ direction from _____ , which is the nearest town in the county of the well site.

11. Distance from proposed location to nearest lease or unit line _____ ft.

12. Number of contiguous acres in lease, pooled unit, or unitized tract _____ (OUTLINE ON PLAT.)

13. FIELD NAME (Exactly as shown on RRC proration schedule). List all established and wildcat zones of anticipated completion. Attach additional Form W-1's as needed to list these zones. One zone per line.	14. Completion depth	15. Spacing pattern (ft.)	16. Density pattern (acres)	17. Number of acres in drilling unit for this well. OUTLINE ON PLAT.	18. Is this acreage assigned to another well on this lease & in this reservoir? If so, explain in Remarks.	19. Distance from proposed location to nearest applied for, permitted, or completed well, this lease & reservoir. (ft.)	20. Oil, gas, or other type well (Specify)	21. No. of applied for, permitted, or completed locations (including this one) on lease in this reservoir. OIL	GAS

22. Perpendicular surface location from two nearest designated lines:
• Lease/Unit _____
• Survey/Section _____

If a directional well, show also projected bottom-hole location:
• Lease/Unit _____
• Survey/Section _____

23. Is this a pooled unit?
Yes ☐ ▶ (Attach Form P-12 and certified plat.) No ☐

24. Is Item 17 less than Item 16 (substandard acreage for any field applied for)?
Yes ☐ ▶ (Attach Form W-1A) No ☐

25. Is this wellbore subject to Statewide Rule 36 (hydrogen sulfide area)? Yes ☐ No ☐
If subject to Rule 36, is Form H-9 filed? Yes ☐ No ☐ ▶ If not filed, explain in Remarks.

26. Do you have the right to develop the minerals under any right-of-way that crosses, or is contiguous to, this tract? Yes ☐ No ☐
If not, and if the well requires a Rule 37 or 38 exception, see Instructions for Rule 37.

Remarks

I certify that information stated in this application is true and complete, to the best of my knowledge.

Signature _____ Name and title of operator's representative _____

Date: mo. day yr. Tel.: Area Code Number

• RRC Use Only •

Instructions to Form W-1

A. IMPORTANT: Do not begin drilling operations on any location until you receive a drilling permit from the Commission, and the waiting-clause period, if specified in the permit, has ended.

B. **Organization Report.** Before this application can be processed, a **Form P-5**, Organization Report, showing the exact operator name used on Form W-1, must be on file with the Commission in Austin.

C. **Fee.** With each W-1 application or materially amended W-1 application, the applicant must submit to the Commission in Austin a fee of $100.00. A check or money order must be made payable to the State Treasurer of Texas. This fee is nonrefundable. An application will be considered materially amended if the amendment requires the issuance of a new permit. A materially amended application includes an application in which an additional field or a change in location or field is sought for a previously permitted well. However, if a new application and/or permit becomes necessary because of Commission action, the $100.00 fee may be waived.

D. **Surface casing.** Before the Commission will assign an allowable to a well, the operator must set and cement sufficient surface casing to protect all usable-quality water strata, as defined by the Texas Department of Water Resources. Before drilling a well where Commission rules do not specify surface casing requirements, the operator must obtain a letter from the Department stating the protection depth. Write: TDWR, Surface Casing, P. O. Box 13087, Capitol Station, Austin, Texas 78711.

E. **What to file.** File Form W-1, a plat, and the $100.00 fee in the Commission's Austin office (the address appears on the front of this form). Send a copy of the W-1 and plat to the RRC District Office that serves the county of the proposed well site.

F. **Plat.** Each W-1 must be accompanied by a neat, accurate plat of the lease or unit which clearly shows the following:

For a REGULAR location (where the proposed site conforms to Commission rules)

- Drilling unit boundary for the proposed location and proration unit boundaries for each producing well on this lease or unit which is completed in the same field. Show the acreage contained in each unit. For Commission purposes, lease or unit acreage must be contiguous unless an exception to Statewide Rule 39 is granted. If a Rule 39 exception has previously been granted for the lease or unit, **attach a copy of the RRC approval.**
- Surface location of the proposed site. If the well is to be directionally drilled, show also the projected bottom-hole location.
- Perpendicular distance to nearest intersecting: (a) lease/unit lines and (b) survey/section lines. To avoid confusion, distinguish between the two sets of lines.
- Distance to nearest applied for, permitted, or completed well on this lease or unit in the same field.
- Section, block, or lot.
- Northerly direction.
- Scale. Where the size of the lease or unit will allow, use a scale of 1" = 1,000'. If it is not practical to show the entire lease or unit on the plat, attach a second plat, drawn to a scale no smaller than 1" = 2,000', to show the entire lease or unit in relation to the patent survey. Enter on Form W-1 (Item 12) the acreage for the entire lease or unit.
- On a pooled unit, outline the entire lease or unit as well as the individual tracts listed on Form P-12, Certificate of Pooling Authority.

For a RULE 37 or RULE 38 Exception (where spacing or acreage is less than prescribed by rule)

- A certified plat of the entire lease or unit which includes the information described above; and
- A list of the names and addresses of all offsetting operators or unleased mineral interest owners of each tract which is contiguous to the drill site tract. If you do not have the right to develop the minerals under any right-of-way that crosses, or is contiguous to, this tract, and if the well requires a Rule 37 or 38 exception, list also the name and address of the person who has this right. The list should refer to the plat clearly so as to enable the Commission to readily identify each tract and its operator or mineral owner.

  NOTE: If you penetrate a Rule 37 or 38 zone in which you do not propose to complete at this time, you will not necessarily be allowed to use the existence of this wellbore as justification for an exception to complete this wellbore in such zone in the future.

G. **Specific Items.**

Item 13. **Field name.** Use only field designations, including reservoir, approved by the Commission (not proposed field names). Enter "Wildcat" if the reservoir has no RRC field designation and give the total projected depth under "Completion Depth." If the well is to be drilled in a multi-pay area, list all established and wildcat zones for which a completion is proposed. If necessary, attach additional Form W-1's to list these zones.

Item 15. **Spacing pattern.** If the proposed location of the well is in a field with special field rules, enter the appropriate spacing pattern. If there are no field rules in effect, Statewide Rule 37 spacing applies. Rule 37 requires wells to be spaced at least 467 feet from lease lines and 1,200 feet from other wells completed in the same reservoir and on the same lease, with one well to each 40 acres. However, if the proposed location is in RRC Districts 7B, 9, or in McCulloch County (District 7C), and in a field with no special field rules adopted, a district (or county regular) rule will apply, with special spacing and depth controls for wells drilled to 5,000 feet or above.

Item 16. **Density pattern.** If the proposed location is in a field with special field rules, enter the appropriate density pattern. If there are no field rules in effect, Statewide Rules 37 and 38 apply, allowing one well to each 40 acres. However, if the proposed location is in RRC Districts 7B, 9, or in McCulloch County (District 7C), and in a field with no special field rules adopted, the special spacing and depth controls in Rule 38(b) govern density.

Type or print only

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

Form W-2
Rev. 4/1/83
483-046

API No. 42-

7. RRC District No.

8. RRC Lease No.

Oil Well Potential Test, Completion or Recompletion Report, and Log

1. FIELD NAME (as per RRC Records or Wildcat)

2. LEASE NAME

9. Well No.

3. OPERATOR'S NAME (Exactly as shown on Form P-5, Organization Report)

RRC Operator No.

10. County of well site

4. ADDRESS

11. Purpose of filing
- Initial Potential ☐
- Retest ☐
- Reclass ☐
- Well record only (explain in Remarks) ☐

5. If Operator has changed within last 60 days, name former operator

6a. Location (Section, Block, and Survey)

6b. Distance and direction to nearest town in this county.

12. If workover or reclass, give former field (with reservoir) & gas ID or oil lease no.
FIELD & RESERVOIR | GAS ID or OIL LEASE # | Oil - O Gas - G | WELL NO.

13. Type of electric or other log run

14. Completion or recompletion date

SECTION I: POTENTIAL TEST DATA IMPORTANT: Test should be for 24 hours unless otherwise specified in field rules.

15. Date of test	16. No. of hours tested	17. Production method (Flowing, Gas Lift, Jetting, Pumping—Size & Type of pump)	18. Choke size

	Oil - BBLS	Gas — MCF	Water - BBLS	Gas - Oil Ratio	Flowing Tubing Pressure
19. Production during Test Period ▶					PSI
Calculated 24-Hour Rate ▶	Oil - BBLS	Gas — MCF	Water — BBLS	Oil Gravity—API—60°	Casing Pressure PSI

21. Was swab used during this test? Yes ☐ No ☐

22. Oil produced prior to test (New & Reworked wells)

23. Injection Gas—Oil Ratio

REMARKS:

INSTRUCTIONS: File an original and one copy of the completed Form W-2 in the appropriate RRC District Office within 30 days after completing a well and within 10 days after a potential test. If an operator does not properly report the results of a potential test within the 10-day period, the effective date of the allowable assigned to the well will not extend back more than 10 days before the W-2 was received in the District Office. (Statewide Rules 16 and 51) To report a completion or recompletion, fill in both sides of this form. To report a retest, fill in only the front side.

WELL TESTER'S CERTIFICATION
I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I conducted or supervised this test by observation of (a) meter readings or (b) the top and bottom gauges of each tank into which production was run during the test. I further certify that the potential test data shown above is true, correct, and complete, to the best of my knowledge.

Signature: Well Tester | Name of Company | RRC Representative

OPERATOR'S CERTIFICATION
I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

Typed or printed name of operator's representative

Title of Person

Telephone: Area Code Number

Date: mo. / day / year

Signature

SECTION II — **DATA ON WELL COMPLETION AND LOG (Not Required on Retest)**

24. Type of Completion:
New Well ☐ Deepening ☐ Plug Back ☐ Other ☐

25. Permit to Drill, Plug Back or Deepen — DATE — PERMIT NO.
Rule 37 Exception — CASE NO.
Water Injection Permit — PERMIT NO.
Salt Water Disposal Permit — PERMIT NO.
Other — PERMIT NO.

26. Notice of Intention to Drill this well was filed in Name of

27. Number of producing wells on this lease in this field (reservoir) including this well

28. Total number of acres in this lease

29. Date Plug Back, Deepening, WorkOver or Drilling Operations: Commenced — Completed

30. Distance to nearest well, Same Lease & Reservoir

31. Location of well, relative to nearest lease boundaries of lease on which this well is located — Feet From Line of the — Line and — Feet from Lease

32. Elevation (DF, RKB, RT, GR, ETC.)

33. Was directional survey made other than inclination (Form W—12)? ☐ Yes ☐ No

34. Top of Pay | 35. Total Depth | 36. P. B. Depth | 37. Surface Casing Determined by: Field Rules ☐ | Recommendation of T.D.W.R. ☐ Dt. of Letter | Railroad Commission (Special) ☐ Dt. of Letter

38. Is well multiple completion?

39. If multiple completion, list all reservoir names (completions in this well) and Oil Lease or Gas ID No.

FIELD & RESERVOIR	GAS ID or OIL LEASE #	Oil—O Gas—G	WELL #

40. Intervals Drilled by: Rotary Tools | Cable Tools

41. Name of Drilling Contractor

42. Is Cementing Affidavit Attached? ☐ Yes ☐ No

43. **CASING RECORD (Report All Strings Set in Well)**

CASING SIZE	WT #/FT.	DEPTH SET	MULTISTAGE TOOL DEPTH	TYPE & AMOUNT CEMENT (sacks)	HOLE SIZE	TOP OF CEMENT	SLURRY VOL. cu. ft.

44. LINER RECORD

Size	TOP	Bottom	Sacks Cement	Screen

45. TUBING RECORD

Size	Depth Set	Packer Set

46. Producing Interval (this completion) Indicate depth of perforation or open hole

From	To
From	To
From	To
From	To

47. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

Depth Interval	Amount and Kind of Material Used

48. FORMATION RECORD (LIST DEPTHS OF PRINCIPAL GEOLOGICAL MARKERS AND FORMATION TOPS)

Formations	Depth	Formations	Depth

REMARKS

Cementer: Fill in shaded areas.
Operator: Fill in other items.

Form W-15
Cementing Report
Rev. 4/1/83
483-045

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

1. Operator's Name (As shown on Form P-5, Organization Report)	2. RRC Operator No.	3. RRC District No.	4. County of Well Site

Field Name (Wildcat or exactly as shown on RRC records)	6. API No. 42-	7. Drilling Permit No.

Lease Name	9. Rule 37 Case No.	10. Oil Lease/Gas ID No.	11. Well No.

CASING CEMENTING DATA:	SURFACE CASING	INTER-MEDIATE CASING	PRODUCTION CASING		MULTI-STAGE CEMENTING PROCESS	
			Single String	Multiple Parallel Strings	Tool	Shoe
12. Cementing Date						
13. •Drilled hole size						
•Est. % wash or hole enlargement						
14. Size of casing (in. O.D.)						
15. Top of liner (ft.)						
16. Setting depth (ft.)						
17. Number of centralizers used						
18. Hrs. waiting on cement before drill-out						
19. API cement used: No. of sacks ▶						
Class ▶						
Additives ▶						
No. of sacks ▶						
Class ▶						
Additives ▶						
No. of sacks ▶						
Class ▶						
Additives ▶						
20. Slurry pumped: Volume (cu. ft.) ▶						
Height (ft.) ▶						
Volume (cu. ft.) ▶						
Height (ft.) ▶						
Volume (cu. ft.) ▶						
Height (ft.) ▶						
Volume (cu. ft.) ▶						
Height (ft.) ▶						
21. Was cement circulated to ground surface (or bottom of cellar) outside casing?						

22. Remarks

OVER ▶

CEMENTING TO PLUG AND ABANDON	PLUG # 1	PLUG # 2	PLUG # 3	PLUG # 4	PLUG # 5	PLUG # 6	PLUG # 7	PLUG # 8
23. Cementing date								
24. Size of hole or pipe plugged (in.)								
25. Depth to bottom of tubing or drill pipe (ft.)								
26. Sacks of cement used (each plug)								
27. Slurry volume pumped (cu. ft.)								
28. Calculated top of plug (ft.)								
29. Measured top of plug, if tagged (ft.)								
30. Slurry wt. (lbs/gal)								
31. Type cement								

CEMENTER'S CERTIFICATE: I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this certification, that the cementing of casing and/or the placing of cement plugs in this well as shown in the report was performed by me or under my supervision, and that the cementing data and facts presented on both sides of this form are true, correct, and complete, to the best of my knowledge. This certification covers cementing data only.

Name and title of cementer's representative | Cementing Company | Signature

Address | City, State, Zip Code | Tel.: Area Code Number | Date: mo. day yr.

OPERATOR'S CERTIFICATE: I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this certification, that I have knowledge of the well data and information presented in this report, and that data and facts presented on both sides of this form are true, correct, and complete, to the best of my knowledge. This certification covers all well data.

Typed or printed name of operator's representative | Title | Signature

Address | City, State, Zip Code | Tel.: Area Code Number | Date: mo. day

Instructions to Form W-15, Cementing Report

IMPORTANT: Operators and cementing companies must comply with the requirements of the Commission's Statewide Rules 8 (Water Protection), 13 (Casing, Cementing, Drilling, and Completion), and 14 (Well Plugging). For **offshore** operations, see the requirements of Rule 13 (c).

A. **What to file.** An operator should file an original and one copy of the completed Form W-15 for each cementing company used on a well. The cementing of different casing strings on a well by one cementing company may be reported on one form. Form W-15 should be filed with the following:

- An initial oil or gas completion report, **Form W-2 or G-1**, as required by Statewide or special field rules;
- Form **W-4**, Application for Multiple Completion, if the well is a multiple parallel casing completion; and
- Form W-3, Plugging Record, unless the W-3 is signed by the cementing company representative. When reporting **dry** holes, operators must complete Form **W-15, in addition to Form W-3, to show any casing cemented in the hole.**

B. **Where to file.** The appropriate Commission District Office for the county in which the well is located.

C. **Surface casing.** An operator must set and cement sufficient surface casing to protect all usable-quality water strata, as defined by the Texas Department of Water Resources, Austin. Before drilling a well in any field or area in which no field rules are in effect or in which surface casing requirements are not specified in the applicable rules, an operator must obtain a letter from the Department of Water Resources stating the protection depth. Surface casing should not be set deeper than 200 feet below the specified depth without prior approval from the Commission.

D. **Centralizers.** Surface casing must be centralized at the shoe, above and below a stage collar or diverting tool, if run, and through usable-quality water zones. In nondeviated holes, a centralizer must be placed every fourth joint from the cement shoe to the ground surface or to the bottom of the cellar. All centralizers must meet API specifications.

E. **Exceptions and alternative casing programs.** The District Director may grant an exception to the requirements of Statewide Rule 13. In a written application, an operator must state the reason for the requested exception and outline an alternate program for casing and cementing through the protection depth for strata containing usable-quality water. The District Director may approve, modify, or reject a proposed program. **An operator must obtain approval of any exception before beginning casing and cementing operations.**

F. **Intermediate and production casing.** For specific technical requirements, operators should consult Statewide Rule 13 (b) (3) and (4).

G. **Plugging and abandoning.** Cement plugs must be placed in the wellbore as required by Statewide Rule 14. The District Director may require additional cement plugs. For onshore or inland wells, a 10-foot cement plug must be placed in the top of the well, and the casing must be cut off three feet below the ground surface. All cement plugs, except the top plug, must have sufficient slurry volume to fill 100 feet of hole, plus ten percent for each 1,000 feet of depth from the ground surface to the bottom of the plug.

To plug and abandon a well, operators must use only cementers approved by the Director of Field Operations. Cementing companies, service companies, or operators can qualify as approved cementers by demonstrating that they are able to mix and pump cement in compliance with Commission rules and regulations.

Form W-3A

Rev. 1/1/83
483-024

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

Type or print only

Notice of Intention to Plug and Abandon

Operators must comply with RRC plugging procedures as outlined on the reverse side.

1. Operator's Name and Address (Exactly as shown on Form P-5, Organization Report)

2. RRC Operator Number

3. RRC District No.

4. County of Well Site

5. API No. 42-

6. Drilling Permit No.

7. Rule 37 Case No.

8. Oil Lease No. or Gas Well ID No.

9. Well No.

10. Field Name (Exactly as shown on RRC records)

11. Lease Name

12. Location
- Section No. _____ Block No. _____ Survey _____ No. _____ Abstract No. A-
- Distance (in miles) and direction from a nearby town in this county (name the town).

13. Type of well
1 - oil 3 - disposal 5 - other (specify) _____
2 - gas 4 - injection Enter appropriate no. in box ▶ ☐

14. Type of completion
Single ☐ Multiple ☐

15. Total depth

16. Usable-quality water strata (as determined by Texas Dept. of Water Resources) occur to a depth of _____ feet and in deeper strata from _____ to _____ feet; and from _____ to _____ feet

17.
- If there are wells in this area which are producing from or have produced from a shallower zone, state depth of zone
- If there are wells into which salt water is being or has been disposed of into a shallower zone, state depth of zone

18. Casing record (list all casing in well)

Size	Depth	Cement (sacks)	Drilled hole size	Top of cement (feet)	Top of cement determined by: Temper. Survey	Calculated	Cement bond log	Anticipated casing recovery (feet)
_____ set @	_____ w/				☐	☐	☐	
_____ set @	_____ w/				☐	☐	☐	
_____ set @	_____ w/				☐	☐	☐	
_____ set @	_____ w/				☐	☐	☐	
_____ set @	_____ w/				☐	☐	☐	

19. Has notice of intent to plug been filed previously for this well?
☐ Yes ___/___/___ (mo. day yr.) ☐ No

20. Plugging proposal (List all bridge and cement plugs. Load the hole with at least 9.5 lbs. per gallon mud.)

	No. of sacks	Depth in feet (top & bottom)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

21. Record of perforated intervals or open hole

Perforations	Open	Plugged	Plugging method
	☐	☐	
	☐	☐	
	☐	☐	
Open Hole			
	☐	☐	

22. Name and address of cementing company or contractor

23. Anticipated plugging date for this well is: ___/___/___ (mo. day yr.)

Typed or printed name of operator's representative

Title of person

Telephone: Area Code Number

Date: ___/___/___ (mo. day year)

Signature

RRC District Office Action

▶ Expiration date ___/___/___ (mo. day year)

District Director

Date

Instructions to Form W-3A, Notice of Intention to Plug

A. **What to file.** An original and three copies of the completed Form W-3A. The operator must also file with this form a current letter from the Texas Department of Water Resources, P.O. Box 13087, Capitol Station, Austin, Texas 78711, stating the depth to which usable-quality water strata occur in the area of the well.

B. **Where to file.** The appropriate Commission District Office for the county in which the well is located. Operators must file this form at least FIVE days before they intend to begin plugging operations. The District Director may approve, modify, or reject the operator's plugging proposal as outlined on this form. IMPORTANT: If Form W-3A is approved, the operator must give at least a FOUR-HOUR notice to the District Director before proceeding to plug the well as outlined.

C. **Notice requirement.** Before plugging any well, the operator must give notice to the surface owner of the well-site tract, or to the resident if the owner is absent, and to the operators of all offset producing leases.

D. **Expiration.** When approved, the plugging proposal described on Form W-3A will be valid for **six** months. The expiration date appears on the front of this form.

E. **Plugging record.** Within 30 days after plugging operations are completed, the operator must file in the appropriate District Office a completed and verified Plugging Record, **Form W-3.** The cementer of the well must complete and sign the cementing report on Form W-3 or file a separate **Form W-15** and attach this report to the plugging record.

F. **Plugging requirements.** Operators must comply with the general plugging requirements in section (c) and the specific technical requirements in sections (d) through (h) of Statewide Rule 14. **Consult Statewide Rule 14; proper plugging is the operator's responsibility.**

lugging Record

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

FORM W-3
Rev. 10/78

API NO. (if available)

1. RRC District

FILE IN DUPLICATE WITH DISTRICT OFFICE OF DISTRICT IN WHICH WELL IS LOCATED WITHIN THIRTY DAYS AFTER PLUGGING

4. RRC Lease or Id. Number

2. FIELD NAME (as per RRC Records)

3. Lease Name

5. Well Number

6. OPERATOR

6a. Original Form W-1 Filed in Name of:

10. County

7. ADDRESS

6b. Any Subsequent W-1's Filed in Name of:

11. Date Drilling Permit Issued

8. Location of Well, Relative to Nearest Lease Boundaries of Lease on which this Well is Located — Feet From ____ Line and ____ Feet From ____ Line of the ____ Lease

12. Permit Number

9a. SECTION, BLOCK, AND SURVEY

9b. Distance and Direction From Nearest Town in this County

13. Date Drilling Commenced

16. Type Well (Oil, Gas, Dry)

Total Depth

17. If Multiple Completion List All Field Names and Oil Lease or Gas ID No.'s

GAS ID or OIL LEASE #	Oil - O Gas - G	WELL #

14. Date Drilling Completed

18. If Gas, Amt. of Cond. on Hand at time of Plugging

15. Date Well Plugged

CEMENTING TO PLUG AND ABANDON DATA:	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7	PLUG #8
19. Cementing Date								
20. Size of Hole or Pipe in which Plug Placed (inches)								
21. Depth to Bottom of Tubing or Drill Pipe (ft.)								
22. Sacks of Cement Used (each plug)								
23. Slurry Volume Pumped (cu. ft.)								
24. Calculated Top of Plug (ft.)								
25. Measured Top of Plug (if tagged) (ft.)								
26. Slurry Wt. #/Gal.								
Type Cement								

28. CASING AND TUBING RECORD AFTER PLUGGING

SIZE	WT. #/FT.	PUT IN WELL (ft.)	LEFT IN WELL (ft.)	HOLE SIZE (in.)

29. Was any Non-Drillable Material (Other than Casing) Left in This Well? ☐ Yes ☐ No

29a. If answer to above is "Yes" state depth to top of "junk" left in hole and briefly describe non-drillable material. (Use Reverse Side of Form if more space is needed.)

30. LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS

FROM	TO	FROM	TO
FROM	TO	FROM	TO
FROM	TO	FROM	TO
FROM	TO	FROM	TO
FROM	TO	FROM	TO

I have knowledge that the cementing operations, as reflected by the information found on this form, were performed as indicated by such information. Designates items to be completed by Cementing Company. Items not so designated shall be completed by Operator.

ignature of Cementer or Authorized Representative

Name of Cementing Company

CERTIFICATE:
I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

REPRESENTATIVE OF COMPANY | TITLE | DATE | Phone A/C NUMBER

IGNATURE: REPRESENTATIVE OF RAILROAD COMMISSION

31. Was Well filled with Mud-Laden Fluid, according to the regulations of the Railroad Commission ☐ Yes ☐ No

32. How was Mud Applied?

33. Mud Weight LBS/GAL

34. Total Depth

Depth of Deepest Fresh Water

Other Fresh Water Zones by T.D.W.R.

TOP	BOTTOM

35. Have all Abandoned Wells on this Lease been Plugged according to R R C Rules? ☐ Yes ☐ No

36. If NO, Explain

37. Name and Address of Cementing or Service company who mixed and pumped cement plugs in this well

Date RRC District Office notified of plugging

38. Names and Addresses of Surface Owner of Well Site and Operators of Offset Producing Leases

39. Was Notice Given Before Plugging to Each of the Above?

FILL IN BELOW FOR DRY HOLES ONLY

40. For Dry Holes, this Form must be accompanied by either a Driller's, Electric, Radioactivity or Acoustical/Sonic Log or such Log must be released to a Commercial Log Service.

☐ Log Attached ☐ Log released to _____ Date _____

Type Logs:

☐ Driller's ☐ Electric ☐ Radioactivity ☐ Acoustical/Sonic

41. Date FORM P-8 (Special Clearance) Filed?

42. Amount of Oil produced prior to Plugging _____ bbls*

* File FORM P-1 (Oil Production Report) for month this oil was produced

RRC USE ONLY

Nearest Field _____

REMARKS _____

Railroad Commission of Texas
Oil and Gas Division

Letter of Credit on Reverse Side

APPLICATION AND LETTER OF CREDIT
For Extension to Statewide Rule 14(b)(2) for Wells NOT Part of an Active Enhanced Recovery Project

E-14LC
Rev. 10/01/87

FINANCIAL ASSURANCE. Applicants for a 14(b)(2) extension must submit a financial assurance to guarantee that the subject well(s) will not have to be plugged with state funds. Complete the letter of credit on the reverse side and submit it as part of this application. Each application for a Rule 14(b)(2) extension and letter of credit must contain only one oil lease or gas well. See F below for blanket letter of credit.

3. **WHERE TO FILE.** File the original and one copy of both the application and letter of credit in the Commission's Austin Office.

Production Allocation/14(b)(2) Section
Oil and Gas Division
Railroad Commission of Texas
P. O. Drawer 12967 - Capitol Station
Austin, Texas 78711-2967

C. **COMPLETION REPORTS.** Applicants for a 14(b)(2) extension must have on file with the Commission oil or gas completion reports—Forms W-2 or G-1—on all wells for which an extension is requested. Each well listed on the letter of credit must have an oil lease or gas well identification number assigned by the Commission.

D. **ESTIMATED COST OF PLUGGING.** The estimated plugging cost for each well is calculated by multiplying the well's total depth by $1.50 a foot. This cost for each well, rounded UP to the nearest whole dollar amount, must be given on the letter of credit. The amount of the letter of credit is the aggregate estimated cost for all wells covered. If the letter of credit is for blanket coverage, the total amount shall not exceed $250,000.

E. **IDENTIFICATION INFORMATION.** All field, lease, and well identifying information given on the letter of credit must be exactly as shown on the Proration Schedule.

F. **BLANKET LETTERS OF CREDIT.** A blanket letter of credit may be submitted to cover more than a single oil lease, gas well, or district, or leases and wells on a statewide basis. Within the boxed area of the letter of credit on the reverse side, complete only No. 1 and No. 2. Across the area for listing wells, place the following statement:

WELLS LISTED ON ATTACHED EXHIBIT A, CONSISTING OF (number) PAGES AND DATED (date)

Complete an Exhibit A, Form E-14EA, and submit it with the application and letter of credit.

For operators having multiple operator numbers, a separate E-14EA must be submitted for each operator number. However, only one letter of credit is required which shall have all operator numbers given in No. 2 on the letter of credit.

G. **LEASE TRANSFER.** A 14(b)(2) extension is NOT automatically transferred when a lease is transferred. A new application for a 14(b)(2) extension must be filed by the new operator before a P-4 can be processed for a lease transfer. The P-4 will not be approved until the application for extension is also approved.

H. **EXTENSION APPROVAL AND EXPIRATION.** You will receive a letter stating whether or not an extension has been granted. An expiration date will be given at that time. Before the extension expires, the Commission will send you a notice so that you may submit a new application. THE EXTENSION EXPIRES 60 DAYS BEFORE THE EXPIRATION DATE OF THE LETTER OF CREDIT.

CERTIFICATION

I certify under penalties prescribed in the Texas Natural Resources Code that the wells listed on the reverse side hereof are in compliance with the following Commission Statewide Rules: Rule 3 (requiring that wells be properly identified), Rule 8 (regarding prevention of pollution), and Rule 13 (requiring that wells be cased, cemented, and capped to prevent leakage or casing failure). I further certify that the information contained in this application is true and correct.

Operator's Name and Address (including city, state, and zip code)			
Signature	Name and title of operator's representative	Date: mo. day yr.	Tel: Area Code Number

• RRC USE ONLY •

Renewal _____ Original _____ Reviewed by _____ Date _____

REMARKS:

Irrevocable Documentary Letter of Credit

TO: Railroad Commission of Texas

Attention: Oil and Gas Division
Production Allocation/14(b)(2) Section

Application on Reverse Side

Gentlemen:

We hereby establish our Irrevocable Documentary Letter of Credit in favor of the Railroad Commission of Texas, Austin, Texas for the account of _____ (operator name), for the aggregate amount of _____ Dollars ($ _____) available by your drafts at sight on the bank when drawn in accordance with the terms and accompanied by the documents listed below:

A. This Letter of Credit is issued in connection with the filing of an application for extension to Statewide Rule 14(b)(2), printed on the reverse side hereof, for plugging the following inactive wells.

1. Operator's Name (As shown on Form P-5, Organization Report)	2. RRC Operator No.	3. RRC District No.	4. County of Well Site
5. Field Name (Exactly as shown on RRC records)		6. Plug Hearing Docket Number (if applicable)	
7. Lease Name		8. Lease Number or Gas Well ID Number	

Well Number	Date Inactive	Depth of Well	Estimated Plugging Cost	Well Number	Date Inactive	Depth of Well	Estimated Plugging Cost
9.				14.			
10.				15.			
11.				16.			
12.				17.			
13.				18.			

B. This Letter of Credit is specifically issued at the request of the operator as guaranty that this fund will be available during the time that the above wells are inactive. We are not a party to, nor bound by, the terms of any agreement between you and the operator out of which this Letter of Credit may arise.

C. Drafts drawn under this Letter of Credit must be accompanied by an affidavit from the Director of Production Allocation or an authorized representative, Oil and Gas Division, Railroad Commission of Texas stating that:

1. Either or both of the following has occurred:
   a. That any well subject to the Letter of Credit is causing or is likely to cause pollution of any ground or surface water in the State or the uncontrolled escape of formation fluids from the strata in which they were originally located; or
   b. That any well has not been maintained in compliance with Statewide Rule 14 relating to plugging.
2. The draft is in the estimated cost of plugging each well, subject to one or both of the occurrences described above.

We will be entitled to rely upon the statements contained in the affidavit and will have no obligation to independently verify any statements contained therein.

Each draft hereunder must be endorsed on the reverse side of this Letter of Credit, and this Letter of Credit must be attached to the last draft when the credit has been exhausted. Drafts may be presented at the office of this bank no later than 2:00 p.m. (local time) on _____ 19 ____ (date), and bear the clause "Drawn under the _____ (Bank name), Bank Letter of Credit No. _____, dated _____."

We hereby engage with the bona fide holders of this draft and/or documents presented under and in compliance with the terms of this Letter of Credit that such draft and/or documents will be duly honored upon presentation to us. Our obligations hereunder shall not be subject to any claim or defense by reason of the invalidity, illegality, or unenforceability of any of the agreements upon which this Letter of Credit is based.

This Documentary Letter of Credit is subject to the "Uniform Customs and Practice for Documentary Credits" (1983 Revision) fixed by the International Chamber of Commerce (Publication #400), when not in conflict with the express terms hereof or with the provisions of Article Five of the Texas Business and Commerce Code.

Bank Name: _____

By: _____

(Name) _____

(Title) _____

(Seal)
ATTEST:

Tel: Area Code Number

Address of Bank:

_____
Assistant Cashier or Cashier

_____

Date: mo day year

Railroad Commission of Texas
Oil and Gas Division

:rformance Bond on Reverse Side

APPLICATION AND PERFORMANCE BOND
For Extension to Statewide Rule 14(b)(2) for Wells NOT Part of an Active Enhanced Recovery Project

E-14PB
Rev. 10/01/87

INANCIAL ASSURANCE. Applicants for a 14(b)(2) extension must submit a financial assurance to guarantee that the subject well(s) will not have to be plugged with state funds. Complete the performance bond on the reverse side and submit it as part of this application. Each application for a Rule 14(b)(2) extension and performance bond must contain only one oil lease or gas well. See F below for blanket performance bonds.

WHERE TO FILE. File the original and one copy of both the application and performance bond in the Commission's Austin Office.

Production Allocation/14(b)(2) Section
Oil and Gas Division
Railroad Commission of Texas
P. O. Drawer 12967 - Capitol Station
Austin, Texas 78711-2967

COMPLETION REPORTS. Applicants for a 14(b)(2) extension must have on file with the Commission oil or gas completion reports—Forms W-2 or G-1—on all wells for which an extension is requested. Each well listed on the performance bond must have an oil lease or gas well identification number assigned by the Commision.

ESTIMATED COST OF PLUGGING. The estimated plugging cost for each well is calculated by multiplying the well's total depth by $1.50 a foot. This cost for each well, rounded UP to the nearest whole dollar amount, must be given on the performance bond. The amount of the performance bond is the aggregate estimated cost for all wells covered. If the performance bond is for blanket coverage, the total amount shall not exceed $250,000.

IDENTIFICATION INFORMATION. All field, lease, and well identifying information given on the performance bond must be exactly as shown on the Proration Schedule.

BLANKET PERFORMANCE BONDS. A blanket performance bond may be submitted to cover more than a single oil lease, gas well, or district, or leases and wells on a statewide basis. Within the boxed area of the performance bond on the reverse side, complete only No. 1 and No. 2. Across the area for listing wells, place the following statement:

WELLS LISTED ON ATTACHED EXHIBIT A, CONSISTING OF (number) PAGES AND DATED (date)

Complete an Exhibit A, Form E-14EA, and submit it with the application and performance bond.

For operators having multiple operator numbers, a separate E-14EA must be submitted for each operator number. However, only one performance bond is required which shall have all operator numbers given in No. 2 on the bond.

LEASE TRANSFER. A 14(b)(2) extension is NOT automatically transferred when a lease is transferred. A new application for a 14(b)(2) extension must be filed by the new operator before a P-4 can be processed for a lease transfer. The P-4 will not be approved until the application for extension is also approved.

EXTENSION APPROVAL AND EXPIRATION. You will receive a letter stating whether or not an extension has been granted. An expiration date will be given at that time. Before the extension expires, the Commission will send you a notice so that you may submit a new application. THE EXTENSION EXPIRES 60 DAYS BEFORE THE EXPIRATION DATE OF THE PERFORMANCE BOND.

CERTIFICATION

I certify under penalties prescribed in the Texas Natural Resources Code that the wells listed on the reverse side hereof are in compliance with the following ommission Statewide Rules: Rule 3 (requiring that wells be properly identified), Rule 8 (regarding prevention of pollution), and Rule 13 (requiring that wells be sed, cemented, and capped to prevent leakage or casing failure). I further certify that the information contained in this application is true and correct.

Operator's Name and Address (including city, state, and zip code)			
Signature	Name and title of operator's representative	Date: mo. day yr.	Tel: Area Code Number

• RRC USE ONLY •

Renewal _____ Original _____ Reviewed by _____ Date _____

REMARKS:

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

Performance Bond

Application on Reverse Side

THE STATE OF TEXAS, COUNTY OF _____

WHEREAS, the grant of an extension to the well-plugging requirements of Statewide Rule 14(b)(2), 16 TAC Section 3.14, hereinafter referred to as Rul 14(b)(2), and Sections 91.101 and 85.202 of the Texas Natural Resources Code, is conditional upon submittal of an acceptable bond;

WHEREAS, the Principal listed below is applying for an extension to Rule 14(b)(2) of the Statewide Rules of the Oil and Gas Division which requires th proper plugging of the following inactive wells in accordance with the requirements of that Rule by submitting the application printed on the reverse sid hereof:

1. Operator's Name (As shown on Form P-5, Organization Report)	2. RRC Operator No.	3. RRC District No.	4. County of Well Site
5. Field Name (Exactly as shown on RRC records)		6. Plug Hearing Docket Number (if applicable)	
7. Lease Name		8. Lease Number or Gas Well ID Number	

Well Number	Date Inactive	Depth of Well	Estimated Plugging Cost	Well Number	Date Inactive	Depth of Well	Estimated Plugging Cost
9.				14.			
10.				15.			
11.				16.			
12.				17.			
13.				18.			

We, _____ (operator name) as Principal, and _____ as Surety, duly authorized and qualified to do business in the State of Texas, are held and firmly bound unto the State of Texas in the sum _____ Dollars ($_____) payable at Austi Travis County, Texas, and for the payment of which, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors an assigns, jointly and severally, firmly by these presents.

This bond is conditioned that if the wells listed above which are the subject of this bond, during the term of this bond, are maintained in full complian with the following requirements, then the Principal and Surety are relieved of their obligation to pay the bond amount to the State:

1. The wells shall be maintained in compliance with Rule 14 by either properly plugging the wells, restoring the wells to beneficial use, or obtaining continuing the Rule 14(b)(2) extension for the wells; and
2. The wells shall be maintained so as to prevent the pollution of any ground or surface water in the State or any uncontrolled escape of formatio fluids from the strata in which they were originally located.

If any well subject to this bond is not maintained in compliance with the conditions listed above, then the estimated cost for the plugging of that we (an amount otherwise impossible to determine as to an exact amount) shall be paid to the Railroad Commission at Austin, Texas, within thirty days aft receipt of written demand therefor, which demand shall be mailed by registered or certified U.S. mail to the addresses shown below, and the bond sha remain in full force and effect for the remaining wells. The State, through its employees or agents, may remedy any such non-compliance without waivi any of its rights to seek reimbursement pursuant to this bond for its actual costs up to the amount listed as the estimated cost of plugging.

The State of Texas shall have the right to sue on and otherwise enforce the obligations of this bond without first resorting to or exhausting its remedi against the properties and assets of the principal.

This bond shall expire _____, 19 ____ (date), or upon issuance of written notification to the surety fro the Director of Production Allocation or an authorized representative that the wells have either been properly plugged, have been restored to benefici use, or that the wells have been transferred to another operator who has obtained a valid Rule 14(b)(2) extension for the wells. Principal and Surety m also be relieved of their obligations to pay to the State part or all of the bond amount by written agreement between the Railroad Commission of Texa Principal, and Surety.

If the bond amount is not paid in accordance with the terms of this bond and if judgment for any part of the bond amount is awarded through action of t Attorney General in bankruptcy, probate, or any other court, then the State shall be entitled to court costs and reasonable attorney's fees awarded by t court. Surety's liability for such costs and fees shall not be limited by the penal amount of this bond.

This bond is not effective until the day an extension is granted by the Railroad Commission of Texas pursuant to Rule 14(b)(2), but Surety hereby waiv notice of the granting of such extension.

IN TESTIMONY WHEREOF, said PRINCIPAL has hereunto subscribed his or their names or has caused this instrument to be signed by its duly authoriz officers and its corporate seal to be affixed this _____ day of _____ 19 ____.

IN TESTIMONY WHEREOF, said SURETY has caused this instrument to be signed by its duly authorized officers and its corporate seal to be affixed th _____ day of _____ 19 ____.

_____
PRINCIPAL

(Seal)

By _____
NAME AND TITLE

_____
SURETY (ATTACH POWER OF ATTORNEY)

(Seal)

By _____
NAME AND TITLE

_____
SURETY'S FULL MAILING ADDRESS

Railroad Commission of Texas
Oil and Gas Division

APPLICATION
For Extension to Statewide Rule 14(b)(2) For Wells Associated with an **Active Enhanced Recovery Project**

E-14ER
Rev. 10/01/87

Where to file. File the original and one copy of the application plus one set of the required attachments (see below) in the Commission's Austin office.

Production Allocation/14(b)(2) Section
Oil and Gas Division
Railroad Commission of Texas
P. O. Drawer 12967 - Capitol Station
Austin, Texas 78711-2967

3. **Attachments.** The following MUST BE attached as part of the application:
   1. Identify the wells by lease name, oil lease number or gas identification number, well number, field, county and district. State the UIC Project Number or the Commission Order Numbers, if applicable, granting authority to inject into injection wells within the project area.
   2. Attach a copy of any completed Form H-1 for a well within the project area which is representative of the reservoir's current status. The attachments required by Form H-1 do not have to be resubmitted.
   3. Attach a statement describing the current status of the project, the date the wells were last produced or utilized, the plans for using the wells, the estimated cost of plugging, and the length of time for which an extension is requested.
   4. Attach a copy of the current Form W-2 or G-1 showing the current well completion.
   5. Attach a plat showing the location of the wells.

Lease Transfer. A 14(b)(2) extension is NOT automatically transferred when a lease is transferred. A new application for a 14(b)(2) extension must be filed before the P-4 can be processed for a lease transfer. The P-4 will not be approved until the application for extension is also approved.

Extension Approval and Expiration. You will receive a letter stating whether or not an extension has been granted. An expiration date will be given at that time. Before the extension expires, the Commission will send you notice so that you may submit a new application. Failure to obtain and maintain an extension could result in the initiation of the appropriate enforcement action for violations of Rule 14.

Additional Information. Your application will be evaluated to ascertain whether the wells will be part of an active waterflood or enhanced recovery project and whether the wells could cause pollution if the extension is granted. Any information which might support your request should be included.

CERTIFICATION

I certify under penalties prescribed in the Texas Natural Resources Code that the wells listed as part of this application for 14(b)(2) extension are in mpliance with the following Commission Statewide Rules: Rule 3 (requiring that wells be properly identified), Rule 8 (regarding prevention of pollution), d Rule 13 (requiring that wells be cased, cemented, and capped to prevent leakage or casing failure). I further certify that the information contained in this plication is true and correct.

Operator's Name and Address (including city, state, and zip code)			RRC Operator No.
Signature	Name and title of operator's representative	Date: mo. day yr.	Tel: Area Code Number

• RRC USE ONLY •

Renewal _____ Original _____ Reviewed by _____ Date _____

REMARKS:

Operator Name _____

Operator No. _____

District No. _____ Oil ____ , or Gas ____

Page ____ of ____ READ INSTRUCTIONS ON BACK

EXHIBIT A

To Blanket Financial Assurances
for Statewide Rule 14(b)(2) Extensions

Railroad Commission of Texas
Oil and Gas Division

Rev. 10/01/87

Complete this section on FINAL page of Exhibit A
Name of person preparing Exhibit A
Title
Phone No. date

FIELD NAME	LEASE NAME	LEASE/ID NUMBER	WELL NUMBER	API NUMBER	COUNTY	DATE INAC-TIVE MO/YR	TOTAL DEPTH OF WELL	ESTIMATED PLUGGING COST	PLUG DOCKET (*)

INSTRUCTIONS

Form E-14EA: Exhibit "A"
to Blanket Performance Bond or Letter of Credit
for Statewide Rule 14(b)(2) Extensions

1. Exhibit A, which identifies all the wells to be covered by the Application and Blanket Performance Bond (Form E-14PB) or Application and Letter of Credit (Form E-14LC) and is to be attached to the appropriate form, is to be submitted in duplicate. Within the boxed area of the financial assurance, complete only Nos. 1 and 2, and across the area for listing wells, place the following statement:

   WELLS LISTED ON ATTACHED EXHIBIT A, CONSISTING OF (number) PAGES AND DATED (date)

   Updates for adding additional wells should normally be submitted quarterly; the Exhibit A accompanying the supplemental blanket bond or letter of credit is to list ONLY those wells being added or deleted. Wells that are being added should be on one Exhibit A marked "Additions"; wells being deleted should be on another Exhibit A marked "Deletions". These supplemental financial assurances should be signed by both you and the bonding company or surety, and they should make reference to the original financial assurance.

2. Wells listed must be separated by: a. district b. oil or gas
   then grouped alphabetically by: a. field name b. lease name

   For operators having multiple operator numbers, a separate E-14EA must be prepared for each operator number. A single financial assurance may be used to cover the listings for all numbers. All operator numbers are to be shown in No. 2 of the blanket financial assurance.

3. Oil lease numbers must be five digits, gas ID numbers must be six digits. Use zeros only if they are part of the assigned numbers; do not use dummy zeros.

4. All identification information (lease names, numbers, etc.) shall be identical to that shown on the proration schedule. Refer to the chart below for positioning of well numbers.

5. If a well has not been assigned an API number, enter two dashes in that column.

6. The estimated plugging cost for each well is calculated by multiplying the well's total depth by $1.50 a foot. Each well's plugging cost must be given in WHOLE dollars; if necessary, round UP to tne next whole dollar.

7. If there is a docketed hearing for the well, denote with an asterisk in the last column.

8. On the final page of Exhibit A, the name, title, and phone number of the person preparing the document is to be shown in the box below the form number, along with the date of preparation.

For information relating to schedule designations, call the supervisor for oil (512-463-6742) or the supervisor for gas (512-463-6975). For information relating to 14(b)(2) extensions, call the Production Allocation Section (512-463-6762).

WELL NUMBERS

Position	Requirement	Purpose	Example
1	Alphabetic, Numeric, or Blank	Tract Designation or high well number	A 1296
2, 3 & 4	Numeric or Blank	Basic well number	1 146
5	Alphabetic or Blank	Replacement well code	122A 1R
6	Alphabetic or Blank	Multiple completion designation as per RRC schedule or coding system	10T 129C

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

APPLICATION FOR FUTURE RE-ENTRY OF INACTIVE WELL BORE AND 14(b)(2) EXTENSION PERMIT

W-1X
(4/88)

FEE OF $100 PER WELL MUST ACCOMPANY APPLICATION

READ INSTRUCTIONS ON BACK

1. Operator name (exactly as shown on P-5 Organization Report)	2. Operator P-5 no.	3. RRC district no.	4. Page ____ of ____
5. Operator address (including city, state, and zip code)			

6. Individual well information (identification must be exactly as shown on Proration Schedule; for well number spacing, see below)

Field Name / Lease Name	Oil Lease or Gas ID No.	Well Number*	API No. 42-	County	Date Inactive mo/yr	Current 14(b)(2) Ext. App. or Docket No.
(1)						
(2)						
(3)						
(4)						
(5)						
(6)						
(7)						
(8)						
(9)						
(10)						

7.a. Number of wells listed on this W-1X application form [ ] b. Total number of wells listed on this and any attached W-1X application forms [ ] X $100 = Payment due $[ ]

CERTIFICATION: I certify under penalties prescribed in the Texas Natural Resources Code that the identified wells are in compliance with the conservation laws of the State of Texas, and all rules, regulations, and orders of the Railroad Commission of Texas; I further certify that the information given in this application is true, complete, and correct; additionally, that the identified wells will be re-entered at a future date or otherwise kept in compliance with the provisions of Statewide Rule 14.

SIGNATURE _____ NAME (Print or Type) _____

TITLE _____ PHONE (____) _____ DATE _____

* To ensure prompt processing of this application, well numbers and letters must be positioned and spaced exactly as shown on the Proration Schedule. Use the chart below for reference.

WELL NUMBERS

Position	Requirement	Purpose	Examples
1	Alphabetic, Numeric, or Blank	Tract designation or high well number	A___1___ 1296___
2, 3 & 4	Numeric or Blank	Basic well number	___1___ _146___
5	Alphabetic or Blank	Replacement well code	_122A_ ____1R_
6	Alphabetic or Blank	Multiple completion designation as per RRC schedule or coding system	___10_T _129_C

Approved by

Date

- RRC USE ONLY -

Instructions

FORM W-1X: APPLICATION FOR FUTURE RE-ENTRY OF INACTIVE WELL BORE AND 14(b)(2) EXTENSION PERMIT

REFERENCE: STATEWIDE RULE 14

FEE OF $100 FOR EACH WELL LISTED MUST ACCOMPANY APPLICATION

WHO IS TO FILE

An operator may file a Form W-1X to support an application for a Statewide Rule 14(b)(2) extension instead of filing a performance bond or letter of credit. Statewide Rule 14(b)(2) extensions are required for the following:

- a gas well that has been incapable of production for a period of one year or more;
- an oil well that has been inactive for a period of one year or more; or
- a well, uncompleted but cased, on which drilling has ceased for a period of one year or more.

WHAT AND WHERE TO FILE

File an **original only** of the completed Form W-1X with the payment covering $100 for each well listed on the application with:

The Railroad Commission of Texas
Oil and Gas Division - 14(b)(2) Section
P. O. Drawer 12967 - Capitol Station
Austin, Texas 78711-2967

Payment may be made by check or money order, payable to "The State Treasurer of Texas." The fee is non-refundable by statute.

MULTIPLE FORM APPLICATIONS

If permits are requested for more than ten wells, attach additional W-1X forms. When a multiple form application is filed, complete Item 7B and the certification area on the first form only. All other items must be completed on each form.

INDIVIDUAL WELL INFORMATION

In Item 6 list each well with identification exactly as shown on the Proration Schedule. The spacing and positioning of the characters and/or numbers of the well number is critical in ensuring the prompt processing of the application. Completion papers (Form W-2 for oil wells and Form G-1 for gas wells) must be on file with the Commission for each well that is listed; if an oil lease number or gas ID number has not yet been assigned, write "NA". If a listed well currently has a 14(b)(2) extension based on a bond or letter of credit or participation in an active enhanced recovery project, include its application number, if available; an approved W-1X future re-entry permit for that well will take the place of any 14(b)(2) extension previously granted. If a listed well is currently under a plugging docket, include its docket number.

CHANGE OF OPERATORS

If a well that has been granted a future re-entry permit is to be transferred to another operator, the new operator must either file a W-1X with fee payment in its name or otherwise bring the well into compliance with the provisions of Statewide Rule 14(b)(2). For prompt processing, the new P-4 (Producer's Transportation Authority) should be attached to the W-1X. A P-4 cannot be processed on a change of operators until the new W-1X has been filed and approved, or the well otherwise brought into compliance with the provisions of Rule 14(b)(2).

RENEWALS

Approximately 30 days before the permit expiration date, the operator will be sent a renewal notice from the Commission.

SEE ALSO STATEWIDE RULES 3, 8, AND 13

RAILROAD COMMISSION OF TEXAS
Oil and Gas Division

INFORMATION ON STATEWIDE RULE 14(b)(2) EXTENSIONS

Statewide Rule 14(b)(2) provides that plugging operations in each dry or inactive well must be commenced within a period of 90 days after drilling or operations have ceased. If, however, drilling or operations cease on or after January 1, 1986 but before January 1, 1989, that period is extended to one year. Plugging operations shall proceed with due diligence until completed.

If the well is not a pollution hazard, a reasonable extension of time may be granted if some form of financial assurance is submitted or if a viable plan for utilization is presented to ensure that the Commission will not have to plug the well with State funds. Applications for the various types of extensions are attached. Additional copies are available from the Commission's Austin and district offices. All applications with one copy should be submitted to

Production Allocation/14(b)(2) Section
Oil and Gas Division
Railroad Commission of Texas
P. O. Drawer 12967 - Capitol Station
Austin, Texas 78711-2967

The provisions of Rule 14(b)(2) apply to all inactive wells (shut-in gas wells showing pressure on the G-10 will not be considered "inactive" as long as the Forms G-10 and P-2 are filed when required). In order to obtain an extension, completion papers, that is, the W-2 for an oil well or G-1 for a gas well, must be on file with the Commission, and the well must be in compliance with Commission Statewide Rules.

Periodic testing or reporting of data regarding the casing integrity of the well may also be required as a condition of obtaining or continuing the 14(b)(2) extension where conditions indicate that there is a possibility that the well may leak oil, gas, mineralized water, or oil or gas waste. You will be notified by letter if casing integrity testing or information will be required. If it is determined that the well does not have mechanical integrity, the 14(b)(2) extension may be cancelled and, if a financial assurance has been submitted, the Commission may initiate collection of the performance bond or letter of credit.

You will receive a letter stating whether or not an extension has been granted. An expiration date will be given at that time. Before the extension expires, the Commission will send you a notice so that you may submit a new application. The extension expires 60 days before the expiration date of the bond or letter of credit.

FINANCIAL ASSURANCES

Applications for Rule 14(b)(2) extensions for wells which are not associated with an active enhanced recovery project must be convered by a letter of credit or performance bond. Such a financial assurance may cover a single oil lease or gas well, or if a blanket letter of credit or performance bond is used, it may cover more than one oil lease, gas well, or district, or leases and wells on a statewide basis.

The amount of the financial assurance is to be the total of the estimated plugging costs for all wells covered. Blanket financial assurances have a maximum of $250,000 or the aggregate plugging costs of all wells covered, whichever is less. The estimated plugging cost is obtained by multiplying the total depth of each well by $1.50 per foot.

Applications are to be submitted on either Form E-14PB for performance bonds or Form E-14LC for letters of credit. In addition, if a blanket financial assurance is being submitted, Form E-14EA with a listing of covered wells must also be attached.

ENHANCED RECOVERY PROJECTS

Applications for 14(b)(2) extensions on wells which are associated with active waterflood and enhanced recovery projects are to be made on Form E-14ER. A letter of credit or performance bond will not generally be required unless there is some question about the future use of a particular well. The application, however, requires more detailed information regarding the future use of the well than is required for wells which are subject to the financial assurance requirement. And, it must be approved by the Underground Injection Control Section.

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION

Form P-1
Rev. 9/79

APPLICATION OF LANDOWNER TO CONDITION AN ABANDONED WELL FOR FRESH WATER PRODUCTION

1. Field Name (as per RRC Records or Wildcat)	2. RRC District
3. Operator	4. County
5. Lease Name(s) and RRC Lease Number(s)	6. Well Number
7. Location (Section, Block, and Survey)	
8. If Operator has changed within last 60 days, give former Operator and his Address.	
9. If Workover, give former Field (with Reservoir).	10. Is this an Abandoned Producer or a Dry Hole?
11. Type of Electric or other Log run.	12. Completion Date of Well.

13. Proposed Plugback Depth of Well for Fresh Water Production (feet)	14. Base of Usable Quality Water	15. Date of TWDB Letter

INSTRUCTIONS:

1. The completed original of this form shall be recorded in the county where the land lies (see reverse side), and one certified copy, showing the recording data, shall be filed in the Railroad Commission District Office.
2. After Commission approval of this form in Austin, an approved copy of the form will be mailed to the landowner, operator, and Railroad Commission District Office.
3. After plugging back the well, the operator shall file one copy of this Commission approved form with the two copies of Form W-3, Plugging Record, in the Railroad Commission District Office.

The undersigned operator and landowner hereby make application for the operator to be authorized to plug the above well in such manner that the well bore be left open to the above depth so that the landowner may condition and equip such well bore to that depth for production of fresh water.

The undersigned landowner further obligates himself, his heirs, successors and assignees, as a condition to the Commission's approval of this application, to complete the plugging of the well if and when it is abandoned as a fresh water well, or when, because the condition of the well is found to constitute a menace to any oil, gas, or fresh water strata in that area, such plugging is ordered by the Commission.

The authority to complete this well in the manner prescribed shall not be construed as authority for any party to produce fresh water from the well.

I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.

LANDOWNER

Date

Signature of Landowner

Name of Landowner (type or print)

Street Address or P.O. Box

City, State Zip Code

Telephone: Area Code

OPERATOR

Date

Signature of Operator or Authorized Representative

Name of Person and Title (type or print)

Operator

Street Address or P.O. Box

City, State Zip Code

Telephone: Area Code

RECORDING DATA:

Recorded in Book

Page

Deed records of

County, Texas

RAILROAD COMMISSION APPROVAL:

Date

Signature of Commission Representative, Austin Office

Distribution by RRC after Approval:
1 – Landowner
1 – Operator
1 – RRC District Office
1 – RRC Files, Austin

THE STATE OF TEXAS §
COUNTY OF _____ §

BEFORE ME, the undersigned authority, on this day personally appeared _____ , referred to as landowner in the instrument attached hereto, and being by me duly sworn acknowledged to me that he executed said instrument for the purposes and consideration therein expressed.

_____
Notary Public in and for

_____County, Texas

Recorded this _____ day of _____ 19 _____

_____ Clerk