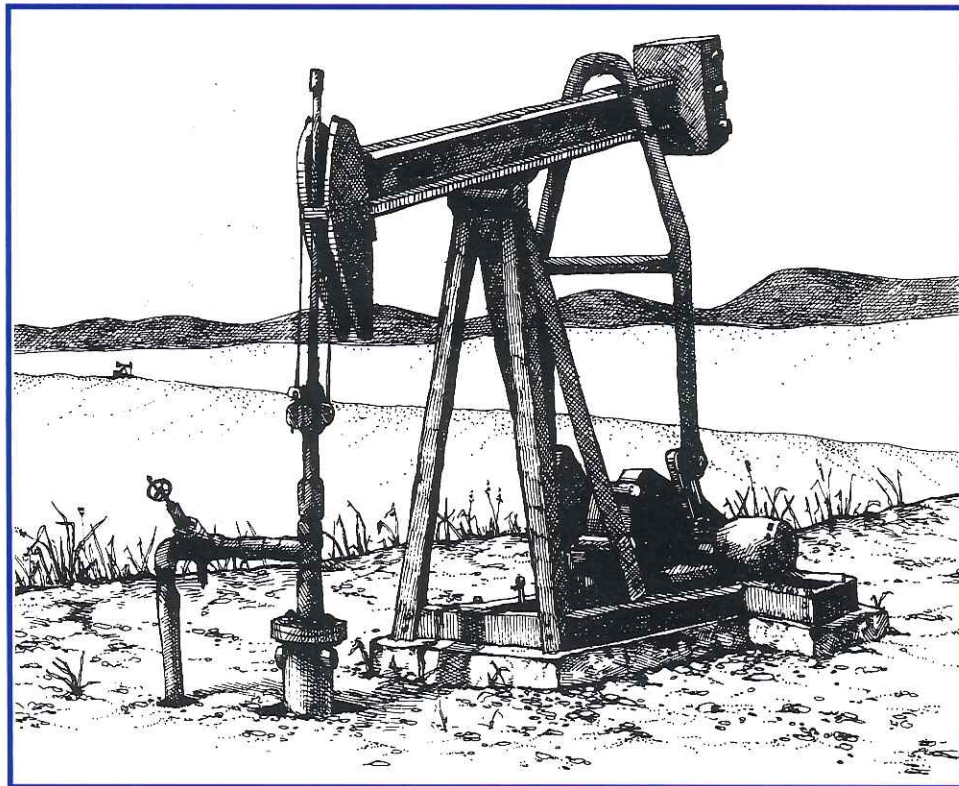


Produce *or* Plug

*The Dilemma over the Nation's
Idle Oil and Gas Wells*



Interstate Oil and Gas Compact Commission
Ad Hoc Idle Well Committee

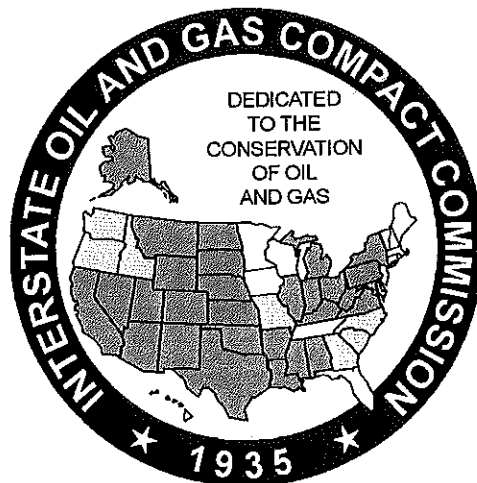
December 1996

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PRODUCE OR PLUG

The Dilemma Over the Nation's Idle Oil and Gas Wells



**A Report of the
Interstate Oil and Gas Compact Commission
Ad Hoc Idle Well Committee**

December 1996

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AD-HOC IDLE WELL COMMITTEE MEMBERSHIP

<u>Member</u>	<u>Affiliation</u>	<u>City and State</u>
State Representatives		
James E. Erb, Chairman	Department of Environmental Protection	Harrisburg, PA
James T. Champion	Department of Conservation	Sacramento, CA
Jose S. Mayorga	Railroad Commission of Texas	Austin, TX
Michael W. Schmidt	Oklahoma Corporation Commission	Oklahoma City, OK
Michael "Matt" Steen	Department of Mines & Minerals	Lexington, KY
Wesley D. Norton	Oil & Gas Division	Bismark, ND
Federal Observers		
Bill Hochheiser	U.S. Department of Energy	Washington, DC
Nancy Johnson	U.S. Department of Energy	Washington, DC
Rudi Beier	U.S. Department of the Interior	Washington, DC

I. EXECUTIVE SUMMARY

The first national study of idle wells garnered a lot of attention when it was released, showing the nation's inventory of idle wells had reached nearly a quarter million.

Now, almost four years later, this report updates the 1992 benchmark study and reveals that approximately 285,000 wells are idle, an increase of 70,000 over the total reported in 1992. While this increase can be attributed primarily to new, more refined estimates, rather than an increase in the number of idle wells, clearly the situation has not improved.

For the first time, however, the Interstate Oil and Gas Compact Commission (IOGCC) presents policy makers with a comprehensive picture of idle wells under state jurisdiction. In addition to state-by-state statistics, this report carries a separate section with information provided by the U.S. Department of the Interior's Bureau of Land Management regarding idle wells on public lands and, in conjunction with the Bureau of Indian Affairs, on the majority of Indian lands.

Every well drilled will eventually reach the end of its productive life, at which point plugging is the appropriate and environmentally sound action. However, the vast majority of the wells in this survey are idle, not because their resource has been depleted, but because they are unprofitable to operate due to depressed prices and ever-increasing production and environmental compliance costs. Most do not represent an environmental threat, and many are potential producers that can provide economic contributions to states and the nation through continued production of domestic oil and gas. Idle wells, if plugged prematurely, could result in the permanent loss of large quantities of domestic oil and gas, which would quickly be replaced by imported oil and gas.

It is difficult to estimate the total production potential from U.S. idle wells and impossible to generalize because there are many states with very different situations. For instance, the average daily marginal oil well production in nine states (Kentucky, Louisiana, Missouri, New York, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia) is less than one barrel, while the national average production from marginal oil wells is 2.1 barrels per day.

However, if each of the 107,000 oil wells that are idle with state approval were returned to production at an average of 1 barrel per day, it would represent a two percent increase in domestic production. Lifetime production from these wells could total 3.2 billion barrels with conventional recovery techniques, with an additional 620 million barrels possible through enhanced recovery.

Eight states (Illinois, Indiana, Louisiana, Maryland, Missouri, New York, Ohio and Tennessee) have average production from marginal gas wells that is less than 10 thousand cubic feet (Mcf) per day, while the national average daily production per marginal gas well is 17.5 Mcf. Assuming gas wells idle with state approval could produce an average of 10 Mcf per day, the resulting increase of 275,000 Mcf per day could be significant for some states.

States have long recognized the economic potential of many idle wells. In fact, this study found that 150,000 of the nation's idle wells (53 percent) are idle with the approval of and oversight by state regulators. Through farsighted, flexible regulations, states have acted aggressively with innovative programs that help preserve the integrity of the wellbore and, therefore, access to the resource while protecting the environment. For example, at least 10

states provide incentives ranging from waiving permit application fees to severance tax exemptions for operators that bring previously idle wells back into production. One of the best examples comes from Texas, the state with the largest number of idle wells. Since adoption of the Three-year Inactive Wellbore Initiative in 1993, more than 5,700 idle wells were returned to production. The state estimates that these wells have an annual production value of more than \$575 million, resulting in an additional \$1.67 billion in economic activity.

State programs have had documented successes in returning wells to production. By focusing on long-term benefits rather than short-term tax collections, states are creating new jobs and generating sales tax and royalty payment offsets. Through partnerships with industry and landowners, many idle wells have been returned to production. Still, state statistics show that idle wells account for 22 percent of the unplugged wells (currently producing or idle). Section IV of this report discusses the many incentives in use or under consideration in states.

While many idle wells represent the potential for economic development, many others represent potential liability. Orphan wells — wells for which the operators have gone out of business or are insolvent — represent five percent of the idle wells. Plugging of all the nation's orphan wells could cost as much as \$342.9 million. These figures may somewhat understate the problem, since they do not address the fact that many of the existing idle wells may eventually become orphaned, thus increasing the states' plugging liability. Some older producing areas, particularly Appalachia, face a significant problem in addressing a large number of idle wells with limited state resources. However, many states have programs that stretch plugging funds by identifying and assigning a high priority to problem wells. Section III-C discusses plugging funds and well-plugging authorization in the states.

In summary, this report both defines the problem and identifies actions for dealing with the nation's 285,000 idle wells. Fifteen specific recommendations regarding idle wells have been identified and discussed in Section VI. The recommendations support three basic concepts: (1) wells should be kept producing as long as possible; (2) wells that pose a threat to the environment or have reached their limit of usefulness should be plugged properly; and (3) regulatory agencies should maintain a high level of awareness concerning idle wells.

Many of the recommendations are also embodied in the states' oil and gas policy developed by the IOGCC. The focus of this effort is to redirect energy policy to the domestic arena, while addressing the vastly different challenges faced in individual states. Principal proposals include a heightened research and development effort and the creation of a level field of competition for U.S. energy production. For example, oil and gas exploration and production technology receives less than five percent of the federally funded energy research budget, while oil and gas supplies more than 60 percent U.S. energy consumption. New technology may permit the recovery of billions of barrels of oil that would otherwise be left behind.

It is the IOGCC's hope that some day, a report on idle wells will be unnecessary. The ultimate goal for states is to have every well productive for as long as possible, while ensuring wells that have outlived their usefulness or threaten the environment are plugged and abandoned.

The IOGCC wishes to acknowledge the participating states not only for providing the data that forms the core of this report, but also for their creative efforts to turn many idle wells from liabilities into assets. The IOGCC also acknowledges the dedicated work of the Ad Hoc Idle Well Committee members and observers and the funding by the U.S. Department of Energy that helped make this report possible.

II. INTRODUCTION

In 1991, the U.S. Department of Energy (DOE) requested that the Interstate Oil and Gas Compact Commission (IOGCC) conduct a study to determine the status of idle wells in the United States. The purpose of this study was 1) to determine the oil and gas resources that may be available from these wells (both as primary producers and for use in enhanced recovery operations), and 2) to encourage states to exchange ideas or approaches being used to address idle wells. The landmark study, *A Study of the Idle Oil and Gas Wells in the United States*, was published in 1992.

In mid-1995, the IOGCC and the U.S. Department of Energy decided to update the 1992 report. The IOGCC formed an ad-hoc Idle Well Committee to survey the states, update information, and prepare a report of its findings. The committee gathered updated information from the states and supplemented it with information from the U.S. Department of the Interior, Bureau of Land Management, to develop a national picture of the idle well issue. This report represents the results of the Idle Well Committee's effort.

Although the terminology used by individual states varies, for the purposes of this report, an idle well is defined as:

1. A well that is not producing or injecting, and has received state approval to remain idle (sometimes known as a temporarily abandoned well);
2. A well that is not producing or injecting, has not received state approval to remain idle, and for which the operator is known and solvent; or
3. A well that is not producing or injecting, has not received state approval to remain idle, and for which the operator is unknown or is not solvent (also known as an orphan well).

This definition for idle wells varies slightly from that used in the first idle wells study. In the 1992 study, the definition attempted to limit the wells in each category to those drilled after the creation of the regulatory authority in each state. In many states, however, pre-regulatory wells may account for the largest share of wells in the latter two categories. Careful examination of the data provided by the states in 1992 indicates that most states could not segregate pre-regulatory wells and thus 1992 responses were actually more consistent with the definitions employed for this report.

The questionnaire for this updated report, sent to the oil and gas producing states, requested information on a range of topics to provide insight into state programs addressing idle wells. States' responses can be summarized as follows:

- ◆ Statutory authority. All states indicated adequate authority to address idle wells.
- ◆ Security or financial assurance. All but one state with current oil or gas production require some form of security or financial assurance. The methods and amounts vary among the states, but financial assurance is required on most wells to ensure proper plugging and abandonment of oil and gas wells. Current amounts of financial security

held by some states may be insufficient to adequately cover the full plugging liability represented by idle wells.

- ◆ Plugging funds. A large percentage of states have established plugging funds to assure that wells for which no or insufficient financial assurance exists are properly plugged and abandoned. Currently, six states – Kentucky, Kansas, Pennsylvania, Illinois, Louisiana, and Texas – each have more than 1,000 wells waiting to be plugged with state funds. Nationwide, over 37,000 wells are waiting to be plugged with state funds.
- ◆ Approval procedures and technical requirements. Most states require regulatory approval for wells to remain idle beyond an initial short period. This approval is typically based on evidence that the well has future utility. In many states, approval to remain idle must be periodically renewed, and renewal often requires that an integrity test be performed on the well.
- ◆ Data management and well tracking. Data management capabilities of the states vary, and these capabilities have an impact on the ability to identify and monitor idle wells. In many states, production and injection reports are evaluated to identify idle wells; other states lack either the authority or the data management capability to use this method.
- ◆ Salvage value of orphan wells. Most states can salvage any lease equipment or hydrocarbons left in storage tanks on the lease, and use the salvage value to offset the cost of state-funded plugging.
- ◆ Pre-regulatory wells. Between 790,000 and 1.04 million wells may have been drilled prior to formal regulatory authority being established in producing states. Four states – Kansas, Ohio, Pennsylvania, and Texas – report having more than 100,000 pre-regulatory wells each. Although the formal regulatory authority was not established, some requirements did apply to these wells, and most have long ago been plugged and abandoned. With a few exceptions, states now have jurisdiction over these pre-regulatory wells.
- ◆ Energy and environmental concerns. Wells idle with state approval represent potential production, state revenues, and economic benefits, as demonstrated by the recent success of programs in Louisiana and Texas. The environmental risk posed by idle wells is variable, based on wellbore and subsurface conditions. Most state programs address this variable risk, and require periodic demonstration of mechanical integrity. The states conclude that idle wells regulated under most current state programs pose minimal environmental risk.
- ◆ Incentives and innovative programs. Several states have enacted tax incentives to prolong production from marginal (low-volume, marginally economic) wells, capture the economic benefits of this continued production, and prevent these marginal wells from becoming idle for economic reasons. Several states have also instituted severance tax reductions for idle wells placed back into production. Several states have established innovative programs for the plugging of orphan wells, remediation of orphan sites, and alternative use of non-polluting, mechanically sound wells scheduled for plugging.

As part of the survey, states were asked to provide well statistics, including wells currently producing or injecting, wells previously plugged and abandoned, and total wells drilled,

as well as the number of wells that fall within the three categories of idle wells described on page 3. These statistics are summarized in the table inset at right. As shown in the pie chart below, of all wells drilled, more than half (55 percent) have been plugged and abandoned. Another 35 percent are still engaged in production of oil and gas, either as producing wells or as injection/disposal wells serving production operations. Only 10 percent of wells are currently idle, including all three categories of idle wells discussed in this report.

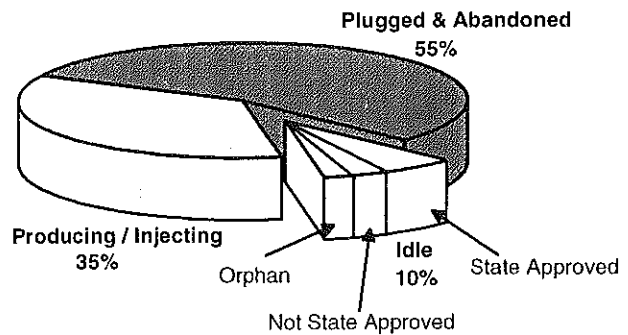
Since the 1992 IOGCC idle well report, the reported number of idle wells has increased from 215,000 to approximately 285,000, as illustrated in the bar chart on this page. While the number of reported wells with state approval to remain idle has stayed relatively constant at slightly more than 150,000, the number of reported idle wells without state approval for which the operator is known and solvent has increased 289 percent, from approximately 18,000 to more than 70,000, and the number of reported orphan wells (no known operator or operator insolvent) has increased from approximately 50,000 to 63,500. These increases do not represent actual increases in the numbers of these wells. They can be attributed to new estimates and updated information now available from the states. For example, some states provided estimates in categories where they made no report in 1992. Readers should be aware that, other than idle wells that have received state approval to remain idle, these figures are estimates provided by state personnel based on their knowledge of the industry within their state.

Of the 285,000 idle wells throughout the U.S., around 53 percent are idle with state approval. While another 25 percent lack approval, the operator is known and some security for the well exists. The map on page 6 illustrates the distribution by state of idle wells (all three categories: idle with state approval, idle without state approval

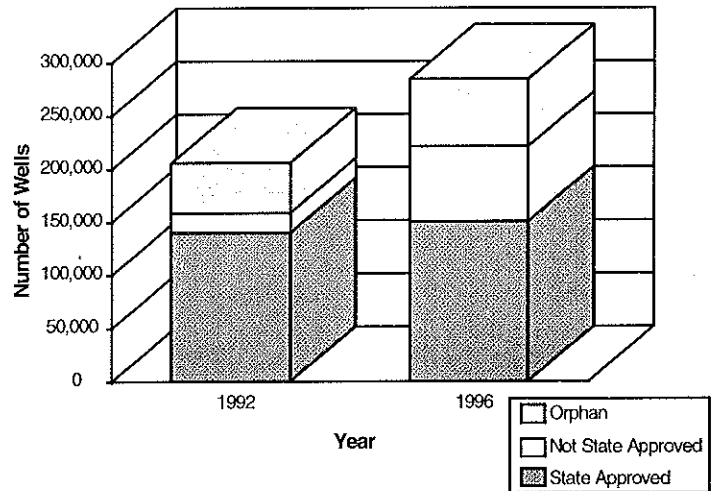
Well Category	1996 Study ¹
Total wells drilled under state regulation	2,669,045
Producing/injecting wells	1,001,857
Plugged and abandoned wells	1,551,724
Wells converted from producing to Class II Injection wells	126,610
Wells idle with state approval	150,669
Wells idle without state approval, operator known	70,472
Wells idle without state approval, operator unknown or insolvent (orphan)	63,438

¹ Data as of December 31, 1994 for most states, and more recent for some states. Categories do not sum to total wells drilled, see Section III-H for reasons.

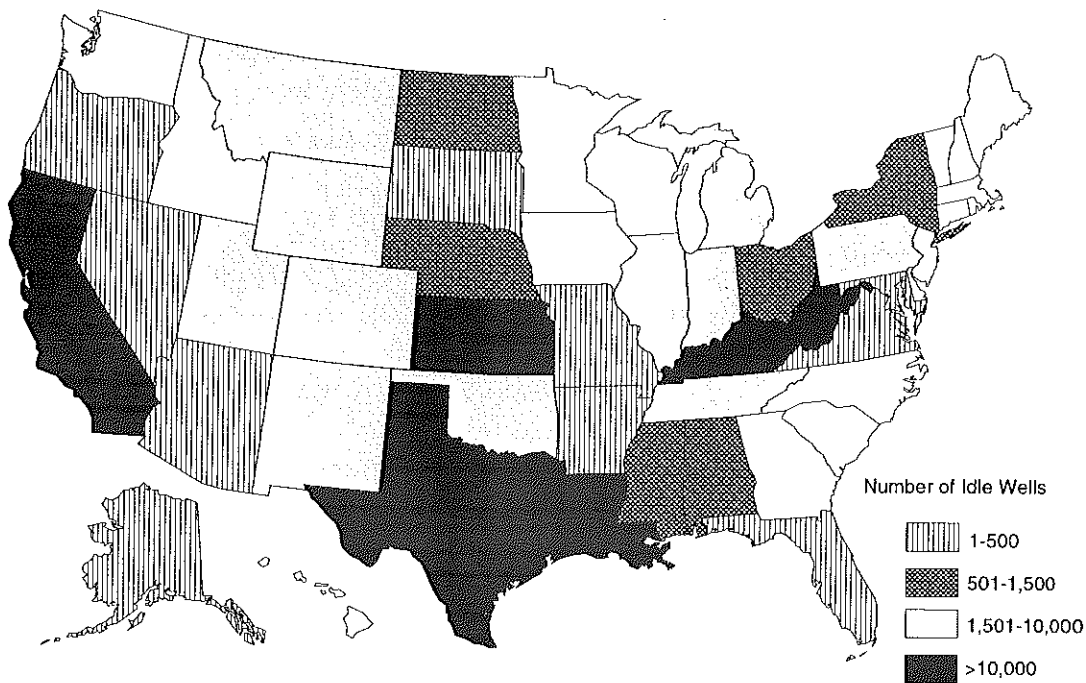
Status of Wells Drilled in the U.S.



Status of Idle Wells in the U.S.



Number of Idle Wells in Oil and Gas Producing States

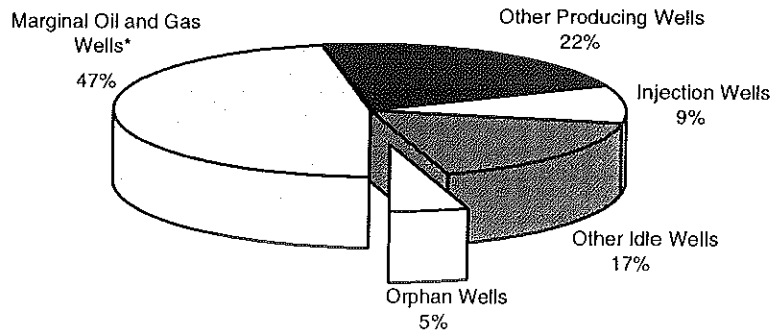


Note: New Mexico data are from the previous report.

but operator known, and orphan). Not surprisingly, some of the largest producing states and older producing areas have the largest number of idle wells. Texas has the largest number of idle wells – 93,000. Other states with more than 10,000 idle wells include: Kansas, 54,000; California, 31,500; Louisiana, 21,000; Kentucky, 15,700; and West Virginia, 14,500.

The number of idle wells reported by the states needs to be put into perspective. Most idle wells (with or without state approval), for which a responsible operator is known, have a potential for future use and a party responsible for ultimate plugging. These wells represent potential production, plus potential state revenues, employment, and economic activity when they are put back into use. Together, all three categories of idle wells account for approximately 22 percent of the unplugged (currently producing or idle) oil and gas wells in the country.

Orphan Wells are a Small Percentage of Existing Wells



*Data for Marginal Wells from: *Marginal Oil and Gas: Fuel for Economic Growth*, IOGCC, 1995.

This report includes both state and federal information. Consequently, it provides the first complete national picture of the idle well issue. It also contains innovative solutions that should be considered by state and federal agencies in their program planning efforts.

The remainder of this report includes sections covering:

- ◆ State summaries of:
 - Statutory authority and definitions
 - Security or financial assurance
 - Plugging funds and well plugging authorization
 - Approval procedures and technical requirements
 - Data management, well tracking, and inventory methods
 - Salvage value of orphan wells
 - Pre-regulatory wells
 - Idle well statistics
 - Energy and environmental concerns
- ◆ Innovative programs, incentives, and new legislation
- ◆ Bureau of Land Management bonding and unfunded liability review
- ◆ Recommendations.

III. STATE SUMMARIES

A. STATUTORY AUTHORITY AND DEFINITIONS

Statutory authorities and regulatory mechanisms used by states to address idle wells range from those specifically addressing idle wells to those broadly applicable to regulating all oil and gas wells. When the original idle well survey was completed in 1992, states indicated that their existing authorities were generally adequate to address idle wells. However, since that time, a number of states have updated their definitions and statutory authorities relating to idle wells.

The survey on idle wells requested specific information from the individual states concerning the date of establishment of the state regulatory program, the authorities used to regulate idle oil and gas wells, including statutory authority, statutory or regulatory definitions, and changes or improvements in programs. While the IOGCC provided definitions for "idle wells" for purposes of this study, state definitions vary for wells that might be included in this category. Terminology used by states includes idle, abandoned, temporarily abandoned, inactive, dormant, shut-in, suspended, deserted, and orphaned. A synopsis of state authorities and definitions is included below. Individual state statutes can be found on DEREK, the IOGCC's publicly accessible electronic bulletin board system (see Appendix H for details on DEREK).

Other agencies involved in the regulation of idle wells are noted. A number of states have Underground Injection Control (UIC) programs administered by the Environmental Protection Agency (EPA), although those are not enumerated. In such cases, idle injection wells used for enhanced oil recovery and water disposal would be under joint jurisdiction with EPA. Additionally, the Bureau of Land Management (BLM) is responsible for wells on federal and Indian lands, although some states share responsibility for these wells with the BLM.

State Authorities and Definitions

Alabama

Regulation of oil and gas wells in Alabama began in 1945 through legislation establishing the State Oil and Gas Board. The Act provided the Board authority to regulate oil and gas wells, protect groundwater, and provide for plugging, abandonment, and bonding. State Oil and Gas Board regulations were promulgated effective October 1, 1946, to regulate these activities. Section 9-17-6 of the Code of Alabama provides for regulation of oil and gas wells by requiring the "drilling, casing, and plugging of wells to be done in such a manner as to prevent the escape of oil and gas out of one stratum to another," and "to prevent the pollution of fresh water supplies by oil, gas, or salt water."

Alabama defines an abandoned well as a well that has not been used for six consecutive months and cannot be operated, whether it is a dry hole or production has ceased, or operations have not been conducted, or for other reasons. A temporarily abandoned well is defined as a well currently not producing oil and/or gas, but has been approved for future utility by the state supervisor.

Statutory Citation: Authority to Regulate Idle Wells – [Section 9-17-6 of the Code of Alabama]

State Authorities and Definitions

Alaska

The Alaska Oil and Gas Conservation Commission began its regulation of oil and gas wells in 1958. No specific statute is granted to regulate idle wells; however, Alaska statutes do provide the Commission with the authority over all wells drilled for exploration and production of oil and gas on state lands. Plugging and abandonment regulations began in 1958. In 1986, groundwater protection began, and the bonding requirements as well as plugging and abandonment regulations were amended.

Alaska approves the suspension of well operations if a well encounters hydrocarbons of a sufficient quality and quantity to indicate the well is capable of producing in paying quantities, or it is demonstrated the well has a future value as a service well. Reasons for suspension include: surface production and resource marketing facilities are unavailable; security maintenance of a completed well in a shut-in status is inappropriate; and pool delineation and evaluation is necessary, or production awaits design, delivery, or introduction of production and market outlets. A well shut-down is permitted if climatic, operational, or environmental concerns prevent the continuation of the program approved on the drilling permit or for rig substitution. This shut-down does not establish a completion, suspension, or abandonment date for the well. If well operations are not resumed within 12 months, the operator is required to abandon the well. An abandoned well is defined as a well that has been plugged as required by the state regulations.

Statutory Citation: Authority to Regulate Idle Wells – [31.05.27 and 31.05.30] Abandoned Wells – [20 AAC 25.105]

Arizona

The Arizona Oil and Gas Conservation Commission was established in 1959 to administer the Conservation Act of 1951, which was expanded in 1978 to include regulation of enhanced recovery, disposal, and storage wells. As of July 1991, the Arizona Geological Survey provides staff support to the Commission to administer and enforce the laws relating to the conservation of oil and gas. Rules promulgated pursuant to statutory authority are reviewed every five years and new rules are adopted, outdated rules repealed, and existing rules amended as necessary to be consistent with applicable federal law, and to account for technological advances and currently accepted practices in the regulated industry. In 1995, Arizona amended its laws to allow the Commission to forfeit the bond of owners who fail to properly plug each dry or abandoned well and to sue them for plugging costs in excess of the bond amount. The Arizona Department of Water Resources has authority over water wells, and the Arizona Department of Environmental Quality has authority over Class I, III, IV, and V injection wells.

Arizona defines an idle well as a well that is not producing and can either be shut-in or temporarily abandoned. A temporarily abandoned well is a completed well that is shut-in and may or may not be capable of production.

State Authorities and Definitions

An abandoned well is a well that is nonproductive, unprofitable, and cannot be put to beneficial use.

Statutory Citation: Authority to Regulate Idle Wells – [27-501(21), 27-515, and 27-516]; Bonding – [27-524(E)]; Plugging – [27-654(D)]

Arkansas

Arkansas began the regulation of oil and gas wells in 1939, and its regulations received significant revision in 1983 to include bonding or a letter of credit for security purposes. Bonding requirements were reduced in 1995. The Arkansas Oil and Gas Commission is the agency responsible for enforcing these regulations.

Arkansas defines an abandoned well as a well not currently producing; has not received regulatory approval to remain idle or temporarily abandoned; and has an unknown or insolvent operator. Arkansas defines a temporarily abandoned well as a well that has been shut-in due to well bore problems or economic reasons, but has not been plugged.

Statutory Citation: Authority to Regulate Idle Wells – [Act 105 of 1939, Act 902 of 1983, and Act 559 of 1991]

California

In 1915, the State of California began its regulatory program, which included plugging and abandonment procedures. A groundwater protection component was added in 1929. In 1931, the first well-bonding requirements were established. In addition, revisions to update/enhance the statutes and regulations have occurred throughout the history of the regulatory program. The California Division of Oil, Gas, and Geothermal Resources is responsible for the maintenance of the regulatory program.

California recognizes several types of idle wells: 1) *idle-deserted* — the operator is defunct and the well poses no apparent threat to health and safety; 2) *suspended* — all required plugs in the well are in place, except for a surface plug; 3) *shut-in* — the well is temporarily not producing or injecting due to economic conditions or operational problems; 4) *hazardous, idle-deserted* — the operator is defunct and the well poses a threat to the health and safety of humans, animals, or the environment; and 5) *long-term idle* — the well, which is subject to bonding or \$100 annual fee, is one that has not produced or been used for injection purposes for six continuous months during a five-year period. California defines an abandoned well as a well properly plugged, with the site location restored, and all reports filed.

Statutory Citation: Authority to Regulate Idle Wells – [Public Resources Code (PRC) 3106, 3237, and 3250]; Idle Deserted Wells – [PRC 3237]

State Authorities and Definitions

Colorado

The Colorado Oil and Gas Conservation Commission began the regulation of oil and gas wells in 1951. The Commission has the authority to regulate the drilling, production, and plugging of oil and gas related wells and all other operations for the production of oil or gas. This authority includes the regulation of chemical treatment of wells, well spacing, and other oil and gas operations so as to prevent and mitigate significant adverse environmental impacts to the extent necessary to protect public health, safety, and welfare. Recent revisions include: shut-in and temporary abandonment rules added in 1988; a Memorandum of Agreement with the Water Quality Commission in 1990; and the establishment of the Environmental Response Fund in 1991. In 1994, Colorado passed legislation requiring the Commission to balance the promotion of oil and gas development with the protection of public health, safety, and welfare. In 1995, the Commission began requiring mechanical integrity testing on any well idle for more than two years.

Colorado defines a shut-in well as a well that is cased or left in such a manner as to prevent the migration of oil, gas, water, or other substance from the formation or horizon in which it originally occurred, for a period not to exceed six months. An abandoned well is defined as a well properly plugged, and the site location restored and all reports filed.

Statutory Citation: Authority to Regulate Idle Wells – [C.R.S. 34-60-106]; Abandonment – [Rule 319]; Mechanical Integrity Testing – [Rule 326]

Florida

Florida began regulation of oil and gas wells in 1946 and has made revisions to its regulations in 1962, 1972, 1981, 1989, and 1993. Groundwater protection and plugging and abandonment procedures also began in 1946. The Florida Geological Survey has responsibility for regulation of oil and gas wells in the state. The state uses definitions for shut-in, plugged and abandoned, and temporarily abandoned wells that are in general use in the oil industry.

Statutory Citation: Authority to Regulate Idle Wells – [Florida Statutes, Chapter 377, Part I and Florida Administrative Code, Rule 62C-27.0015(2)]

Illinois

The Illinois Oil and Gas Act was adopted in 1939. It provides the Department of Natural Resources, Division of Oil and Gas in the Office of Mines and Minerals the authority to define and regulate idle wells, orphaned wells, and temporarily abandoned wells. While the Act generally specified the protection of groundwater, surface casing requirements were not implemented until 1984. Plugging requirements, which have been modified since the adoption of the Act, have been in place since the passage of the Act in 1939.

No significant revision occurred to that Act until 1988 when authority for regulation of oil and gas wells was removed from the State Mining Board and given to the Director of the Department of Mines and Minerals. In 1989, the Division of Oil and Gas was given enforcement authority in the form of administrative orders in the issuance of civil penalties for violations. Bonding

State Authorities and Definitions

requirements for wells were eliminated in 1990 and replaced with a yearly operator's fee paid to the state plugging and restoration fund. The temporary abandonment plugging rules and mechanical integrity testing rules for Class II wells were adopted in 1990, as well as revised permitting requirements for production and Class II wells and revised rules for operation and construction of those wells. In 1994, Illinois amended its rules to address the handling, transportation, and disposal of E&P wastes, and the elimination of produced water pits.

Illinois defines a well as idle if it has been inactive for less than two years and is not required to be temporarily abandoned in accordance with state rules. A temporarily abandoned well is a well that has been inactive for more than two years and has been temporarily abandoned in accordance with state rules. An orphaned well is defined by statute as a well that has been inactive for more than two years, does not have a bond or has not paid in accordance with the annual fee assessment, and for which an owner cannot be located or is insolvent.

Statutory Citation: Authority to Regulate Idle Wells – [225 ILCS 725/1]

Indiana

Regulation of oil and gas wells began in 1947. Idle wells are regulated through the Indiana Department of Natural Resources, Division of Oil and Gas. The statutes provide for placing a well in temporary abandoned status, enabling the Division to require (after two years) that wells be plugged, recased, or demonstrate mechanical integrity. Significant revisions were made in 1985 in the bonding and UIC programs.

Statutory Citation: Authority to Regulate Idle Wells – [IC 14-37]

Iowa

Regulation of oil and gas wells began in 1963 and regulations were revised in 1987. Iowa also implemented groundwater protection procedures in 1963, but has no formal procedures for plugging and abandonment. The Department of Natural Resources is responsible for regulating idle wells. Iowa uses the term abandoned well in its regulations.

Statutory Citation: Authority to Regulate Idle Wells – [Chapter 50, Administrative Code]

Kansas

Kansas had some plugging authority in place in 1933, although, for practical purposes, the regulation of oil and gas wells began in 1935. Groundwater protection regulations that related to injection wells or ponds were in place in 1935. These regulations were enforced by the Kansas Department of Health and Environment through 1986, and by the Kansas Corporation Commission since that date. Plugging and abandonment procedures were also in place in 1935, but were revised and expanded in 1982. The Corporation Commission has the statutory authority, under Chapter 55 of the Kansas Statutes, to cause operators to plug abandoned wells and to remediate or repair

State Authorities and Definitions

abandoned wells prior to plugging. The Commission can direct an order to plug an abandoned well towards any party that has had physical control of the well during its existence.

The Oil and Gas Conservation Division defines a shut-in well as a well in a state of nonproduction due to 1) a lack of pipeline connection; 2) being under a Commission noncompliance order; or 3) the completion of an allowable over-production penalty for a period under a proration order. A temporarily abandoned well is defined as a well where an application has been made to the Commission and approved for this status with the intention of saving the well for future production or injection use. An abandoned well includes any well that has not been plugged and abandoned properly under regulation, and where there is no identifiable owner or current lease ownership has denied the intention to include the well in production plans. While no official definition exists, the Commission views an idle well as a well that is temporarily not pumping due to a correctable malfunction or by operator choice.

Statutory Citation: Authority to Regulate Idle Wells – [Chapter 55]

Kentucky

Regulation of oil and gas wells began in 1960, and the Kentucky Revised Statutes provide the Department of Mines and Minerals, Division of Oil and Gas the authority to require wells to be drilled, cased, and plugged in a manner to prevent waste, blowouts, cavings, seepages, and fires, and to protect correlative rights. Groundwater protection regulations began in 1978 through an administrative regulation for protection of freshwater zones. Regulation of plugging and abandonment procedures began in 1961, including regulations for wells drilled through both non-coal-bearing strata and coal-bearing strata. Bonding requirements and penalty provisions were established in 1966 and increased in 1990.

Kentucky defines an idle well as a well that is equipped but not in production. A temporarily abandoned well is defined as a well shut-down for good cause as determined by the state and an improperly abandoned well is defined as a well that is neither producing nor plugged.

Statutory Citation: Authority to Regulate Idle Wells – [Kentucky Revised Statutes, Chapter 353.510, 353.550, 353.560]

Louisiana

Regulation of oil and gas wells began with the adoption of Order No. 29 in 1941, and groundwater protection and plugging and abandonment procedures were in place with the adoption of that Order. Louisiana revised the plugging and abandonment regulations in 1974, and groundwater protection requirements by the adoption of pit regulations in 1986. Regulation of idle wells is accomplished through the Louisiana Department of Natural Resources, Office of Conservation. No official definitions exist for idle wells, temporarily abandoned wells, or abandoned wells.

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Statutory Citation: Authority to Regulate Idle Wells – [LSA-R.S. 30:4 and Statewide Order No. 29-B Section XIX]; Plugging Fund – [Act 404 of 1993 as amended by Act 297 of 1995]

Maryland

Maryland began regulation of oil and gas wells in 1957, but did not have regulations in place for groundwater protection or plugging and abandonment procedures until 1991. The Mining Program, under the Maryland Department of the Environment, is responsible for the regulation of oil and gas wells. Maryland uses the term shut-in well to define an idle well.

Statutory Citation: Authority to Regulate Idle Wells – [Environment Article §14-103 Code of Maryland Regulations 08.10.01.06 B]

Michigan

Act No. 65 of the Michigan legislature provides for the issuance of permits and regulation of drilling, and in 1927 created the Office of the Supervisor of Wells, now located in the Geological Survey Division of the Department of Environmental Quality. The Act also requires casing and sealing of each freshwater, brine, oil or gas formation. Plugging requirements were also introduced in 1927. Specific regulations concerning the power to regulate idle wells occurred in 1939, allowing the Supervisor of Wells to require the locating, drilling, deepening, redrilling, or casing reopening, sealing, operating, and plugging of wells drilled for oil or gas disposal, and to prevent pollution damage to freshwater by such methods and means that no unnecessary damage to underground resources, neighboring properties, or rights to life will result. In 1994, Michigan passed legislation creating an orphan well fund and providing the Supervisor with the authority to use the fund for plugging, response activity, or site restoration at orphaned oil or gas wells.

A shut-in well is defined as a well economically producible but shut-in for non-compliance, mechanical problems, or awaiting pipeline for gas sales. A temporarily abandoned well is defined as a well that has received permission from the Supervisor of Wells to remain unplugged for more than 12 consecutive months. An abandoned well is a dry hole left unplugged for more than 60 days, or a well that has not produced for more than 12 consecutive months, unless the Supervisor has authorized it to remain idle. An orphan well is an abandoned or improperly closed well for which no owner or operator is known, for which all owners or operators are insolvent, or at which the Supervisor determines there exists an imminent threat to the public health and safety.

Statutory Citation: Authority to Regulate Idle Wells -- [Part 615 (Supervisor of Wells) and Part 616 (Orphan Well Fund) of Act 451 of 1994, as amended.]

Mississippi

Regulation of oil and gas wells in Mississippi began in 1948 with the establishment of the State Oil and Gas Board. Section 53:1-17 of the Mississippi Code gives the Board jurisdictional authority to enforce all laws

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relating to the conservation of oil and gas. Statewide rules were adopted in 1951, and the plugging rules, initially adopted in 1948, were revised in 1981. Groundwater protection rules, initially adopted in 1948, were revised in 1981 and 1989. Requirements for the financial responsibility of operators were established in 1992. Mississippi defines an idle well as an inactive well and an abandoned well as one that has been plugged and abandoned.

Statutory Citation: Authority to Regulate Idle Wells – [Mississippi Code, Section 53-1-17]; Idle Well Definitions – [Oil and Gas Board Rule 28]

Missouri

Missouri began the regulation of oil and gas wells in 1966. Regulations for groundwater protection, plugging and abandonment, and bonding were also established in 1966 and have since been revised on several occasions. Regulation is accomplished through the Division of Geology and Land Survey under the Department of Natural Resources. A temporarily abandoned well is a well not in operation for more than 90 days. Every two years, the well operator must demonstrate that a temporarily abandoned well is capable of production or plug the well. An abandoned well is defined as a well with a permanent plug in accordance with the oil and gas regulations.

Statutory Citation: Authority to Regulate Idle Wells – [Missouri RSMo. Chapter 259]

Montana

The regulation of oil and gas wells in Montana began in 1953. Bonding requirements were increased in 1993. The statutes give the Montana Board of Oil and Gas Conservation the authority to regulate the drilling, casing, and production and plugging of wells in a manner to prevent waste or pollution. Montana has applied to EPA for primacy to regulate its Class II injection wells. No definitions are established for the terms “idle well,” “abandoned well,” or “temporarily abandoned well.”

Statutory Citation: Authority to Regulate Idle Wells – [82-11-123]

Nebraska

The present Oil and Gas Conservation Act for the regulation of oil and gas was adopted in 1959; however, the first regulations that gave authority to the Nebraska Geological Survey were adopted in 1940 and updated in 1956. Section 57-905(3)(C) of the Nebraska Revised Statutes gives the Oil and Gas Conservation Commission the authority to require drilling, casing, operating, and plugging of wells in such a manner as to prevent: 1) the escape of oil or gas out of one stratum into another; 2) the intrusion of water into oil or gas strata; 3) the pollution of freshwater supplies by oil, gas, or saltwater; and 4) the prevention of blowouts, cave-ins, seepages, and fires.

Statutory Citation: Authority to Regulate Idle Wells – [Revised Statutes, Section 57-905(3)(C) and Title 267, Chapter 3-040 of the rules and regulations]

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Nevada

Regulation of the Nevada oil and gas industry began in 1954. The Department of Minerals was created in 1983 and given the responsibility to regulate oil and gas activities. In 1993, the Department was changed to the Division of Minerals under the Nevada Department of Business and Industry. Groundwater protection and plugging and abandonment procedures began in 1954. The oil and gas regulations have been amended in 1976, 1987, and 1994. The Division of Minerals has the authority to require the plugging of wells so as to prevent the escape of oil or gas, as well as the authority to require a reasonable bond for plugging purposes. The Nevada Division of Environmental Protection is responsible for the regulation of injection wells.

Nevada considers a temporarily abandoned well as a well that has been shut-in but not plugged, and considers an abandoned well as a well where production of oil/gas has ceased because the well has become unprofitable. Wells in which production casing has been run but have not been in operation for one year must be immediately plugged. Wells in which no production casing has been run and drilling operations have ceased for 30 days must be immediately plugged.

Statutory Citation: Authority to Regulate Idle Wells – [NRS 522.040]; Idle Well Definitions – [Rules of Practice and Procedure, 522.430]

New Mexico

The New Mexico Oil Conservation Commission was created in 1935, along with the regulations for groundwater protection and plugging and abandonment. Specific to plugging and abandonment and groundwater protection, the Conservation Division has been given authority to require dry or abandoned wells to be plugged in a way that confines the oil, natural gas, or water to the strata in which they are found and to expend the oil and gas reclamation fund and take all actions necessary to plug dry or abandoned oil and gas wells in accordance with the provisions of the Oil and Gas Act, including the disposition of salvageable equipment and material removed from wells being plugged by the state. Significant revisions include the 1957 requirement that water from oil-producing pools with water-driven reservoirs be disposed of in disposal wells, the 1967 elimination of pit disposal, and the 1987 requirement for mechanical integrity testing (MIT) on all wells that have not produced for one year.

A shut-in well is defined by New Mexico as a well that has not produced oil or gas for up to one year. A temporarily abandoned well is defined as a well that has been approved by the regulatory body, and has had an approved mechanical integrity test on the casing. Temporarily abandoned well status may be approved for up to five years. An abandoned well is a well that has an approved amount of cement and mud to prevent the migration of fluid in the wellbore from total depth to surface.

Statutory Citation: Authority to Regulate Idle Wells – [SEE-70-2-12 and Chapter 72 of the laws of 1935]

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New York

Current requirements for the regulation of oil and gas wells were put in place in 1963, especially with regard to groundwater protection and bonding procedures. However, statutes that required wells to be plugged and abandoned were in place as early as 1879. The Environmental Conservation Law gives the Division of Mineral Resources the authority to enter, take temporary possession of, plug, or replug an abandoned well when an owner or operator neglects or refuses to comply with the rules and regulations. The rules and regulations also make it unlawful to shut-in or temporarily abandon a well for more than one year or 90 days respectively, without Department approval.

A shut-in well is defined as a well capable of production that is closed down temporarily for repairs, testing, or lack of market. A temporarily abandoned well is one in which operations have been discontinued or the well has been closed in without plugging and abandonment operations. An abandoned well is defined as any unplugged well shut in for more than one year without Department approval and whose ownership may or may not be known.

Statutory Citation: Authority to Regulate Idle Wells – [Environmental Conservation Law, Article 23-030s (8)(E) and Chapter 959, Article 3-A of 1963]; Plugging and Abandonment – [Chapter 64 of 1882 and Rules and Regulations, Parts 555.2 and 555.3]

North Dakota

Oil conservation laws and rules were enacted in 1941, although oil itself was not discovered within the state until 1951. Significant changes since that time include increased bond amounts in 1961, the abolition of the use of earthen pits for produced water storage in 1969, monitoring the disposal of drilling pit fluids in 1982, the requirement for mechanical integrity testing on temporarily abandoned wells in 1990, as well as other bond increases. The North Dakota Industrial Commission is the agency responsible for the regulation of idle wells. A temporarily abandoned well is defined as a well that has been approved for such status (upon application) for one year. An abandoned well is defined as one that has had the equipment removed or from which oil or gas has not been produced for one year.

Statutory Citation: Authority to Regulate Idle Wells – [North Dakota Century Code, Section 38-08-04.(2)]; Idle Well Definitions – [North Dakota Administrative Code 43-02-03-55]

Ohio

Current regulatory authority was established with the creation of the Division of Oil and Gas in 1965. However, in 1883 the first oil and gas law was enacted regulating methods used to case and plug oil and gas wells to prevent water from penetrating and contaminating the oil-and gas-bearing rock. Plugging and abandonment procedures and groundwater protection were also established with the creation of the Division of Oil and Gas. The Division of Mines of the Ohio Department of Industrial Relations oversees and supervises plugging operations that are located in a coal-bearing township. Significant revisions to the statutes include the required restoration of lands

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disturbed after drilling and plugging a well (1974); permit issuance, well construction and monitoring and reporting requirements (1982); the elimination of brine storage pits and the establishment of standards to define contamination of water supplies (1985); and the amendment of annular disposal rules (1990).

An idle well is defined as a well incapable of production. A temporarily abandoned well is a well for which permission has been given to delay plugging. An abandoned well is defined as a well that has been deserted.

Statutory Citation: Authority to Regulate Idle Wells – [Chapter 1509.12 of the Ohio Revised Code]

Oklahoma

In 1915, the Oil Conservation Division of the Oklahoma Corporation Commission was given exclusive jurisdiction over all wells drilled for exploration and production of oil and gas. Regulation for groundwater protection and plugging and abandonment procedures began in 1917.

Oil and Gas Division policy defines an idle well as a well that has been drilled since regulation began, is not currently producing or injecting, and meets one of the following criteria: 1) has received regulatory approval to remain idle or temporarily abandoned; 2) has not received regulatory approval to remain idle or temporarily abandoned and has a known and solvent operator; or 3) has not received regulatory approval to remain idle or temporarily abandoned and has an unknown or insolvent operator. A temporarily abandoned well is defined as an idle well that has received regulatory approval to remain idle and has a known and solvent operator. Oklahoma regulations require a cased well be plugged within one year after cessation of production, an uncased well be plugged within 72 hours after completion of drilling or testing, and a surface cased only well be plugged within 90 days after completion of drilling or testing. Exceptions are made if the well is placed in an environmentally safe condition, at which point the abandonment is valid for two years with extensions available for good cause shown. Division policy also defines an abandoned well as a well drilled before or since regulation began, that is not currently producing, has not received regulatory approval to remain idle and has an unknown or insolvent operator.

Statutory Citation: Authority to Regulate Idle Wells – [Title 52 O.S., Section 139]; Plugging and Abandonment – [OAC 165: 10-11-9 and OAC 165: 10-11-3]

Oregon

In 1923, Oregon created regulations covering oil and gas wells, including groundwater protection and plugging and abandonment procedures. However, these regulations were not enforced until 1949. The regulations were significantly revised in 1949 and 1953. Oregon Revised Statute 520.095 gives the Department of Geology and Mineral Industries authority to make rules regarding the regulation of idle wells, including rules to govern drilling,

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casing, plugging, pollution of fresh water, and damage to hydrocarbon resources by water.

Oregon defines an idle well as an inactive well that has not been completed, suspended or abandoned with approval of the State Geologist. An abandoned well is defined as a well that is permanently plugged and the site restored with the approval of the Department. A suspended well is defined as a well that is not in abandoned or completed condition but left unattended for a period greater than 30 days, with the approval of the State Geologist.

Statutory Citation: Authority to Regulate Idle Wells – [Oregon Revised Statute 520.095]; Plugging and Abandonment – [Oregon Administrative Rule 632-10-198]

Pennsylvania

The Bureau of Oil and Gas Management was given responsibility for oil and gas regulation in 1955. Since the 1890's there has been legislation requiring nonproducing wells to be plugged in order to protect the formation. Legislation in 1984 updated plugging requirements to include environmental considerations, require bonding, and allow for a specified period of approved nonproduction before the well must be plugged.

Pennsylvania defines an abandoned well as one that has not been used to produce, extract, or inject gas, petroleum, or other liquids within the preceding 12 months; a well for which the equipment necessary for production, extraction, or injection has been removed; or a well considered dry and not equipped for production within 60 days of drilling. However, the term does not include wells granted inactive status. In 1992, the state added a definition of an orphan well as any well abandoned prior to the effective date of the Oil and Gas Act (April 18, 1985) that has not yielded the current landowner any economic benefit, outside of royalty interest from the well.

Statutory Citation: Authority to Regulate Idle Wells – [P.L 1140, No. 223; 58 P.S. § 601.204]; Idle Well Policies – [Chapter 78 of Department's Rules and Regulations]

South Carolina

South Carolina began the regulation of oil and gas wells in 1976, and in 1994 the authority for implementing the oil and gas regulations was transferred to the South Carolina Department of Health and Environmental Control. The state defines an abandoned well as a well which has been plugged. A well is considered temporarily abandoned when it has not been used for six consecutive months.

Statutory Citation: Authority to Regulate Idle Wells – [§ 48-43]; Idle Well Definitions – [Regulation R. 121-8]

South Dakota

The regulation of oil and gas wells in South Dakota began in 1939. Groundwater protection and plugging and abandonment regulations began in 1943. Enhancement of the groundwater regulations occurred in 1960 and

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1967; regulations for plugging and abandonment were enacted in 1960 and 1974, accompanied by appropriate increases in bonding amounts for plugging and for surface restoration. South Dakota statutes give the Department of the Environment and Natural Resources the authority to regulate the drilling and plugging of wells and all other operations.

Statutory Citation: Authority to Regulate Idle Wells – [SDCL 45-9-11]; Idle Well Definitions – [Rule: ARSD 74:10:04:03]

Tennessee

Regulation of oil and gas wells, including plugging and abandonment procedures, was begun in 1968. Groundwater protection rules came into place in 1972. Improvements to the program since that time include regulations to limit the blanket bond to ten wells in 1987 and additional changes to the bonding provisions in 1988. The Tennessee Division of Geology is responsible for the regulation of idle wells. No definitions are provided by statute or rule for idle or abandoned wells. A temporarily abandoned well is a well at which drilling has ceased for 30 days or production has ceased.

Statutory Citation: Temporarily Abandoned Well – [1040-2-2-.02(3) and 1040-4-2-.10]

Texas

The Railroad Commission of Texas was given authority in 1917 for the regulation of oil and gas wells. Rule 20 for groundwater protection was initiated in 1919. Plugging and abandonment procedures also were initiated through Statewide Rules 10(b), 13 and 23 in 1919. Chapter 89 of the Texas Oil and Gas Conservation Laws and Statewide Rule 14 give the Commission authority to require the plugging of abandoned oil and gas wells. The Commission was given authority in 1965 to plug wells using state funds. Available funds at that time consisted of general revenue appropriations. However, a dedicated well plugging fund was created in 1983 and 1991. Chapter 91 of the Texas Oil and Gas Conservation Laws enlarged the plugging fund and established the Oil Field Cleanup Fund to plug wells and remediate pollution sites abandoned by oil and gas operators. Changes in the bonding program were initiated in 1983 and 1991.

No state definition is in place for an idle well. An inactive well is defined as a well that has not been operated for a period of 12 or more months, and a temporarily abandoned well is defined as a well that is currently not in service.

Statutory Citation: Authority to Regulate Idle Wells – [Texas Oil and Gas Conservation Laws, Chapter 89 and Statewide Rule 14]

Utah

Regulation of oil and gas in Utah began in 1955, including regulations for groundwater protection and for plugging and abandonment. Authority for drilling, operating, producing, and plugging wells is found in the Utah Code Annotated, Section 40-6-1. In 1983, revisions occurred to the Code to

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increase the regulatory responsibility for groundwater protection, site reclamation, well plugging, and increased bond amounts. The Division of Oil and Gas and Mining is primarily responsible for the regulation of idle wells, and shares that responsibility with the Bureau of Indian Affairs, the Utah Sovereign Lands and Forestry, and the Utah School and Institutional Trust Lands Administration.

An idle well is considered as a shut-in oil, gas, or water-injection well. An abandoned well is defined as a well no longer in use, whether a dry hole or one that has ceased production, or for some other reason cannot be operated. A temporarily abandoned well is a well that has been completed, is not capable of production in paying quantities, and is not being operated presently.

Statutory Citation: Authority to Regulate Idle Wells – [Utah Code Annotated, Section 40-6-1 et. seq.]

Virginia

Statutory standards were first enacted by Virginia in 1948. The regulatory program began in 1950, along with the creation of the Oil and Gas Board. The Department of Mines Minerals and Energy was created in 1985. The Virginia Statutes give specific authorities for the abandonment or cessation of a well and the orphan well program. Specific protection for groundwater and plugging and abandonment procedures were established in 1950. The Virginia Gas and Oil Act was passed in 1990, and subsequent regulations were finalized in 1991. No definitions are provided for an idle well, abandoned well, or temporarily abandoned well. However, the term shut-in is used for wells that are not producing for good cause, such as economic conditions or operating problems. The statutes define an orphaned well as a well abandoned prior to July 1, 1950, or a well for which no records exist concerning drilling, plugging, or abandonment.

Statutory Citation: Authority to Regulate Idle Wells, Orphan Well Fund, Gas and Oil Restoration Fund – [§ 45.1-361]

West Virginia

West Virginia initiated regulating oil and gas operations in 1929. These regulations included plugging and abandonment procedures. Groundwater protection legislation passed in 1969 was revised in 1991. The West Virginia Abandoned Well Act was passed in 1992. It incorporates into West Virginia Code, section 22-10 language requiring financial responsibility for all wells, establishing abandoned well plugging priorities, and providing for interested party plugging. The West Virginia Division of Environmental Protection, Office of Oil and Gas is responsible for the regulation of idle wells.

The state defines an abandoned well as any well that is completed as a dry hole or has not been in use for 12 consecutive months, or has not shown any bona fide future use. For purposes of the Abandoned Well Program, even though “orphaned well” is not a defined term in the statute, it is considered to be a well having no production reported to the state since 1984, having no

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affidavit on file showing total plugging, and not identified as a storage, secondary recovery, or disposal well in the oil and gas data system. West Virginia also classifies wells as having an “inactive status” when they are not producing or injecting and have received state approval to remain idle by demonstrating the existence of bona fide future use.

Statutory Citation: Authority to Regulate Idle Wells – [West Virginia Code 22-6 and 22-10]; Idle Well Definitions – [WV Code 22-6-19 and 22-10, State Regulations 38-20 and 38-22, and 40 CFR 146.3]

Wyoming

Regulation of oil and gas under the current Wyoming program began in 1951. Revisions include 1) establishment of Underground Injection Control programs in 1981; 2) pit regulation revisions in 1984 and 1992; 3) changes in 1982 and 1991 to rules governing plugging of shallow seismic holes; 4) bonding revisions, amendment of the waste rules, and well status definitions in 1992; and 5) rules on reporting water flows and mechanical integrity testing in 1993. Wyoming Statutes 30-5-104 created the Oil and Gas Conservation Commission with authority to require that drilling, casing or plugging wells be done in such a manner as to prevent the escape of oil or gas from one stratum into another and the pollution of freshwater supplies by oil, gas, or salt water, and to use funds collected under Wyoming Statutes 30-5-116 (conservation tax) to plug wells and reclaim the surrounding area under the State Plugging fund. The Bureau of Indian Affairs is responsible for the regulation of idle wells on the Wind River Indian Reservation.

A dormant well is a well that is no longer actively producing, monitoring, or injecting, or which does not qualify as a permanently abandoned, shut-in, or temporarily abandoned well. Temporarily abandoned wells are those in which the completion interval has been isolated. A permanently abandoned well is one that is no longer active and has been permanently plugged and abandoned. Shut-in wells are those wells not currently considered active in which the completion interval has not been isolated from the wellbore, and where the wellbore condition is such that its utility may be restored by opening valves or by energizing equipment involved in operating the well.

Statutory Citation: Authority to Regulate Idle Wells – [§30-5-104 and Rules 304, 315, and 316]

B. SECURITY OR FINANCIAL ASSURANCE

The primary purpose of security or financial assurance requirements in the producing states is to ensure proper plugging and abandonment of oil and gas wells. Most states have made recent changes to upgrade their security and financial assurance requirements; some have begun to charge annual fees in lieu of, or in addition to, routine security or financial assurance requirements.

The majority of oil and gas producing states require specific security or financial assurance in the form of a surety bond, cash, certificate of deposit, or irrevocable letter of credit. The security or financial assurance can be to ensure performance, plugging of the wellbore at the time of abandonment, restoration of the surface, or a combination of any of the above. The date that security or financial assurance requirements were established varies widely among the states, but the states where production started most recently have required security or financial assurance since the inception of their programs.

Types of Financial Assurance	
	Number of States Allowing
Surety bond	31
Certificate of deposit	27
Cash	26
Letter of credit	11
Fee in lieu of bond	2
Financial statement	2
Negotiable U.S. bonds	2
First lien on well equipment	1
Consolidated investment fund	1
Licensing	1

All states except Louisiana with current oil or gas production require some form of security or financial assurance, although certain classes of wells in some states are exempt from financial security requirements. Of the 32 states requiring security, 31 allow surety bonds, 26 allow cash, 27 allow the use of certificates of deposit, and 11 allow the use of a letter of credit. Several states also allow other forms of security. For example, Utah allows the acceptance of negotiable U.S. bonds. Oklahoma allows a financial statement demonstrating a minimum of \$50,000 net worth in the state. Texas will accept the first lien on salvageable equipment when its value is greater than the security amount required. West Virginia allows the use of a consolidated investment fund, which is a state-operated investment fund.

The costs of plugging and site restoration intended to be covered by security may vary by well depth and geographic location. Reflecting these differences, single well bonds range from \$500 for wells 500 feet deep or less in Kentucky, to a minimum of \$100,000 per well in Alaska. Twelve states set the security amount by depth (Alabama, Arizona, California, Illinois, Kentucky, Missouri, New Mexico, New York, South Carolina, Oregon, Utah, and Wyoming). The amounts for single well bonds in Oklahoma are established by a licensed plugger (pluggers who are permitted to bid on state plugging contracts are licensed by the Corporation Commission after reviewing their qualifications), although the blanket bond amount is a set dollar amount. The required amounts for blanket bonds range from \$10,000 (Kentucky, Tennessee, and wells of depths less than 1,000 feet in Utah) to a \$200,000 minimum in Alaska, a \$500,000 maximum in Maryland, \$250,000 for offshore wells in California, \$250,000 for more than 100 wells in Texas, and \$1,000,000 in Florida.

Though most states require security or financial assurance, some states, such as New York, do not require security on pre-regulatory wells, while other states may have inadequate

levels of financial assurance to cover plugging costs. Blanket bonds are sometimes inadequate to properly plug all of an operator's wells.

Of the states that require bonds, California and Illinois do not maintain their individual bonds for the life of the well — rather, they are completion bonds. The bonds in California are released after a successful completion, which is defined as six months continuous production or approved plugging and abandonment; therefore, many wells in that state are not covered by current well bonds. Bonds are held in Illinois for two years. At that time, if the operator is not in violation of the Illinois Oil and Gas Act, the bond is released and the operator is required to contribute an annual fee (based on the total number of wells owned by the operator) to the state plugging fund. Failure to pay the fee results in issuance of a cessation order for all production of that operator. Indiana has proposed to adopt a program similar to that of Illinois.

In addition to the routine security requirements, seven states have developed programs that merit discussion. They are as follows:

Arkansas As an incentive to increase production in Arkansas, the bond amount for single wells was lowered from \$10,000 to \$3,000. In addition, bonds are not required for wells inactive for at least 12 months that are placed back on production by a responsible operator in good standing approved by the Commission.

California Wells that have been inactive (not producing for six consecutive months) for five years or longer and are not bonded are charged \$100 per well per year under a program instituted in 1991.

Florida The Petroleum Exploration & Production Bond trust fund is a mechanism for operators to obtain coverage if they are unable to obtain coverage elsewhere. The single well charge is \$4,000 for the first year, and \$1,500 thereafter. The blanket bond charge is \$30,000.

Pennsylvania In 1985, Pennsylvania instituted a program for operators of not more than 200 wells who could not obtain bonds for wells drilled prior to April 18, 1985. This program permitted the submission to the Department of an annual \$50 per well fee, a blanket fee of \$500 for 10–20 wells, or a blanket fee of \$1,000 for more than 20 wells. This nonrefundable fee is paid each subsequent year that the operator did not file a bond with the Department.

The legislation was amended in 1992 to permit operators to make phased deposits of collateral to fully collateralize bonds. These bonds are fully refundable. An operator with up to 10 existing wells who does not intend to operate additional wells would deposit \$250 per well initially, and deposit \$50 per well annually until the obligations were met. An operator of 11–25 wells, or an operator of up to 10 wells, applying for one or more permits for additional wells, makes a deposit of \$2,000 and annually deposits \$1,150 plus \$150 for each additional well until the obligations are met. An operator of 26–50 wells deposits \$3,000, and annually deposits \$1,300 plus \$400 for each additional well to be permitted. Operators of 51–100 wells deposit \$4,000, and annually deposit \$1,500 plus \$400 for each additional well to be permitted. Operators of 101–200 wells deposit \$8,000, and annually

deposit \$1,600 plus \$1,000 for each additional well to be permitted. Operators of more than 200 wells are required to fully bond their wells immediately. Operators who paid a fee in lieu of a bond have that amount credited against the phased collateral payments.

Texas

To slow the growth in the number of abandoned wells and other oil field sites that must be addressed with state funds, S.B. 1103 of 1991 established new financial responsibility requirements for oil and gas operators. Anyone conducting oil and gas operations regulated by the Railroad Commission must file an annual organization report and, at the same time, must submit a bond or alternate form of financial security. This financial security covers all of the operator's oil and gas operations regulated by the Commission. S.B. 1103 gives an operator the choice of several methods of satisfying this requirement. The options are:

- 1) If the operator's only operations are wells, a bond in an amount equal to \$2 per foot of the aggregate total depth of all the operator's wells;
- 2) A blanket bond in an amount equal to:
 - a) \$25,000 if the operator has 10 or fewer wells or has no wells but performs other operations;
 - b) \$50,000 if the operator has 11 to 99 wells; or
 - c) \$250,000 if the operator has 100 or more wells;
- 3) If the operator can demonstrate an acceptable record of compliance with the Commission's safety and pollution prevention rules during the previous 48 months, an annual fee of \$100;
- 4) An annual fee of three percent of the amount of the bond that would otherwise be required;
- 5) A first lien on oil field equipment with a salvage value equal to the amount of the bond that would otherwise be required.

If an operator chooses to pay a fee or file a lien, rather than file a bond, the operator must also pay a fee of \$100 with each application for an extension of time to plug an inactive well.

In 1995 the Texas legislature passed H.B. 1407, a companion to S.B. 1103, as an incentive for further compliance. H.B. 1407 requires the RRC to set a company to non-compliant status when outstanding violations of safety or pollution prevention rules exist. This bill also provides for "tainted" companies (companies that have a common officer on their annual Organization Report with the non-compliant company) to have their status set to non-compliant as well. The timeframe for non-compliant status is five years from the next organization report filing after the "law date." The "law date" is the date after all appeals of a violation have been exhausted. As long as an organization report shows non-compliant status, the commission is required to reject any and all new permit applications and disapprove any lease transfer applications.

West Virginia

The West Virginia Abandoned Well Act requires all wells to be bonded. For wells not bonded under the present \$5,000 per well or \$50,000 blanket

bond, the state may suspend the financial requirements until July 1, 1995, if a hardship is demonstrated — two years beyond the statutory deadline of July 1, 1993. Alternatively, the state may require 20 percent of the bond amount to be supplied by July 1, 1994, with an additional 20 percent in each subsequent year until fully bonded by July 1, 1998.

Wyoming

An additional \$2 per foot bond may be required under the blanket bond when the total dormant well footage exceeds 12,500 feet. The supervisor may allow the additional bond to be paid on a percentage basis over eighteen months. The state must be notified prior to the transfer of wells to inform the new owner of any additional bonding to be required.

Two states, Kansas and Mississippi, take a different approach to financial assurance. Kansas requires operators and drillers to be licensed prior to producing. Licensing operators is considered to be a form of financial assurance because it allows latitude to work with operators or totally shut down the production of an operator by suspending or revoking the license. Loss of production on all operated leases serves as a deterrent from defaulting on the responsibility to either plug or produce all wells. Kansas has recently adopted bonding legislation (see Section IV), which takes effect January 1, 1998. Recent legislation in Mississippi authorizes the Oil and Gas Board to require proof of financial responsibility for each well. Louisiana is the only state not currently requiring some form of security or financial assurance. Louisiana statutes provide authority for the Commissioner of Conservation to promulgate bonding rules and regulations, although none have been enacted.

The majority of states permit the regulatory agency to change the bond amount by regulation. In New Mexico and Oklahoma, that authority is limited with flexibility on individual wells or within a range set by the legislature. The bond amounts in California, Indiana, Iowa, Kentucky, New York, Oregon, Texas, and West Virginia are established solely by the state legislature.

A number of states either require filing a separate security or financial assurance for site restoration, or restoration is included in the plugging bond. The states of Alabama, Florida, New York, Pennsylvania, Utah, and Virginia cover site restoration as an obligation of the bond. Amounts for site restoration range from \$1,500 per well in Tennessee, to \$100,000 per lease or \$500,000 statewide in Alaska.

Some states have the authority to either place a lien on the surface equipment of a well if the operator fails to comply with the plugging regulations, or actually become the owner of the equipment. Arizona, California, Illinois, Nebraska, Oklahoma, and Pennsylvania may file liens on abandoned equipment. In Kentucky, the state claims the property unless it is claimed by the lessor, or someone with evidence of title other than the operator, although no liens can be filed. In Louisiana prior to a sheriff's sale, the Commissioner of Conservation is notified, if appropriate, and that official may place a lien that can follow to a third party. No lien authority exists in Michigan although, in practice, the contractor removes the equipment as part of the cleanup, and may dispose of the equipment and credit the state for the value of the salvage. Following a hearing, equipment in North Dakota may be confiscated after a well is plugged. In West Virginia, the party conducting the plugging operations or the surface owner may take the equipment.

Once a state has determined that it has the responsibility to plug a well, various obstacles have been encountered along the path to closure. These obstacles may include: state procurement procedures, which make it difficult and time-consuming to obtain bids; resistance of landowners; limited access to the wellbore; and inability to quickly obtain funds from securities.

A complete list of plugging and restoration bond amounts follows as Table I.

Table I. State Security or Financial Assurance Requirements

State	Security First Required/ Last Modification	Securities Permitted	Security for Single Wells	Blanket Bond	Can Regulatory Authority Alter Amount?	Separate Site Restoration Bond?	Amount
Alabama	1945/1976	Surety	\$5,000 to \$50,000 based on depth	\$100,000	YES	NO	Included in plugging bond
Alaska	1958/1986	Surety, CD	\$100,000 minimum	\$200,000 minimum	YES	YES	\$100,000 /lease
Arizona	1959/1992	Cash, surety, CD	\$10,000 (<10,000 ft) \$20,000 (>10,000 ft)	\$25,000	YES	NO	N/A
Arkansas	1983/1995	Cash, surety, CD, Letter of credit	\$3,000	N/A	YES	NO	N/A
California	1931/1977	Cash, surety, CD	\$10,000 (0-5,000 ft) \$15,000 (5,000-10,000 ft) \$25,000 (>10,000 ft) Released upon well completion	\$100,000 onshore \$250,000 offshore	NO	NO	N/A
Colorado	1951/1988	Cash, surety, CD, treasury bills	\$5,000	\$30,000	YES	YES	When mineral interest is severed from surface — \$2000-\$5000
Florida	1946/1969	Cash, surety, CD	\$50,000, \$100,000 Petroleum E&P Bond Trust Fund \$4,822 first year, \$1,801 per year after	\$1,000,000 \$30,000	YES	NO	Included in plugging
Iowa ²	1963	Cash, surety, CD	\$15,000	\$30,000	?	NO	N/A
Illinois	1939/1990	Cash, surety, CD irrevocable letter of credit Security is now only required for new operators, and must be maintained for two years; released, and operator responsible for annual fee.	\$1,500 (<2,000 ft) \$3,000 (>2,000 ft)	\$25,000 (0-25 wells) \$50,000 (26-50 wells) \$100,000 (>50 wells)	YES	NO	N/A

Table I. State Security or Financial Assurance Requirements (Continued)

State	Security First Required/ Last Modification	Securities Permitted	Security for Single Wells	Blanket Bond	Can Regulatory Authority Alter Amount?	Separate Site Restoration Bond?	Amount
Indiana	1947/1985	Cash, bond, CD	\$2,000	\$30,000	NO	NO	N/A
Kansas	1982/1996	Licensed operators, drillers & pluggers; suspension or revocation of license causes shutdown of operator statewide until in compliance. (through 1997) Surety, CD, acceptable compliance record plus fee, payment in lieu, lien on tangible property (effective 1/1/98)	\$0.75 per foot	Wells < 2,000 ft: 1-5 = \$5,000 6-25 = \$10,000 > 25 = \$20,000 Wells > 2,000 ft: 1-5 = \$10,000 6-25 = \$20,000 > 25 = \$30,000	NO	NO	N/A
Kentucky	1966/1990	Cash, surety, CD, Letter of Credit	\$1 per foot; \$500 increments	\$10,000	NO	NO	N/A
Louisiana	None	N/A	N/A	N/A	N/A	N/A	N/A
Maryland ²	1957	Cash, surety, CD	\$100,000 maximum	\$500,000 maximum	YES	NO	N/A
Michigan	1931/1977	Cash, surety, CD	\$5,000	\$50,000	NO	NO	N/A
Mississippi	1992	None, now requires proof of financial responsibility					
Missouri	1966/1989	Surety, CD, letter of credit	\$1,000 (0-500 ft) \$2,000 (501-1,000 ft) \$3,000 (1,001-2,000 ft) \$4,000 (2,001-5,000 ft) \$4,000 + \$1 per foot (>5,100 ft)	\$20,000 (0-800 ft) for maximum of 50 wells \$30,000 (801-1,200 ft) for maximum of 15 wells	YES	NO	N/A

Table I. State Security or Financial Assurance Requirements (Continued)

State	Security First Required/ Last Modification	Securities Permitted	Security for Single Wells	Blanket Bond	Can Regulatory Authority Alter Amount?	Separate Site Restoration Bond?	Amount
Montana	1954/1993	Surety, CD	\$5,000 (<3,500 ft) \$10,000 (>3,500 ft)	\$25,000	YES	NO	N/A
Nebraska	1959/1984	Cash, surety, CD	\$5,000	\$25,000	YES	NO	N/A
Nevada	1954/1976	Cash, surety, CD	\$10,000	\$50,000	YES	NO	N/A
New Mexico	1935/1986	Surety, CD	\$5,000 (<5,000 ft) \$7,000 (5,100-10,000 ft)	\$50,000	NO ³	YES	\$10,000 lease, \$20,000 blanket
New York	1963/1985	Cash, surety, CD, letter of credit	\$2,500 (<2,500 ft) \$5,000 (2,500-6,000 ft) >6,000 ft. anticipated plugging costs	\$25,000 to \$100,000 \$40,000 to \$150,000	NO	NO	Security covers plugging & restoration
North Dakota	1941/1992	Cash, surety	\$15,000 Commercial disposal wells must single well bond	\$50,000 (10 wells) \$100,000 (no limit) No \$100,000 blanket bond may have more than 10 unplugged dry holes and abandoned wells	YES	NO	N/A
Ohio	1963/1989	Cash, surety, CD, letter of credit	\$5,000	\$15,000	YES	NO	N/A
Oklahoma	1922/1990	Surety, CD, letter of credit, financial statement	As established by licensed pluggers	\$25,000 or \$50,000 net worth in Oklahoma for financial statement	NO ³	NO	N/A
Oregon ²	1953	Cash, surety, letter of credit	\$10,000 (<2,000 ft) \$25,000 (>2,000 ft)	\$150,000	YES	NO	N/A

Table I. State Security or Financial Assurance Requirements (Continued)

State	Security First Required/ Last Modification	Securities Permitted	Security for Single Wells	Blanket Bond	Can Regulatory Authority Alter Amount?	Separate Site Restoration Bond?	Amount
Pennsylvania	1985/1992	Cash, surety, CD, fee-in-lieu for pre-act wells	\$2,500 fee-in-lieu (1-10 wells) \$500 per year (11-20 wells) \$1,000 per year (>20 wells)	\$25,000	YES	NO	Security covers drilling, plugging, water supply, replacement and restoration
South Carolina ²	1976	Cash, surety	\$20,000 (0-10,000 ft) \$30,000 (10,000-15,000 ft) \$40,000 (15,000-20,000 ft) \$50,000 (>20,000 ft); submerged lands \$100,000	\$100,000	NO	NO	N/A
South Dakota	1943/1979	Cash, surety, CD	\$5,000	\$20,000	YES	YES	\$2,000 per well, \$10,000 blanket
Tennessee	1968/1988	Cash, surety, CD, letter of credit	\$2,000	\$10,000	YES	YES	\$1,500, reduced to \$1,000 after initial reclamation
Texas	1983/1991	Cash, surety, letter of credit, well fee, first lien on equipment when value is equal to bonding	Annual fee ranges from \$100 to \$750 plus \$100/inactive well	\$25,000 (1-10 wells) \$50,000 (11-99 wells) \$250,000 (>100 wells)	NO	NO	N/A
Utah	1955/1983	Cash, surety, CD, letter of credit, negotiable U.S. bonds	\$1,000 (<1,000 ft) \$10,000 (>1000- <3000ft) \$20,000 (>3000-<10000ft) \$40,000 (>10,000 ft)	\$10,000 (<1,000 ft) \$80,000 (>1,000 ft)	YES	NO	

Table I. State Security or Financial Assurance Requirements (Continued)

State	Security First Required/ Last Modification	Securities Permitted	Security for Single Wells	Blanket Bond	Can Regulatory Authority Alter Amount?	Separate Site Restoration Bond?	Amount
Virginia ¹	1955/1990	Cash, surety, CD	\$10,000 plus \$2,000 per acre of disturbed land	\$25,000 (1-15 wells) \$50,000 (16-30 wells) \$75,000 (31-50 wells) \$100,000 (512 or more wells) For purposes of calculating blanket bond amounts, from one-tenth of an acre to five acres of disturbed land for a separately permitted gathering pipeline is equivalent to one well.	YES for single well bonds only	NO	Security includes plugging and restoration
West Virginia	1963/1992	Cash, surety, CD, irrevocable letter of credit, consolidated investment fund	\$5,000	\$50,000	NO	NO	N/A
Wyoming	1951/1992	Cash, surety, CD, letter of credit, certified check	\$5,000 (<2,000 ft) \$10,000 (>2,000 ft)	\$25,000 additional amount may be required for dormant wells	YES	NO	N/A

¹ States that were new on this report.

² States that have flexibility on individual wells or within range set by legislature.

³ Michigan expects new rules in late 1996 which will increase bonding amounts and allow use of financial responsibility.

C. PLUGGING FUNDS AND WELL PLUGGING AUTHORIZATION

Most states have established plugging funds that vary widely, both in scope and funding mechanisms, to ensure that wells for which no or insufficient financial assurance exists are properly plugged and abandoned. As the wells for plugging and abandonment are identified, they are included on waiting lists established by the states and prioritized for plugging and abandonment. The number of wells on each state's waiting list may be different from the number of orphan wells because:

- ◆ States plug wells other than orphan wells.
- ◆ Some orphan wells may later be adopted by an operator and returned to production or other use.
- ◆ States prioritize among wells to be plugged, focusing on those that pose the greatest potential harm.

Idle wells are not necessarily an environmental threat. Many wells are allowed to remain idle with approval of state regulatory agencies because they are not threatening the environment or public safety. However, an increase in the number of idle wells, which may or may not become orphan wells, can cause concern for state agencies.

Changes in State Plugging Fund Balances

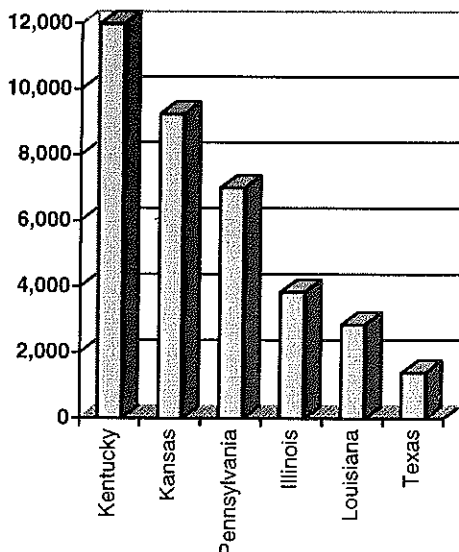
Increases Since 1992

Arkansas	\$500,000
California	\$150,000/year
Colorado	\$721,000
Florida	\$118,000
Indiana	\$325,000
Kentucky	\$1,300,000
Louisiana	\$5,917,000
Michigan	\$567,000
Mississippi	\$1,200,000
Missouri	\$30,500
Montana	\$20,000
Tennessee	\$11,000
Texas	\$3,140,000
Utah	\$164,000
Virginia	\$112,000

Decreases Since 1992

New Mexico	\$600,000
New York	\$778,000
North Dakota	\$26,000
Ohio	\$500,000
Pennsylvania	\$573,000
West Virginia	\$217,000

States With More than 1,000 Wells Waiting to be Plugged



Since the completion of the original idle well survey in 1992, plugging of orphan wells by state regulatory agencies has become a significant issue. Louisiana, Michigan, and Pennsylvania have established new plugging funds to address the orphan well problem. Fourteen states have increased their plugging fund balances since the original survey (see inset), while six states have lower plugging fund balances since the original survey. These declines may be attributable to using funds for plugging and site restoration, changes in activities that contribute to the fund (fees, etc.), and administrative changes redirecting funds elsewhere.

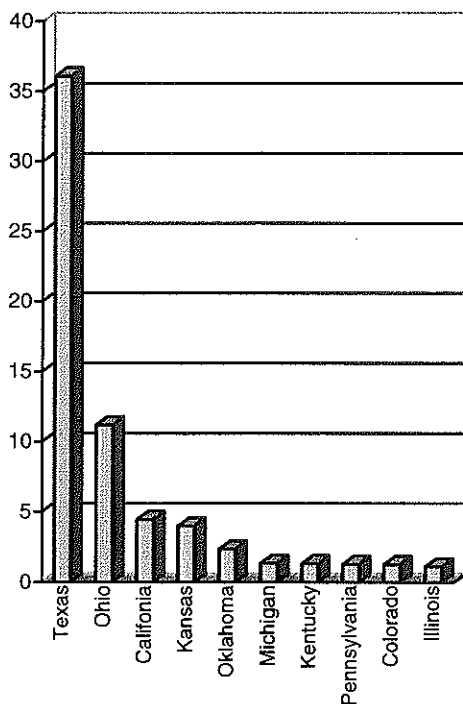
The number of wells waiting to be plugged in individual states at any given time may depend on a variety of factors, such as the number of oil and gas wells within the state regulatory program, the adequacy of security or financial assurance provided by oil and

gas operators, the availability of state plugging funds and staff resources, and state procurement procedures. Legal issues arising from insolvency can also delay plugging by either operators or the state.

Kentucky remains the state with the most wells waiting to be plugged, an estimated 12,000. Prior to recent changes that strengthened financial responsibility, operators often walked away from wells that were no longer economically profitable, leaving the cost of plugging to the Commonwealth. Kansas has the second largest number of wells waiting to be plugged — an estimated 9,250. [Note: As of April 1996, Kansas was completing an inventory of all idle wells and currently believes a significant number of wells may be orphaned, with estimates as high as 48,000.] Four additional states have more than 1,000 wells currently waiting to be plugged with state funds: Pennsylvania — 7,008; Illinois — 3,844; Louisiana — 2,849; and Texas — 1,395. States with lower, but significant numbers of wells on the state plugging list include Ohio — 400; Michigan — 279; West Virginia — 200; Oklahoma — 194; and California — 145. The number of wells waiting to be plugged may not correspond to the number of orphan wells reported in Section III-H. This is

because most states have a process to follow for adding wells to the state plugging list. Although all orphan wells reported may ultimately require plugging with state funds, the figures reported in this section are limited to those wells that have already been approved for plugging with state funds.

**Well Plugging Expenditures
Through December 31, 1994
\$ Millions**



The following states have been very active in plugging wells under their respective programs since the original survey in 1992: Texas — 4,002 wells plugged; Kansas — 301; Illinois — 243; Oklahoma — 222; Kentucky — 204; and California — 70. As of December 31, 1994, the states that have plugged the greatest number of wells under their respective programs are Texas — 8,421; Kansas — 1,250; Ohio — 1,127; Kentucky — 636; Oklahoma — 514; Illinois — 255; and California — 249. Those states with significant fund expenditures under their programs, as of December 31, 1994, are: Texas — \$36,074,000; Ohio — \$11,200,000; California — \$4,472,000; Kansas — \$4,003,000; Oklahoma — \$2,361,000; Michigan — \$1,353,900; Kentucky — \$1,323,000; Pennsylvania — \$1,273,000; Colorado — \$1,250,276 and Illinois — \$1,100,000.

Through December 31, 1994, states have spent \$69.2 million to plug and abandon 12,831 wells. The national average plugging cost is around \$5,400 per well, with state averages ranging from a high of \$125,000 per well to a low of \$1,075 per well. A cautionary note should be mentioned regarding the average plugging costs based upon the number of wells plugged and the amount of money spent. Some states are allowed to charge certain administrative or staffing costs to their plugging funds (which would increase the average cost per well), while others charge only the actual costs of plugging and site restoration to the fund. In many instances, the states have established priority systems for expenditures of monies under their respective

plugging funds. High on any state's list are wells that are either causing or have the greatest potential to endanger the environment and/or public health. Such wells frequently are more costly to plug and abandon than a well that is in good condition. Therefore, the average costs extrapolated from the figures available in this study may not reflect true plugging costs. Nonetheless, using the calculated national average plugging cost of \$5,400 per well, potential state plugging liability can be estimated. [For individual states, actual plugging costs may be higher or lower than the national average.] If all of the nearly 63,500 orphan wells identified in this report (see Section III-H) require state plugging, and per well costs are equal to the national average, total state plugging liability could be around \$342.9 million.

Funding mechanisms vary greatly for the individual states. Some states supplement their plugging funds with bonds or other security forfeitures, or utilize plugging fund monies to supplement a security that is insufficient to plug a well. In some states, money is made available from general appropriations to the particular oil and gas agency, such as in Arkansas where funding comes from the Commission's budget. Like Arkansas, most of California's plugging funds come from its Division of Oil, Gas, and Geothermal Resources budget, which is supplemented by fees of \$100/year per unbonded, long-term, idle well. The Mississippi Oil and Gas Board uses excess funds from the Oil and Gas Conservation Fund (when the fund contains an amount over \$200,000 above the current fiscal year's estimated budget) to plug oil, gas, and Class II wells that are determined to be an imminent threat to the environment.

Michigan now has two funds that can be used for plugging wells: 1) Part 201 Environmental Remediation (1994 PA 451, as amended), is funded from general obligation bonds which are used to clean up contaminated sites, including oil and gas well sites; and 2) the Orphan Well Fund established in 1994, which is funded from a severance tax on oil and gas production. Bond forfeiture and salvage revenue are also used to replace expended funds. Pennsylvania also has two funds that can be used for plugging wells: 1) the Well Plugging Restricted Revenue Account, established in 1984 and renamed the Abandoned Well Plugging Fund in 1992, is funded by a \$50 surcharge that is added to the permit fee; and 2) the Orphan Well Fund, established in 1992, is funded by a permit application surcharge of \$100 for an oil well and \$200 for a gas well.

Permit fees are used to fund well plugging operations in Alabama, Florida, Illinois, New York, North Dakota, Texas, Virginia, and West Virginia. States that utilize a percentage of the gross production assessment or tax for well plugging include Colorado, Kansas, New Mexico, Ohio, Oklahoma, Utah, and Wyoming. Kentucky funds its plugging account solely with bond forfeitures and the interest accrued on the plugging fund accounts. Other states including Missouri, New York, Tennessee, and Texas utilize funds from penalty assessments for their plugging fund.

Nine states — Alaska, Arizona, Idaho, Maryland, Nebraska, Nevada, Oregon, South Carolina, and South Dakota — have not established a plugging fund of any type. The fund established in Alabama in 1990 is dedicated to coalbed methane wells only.

Costs to administer plugging funds can be substantial and can require resources to be diverted from other important regulatory functions. While several states utilize plugging funds to pay the administrative costs of the plugging program, including staff positions, other states lack this authority.

Many states have adopted policies or use specific criteria to set priorities for use of their plugging funds. In 1993, the IOGCC developed guidelines for state prioritization schedules (see

State Prioritization Criteria

plugging when the Division learns they are idle and a well owner cannot be found.

Oklahoma	Wells posing an endangerment to human health and safety are the highest priority followed by wells posing environmental damage, and progressively less threat to the environment.
Pennsylvania	Division chief prioritizes wells for both funds based upon various factors as follows: Abandoned Well Plugging Fund — possible effect on private water supplies, public safety, surface and groundwater quality, and well integrity; Orphan Well Plugging Fund — based on location (public vs. private land, land-use, proximity to water supplies, streams, lakes, and buildings) [See Appendix B].
Texas	Wells are ranked based upon a numeric score. Leaking wells with a higher score are ranked as Priority 1, while other wells with lower scores are ranked as Priority 2 through 5. The priority system includes 20 environmental, wildlife, and/or human health factors. State plugging funds are designated for use in plugging the highest priority wells first (see Appendix B).
Utah	1) Potential for environmental degradation; 2) no responsible party for plugging; 3) no surety available for plugging; and 4) forfeited surety insufficient for plugging.
Virginia	1) Gas and Oil Plugging and Restoration Fund — to supplement bond proceeds to pay full plugging and restoration costs when the blanket bond is insufficient; 2) Orphaned Well Fund — wells abandoned prior to July 1, 1950, that pose an imminent danger to public safety.
West Virginia	The degree to which a well is a threat to health, safety, or the environment, and the degree to which a well is an impediment to mineral development.
Wyoming	Priority given to wells in sensitive areas or wells in a condition to cause surface damage or endanger lives.

Table II shows funding amounts, sources, number of wells plugged, and monies spent or obligated.

Table II. State Plugging Funds

State	Fund Established	Target Amount	Current Amount (as of 12/31/94)	Funding	As of 12/31/94		
					No. of Wells Plugged	Amount Spent	No. of Wells on Waiting List
Alabama	1990	\$1,000,000	\$335,000	\$150 plugging fee for all coalbed methane wells permitted	0	\$0	0
Alaska		N/A					
Arizona		N/A					
Arkansas	1991	\$150,000	\$650,000	From Commission budget including tax assessments, permit fees, etc.	8	\$78,000	N/A
California	1977	\$500,000 per year	\$500,000 Fund does not build up from year to year	Oil & gas production assessment and unbonded 5 year idle well fees	249	\$4,472,000	145
Colorado	1991	\$500,000	\$961,000	0.2 mil surcharge on market value of oil, gas, and CO ₂ and severance tax appropriations	10	\$1,250,376	20
Florida	1989	Unlimited	\$220,000	Permit fees and per well fees from trust fund	0 (fund has not reached level to plug well and restore location and access road)	\$0	0
Illinois	1991	\$500,000– \$750,000 per year	\$500,000–\$750,000 per year	Operator fees, based on no. of wells \$150/year – 1 well \$300/year – 2 to 5 wells \$750/year – 6 to 25 wells \$1,500/year – 26 to 100 wells \$1,500/year + \$12.50/well – over 100 wells	255	\$1,100,000	3,844
Indiana	1988	\$1,000,000	\$825,000	Revenue from penalty assessments and permit fees	9	\$200,000	currently developing inventory

Table II. State Plugging Funds (Continued)

State	Fund Established	Target Amount	Current Amount (as of 12/31/94)	Funding	As of 12/31/94		
					No. of Wells Plugged	Amount Spent	No. of Wells on Waiting List
Kansas ¹	1982	unlimited	\$500,000 per year	Allocated from conservation fee fund which is mix of oil & gas assessments and permit fees	1,250	4,003,000	9,250 ¹
Kentucky	1966	none	\$2,900,000	Forfeited bonds, with forfeited bond & cash bond account interest transferred to plugging fund	636	\$1,323,150	12,000
Louisiana	1993	\$10,000,000	\$6,000,000	\$0.01 per barrel of oil and \$0.002 per Mcf of gas produced	71	\$2,589,680	2,849
Maryland	N/A						
Michigan	1968/1994 ²	none/\$3,000,000	\$567,000	Two percent of revenue received from severance tax	50/0	\$890,000/ \$243,000	279
Mississippi	1991	none	\$1,200,000	Oil & Gas Board funds in excess of budget requirements	30	\$900,000	10
Missouri	1983	\$100,000 ceiling	\$40,000	Penalty assessments on operators and bond forfeitures	40	\$43,000	N/A
Montana	1989	\$200,000	\$200,000	Tax on production, bond forfeitures	46	\$1,180,000	60
Nebraska	N/A						
Nevada	N/A						
New Mexico	1977	\$500,000 to \$1,000,000	\$300,000	0.01% of value of gross production of oil and gas	30	N/A	0
New York	1981	\$1,500,000	\$222,000	A \$100 drilling permit fee	6	\$250,000	20
North Dakota	1983	\$50,000	\$49,000	Permit fees, forfeitures, oil and gas impact fund	3	\$113,000	1
Ohio	1967	-	\$800,000	The fund receives 20% of the mineral severance tax on oil and gas production; and bond forfeiture	1,127	\$11,200,000	400
Oklahoma	1990	\$5,000,000 over five years	\$200,000	10.526% of 0.095 of 1% of value of gross production of oil and gas	514	\$2,360,762	194
Oregon	N/A						
Pennsylvania	1984/1992	none	\$527,000	Surcharge on permit fees	62	\$1,273,380	7,008

Table II. State Plugging Funds (Continued)

State	Fund Established	Target Amount	Current Amount (as of 12/31/94)	Funding	As of 12/31/94		
					No. of Wells Plugged	Amount Spent	No. of Wells on Waiting List
South Carolina	N/A						
South Dakota	N/A						
Tennessee	1987	none	\$21,000	Penalty assessments	0	\$0	12
Texas	1983	\$10,000,000 per year	\$4,790,000	Fees, enforcement penalties, proceeds from bond forfeitures	8,421	\$36,074,158	1,395
Utah	1992	\$60,000	\$164,000	From oil & gas conservation tax revenue	14	\$106,000	42
Virginia ¹	1990	\$100,000 both funds	Gas and Oil Restoration Fund \$160,000 Orphaned Well Fund \$106,000	Annual permit fee under blanket bond until \$100,000 reached, may be reassessed if fund falls below \$25,000	0	\$0	25
West Virginia	1977	none		\$100 fee for each well drilled plus bond forfeitures; plus civil penalties collected	39	\$360,000	200
Wyoming	1951	none	N/A	From oil & gas conservation tax revenue	6	\$82,600	unknown
TOTALS			\$22,686,000		12,831	\$69,249,106	37,754

¹ Kansas is completing an on-ground survey of all abandoned wells in the state. When the survey response was submitted, 9,250 wells had been identified. Kansas believes that this number could eventually grow to as high as 48,000 wells when the on-ground survey is completed.

² In Michigan, a special appropriation was made to plug specific wells in 1968. Approximately 50 wells were plugged from 1968 to 1994 using various sources of revenue.

D. APPROVAL PROCEDURES AND TECHNICAL REQUIREMENTS

When the Petroleum Technology Transfer Council (PTTC)¹ surveyed independent oil and gas producers about their technology needs and regulatory impediments, "produce or plug" requirements were highlighted as an area of concern.² Producers said that such requirements sometimes force premature abandonment, to no one's benefit. State regulators are also concerned about premature abandonment and have worked to find ways to avoid this potential waste of oil and gas resources. Procedures have been developed by states to allow wells to remain viable for production or other use in the future, if the well does not pose a threat to human health or the environment. This is done to allow operators to further evaluate the economic potential of existing producing horizons, new potential productive zones, enhanced recovery operations, waste disposal operations, and other cost-saving technologies. Future increases in price may make these wells economic to produce again. It is well known that once a well is plugged and abandoned, the cost is prohibitive to reenter it and recover marginal reserves.

States use several terms to describe wells that are allowed to remain unplugged but not producing, as described in Section III-A. For purposes of this section, the term *temporary abandonment* will denote wells approved by a state agency, under the terms of that agency's requirements, to remain unplugged and non-producing for a period of time.

Most states allow wells to remain idle for a short period (six months to one year) without approval by the state agencies. Beyond that period, most states require approval for production and injection wells to remain idle. California is the only major producing state that does not require approval for wells to be temporarily abandoned. Iowa does not address the issue of temporary abandonment since all wells in the state are now plugged and abandoned. Maryland does not give temporary abandonment approval for injection wells because it prohibits wells that inject oil and gas nonhazardous wastes.

Reasons for Temporary Abandonment
<input type="checkbox"/> Future use as: <ul style="list-style-type: none">- Producing well- Enhanced recovery (injection) well- Disposal well
<input type="checkbox"/> Economic conditions
<input type="checkbox"/> Waiting for pipeline connection

Conditions under which temporary abandonment is allowed do not vary widely among states. Future utility of a well, either for production purposes, enhanced recovery, or injection, is the most common reason for temporary abandonment, followed by economic conditions. Most states are not in the position to determine the economic viability of wells, leases, or operations, and leave those tasks to the owner/operator. However, states requiring a statement of future use may require extensive geological and engineering information, including a detailed plan and time schedule for returning the well to use. If owner/operators fail to properly justify

¹ The Petroleum Technology Transfer Council is a nonprofit organization established to facilitate the transfer of oil and gas production technologies to independent producers across the U.S. The PTTC maintains 10 regional technology transfer centers.

² Petroleum Technology Transfer Council, *Technology and Related Needs of U.S. Oil and Natural Gas Producers*, March 1996.

requests or fail to comply with the plans, temporary abandonment permits may be denied or revoked. Some states (Alabama, Kentucky, Nevada, and New York) specifically mentioned connections to pipelines as a condition for temporary abandonment. Most other states also allow wells to be idle for this reason, but probably define these wells as shut in rather than as temporarily abandoned. Lack of a pipeline connection is a common reason for temporarily idling gas wells, especially in newer producing areas.

Of the states requiring prior approval, most allow an initial period for temporary abandonment of six months to one year. Those states allowing a longer initial period include: Florida – up to 10 years; Illinois and Indiana – five years; Kentucky – up to two years; Michigan – five years; Oklahoma – two years; Pennsylvania – five years; West Virginia – five years; and Wyoming – two years. Most states allow the program director wide latitude in determining if a permit for temporary abandonment should be approved, extended or denied. Maryland does not specify a definite time period in granting initial approval for temporary abandonment of a well. While Alaska has no definition for temporary abandonment, it does allow indefinite suspension based on the lack of production and market facilities or the need for pool delineation or evaluation. The requirements for suspension are similar to those for permanent abandonment. They include an additional requirement for a bridge plug 200–300 feet below surface, capped by 100 feet of cement. The Environmental Protection Agency's guidance for temporary abandonment of injection wells is described in Appendix C.

Initial Period Approved for Temporary Abandonment	
	Number of States Allowing
Indefinite	2
10 years	1
5 years	4
2 years	4
1 year	7
6 months	8
Case-by-case	4
Approval not required	4
Not applicable	1

Nearly all states allow extensions beyond the initial period of temporary abandonment. In Illinois, extensions are allowed only if future utility for the well can be demonstrated. All other states except Michigan, Missouri, and Texas allow an unlimited number of extensions, although in some states, such as Pennsylvania and Colorado, the extension must be renewed annually. Missouri allows six-month extensions for up to two years, while Michigan allows extensions only by the supervisor. New York allows one-year extensions with cause. Texas limits its one-year extensions of temporarily abandoned status to four times for unbonded wells, although bonded wells may be extended an unlimited number of times. Twenty-four of the 35 states surveyed require that injection wells receive temporary abandonment approval in the same manner as production wells.

Approving and granting extensions for temporarily abandoned wells does not mean that a state takes no further interest in the condition of the well. Sixteen states have specific requirements for testing temporarily abandoned wells. Most require a mechanical integrity test (MIT) of the well every two to five years. Wells that cannot demonstrate integrity are ordered repaired or plugged. In California, a fluid-level test is required for all five-year (long term) idle wells, with a two-year testing interval for wells in freshwater areas and a five-year testing interval for wells in areas with no fresh water. A MIT is required when a fluid level is substantially different between testing intervals or is above the base of fresh water. Texas requires a fluid-level survey every year for wells more than 25 years old, but Kansas and Nebraska require this test annually, with a MIT depending on well conditions. Colorado requires a MIT within two years of temporary abandonment, then every five years thereafter. North Dakota requires a MIT only if problems are suspected, whereas Pennsylvania requires a MIT annually. In Virginia, operators are required to measure shut-in pressures annually. Oklahoma

does not require a MIT on temporarily abandoned production wells, but does require temporarily abandoned injection wells to pass a MIT every two years.

When wells become orphaned and the states' responsibility to plug, most states do not explicitly evaluate the economic potential of the well for future use; however, Alaska does. If Alaska's Commission determines that an orphaned well has a tangible value as a producer, does not pose a threat to correlative rights, a freshwater or a hydrocarbon bearing zone, and is of sound mechanical integrity, the well may not be ordered plugged. In other states, the use of state funds to plug orphan wells is done on a prioritized basis (see Section III-C and Appendix B). Wells that pose no threat and are in sound mechanical condition are either not plugged or have a very low priority status. These states generally maintain an "Orphaned Well List" that is accessible to the public and operators. If someone wanted to use an orphaned well, complied with the state's individual operator requirements, and obtained legal title, the state can transfer the well to the new entity. In most states this rarely occurs, but Texas has an innovative program to encourage the reuse of wells about to be plugged with state funds (see Section IV).

Industry has also developed appropriate procedures for well abandonment (both permanent and temporary). The American Petroleum Institute (API) has developed risk-based guidelines for operators who must ensure environmental protection for shut-in, temporarily abandoned, or permanently abandoned wells.³ While these guidelines are subordinate to existing state requirements, they provide guidance to operators in states lacking requirements, as well as identifying good operating practices. The shutting-in or the temporary abandonment of wells may be performed when a wellbore has future utility — such as in enhanced recovery projects — and must be held in a condition whereby routine operations can restore it to service. Permanent abandonment is done when no future utility for a wellbore exists and the wellbore is indefinitely sealed to prevent fluid migration. API's risk-based guidelines are discussed further in Section III-I.

A brief synopsis of state approval procedures and technical requirements is found in Table III.

³ American Petroleum Institute, *Environmental Guidance Document: Well Abandonment and Inactive Well Practices for U.S. Exploration and Production Operations*, API Bulletin E3, January 31, 1993.

Table III. Approval Procedures and Technical Requirements

State	Conditions For Temporary Abandonment	Specific Approval Required	Initial Period	Extension	Test Req'd on Idle Production Wells	Frequency	Approval for Idle Injection Wells
Alabama	Future utility, connection to pipeline	YES	6 months	6 months, unlimited number	NO	N/A	YES
Alaska	Production & market facilities specified not available, pool delineation & evaluation necessary to determine development	YES	Indefinite	N/A	NO	N/A	Not specified
Arizona	Future utility, observation and testing	YES	Case by case	N/A	NO	N/A	YES
Arkansas	Operator economic conditions, future utility	YES, When security is filed	1 year	1 year, unlimited number	NO	N/A	NO
California	Wells operating close to economic limit, future utility	NO	N/A	N/A	YES	Fluid level for all five year idle wells	NO
Colorado	Operator economic conditions, future utility	YES	1 year	1 year, unlimited number	YES	Within 2 years of shut-in	YES
Florida	Future utility	YES	Up to 10 years	Up to 10 years, unlimited number	YES	Every 5 years for most wells, every 2 years for some	YES
Illinois	Future utility and testing	YES	5 years	Possible, based on future utility	YES	MIT every 5 years or fluid level every year	YES
Indiana	Demonstration of mechanical integrity	YES	5 years	5 years, with justification	YES	Initial application	YES
Iowa ¹	Not specified, all wells in Iowa have been plugged and abandoned						

Table III. Approval Procedures and Technical Requirements (Continued)

State	Conditions For Temporary Abandonment	Specific Approval Required	Initial Period	Extension	Test Req'd on Idle Production Wells	Frequency	Approval for Idle Injection Wells
Kansas	Economic conditions, future utility	YES	1 year	1 year, unlimited number, proof of need more stringent after 5 years and 10 years	YES – fluid level, if high MIT required	Fluid level test annually, MIT based on well conditions	YES
Kentucky	Economic conditions and connection to pipeline	YES	Up to 2 years, unlimited	2 years Operator must show casing string adequately cemented	N/A	NO	N/A
Louisiana	Future utility	YES	6 months	6 months unlimited numbers	NO	N/A	NO
Maryland ¹	Economic conditions, future utility, connection to pipeline	YES	Indefinite	N/A	NO	N/A	N/A
Michigan	Operator hardship, future utility	YES	6 months, (hardship) 5 years (utility)	Only by Supervisor of Wells	NO	N/A	YES
Mississippi	Economic conditions, future utility	YES	6 months	6 months unlimited number	NO	N/A	YES
Missouri	Future utility	YES	6 months	6 months, up to 2 years	NO	N/A	YES
Montana	Economic conditions, future utility	NO	N/A	N/A	NO	N/A	NO
Nebraska	Economic conditions, future utility	YES	1 year	1 year unlimited number	YES	Fluid level or MIT yearly	YES
Nevada	Future utility, pending pipeline construction	YES	6 months	6 months unlimited number	YES	MIT every 5 years	YES
New Mexico	Not specified	YES	Up to 5 years	As long as well passes MIT	YES	MIT every 1-5 years depending on test & interpretation MIT at state option	YES
New York	Future utility, pipeline construction	YES	1 year (shut-in) 90 days (TA)	1 year with cause (shut-in) reasonable time period with cause (TA)	NO		YES
North Dakota	Future utility	YES	1 year	1 year, unlimited number	YES	If problems suspected min. of every 5 years	YES

Table III. Approval Procedures and Technical Requirements (Continued)

State	Conditions For Temporary Abandonment	Specific Approval Required	Initial Period	Extension	Test Req'd on Idle Production Wells	Frequency	Approval for Idle Injection Wells
Ohio	Economic conditions, future utility	YES	6 months	6 months, unlimited number	NO	N/A	YES for 6 months only
Oklahoma	Economic conditions, future utility	YES	2 years	2 years, unlimited number	NO, only injection	Every 2 years	YES
Oregon ²	Economic conditions, future utility, surface impact	YES	Case by case	Case by case, unlimited number	NO	N/A	YES
Pennsylvania	Economic conditions, future utility	YES	5 years	Year to year, unlimited number	YES	MIT annually	YES
South Carolina ¹	Future utility	YES	6 months	6 months, unlimited number	YES	Not specified	YES
South Dakota	Economic conditions, future utility	YES	6 months	6 months, unlimited number	NO	N/A	YES
Tennessee	Not specified	NO	N/A	N/A	NO	N/A	NO
Texas	No threat of pollution	YES	1 year	1 year, 3 times, unlimited number for bonded wells	YES	Fluid level every year for wells more than 25 years old	NO
Utah	Economic conditions, future utility	YES	As necessary	As necessary	YES	Every 5 years or future utility when necessary	YES
Virginia	Economic conditions, future utility	NO	N/A	N/A	NO	N/A	NO
West Virginia	Bona fide future use	YES	Notice provided on monthly and annual reports 5 years maximum	May be renewed unlimited number	YES	As requested	NO
Wyoming	Economic conditions, future utility	YES	2 years	Up to 2 years, unlimited number	YES	Every 5 years	YES

¹ States that are new on this report

E. DATA MANAGEMENT, WELL TRACKING, AND INVENTORY METHODS

To identify and monitor idle wells, the vast majority of states indicated that they routinely review production and injection reports for wells with zero production and check current reports against previous reports to identify wells that have been removed. However, this was not the case in Florida, Illinois, Indiana, Kentucky, and Ohio. In Illinois, no authority is given to collect production data; in Kentucky, the production reports for each well are not made available to the state regulatory agency. Kentucky, however, recently initiated a production reporting program. This precludes this method as a way to identify idle wells in these two states. Florida and Ohio not routinely check production reports due to staffing limitations. Indiana reviews injection well reports but does not require production reporting. The ability to check idle wells through production reports is limited in those states that have production reporting on a lease basis rather than an individual well basis (i.e., Kansas, Louisiana, Missouri, and Texas).

Tools Used by States to Track Wells

- Analysis of production and injection reports
- Audits
- Field inspections
- Improved data management techniques

States also use other methods for identifying and monitoring idle wells. In California, production and injection reports for all wells are filed on a monthly basis. An idle well list is generated through comparative analysis of the monthly reports. Through its audit process, the state is able to check the accuracy of production and injection reports submitted by the operator. An additional check in the State of Louisiana occurs when an operator fails to submit its annual regulatory fee and other required reports. Alabama maintains an active file on all wells that have been drilled. For those that are not on production and have been inactive for six months, a letter is sent to the operator asking about the status and future utility of the well. In

addition, many states utilize field inspections to identify idle wells.

Data management capabilities of the states vary, and these capabilities have an impact on the ability to identify and monitor idle wells. The data available to identify and evaluate idle wells vary widely among the states. Useful information for identifying idle wells and determining their production capabilities or the risks associated with the well remaining idle include location, reservoir, age, construction, location of underground sources of drinking water, and other surface and subsurface conditions. Often, these data are not available for older wells, or are not included in the state's automated data management system. IOGCC has completed a guidance document on minimum and "expanded" categories of data that states should have available to manage all oil and gas wells, including idle wells.⁴

Additional information on data management capabilities of state regulatory programs (not specific to idle wells) was compiled recently by the Underground Injection Practices Research Foundation (UIPRF) for the Department of Energy.⁵ Also, many states recently have implemented, or are in the process of implementing, a Risk Based Data Management System

⁴ IOGCC, *Guidelines for States: Exploration and Production Data Management*, November 1996.

⁵ CH2M Hill and Digital Design Group, Inc., *Phase I Inventory and Needs Assessment of 25 State Class II Underground Injection Control Programs*, prepared for the Underground Injection Practices Research Foundation, July 1992.

(RBDMS) developed under the sponsorship of the Ground Water Protection Council⁶ and the U.S. Department of Energy. This PC-based program is designed to allow states to use risk analysis in a database program to track data related to oil, gas, and injection wells. The system includes several modules that cover permitting, enforcement, well construction and testing, and many other components.

A brief description of data collection and management methods currently used by the states follows.

Data Collection and Management Methods

<i>Alabama</i>	Geologic data includes well logs, core data, and core analyses. Engineering data includes monthly production reports, well tests, bottom hole pressure tests, pressure-volume-temperature (PVT) analyses, injection reports, completion and stimulation records. The Oil and Gas Board has also initiated a well-file management, production management, and injection management system for all wells. This system is partially completed at this time.
<i>Alaska</i>	A database is utilized for well-data collection or well history, including drilling data, well production and injection, gas disposition, gas flaring, digital well log data, reservoir parameters, and Oil and Gas Commission compliance reports.
<i>Arizona</i>	The state maintains production records, well files, and a sample and core repository. Production data are entered into a computer database, with basic well data including well status.
<i>Arkansas</i>	Monthly forms are received by the Arkansas Oil and Gas Commission. This information is not automated.
<i>California</i>	The principal database is the monthly well production and injection reporting system. All wells, other than abandoned wells, are included and monthly production and injection data are recorded. Printouts, microfiche, and various computer media are available. Well histories and technical well data are available on hard copy, microfiche, and microfilm. The implementation of Risk Based Data Management System (RBDMS) is under way.
<i>Colorado</i>	The state has three master databases: 1) a lease master database containing lease records and production information, 2) a well master database with specific technical data on wells, and 3) an injection well master database.
<i>Florida</i>	The state has recently implemented a PC-based computer system. Production statistics are stored on spreadsheets and basic well data are stored in database programs.

⁶ The Ground Water Protection Council is a national nonprofit organization of state and federal ground water and underground injection control regulatory agencies, regulated industry representatives, environmentalists, and concerned citizens.

Data Collection and Management Methods

- Illinois** The state maintains a networked, multi-user computer database on well location and current networked ownership, well construction, mechanical integrity test and temporarily abandonment test information, and compliance status. Another database is maintained on the overall compliance status and ongoing enforcement actions for each operator. The agency does not have the authority to collect production data.
- Indiana** The official records, which are on hard copy, include all the required state forms. The statistical and reporting data are stored in a computer database.
- Kansas** The Underground Injection Control inventory and plugged well database are on the state mainframe, which is part of the Kansas water database. Listings of temporarily abandoned wells under permit are computerized on a PC network at the Oil and Gas Division, Wichita Office, and active wells on the severance tax list are on the Department of Revenue database. Wells with approved temporarily abandoned status are tracked by each district office. Tracking covers status, renewal, and retesting date.
- Kentucky** The Geological Survey and the Department of Mines and Minerals have databases that track well location information and completion and plugging records. The data are available to the public in printout form or on overlay maps. The Geological Survey plans to automate well data and location information for public use. Production information is collected by the Department of Revenue; however, it is confidential. The Department of Mines and Minerals has initiated its own production reporting program beginning with 1994 production.
- Maryland** A PC database is utilized for maintaining oil and gas permit information, including well location and construction, subsurface geology, well completion, performance bond, liability insurance coverage, and enforcement actions. Monthly production information is confidential, and is kept separately in spreadsheets.
- Louisiana** Forms for well-data collection include production reports, well history and work resume reports, well completion or recompletion reports, and plugging and abandoning reports. This information is automated through the Production Accounting Reporting System and various well ledgers.
- Michigan** A mainframe database is utilized for permitting, production, subsurface data, compliance information, and well-status changes. The district offices maintain district-wide PC databases for average daily gas, oil, and water production, well status and type, and disposal wells utilized.
- Mississippi** The state agency is participating in an Underground Injection Practices Research Foundation program to assist states to improve their data management capabilities and incorporate data elements necessary for risk-based decision making.

Data Collection and Management Methods

Missouri	Production data, operator data, and well information (well construction, etc.) are automated in PC databases.
Montana	Information includes well data from files and production reports, which are filed in a computer-based system.
Nebraska	The state utilizes a database on a PC for its production and other well information, and is shifting the computer system to RBDMS on PCs.
Nevada	Data collected by the Nevada Bureau of Mines and Geology uses PC file software for the well database, and the Bureau also has the capability to generate custom-plotted maps.
New Mexico	Required reporting information is maintained on a database. The information is retrievable from this database using various programs. The system will be fully automated in 1997 when ONGUARD, the new state system, goes online.
New York	The state uses a multi-user system with a fully relational database. The state has over 32,700 wells in the database, out of an estimated 65,500 total wells drilled in the state. The annual production information has been computerized since 1983, and historic information is added as records become available and staffing constraints allow.
North Dakota	The various files, including lease master file, production records, and UIC file and injection data, are automated on a mainframe, in addition to the hardcopy files. Customized data are downloaded to a workstation as needed, and routine data are accessed through terminals to the workstation.
Ohio	Since 1982, the Ohio Division of Oil and Gas has maintained a database on each permitted well. The database includes follow-up information, including ownership data, the proposed formation, completion records, plugging records, and information on brine hauling. The database is stored on a mainframe computer, and individualized listings of well records can be requested by the industry and the general public.
Oklahoma	Databases are kept on permitting, well construction, production, sales, purchaser, operator, and well plugging. The system runs on a variety of platforms, including mainframe, client/server, and stand-alone PC.
Oregon	Production data are stored in a computerized database.
Pennsylvania	Hard copy files are maintained in the regional offices in Pittsburgh and Meadville. Information related to drilling, inspection, compliance, and bonding is entered into a mainframe computer that is accessed by staff and the public. Production information is entered into a DEC VAX computer. The mainframe is in the process of being converted to a DEC computer, which will make possible data interchange and sharing by the two systems.

Data Collection and Management Methods

- South Dakota** The state maintains geological and engineering files that include well logs; sample descriptions; core analyses; water, oil, and gas analyses; drill-stem test results; sample cuttings and cores; monthly production and injection reports; bottom-hole pressure tests; annual gas/oil ratio tests; mechanical integrity tests; underground injection control data; wells certified to the Federal Energy Regulatory Commission (FERC) for wellhead pricing; well completion and plugging reports; and sundry notices. An expanded database that will incorporate most of this information is being established and will be networked to other interested state agencies. Hard copies are maintained for consultation and copying.
- Tennessee** The state has one database with well information that is updated monthly. Records include location, test results, formation data, and other types of well data. The system includes approximately 10,000 records.
- Texas** The reporting information, included on numerous Information Management System IMS-type databases, is accessible through the Customer Information Control System (CICS) and database.
- Utah** Well data and production volumes are included in the Oil and Gas Information System. The database resides on a mainframe at the State Capitol. Physical well files and card files are available, as are microfiche and microfilm.
- Virginia** The Division of Gas and Oil maintains a computerized well data system. The system may be used to retrieve information on any particular well.
- West Virginia** Various databases are utilized for West Virginia oil and gas production information. The information is reported monthly by well and operator, and the operator may file information on diskette. All wells, even nonproducing wells, must file production reports.
- Wyoming** An inventory of wells and seismic drilling information is located on office PCs and on the state's mainframe. Both databases are updated continually as data are submitted. Monthly production, injection, and disposal pressures and volumes are keypunched, used for updates to the mainframe, and downloaded for office PC use. This information can be accessed via modem.

F. SALVAGE VALUE OF ORPHAN WELLS

Even though wells have been orphaned, they potentially have an asset value associated with them. Any lease equipment or hydrocarbons left in storage tanks on the lease may have value, and the hydrocarbons left in the reservoir could also potentially be viewed as an asset. Orphan wells also represent a liability to the state, since in many cases inadequate or no security exists to cover the cost of plugging, so the state will be required pay for plugging. Even where security exists, the state often must plug the well first, then attempt to claim the security. Wells in poor condition can pose further liability where human health or the environment could be endangered.

States were asked by the IOGCC survey if they determine the asset value of wells prior to plugging them. Most states are able to recover, through a variety of mechanisms, the asset value of any equipment or hydrocarbons remaining on the lease to offset the state costs of plugging the well, although in many cases operators have removed virtually all salvageable equipment prior to abandoning responsibility for the well. No states with oil or gas production indicated that they attempt to determine whether the hydrocarbons remaining in the reservoir have any value. Most states probably do not make this evaluation for several reasons: a new lease would likely need to be negotiated before another operator could use the well to access the reservoir, future economic conditions and technology may dictate the feasibility of recovering those "assets" in the reservoir, and without economic benefit to the state, allocation of staff resources to this evaluation is not prudent. Texas does have an innovative program to try to save for future hydrocarbon recovery older wells that might otherwise be abandoned (described in Section IV), but this program was not designed for orphan wells.

For all states except Washington, only the salvage value of equipment and hydrocarbons left at the well site is determined for wells scheduled for state-funded plugging. Most states have some form of a salvage program. However, the salvage value of a state-funded well plugging typically offsets only a portion of the well-plugging costs. Texas, by far the most active state plugging program (see Section III-C), has encountered less than five wells where the equipment salvage value was greater than the plugging costs. Since wells left for state plugging are often older wells, the equipment may have little or no resale value, and the only remaining value is typically from scrap metal.

The salvage value of equipment sold from state-funded well pluggings is determined by most states as part of a combined salvage and well-plugging bidding process. With a few exceptions, most states reduce their well-plugging costs by allowing well-plugging contractors to retain possession of the equipment in lieu of selling the equipment separately and depositing the proceeds in the state's general revenue fund or well-plugging fund. In many states, this approach is far simpler than having a separate salvage program due to state procurement requirements and the ease of dealing with both plugging and salvage in a single contract. The following is a summary of the approach to salvage in each state with some form of salvage program or asset value determination process.

Salvage Value of Orphan Wells

Alaska	Evaluation criteria for determining a well's asset value are whether or not a well may serve as a producing or a service well. Wells with high risks of damaging the integrity of freshwater or hydrocarbon zones are plugged with state funds, regardless of the well's asset value.
Arkansas	A well's salvage value is determined by the plugging contractor as part of the bidding process on wells plugged with state funds. Any equipment left on site may be retained by the plugging contractor.
California	Salvage value determination for a well plugged with state funds is considered in the bidding process using the formula " <i>Cost to plug the well – salvage value = net cost to the state.</i> " This approach may reduce significantly the cost to the state.
Illinois	Salvage value is established at the time a project is bid. Minimum acceptable salvage bids are established for each project.
Colorado	Any salvage from a well to be plugged with state funds is bid out at the same time the well is bid out for plugging. The salvage value of a well offsets a portion of the total plugging cost. However, if there are any tax liens against the equipment, it is not salvaged.
Iowa	Only a salvage value determination is made on wells to be plugged with state funds. The amount is incorporated into each plugging project sent out for bid.
Kansas	Value determination on wells plugged with state funds is strictly the salvage value of the equipment left on location. The equipment value is determined by bidding the equipment separately from the well plugging bid process or included in the bid negotiations for plugging services provided by the plugging contractor.
Kentucky	Only salvage value is determined for a well plugged with state funds. The salvage value is determined by bidding the equipment separately from the well plugging bidding process.
Louisiana	Salvage value of a well scheduled for plugging with state funds is included in the bidding process for a state-funded well plugging operation.
Michigan	Only salvage value determination is made on wells scheduled for plugging with state funds. The salvage program was initiated in fiscal year 1996. Proceeds from the sale of salvageable equipment are deposited into the Orphan Well Fund.
Mississippi	Salvage value determination is provided for in the contract to plug wells with state funds.

Salvage Value of Orphan Wells

- Missouri** Salvage value of wells scheduled for plugging with state funds is incorporated into the well plugging bidding process to reduce a contractor's bid and make the bids more competitive.
- North Dakota** Idle wells are rare. Consequently, state funded pluggings seldom occur. However, if state-funded plugging is required, salvage value is determined during the bidding of any salvageable equipment.
- Oklahoma** Equipment left on wells plugged with state funds is of value only to the surface owner or the well plugging contractor, who will haul away any equipment and either dispose of it or sell it if there is any value to the equipment.
- Pennsylvania** Only salvage value on wells plugged with state funds is determined. However, the salvage value is either minimal or non-existent due to the deteriorated condition of most wells plugged with state funds
- Texas** Only salvage value is determined for wells scheduled to be plugged with state funds. The salvage value for both equipment and hydrocarbons is determined through a separate bidding process from the well plugging itself. The purchaser of the equipment is given a free and clear title to the equipment and a bill of sale. Proceeds from the sale of salvageable equipment and hydrocarbons are deposited into the Oil Field Cleanup Fund; however, potential claimants have an indefinite period of time to make a claim against the fund for the proceeds derived from the sale of equipment or hydrocarbons. Proceeds from the sale of equipment and hydrocarbons from wells plugged with state funds totaled \$612,987 in fiscal year 1995.
- Washington** Wells scheduled for plugging with state funds are evaluated for their potential reserves using normal reservoir engineering procedures prior to plugging. Washington is the only state valuing wells in this manner prior to plugging with state funds.
- West Virginia** Equipment salvaged from state-funded well pluggings is retained by the well plugging contractor. However, most wells do not have any equipment left at the site.
- Wyoming** The value of equipment for a well scheduled for plugging with state funds is determined through a combined bidding of the equipment and the well plugging. A free and clear title to the equipment is given to the person plugging the well, reclaiming the drill site, or removing the equipment.

G. PRE-REGULATORY WELLS

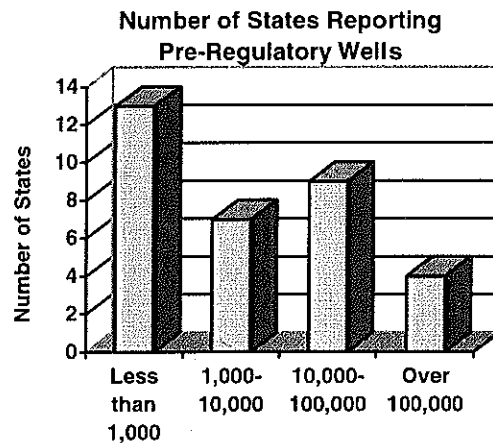
The first drilling for oil and gas in the U.S. occurred during the early to mid-1800s. In many states, only a few wells were drilled (many of these dry holes) in the very earliest years, as wildcatters searched widely for oil and gas resources. In a few states where exploration activities were successful, however, a fairly large number of wells were drilled and produced prior to the enactment of state regulations. Since many of these wells were drilled between 1860 and 1930, the exact number of wells drilled may be uncertain.

None of the 35 states submitting responses to the IOGCC idle well questionnaire enacted rules or statutes pertaining to the exploration for or the production of oil and gas until after such activities commenced in the state. On average, 60 years elapsed between the drilling of the first exploratory well and the establishment of a formal regulatory system. Three states established regulations approximately 20 years after the first well was drilled, while four states waited as long as 100 years after exploration commenced to establish a formal regulatory system. Some states reported that although a regulatory authority was not established to govern the production of oil and gas, some form of regulation or reporting requirement did exist via the state's Geological Survey or engineer's office. In New York, for example, a law requiring plugging of abandoned wells was passed in 1879, even though a formal oil and gas regulatory authority was not established until 1963. This allowed these states to control some drilling activities and protect their ground water resources, or at least better identify wells and potential problems.

Estimates of the total number of pre-regulatory wells range from about 791,000 to nearly 1,040,000 based on the responses from 35 states. Kansas, Ohio, Pennsylvania, and Texas each reported that more than 100,000 wells may have been drilled prior to the enactment of state regulations.

Once the regulatory authority was created, wells previously drilled generally became subject to state regulation. In a few states, pre-regulatory wells were "grandfathered" and exempted from financial security and spacing requirements. This limited jurisdictional authority extended until the well ownership changed. Then the well became subject to full regulatory authority.

Records of pre-regulatory drilling activities were transferred to the new state authority for incorporation into its well files. In most instances, states do not maintain a separate filing system to identify pre-regulatory wells. States that have their well records available for use in a digital data management system may be able to identify pre-regulatory wells by the drill dates recorded or other identifiable characteristics. However, most states reported having only sketchy information on pre-regulatory wells. Efforts to gather data for these wells have varied, but most states have employed field investigations, archival searches, commercial scout tickets, historic field maps, and owner/operator records. Some states reported that they can account for every well drilled; others have little, if any, information on most pre-regulatory wells.



If a state knows the location of a pre-regulatory well, it can determine the approximate total depth and target formation and whether the well had established production. States may be able to determine the owner/operator, well name and number, and other pertinent information. Since these wells were drilled and possibly plugged and/or abandoned prior to an established regulatory program, states lack the construction history for most of these wells. In many states, casing and cementing programs were not yet required to protect groundwater resources, and some older wells have occasionally posed a risk to groundwater (see Section III-I). However, if the wells were still producing at the time the regulatory authority gained jurisdiction, the owner/operator was required to file reports pertaining to the well's construction and production. The wells were also subject to state plugging regulations and groundwater protection requirements at the time of abandonment.

Most states now have jurisdiction over all wells drilled for oil and gas exploration and production purposes, whether or not the well pre-dates regulatory authority. All but seven states reported that they currently have full or partial jurisdiction by statute over pre-regulatory wells. Two of these states — Illinois and Missouri — only have jurisdiction for those wells that were active when the regulatory authority was established. The only states without jurisdiction over pre-regulatory wells are:

- ◆ Iowa, with 60 pre-regulatory wells, all of which have been plugged and abandoned (P&A)
- ◆ North Dakota, with 25 pre-regulatory wells, all P&A
- ◆ Oregon, with 100 pre-regulatory wells, all P&A
- ◆ Tennessee, with 3,179 pre-regulatory wells
- ◆ Washington, with 200 pre-regulatory wells, all P&A.

All other states report that they have the ability to take care of any problems that may be caused by pre-regulatory wells, either by using regulatory avenues available in their state (if a financially viable responsible party can be identified) or through the use of state funds in the form of an established well plugging fund. Tennessee reported that it could use state reclamation funds to P&A a pre-regulatory well.

Although the number of pre-regulatory wells drilled could exceed one million, many of these wells have long been plugged and abandoned safely. Other such wells may still be producing or currently idle. States are generally aware of these wells and many have taken significant steps to identify locations, owner/operators, construction, and current well status. State mechanisms for plugging pre-regulatory wells exist when the owner or operator cannot be identified. Through these mechanisms, states are actively working to ensure that pre-regulatory wells do not pose a risk to human health or the environment. The following summarizes the authority of the states for pre-regulatory wells.

Authority for Pre-Regulatory Wells

Alabama

During approximately 80 years of pre-regulatory exploration and production activity in Alabama, about 325 wells were drilled. When the regulatory structure was established, the few remaining active wells were brought under regulatory jurisdiction. All existing information for pre-regulatory wells was cataloged and published by the Alabama Geological Survey. This information consists primarily of drillers' logs with well cuttings and

Authority for Pre-Regulatory Wells

cores, electric logs, and well construction information for some wells. Alabama maintains a separate designation for pre-regulatory wells. All wells requiring plugging or that are temporarily abandoned, including those drilled prior to regulation, fall under the regulatory jurisdiction of the Oil and Gas Board.

Alaska

Oil and gas exploration began in Alaska with oil claims staked in 1867. The first well was drilled in 1898 and the first production was established in 1902. Alaska's regulatory program began in 1958. During the 60 years of activity, 189 wells were recorded as drilled, but the state agency estimates that 200-225 wells were actually drilled. All pre-regulatory wells were brought under jurisdiction of the Alaska Oil and Gas Conservation Commission with the initiation of the regulatory program. Prior to this point, the Territorial Government's Department of Mining required the registration of wells drilled on what became state lands. Wells drilled on fee lands did not have strict registration requirements, however, a large number of operators voluntarily submitted information on their activities. The Alaska Commission continues to collect and archive relevant information on pre-regulatory wells as it is discovered. Alaska has the location and much of the well history on most pre-regulatory wells. The Commission does not maintain a separate listing for these wells, but they are identified in the database via a unique set of codes. If vintage wells required plugging or abandonment, the Commission would have jurisdiction and would seek legislative appropriations to fund the required work.

Arizona

The Oil and Gas Conservation Act of 1951 established the regulatory structure for Arizona. The Oil and Gas Conservation Commission was established in 1959. Arizona had 46 years of activity before the establishment of its regulatory authority and 54 years before the creation of its current regulatory structure. During this time, 210 wells were drilled. The Arizona Oil and Gas Conservation Commission has regulatory authority over these pre-regulatory wells. Arizona has information concerning all 210 pre-regulatory wells developed through newspaper accounts, published reports, direct contacts, field checks, word-of-mouth, etc. This information includes location, elevation, total depth, geologic data, scout tickets, testimonials, and other information that was available. Arizona does not maintain a separate list for pre-regulatory wells. Although no pre-regulatory wells require plugging, A.R.S. 27-524(E) allows the Commission to establish owner liability and to sue the well owner for the cost of plugging and abandonment of a well.

Arkansas

The first well in Arkansas was drilled in 1901; 9,407 wells were drilled prior to the establishment of regulations in 1939 (the first permit was issued in 1923). All of these pre-regulatory wells were brought under regulatory jurisdiction. Arkansas does not maintain a separate listing for these wells. The guidelines for pre-regulatory wells are the same as those for wells drilled after the establishment of the regulatory program.

Authority for Pre-Regulatory Wells

California

Thirty-nine years of pre-regulatory activity occurred in California: the first wells were drilled in 1876 and the regulatory authority was established in 1915. The 12,796 wells drilled during this time were all brought under regulatory jurisdiction. Records for pre-regulatory wells were obtained from the counties that were conducting regulatory activities at the time. These records included active, inactive, and plugged wells. In many cases, complete well records were available. In some cases, nothing more than a well name, number, and location was available. California does not maintain a separate listing for pre-regulatory wells. Regulatory avenues are available to the state to resolve any problems associated with pre-regulatory wells.

Colorado

Colorado established its regulatory program in 1951, and the Oil and Gas Conservation Commission has no record of how many wells were drilled in the 89 years of activity prior to this date, even though all wells were brought under that entity's jurisdiction. All wells that were still producing in 1952 are accounted for, but the Commission has no information pertaining to the other pre-regulatory wells. The Oil and Gas Conservation Commission does have an "Environmental Response Fund," established under CRS 34-60-124, to handle any environmental problems that may occur with pre-regulatory wells.

Georgia

Georgia estimates that 100 to 120 pre-regulatory wells exist in the state. Seventy-five years passed between Georgia's initial exploratory activity and establishment of a regulatory structure. The pre-regulatory wells, which have all been plugged and abandoned, were brought under regulatory jurisdiction. No effort was made by the state to gather information on these wells and no separate pre-regulatory listing is available.

Illinois

Production first occurred in Illinois in 1905 and the first regulatory authority was established in 1939. The Illinois Department of Natural Resources, Division of Oil and Gas, estimates that 28,000 to 30,000 wells were drilled during this 35-year window. Initially, pre-regulatory wells were not included in the 1939 legislation enacting regulatory jurisdiction. The Act was amended in 1990 to require all remaining, existing pre-law wells to be permitted by the current owner of the lease on which the pre-law well existed. The Department conducted inspections of each lease to locate all unpermitted, pre-law wells. All active and inactive wells were located but no attempt was made to locate pre-law wells that were previously plugged. From this inspection effort and previous information, all known pre-law well locations, whether plugged or unplugged, are included in the Department's database. Illinois does not maintain a separate listing for these wells. All wells, whether pre-regulatory or not, are treated equally under the regulatory program.

Indiana

Regulatory controls for oil and gas activities in Indiana were authorized in 1947, but those activities began in the mid 1880s. During this time, the

Authority for Pre-Regulatory Wells

Department of Natural Resources estimates that between 24,000 and 30,000 wells were drilled. These wells were grandfathered when regulations were established, but remained so only until the well ownership changed. No formal survey was conducted by the Department to identify or gather information on these pre-regulatory wells, but the Indiana Geological Survey has historic information for many of the wells. Typically, most of the information is limited to location, lease or property name, and elevation. Pre-regulatory well information is not maintained in a separate file. Should problems occur with pre-regulatory wells, the Department may use money from forfeited bonds or environmental funds to plug and abandon the wells.

Iowa

About 30 years of pre-regulatory activity occurred in Iowa, and 60 wells were drilled. The wells were not brought under the jurisdictional umbrella when regulation was established. The Department of Natural Resources has some information on these wells, such as well logs, geophysical data, and bore-hole samples. This information is maintained in a separate listing. Most pre-regulatory wells were voluntarily plugged, and Iowa has experienced no significant problems with them.

Kansas

Although the Kansas Corporation Commission does not know the exact date for the first drilling activity in Kansas, it believes that it occurred in the fall of 1860. This translates to around 72 years of exploration and production activity in Kansas prior to regulation. There is no accurate way to assess the total activity prior to regulation, but based on production data, the KCC estimates that between 125,000 and 150,000 wells were drilled prior to regulatory authority. All pre-regulatory wells were brought under the KCC's jurisdiction by statute. During the development of the existing injection/disposal well inventory and the API well numbering project under way, in-house inventories were conducted from routine inspections for active and inactive wells. The KCC maintains a library for all well pluggings since the imposition of regulation. Within this library, some pre-regulatory well information is available. Also, the KCC reports that available commercial scout card files have some pre-regulatory records. No separate listing for pre-regulatory wells exists in Kansas, but if problems should arise, KCC has the same authority by statute over these wells that is available over post-regulatory wells.

Kentucky

In 1818, the first exploratory well was drilled in Kentucky. The well was actually drilled for salt water but started producing oil in commercial quantities. Full scale drilling activities for oil and gas commenced in the mid 1850s, but no published production data were available prior to 1883. Based on data received from the Kentucky Geological Survey, the Department of Mines and Minerals estimates that between 60,000 and 70,000 wells were drilled in the 100 years before regulation. In 1960, the department was provided statutory jurisdiction for pre-regulatory wells, but these wells were not required to be covered by financial security for plugging. The Kentucky Geological Survey gathered records from

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operating entities for years, and scout tickets and old production maps provide much information. Among these data, at least some information on most pre-regulatory wells is available. Kentucky does not maintain a separate list of pre-regulatory wells. When a pre-regulatory well is to be plugged, the Department places it in violation and plugs it using state funds. Pre-regulatory wells are treated the same as post-regulatory wells when temporary abandonment is requested.

Louisiana

The Louisiana Office of Conservation was created in 1912 by Act 127. Comprehensive statutory authority to regulate exploration and production activity in Louisiana was provided by Act 1517 in 1940. Prior to that act, certain oil and gas activities were regulated by the Department of Minerals, now part of the Office of Conservation. The Office of Conservation issued its first order affecting oil and gas activities in 1941. The 24,714 wells drilled prior to 1941 are considered pre-regulatory, but were brought under the jurisdiction of the Office of Conservation. The only information available to the Office of Conservation on these wells is that submitted by the operator of record when regulation began. No separate listing is available of pre-regulatory wells. The Office of Conservation requires that the operator of record be responsible for plugging and abandonment.

Maryland

The first laws regulating oil and gas exploration in Maryland were passed in 1954, 49 years after the first exploration well was drilled. About 116 wells were drilled prior to this date. The statutes governing oil and gas brought these wells under the state regulatory authority. Maryland has accounted for all 116 wells by location, but other information is sparse. Only minimal efforts have been made toward seeking more information due to time constraints. Pre-law wells are included in the state's well database. There were no provisions for plugging pre-regulatory wells, but if they were still producing in 1954, well operators were required to post performance bonds and follow all applicable regulations.

Michigan

Exploration activities are recorded as early as 1863 in Michigan, with documented production commencing in 1886. Regulation began in 1927. During the 64 years of pre-regulatory activity, only 300 producing wells were drilled (no estimate provided for dry holes) and those wells were brought under the regulatory authority of the state. Some old records exist with limited data, but there is no comprehensive compilation of this information. Old geologic reports, newspaper accounts, and other informal sources are used to create well records. There is no listing of pre-regulatory wells. The Department of Natural Resources has an Orphan Well Fund at its disposal to handle plugging problems that may occur with abandoned wells, regardless of when they were drilled.

Mississippi

The Oil and Gas Board of Mississippi was formed in 1948. The first exploratory activities began in 1929. During these 20 years, approximately 6,000 wells were drilled. All pre-regulatory wells were brought under the jurisdiction of the Board. The Board has well files on most of the wells and

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at the least, the locations of the rest, including wells plugged and abandoned prior to regulation. If a pre-regulatory well needs to be plugged and is declared orphaned by the Board, the well is plugged with Oil and Gas Board funds.

Missouri

Missouri estimates that between 5,000 to 6,000 wells were drilled prior to regulation; 4,943 wells are on file. Only when wells or leases are placed back into production does regulatory jurisdiction exist. A search was made through archives, scout tickets, and publications for all wells regardless of status, and additional wells are added to the well files as they are encountered in the field. A database file is maintained with as much information as is available for each well. Separate hard copy and log files also are kept for information that is not readily adapted to the database format. Those pre-regulatory wells that are in Missouri's files have an API number beginning with "0", while the post-regulatory wells begin with a "2." Pre-regulatory wells that have been re-entered after regulation may exist in duplicate on the database. At present, only wells that pose a threat to human life or habitation or a significant threat to the environment are plugged using state funds. A procedure is being considered to require the plugging of all abandoned wells prior to the sale of any lease.

Montana

About 6,000 to 8,000 pre-regulatory wells were drilled during the approximately 40 years of activity in Montana before regulations were established. All such wells were brought under the regulatory authority's requirements, except for well spacing. Montana maintains files on all known wells, with any available information. No separate listing is available for pre-regulatory wells. When plugging or temporary abandonment is necessary, the pre-regulatory wells are treated equally with post-regulatory wells.

Nebraska

Nebraska's approximately 6,056 pre-regulatory wells came under state jurisdiction when enabling statutes were passed around 20 years after initial exploration activities. The Nebraska Conservation and Survey Division began collecting well information in 1912 and issuing drilling permits in 1951. In 1959, the Nebraska Oil and Gas Conservation Commission was established. The commission believes that every well drilled is accounted for in its records. Most wells have files, but wells drilled prior to 1939 may not. The Commission has available logs, sample descriptions, and scout tickets for most wells drilled prior to 1951. All well files are incorporated in a comprehensive system and pre-regulatory wells are treated the same as post-regulatory wells for regulatory purposes.

Nevada

About 30 years of drilling activity passed before the Division of Minerals was formed in Nevada. The State Water Engineer regulated oil and gas activities prior to this time. Only about 20 wells were drilled prior to the creation of the Division of Minerals, and those were brought under its regulatory jurisdiction. All pre-regulatory wells are plugged and abandoned

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and the Division of Minerals has all the basic completion information pertaining to those wells.

- New Mexico*** In the mid-1930s, all wells in New Mexico were brought into compliance with the regulatory programs that commenced in 1935. An estimated 500 to 1,000 wells were drilled prior to this time.
- New York*** In New York, the first natural gas well was drilled in 1821 and the first oil production was established in 1865. A law was passed in 1879 requiring owners to plug abandoned wells and a comprehensive regulatory program was implemented in 1963. About 55,000 wells were drilled prior to the comprehensive regulatory program. The enabling statutes of 1963 followed by the 1967 rules subjected all wells to regulatory control. Pre-regulatory wells were exempted from certain financial security requirements. Efforts to gather information on pre-regulatory wells included a review of old records, requests to owners and operators to identify wells, and field inspections. This information was sought on all active, inactive, and plugged wells. These data are available but not listed separately for pre-regulatory wells. Statutory abandonment and plugging responsibilities apply to all wells.
- North Dakota*** About 25 pre-regulatory wells were drilled prior to the establishment of rules in 1941; all were dry holes. No information is maintained on these wells.
- Ohio*** About 105 years of pre-regulatory activity occurred in Ohio, with 151,862 pre-regulatory wells being drilled. All these wells were brought under jurisdiction in 1965.
- Oklahoma*** Twenty years of oil and gas exploration and production occurred in Oklahoma prior to regulation, which resulted in 45,000 to 55,000 pre-regulatory wells. All these wells were brought under the jurisdiction of the Oklahoma Corporation Commission in 1915. If the pre-regulatory well was still active at this time, the operator was required to file all completion and production records with the Commission. If the pre-regulatory well had been plugged and/or abandoned, little or no information was received. However, the Oklahoma Geological Survey received voluntary well drilling and completion reports for many pre-regulatory wells at the time of completion. These reports are available to the Commission, and have been entered into a data management system that includes all post-regulatory wells. The system allows retrieval of wells via drill dates; thus an electronic listing is available of known pre-regulatory wells. All hard copy records for pre-regulatory wells are merged with post-regulatory wells. The Corporation Commission has exclusive regulatory authority over all wells in Oklahoma, and makes no distinction between pre- and post-regulatory wells for regulatory purposes.

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- Oregon** In the 50 years before the regulatory authority was established in 1957, approximately 100 wells were drilled in Oregon. All were dry holes. These wells were all plugged and were not brought under the jurisdiction of the Department of Geology and Mineral Industries. All available data have been acquired on pre-regulatory wells, including lithology logs, well logs, location plats, summaries and histories, and plugging data. No separate listing exists, as all well files are merged with post-regulatory well files.
- Pennsylvania** The first well in Pennsylvania was drilled in 1859 and the first requirement to plug was issued in the 1890s. Pennsylvania issued permits to drill through coal seams in 1956, and to drill all wells in 1963. In 1985, all wells not previously permitted were required to be registered and nonproducing wells were required to obtain an inactive regulatory status or be plugged. Pennsylvania has documented 33,364 pre-regulatory wells, but estimates that the total number may approach 200,000 wells. All wells fall under the jurisdiction of the Pennsylvania Department of Environmental Protection. Pre-act wells are required to be registered, which provides well location information. All wells not plugged must provide an annual production report with the operational status of each well. The state maintains computerized and paper files with available information on all known wells, but pre-regulatory wells are not separately identified. If the well is operating and has not been registered, the Department can request information from the operator. If the Department is unable to determine the operator and the well is not registered or the well is abandoned with no known operator, the state can plug the well using state plugging funds.
- South Dakota** Fewer than 100 wells were drilled in South Dakota prior to regulation; according to the South Dakota Geological Survey and the State Engineer's Office, all are plugged. The State Engineer's Office required certain information on all wells drilled, not just oil and gas wells. Much information is published in its biennial reports, and many early-day oil and gas wells were converted to water wells. Most pre-regulatory well files are sketchy, and no separate listing exists for such wells. The State Engineer's Office has received special funding (appropriations) over the years to plug a number of the most environmentally unsound wells.
- Tennessee** At least 50 to 60 years of exploration and production occurred in Tennessee prior to regulation. During this time, 3,179 wells were drilled. These wells were not brought under regulatory jurisdiction. In past years, several surveys were conducted to locate and identify pre-regulatory wells. These records have been maintained on all available wells by the Tennessee Division of Geology. The records include location, total depth, current status, casing program, and production information. Tennessee maintains this file separately from post-regulatory wells. In 1987, a reclamation fund was established to provide funding (acquired through assessed penalties) for plugging and reclaiming abandoned wells. These funds may be used on pre-regulatory wells.

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Texas

Production began in Texas in 1859, and the oil and gas regulatory program was established in 1919. During these 60 years of activity, the Texas Railroad Commission estimates 113,000 wells were drilled. This estimate is made through the total number of permitted locations on the Commission's computer mapping system, minus the number of permitted wells known not to have been drilled, minus the number of wells known to have been drilled since 1939 when consistent records began. The Texas legislature included regulation of all oil and gas activities under the jurisdiction of the Railroad Commission, including pre-regulatory wells. The Commission has been developing a comprehensive mapping system to identify all of the wells drilled prior to and since the commencement of regulatory efforts. Many of the pre-regulatory well locations are from old maps and old scout cards received from major oil companies. Only the operator names, well numbers, well locations, and total depths are known for the wells identified from the maps. The scout card information contains casing size and depth, perforations, lease names, and dates of activities. The information for pre-regulatory wells is maintained in a merged file with post-regulatory wells. Typically, pre-regulatory wells were plugged in accordance with the standards of that time. The operators are usually no longer active in the state. However, some current active operators may be successor companies to the older entities. If a pre-regulatory well is determined to require plugging, efforts are made to identify the operator and determine the company's current status. If the operator is not identified or is no longer active, the well is plugged with state funds without seeking reimbursement. If the operator is a predecessor company to a currently active operator, the current operator is requested to plug the well or reimburse the state for the plugging expense. If the operator refuses, penalties are sought through the Attorney General's Office.

Utah

Approximately 250 wells were drilled in Utah in the 50-plus years of activity prior to regulation. These wells were brought under regulatory jurisdiction and the state has information on them all. The information includes total depth; formation record; specific downhole information as to casing, cementing, and perforations; and current status (plugging information). Utah does not maintain separate files for pre-regulatory wells. All regulations apply to pre-regulatory wells. If problems should occur, the state may plug the wells using its plugging fund.

Virginia

Virginia began its regulatory efforts in 1950. The first exploration effort began in the late 1890s. During the 50 plus years, only 157 wells were drilled, and they were brought under the state's jurisdiction. The 1990 Virginia Gas and Oil Act established an Orphan Well Program for wells drilled prior to 1950 (without bonding or security requirements). The current inventory shows that only 35 of the 157 wells drilled qualify under this program. The remaining 122 wells have all been plugged or are still actively producing oil and gas under the bonding requirements. Historical and file data on drilling, completion, plugging, and production are maintained by both the Division of Gas and Oil and the Division of Mineral

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Resources. This information includes total depth, zones of completion, well locations, and other pertinent information. The Division does not keep a separate listing for pre-regulatory wells, but one could be developed. The Orphan Well Fund, established to plug the 35 pre-regulatory wells, is funded through an assessment fee placed on new permit applications.

Washington

Washington issued its Oil and Gas Conservation Act in 1952. Its first well was drilled in 1900, and about 200 more wells were drilled prior to regulation. Pre-regulatory wells are not included under the state's regulatory effort. All wells are cataloged in a published information circular. The state maintains well files on all wells, with pre-regulatory well files maintained separately. Washington has not experienced any significant environmental problems resulting from abandoned wells.

West Virginia

About 65,000 pre-regulatory wells exist in West Virginia. These wells were drilled over approximately 100 years of activity before formal regulations were established. When the state enabled its Office of Oil and Gas to regulate exploration and production activity, these pre-regulatory wells were not included. West Virginia since has extended its regulatory authority to include these wells. The West Virginia Geological and Economic Survey and the Office of Oil and Gas are attempting to identify all inactive, pre-regulatory wells. For some wells, the original and current (last) operators are known, along with the farm name, well number, and location. These wells can be identified separately. Pre-regulatory wells are treated the same as post-regulatory wells by the Office.

Wyoming

The Wyoming Oil and Gas Conservation Commission was established in 1951. Wyoming's first successful well was drilled 67 years previously, in 1884. The exact number of pre-regulatory wells drilled is unknown, but may range between 15,000 to 30,000 wells. Early development (prior to 1951) was recorded and monitored by both the state and federal governmental entities. Federal mineral leases account for 65 percent of the land in the state. In 1944, the U.S. Geological Survey published an inventory of 9,152 wells that became part of the current agency's records. After 1931, the State Geologist accumulated technical information on oil and gas wells and those records likewise have been incorporated. There was also a Mineral Supervisor who monitored oilfield activity and inspected producing properties on state leases. Pre-regulatory wells came under the WOGCC's jurisdiction by statute in 1951. The above-mentioned files, along with files from the U.S. Department of the Interior, Bureau of Land Management, were incorporated into the state's files. The WOGCC seeks to maintain a complete and accurate history on each well drilled in the state. The files include information on all wells, whether active, inactive, or plugged, and whether on private, state, reservation, or federal lands. These files include information pertaining to drilling, completion, logs, driller's logs, correspondence, and plugging procedures. All information is maintained in one comprehensive data management system. If a problem occurs with a pre-regulatory well, the WOGCC determines if a company

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now bonded for other wells in the state had an interest in the problem well. If so, that entity is requested to plug the well. If no currently bonded entity is found, the state plugs the well and places a lien on the equipment, if any.

Table IV summarizes information about pre-regulatory wells and state authority for regulating them.

Table IV. Pre-Regulatory Wells

State	Pre-Regulatory Activity	First Regulation	Approximate Number of Years of Pre-Reg. Activity	Number of Pre-Regulatory Wells (Low)	Number of Pre-Regulatory Wells (High)	Pre-Regulatory Wells Under Full or Partial Jurisdiction	Pre-Regulatory Well Files Maintained Separately	Regulatory Avenues Available on Pre-Regulatory Wells
Alabama	Yes	1945	80	325	325	Yes	Yes	All
Alaska	Yes	1958	60	189	225	Yes	No	P&A Only*
Arizona	Yes	1959	54	210	210	Yes	No	P&A Only*
Arkansas	Yes	1939	38	9,407	9,407	Yes	No	All
California	Yes	1915	39	12,796	12,796	Yes	No	All
Colorado	Yes	1951	89	unknown	unknown	Yes	No	P&A Only*
Georgia	Yes	1939	75	100	120	Yes	No	n/a
Illinois	Yes	1947	35	28,000	30,000	Yes	No	All
Indiana	Yes	1963	65	24,000	30,000	Yes	No	P&A Only*
Iowa	Yes	1933	30	60	60	No	Yes	All
Kansas	Yes	1960	73	125,000	150,000	Yes	No	All
Kentucky	Yes	1941	100	60,000	70,000	Yes	No	All
Louisiana	Yes	1954	49	24,714	24,714	Yes	No	P&A Only*
Maryland	Yes	1927	64	116	116	Yes	No	All
Michigan	Yes	1948	20	300	300	Yes	No	All
Mississippi	Yes	1966	100	6,000	6,000	Yes	No	P&A Only*
Missouri	Yes	1953	40	5,000	6,000	Active Only	Yes	P&A Only*
Montana	Yes	1959	20	6,000	8,000	Yes	No	All
Nebraska	Yes	1954	20	6,056	6,056	Yes	No	All
Nevada	Yes	1935	30	20	20	Yes	No	n/a
New Mexico	Yes	1963	108	500	1,000	Yes	No	n/a
New York	Yes	1941	20	55,000	65,000	Yes	No	All
North Dakota	Yes	1965	105	25	25	No	No	n/a
Ohio	Yes	1915	20	151,862	151,862	Yes	No	All
Oklahoma	Yes	1957	50	45,000	55,000	Yes	No	P&A Only*
Oregon	Yes	1955	96	100	100	No	No	All
Pennsylvania	Yes	1939	40-45	33,364	200,000	Yes	No	P&A Only*
South Dakota	Yes	1968	50-60	100	100	Yes	No	All
Tennessee	Yes	1919	60	3,179	3,179	No	Yes	P&A Only*
Texas	Yes	1955	50	113,000	113,000	Yes	No	P&A Only*
Utah	Yes	1950	50	250	250	Yes	No	All
Virginia	Yes	1952	50	157	157	Yes	No	P&A Only*
Washington	Yes	1929	52	200	200	No	Yes	None
West Virginia	Yes	1951	100	65,000	65,000	Yes	Yes	All
Wyoming	Yes	1951	67	15,000	30,000	Yes	No	P&A Only*
Totals				1,039,222	0			

* P&A = Plugged and Abandoned

H. IDLE WELL STATISTICS

The primary purpose of the IOGCC idle well survey was to obtain a census of currently idle wells and their status by state. Other statistics were collected to provide an understanding of the current number and use of wells in each state and the number of wells that have been plugged and abandoned. Table V provides the following statistics as of December 31, 1994:

- ◆ Wells drilled since the state regulatory program began, by type (oil, gas, dry, service)
- ◆ Wells currently producing or injecting, by type (oil, gas, service)
- ◆ Wells that have been plugged and abandoned, by type (oil, gas, dry, service)
- ◆ Wells converted to Class II underground injection, both for enhanced oil recovery (EOR) and for produced water disposal
- ◆ Wells currently idle with state approval (oil, gas, service)
- ◆ Estimated oil and gas production potential from wells idle with state approval (where available)
- ◆ Estimated number of wells currently idle without state approval, but where the operator is known⁷
- ◆ Estimated number of wells currently idle without state approval, but where the operator is unknown or is insolvent (generally considered to be orphan wells)⁷

Because state data collection and management systems vary, the level of detail available from the states in these categories varies. Some states were able to extract well counts with substantial precision while, for others, the figures represent the best estimate based on available data and field experience. For some states, the total number of wells in a particular category was available, but numbers by well type were not available.

The data variations create several caveats for a reader examining Table V. Because of differences in definitions and the different start dates for state regulatory programs, state-to-state data in a category may not be directly comparable. Since not all states were able to provide breakdowns by well type, the total number of wells in a category (such as total wells drilled or wells plugged and abandoned) may be greater than the sum of oil, gas, dry, and service wells, which are provided only for those states that could provide a breakdown. The sum of wells currently producing/injecting and wells plugged and abandoned may not equal the figure for total wells drilled. This occurs due to a mix of pre- and post-regulatory program statistics for some states. For wells drilled, the survey requested only the number since regulation began. The number of producing/injecting wells may include wells drilled pre-regulation. States may also have abandonment records on pre-regulatory wells. Additional discussion of pre-regulatory wells, and estimates of their numbers, are included in Section III-G.

⁷ Estimating the number of these wells is an imprecise science, since it is asking states to quantify the unknown. Numbers should be treated as best estimates by knowledgeable state personnel.

Many of these inconsistencies are explained in footnotes for each state following the table. The energy analysis performed in Section III-I requires a breakdown of oil and gas wells by currently producing wells and wells idle with state approval. Where states were unable to provide this breakdown, secondary sources (for producing wells) and ratio calculations based on producing wells (for idle wells) were used to produce separate well counts for oil and gas wells. States where these breakdowns were performed are noted in the table, along with footnotes referencing the source or method of calculation.

In examining trends in the number of idle wells, it is also important to note the difference in definitions between the 1992 and current studies. As discussed in more detail in Section II, in 1992 the definition for idle wells was limited to wells drilled after the creation of the regulatory program. Because states were typically unable to make that distinction, and pre-regulatory wells may comprise a large portion of orphan wells, the definition for this study was changed to encompass all idle wells regardless of when they were drilled.

Total Well Statistics

Well Category	1992 Study	1996 Study
Total wells drilled	3,263,000	2,669,045
Producing/injecting wells	1,033,000	1,001,857
Plugged and abandoned wells	1,895,000	1,551,724
Wells converted to Class II UIC from producing	120,000	126,610

Since states began regulating oil and gas operations, mostly before 1955, nearly 2.7 million wells have been drilled. These wells are in addition to the 790,000 to 1.04 million wells possibly drilled before regulation began (see Section III-G). The

states have records for plugging and abandoning approximately 1.55 million wells. Roughly 1 million additional wells are currently producing oil or gas or injecting fluids for enhanced recovery or disposal. These figures, except for wells converted to underground injection control (UIC) wells, are all *lower* than the comparable statistics reported in the 1992 idle well study, as shown in the table inset. This discrepancy results from several factors:

- ◆ Many states have improved their data management systems and computerized well data, resulting in better data for this report
- ◆ Previously, some states only provided data for the number of permits issued. Since not all permitted wells are actually drilled, new data on the number of wells drilled is lower
- ◆ Some states that previously provided only estimates have now provided actual statistics. This accounts for much of the difference. The 1992 report focused attention on these estimates, and states have placed greater emphasis on providing improved estimates or actual statistics for this study.

Of the wells drilled in the United States, over half (55 percent) have been plugged and abandoned. Another 35 percent are still engaged in production of oil and gas, either as producing wells or as injection/disposal wells serving production operations. Only 10 percent of the wells are currently idle, including all three categories of idle wells discussed in this report, as shown in the pie chart on the next page.

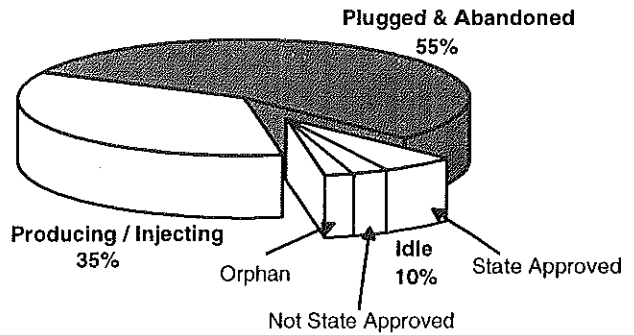
Idle Well Statistics

States report that nearly 285,000 wells throughout the U.S. are currently idle. Of these, 53 percent are idle with state approval and subject to state idle-well programs; and while another 25 percent lack state approval, the operator is known and some security exists for the well.

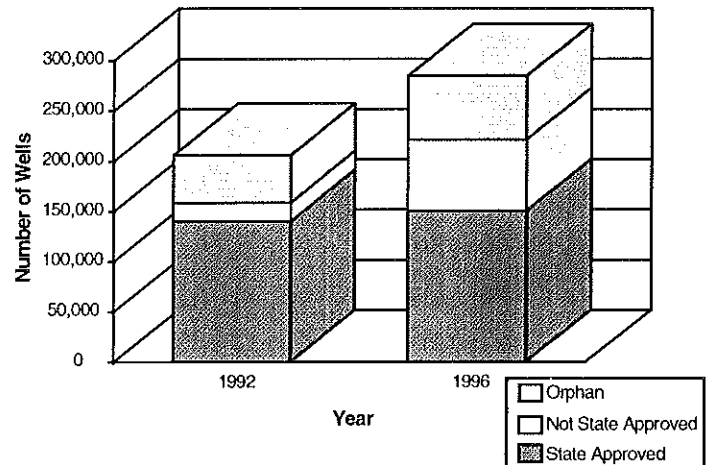
The number of orphaned wells (where the operator is unknown or insolvent and plugging responsibility is likely to fall to the state) is around 63,500. This represents the best current estimate of the states of the number of orphan wells, although some states, like Kansas, are actively seeking to identify these wells and feel that their current estimate may grow. Please note that estimating the number of orphan wells is an imprecise science, since it is asking states to quantify the unknown. In older producing areas, orphan wells may exist that have not yet been detected. In other cases, the state does not become aware of an orphan well until it poses a problem. The large estimated number of orphan wells in Texas (17,000) is consistent with the large population of wells in the state, the existence of some very old production areas, and approximately 60 years of pre-regulatory activity.

The number of reported idle wells has increased from the 1992 idle well study (see inset on next page). This increase is due to better data in many states and more attention to the estimates made by other states. It is not felt that these data represent an actual increase in the number of idle wells since 1992, particularly in the number of wells that have been orphaned. The most dramatic change is in the number of wells idle without state approval where the operator is known. This is primarily due to changes in the data provided by Kansas and Texas. Kansas' data are based on a recent survey conducted in a few fields and extrapolated to the state, and represents an increase of nearly 36,000 wells over what was reported in 1992. Texas did not provide a 1992 estimate of the number of wells idle without state approval. Texas currently reports nearly 19,000 wells where the operator is known but has not followed state procedures for remaining idle.

Status of Wells Drilled in the U.S.



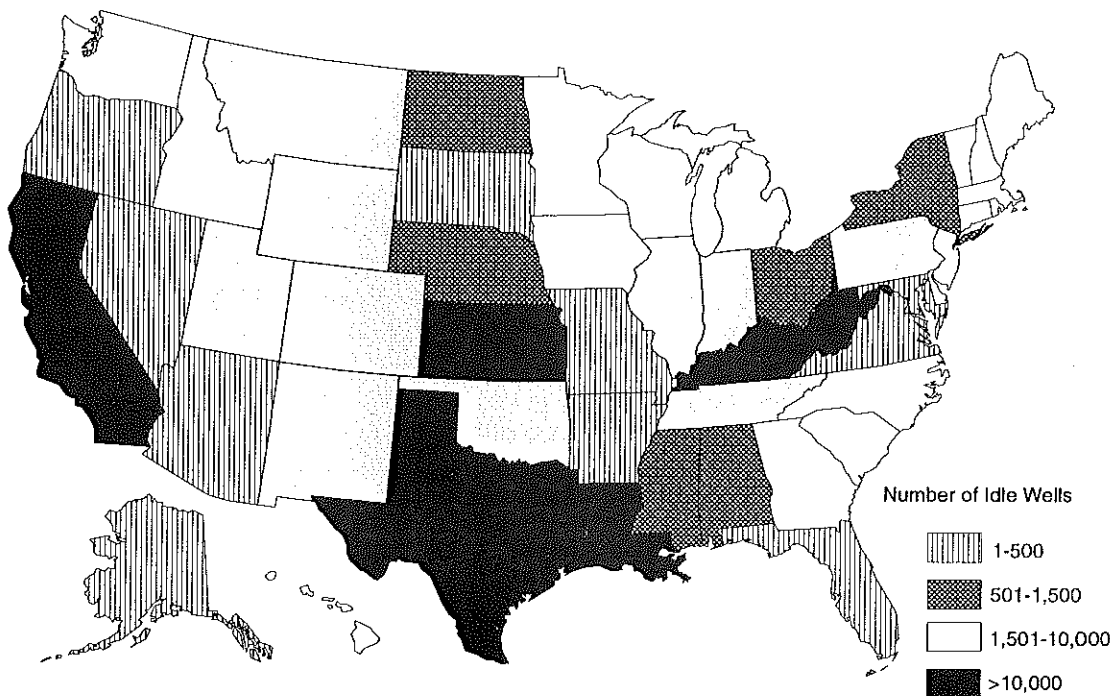
Status of Idle Wells in the U.S.



The map below illustrates the distribution of all three categories of idle wells by state: idle with state approval, idle without state approval but operator known, and orphan. Not surprisingly, some of the largest producing states and older producing areas have the largest number of idle wells. Texas has the largest number of idle wells – 93,000. Other states with more than 10,000 idle wells include: Kansas — over 54,000; California — 31,500; Louisiana — 21,000; Kentucky — 15,700; and West Virginia — 14,500. These sound like large numbers, but it is important to place them in an appropriate context. First, a majority of these wells are idle with state approval. Most of the wells have some type of security, even when the operator has not complied with the state approval process. Second, these states have a large number of producing wells. Considering the idle wells as a percentage of the total existing wells in a state is more appropriate than absolute numbers for measuring the significance of idle wells.

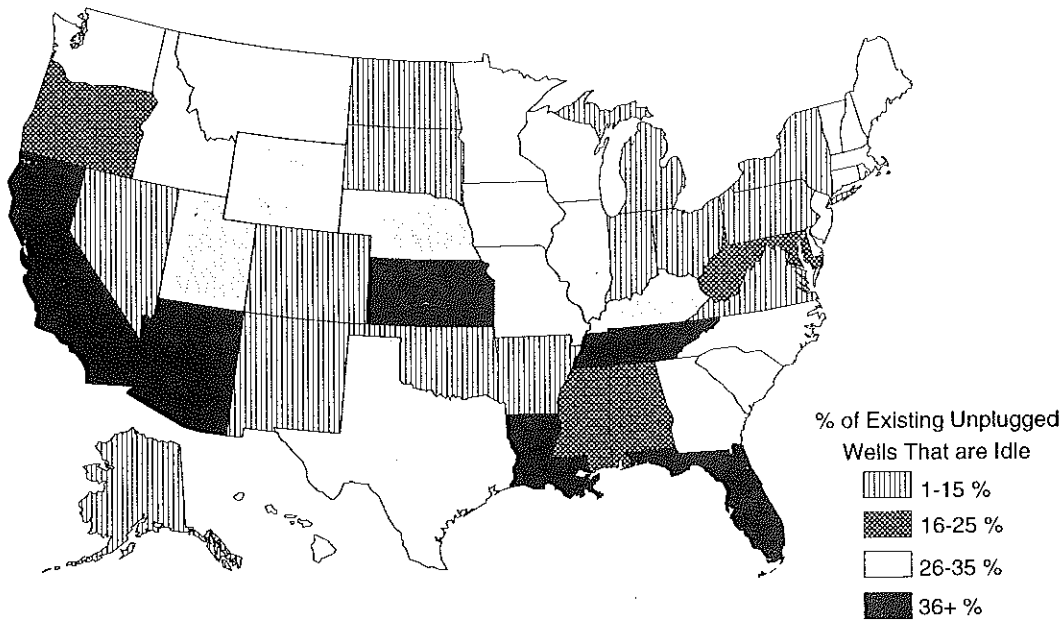
Well Category	1992 Study	1996 Study
Idle with state approval	147,000	150,689
Idle without state approval, operator known	18,000	70,472
Idle without state approval, operator unknown or insolvent (orphan wells)	50,000	63,438

Number of Idle Wells in Oil and Gas Producing States



Note: New Mexico data are from the previous report.

Idle Wells as a Percentage of Existing Unplugged Wells



Note: Existing unplugged wells are calculated by adding producing wells and all categories of idle wells

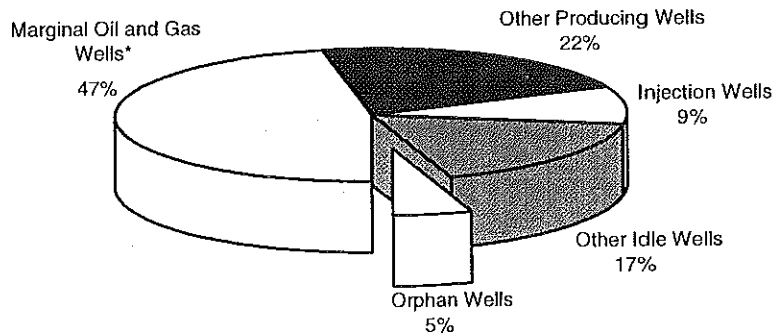
Note: New Mexico data are from the previous report.

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The map shows idle wells as a percentage of existing, unplugged wells (idle wells plus active production/injection wells), illustrating the relative importance of idle wells in each state. Nationwide, idle wells comprise around 22 percent of existing unplugged wells. Although Texas has the largest absolute number of idle wells, when these are considered as a percentage of existing wells, Texas is only slightly above the national average at 26 percent. States that have a smaller number of idle wells may actually have a much larger percentage of the wells in their state currently idle, such as Arizona, Florida, and Tennessee. Also, it is important to remember that these numbers refer to all types of idle wells (many of which have surety), not just wells that are orphaned.

Orphan wells represent only a very small portion of the total number of wells currently operating and idle. While these wells may represent a significant liability to the state, it is crucial to keep the size of the problem in appropriate perspective. Orphan wells represent only 5 percent of existing unplugged wells nationwide, as shown in the pie chart at right. While this percentage varies by state, only in Kentucky does the number of

Orphan Wells are a Small Percentage of Existing Wells



*Data for Marginal Wells from: *Marginal Oil and Gas: Fuel for Economic Growth*, IOGCC, 1995.

orphan wells exceed 20 percent of the number of existing wells. As described in Section III-B, states have tightened their financial responsibility requirements to help reduce future numbers of orphan wells. States have also developed funding mechanisms to allow them to plug and abandon orphaned wells (Section III-C).

Although the number of idle wells reported here has increased from the 1992 study, this is primarily due to improved data, not to an actual increase in the number of idle wells. After the 1992 study highlighted idle wells, states took greater care in estimating the number of idle wells for this report. Idle wells remain a small percentage of the number of existing wells. Orphaned wells, which represent a potential state liability, are a very small portion of the total number of wells. Although many are marginal (stripper wells), the vast majority of existing wells continue to produce oil and gas, benefiting operators, states, and the nation.

Wells statistics gathered for this report are presented in Table V.

Table V: State Idle Well Statistics³³

	Wells Drilled						Wells Producing/Injecting						Wells Plugged and Abandoned					
	Total*		Oil	Gas	Dry Holes	Service	Total*		Oil	Gas	N	Service	Total*		Oil	Gas	Dry Holes	Service
Alabama	9,783	1,285	4,850	3,315	333		4,546	882	3,448		216		4,021	203	422	3,315	81	
Alaska ¹	3,858	2,431	131	651	645		2,504	1,690	105	709		1,240	869	31	293	47		
Arizona ²	727	58	45	599	25		44	22	6	16		652	18	33	595	6		
Arkansas ³	28,336	0	0	0	0		12,523	8,523 (a)	3,092 (a)	908 (b)		9,920	0	0	0	0		
California ⁴	160,280	0	0	0	0		53,452	43,663	1,244	8,545		75,326	0	0	0	0		
Colorado ⁵	52,016	0	0	0	0		18,027	9,440 (a)	7,726 (a)	951		30,818	0	0	0	0		
Florida	1,094	319	0	713	62		124	85	0	39		894	169	0	713	12		
Illinois ⁶	115,511	57,156	237	35,000	23,118		28,655	19,702	6	8,947		76,943	30,335	51	35,000	11,557		
Indiana ⁷	62,000	0	0	0	0		9,724	7,516	828	1,380		n/a	0	0	0	0		
Iowa ⁸	125	0	0	0	0		0	0	0	0		125	0	0	0	0		
Kansas ⁹	237,500	0	0	0	0		80,500	49,000	17,000	14,500		139,150	0	0	0	0		
Kentucky ¹⁰	90,302	38,439	11,721	35,089	5,053		42,731	24,247	13,104	5,380		53,837	11,844	2,046	37,955	1,992		
Louisiana ¹¹	192,120	79,088	43,055	60,377	9,600		37,865	20,826	12,955	4,084		126,779	39,798	21,204	60,377	5,400		
Maryland ¹²	141	0	0	0	0		9	0	9	0		162	0	0	0	0		
Michigan ¹³	46,647	14,645	7,084	20,715	4,203		12,437	4,005	4,688	3,744		32,313	9,772	1,826	20,715	0		
Mississippi ¹⁴	27,363	8,557	1,833	16,694	279		3,035	1,475	685	875		24,168	6,911	608	16,649	0		
Missouri ¹⁵	2,955	1,036	72	586	1,147		798	507	50	241		1,817	360	9	584	840		
Montana ¹⁶	21,100	5,400	4,100	10,600	1,000		7,800	4,000	3,200	600		16,400	2,500	1,000	12,500	400		
Nebraska ¹⁷	18,584	0	0	0	0		2,080	1,489	76	515		15,578	2,937	25	12,018	598		
Nevada ¹⁸	710	82	0	617	11		82	71	0	11		628	10	0	617	1		
New Mexico ^{19(c)}	63,924	0	0	0	0		50,966 (c)	26,252 (c)	19,850 (c)	0 (c)		17,820	11,025	2,677	3,818	300		
New York ²⁰	10,282	2,608	6,524	613	537		10,356	3,670	6,016	670		13,878	8,015	1,179	1,839	2,845		
North Dakota	13,276	6,453	163	5,733	927		3,831	3,261	104	466		8,421	2,329	28	5,725	339		
Ohio ²¹	68,141	0	0	7,031	662		64,380	29,599 (a)	34,436 (a)	345 (b)		26,113	0	0	7,031	405		
Oklahoma ²²	405,431	238,560	46,757	91,087	29,027		136,470	89,831	29,337	17,302		265,121	147,271	17,420	91,087	9,343		
Oregon ²³	500	0	0	0	0		40	0	40	0		440	0	0	0	0		
Pennsylvania ²⁴	63,612	26,259	31,421	1,302	4,630		80,454	37,284	40,021	3,149		39,820	23,500	5,468	1,189	9,663		
South Carolina ²⁵	10	0	0	0	0		0	0	0	0		0	0	0	0	0		
South Dakota ²⁶	1,734	226	102	1,327	79		262	146	55	61		1,744	53	10	1,673	8		
Tennessee ²⁷	8,986	1,799	1,822	3,098	0		1,186	701	485	0		2,870	0	0	0	0		
Texas ²⁸	800,879	451,400	111,792	223,916	13,771		266,560	177,006	49,701	39,853		490,978	208,676	43,551	223,916	14,835		
Utah ²⁹	10,745	0	0	0	0		4,015	1,939 (a)	1,321 (a)	755		5,261	0	0	0	0		
Virginia ³⁰	2,572	149	2,423	unknown	0		1,755	63	1,671	21		473	188	290	0	0		
Washington	0	0	0	0	0		0	0	0	0		0	0	0	0	0		
West Virginia ³¹	87,901	0	0	0	0		46,080	11,520	34,560	0		20,475	0	0	0	0		
Wyoming ³²	60,000	24,564	3,898	26,805	4,733		19,466	13,519	2,723	3,224		45,534	16,045	1,175	26,805	1,509		
Totals	2,569,045	950,514	278,030	545,868	99,842		1,001,857	591,934	288,542	117,417		1,551,724	522,828	99,053	564,414	60,181		

* Note: Well categories may not add up to totals because not all states provided a well category breakout. Data are through December 31, 1994 unless otherwise noted.

Table V: State Idle Well Statistics (continued)²³

	Wells Converted to UIC Class II		Idle Wells with State approval						Estimate of Production		Idle Wells without State approval:		Total Idle Wells	
	EOR	Disposal	Total ^(e)	Oil	N	Gas	N	Service	N	Oil (b/d)	Gas(mcf/d)	Operator Known and Solvent		Operator Unknown or Insolvent
Alabama	84	66	1,136	200	900	36			650	130,000	0	6	1,142	
Alaska ¹	453	2	114	106	7	1			none	none	0	0	114	
Arizona ²	0	6	26	14	6	3			none	none	5	2	33	
Arkansas ³	349	541	281	191 (d)	70 (d)	20 (d)			none	none	n/a	unknown	281	
California ⁴	n/a	n/a	30,269	24,637	619	5,013			none	none	n/a	1,233	31,502	
Colorado ⁵	672	184	3,171	1,661 (d)	1,359 (d)	151 (d)			none	none	unknown	unknown	3,171	
Florida	28	23	76	65	0	11			none	none	0	0	76	
Illinois ⁶	4,077	1,124	3,647	1,578	34	2,035			1,578-3,156	none	3,917	2,349	9,913	
Indiana ⁷	980	163	131	56	15	60			none	none	203	1,245	1,579	
Iowa ⁸	0	0	0	0	0	0			none	none	0	0	0	
Kansas ⁹	n/a	n/a	8,000	4,872 (d)	1,688 (d)	1,440 (d)			4,500	none	36,850	9,250	54,100	
Kentucky ¹⁰	1,950	50	272	72	8	0			72	80	2,500	13,000	15,772	
Louisiana ¹¹	1,000	8,600	18,206	10,013 (d)	6,229 (d)	1,964 (d)			none	none	unknown	2,849	21,055	
Maryland ¹²	0	0	3	0	3	0			0	0	n/a	0	3	
Michigan ¹³	585	605	1,438	868	570	0			< 868	< 34,200	n/a	279	1,717	
Mississippi ¹⁴	501	1,073	691	171	520	0			53,000	253,375	unknown	unknown	691	
Missouri ¹⁵	n/a	n/a	235	160	13	59			none	none	24	81	340	
Montana ¹⁶	1,000	250	4,100	2,900	1,200	0			none	none	unknown	unknown	4,100	
Nebraska ¹⁷	1,144	121	927	689	14	224			1,000	1,400	0	1	928	
Nevada ¹⁸	0	11	5	5	0	0			none	none	0	0	5	
New Mexico ^{19(c)}	n/a	n/a	4,350 (c)	3,000 (c)	1,200 (c)	150 (c)			none	none	0	75	4,425	
New York ²⁰	986	5	485	444	11	30			89	110	228	unknown	713	
North Dakota	527	402	696	591	11	94			none	none	0	0	696	
Ohio ²¹	193	164	49	14 (d)	16 (d)	19 (d)			15	95	500	600	1,149	
Oklahoma ²²	17,159	8,965	3,840	1,458	0	2,382			none	none	unknown	524	4,364	
Oregon ²³	0	2	13	0	13	0			0	0	0	0	13	
Pennsylvania ²⁴	13,419	6	330	82	241	7			none	none	unknown	7,151	7,481	
South Carolina ²⁵	0	0	0	0	0	0			none	none	0	0	0	
South Dakota ²⁶	37	23	36	18	11	7			none	none	0	0	36	
Tennessee ²⁷	9	5	0	0	0	0			none	none	2,000	652	2,652	
Texas ²⁸	39,339	12,153	57,077	47,288	9,789	0			none	none	18,895	17,000	92,972	
Utah ²⁹	697	58	1,469	710 (d)	483 (d)	276 (d)			none	none	0	70	1,539	
Virginia ³⁰	0	3	241	16	225	0			none	none	0	0	241	
Washington	0	1	0	0	0	0			none	none	0	0	0	
West Virginia ³¹	725	100	2,099	510	1,528	61			none	none	5,350	7,071	14,520	
Wyoming ³²	5,680	310	7,276	4,842 (d)	978 (d)	1,456 (d)			none	none	unknown	unknown	7,276	
Totals	91,594	35,016	150,689	107,231	27,761	15,499					70,472	63,438	284,599	

* Note: Well categories may not add up to totals because not all states provided a well category breakout. Data are through December 31, 1994 unless otherwise noted.

Footnotes for Table V

Wells idle without state approval with an unknown or insolvent operator, are referred to as "orphan wells" in these footnotes.

- (a) Approximate, based on *World Oil* data.
 - (b) Calculated from total and estimated data.
 - (c) 1992 data — not yet updated.
 - (d) Estimated, based on percentage of producing wells that are oil, gas, or service.
1. Alaska's figure for dry holes plugged is an estimate.
 2. Arizona's well counts for wells drilled and wells plugged and abandoned are lower than those in the 1992 report. This occurs because stratigraphic tests, which were counted as dry holes in the 1992 report, are not counted as dry holes in the 1996 report. Well counts are updated through September 1995. Arizona's total for approved idle wells includes 3 dry holes.
 3. Arkansas believes the number of wells drilled to be more accurate than the corresponding figure in the 1992 report, which was based purely on the number of permits issued. Arkansas does not break down well counts into oil, gas, and service well categories. See notes (a), (b), and (d) above.
 4. All California wells have been brought under regulation, including the 12,796 wells drilled before the inception of the regulatory program.
 5. Colorado's figure for wells plugged and abandoned is an estimate. Colorado's well counts are updated through June 1996. Colorado was not able to provide a breakdown of oil, gas, dry holes, and service wells for their statistics. See notes (a) and (d) above.
 6. Gas storage wells are included in the service well category for Illinois. Unapproved idle wells in Illinois are those wells known to be inactive through field inspections, etc., but not officially temporarily abandoned.
 7. Indiana's figures for idle wells without state approval and orphan wells are based on current available enforcement and permitting documentation that has been computerized. This information does not reflect a survey of all available well records. Indiana was unable to provide numbers for wells plugged and abandoned because these records have not been computerized.
 8. Iowa was not included in the original survey, and there is presently no oil and gas production in the state.
 9. Kansas' figures are estimates. Kansas reported 375,000 total wells drilled and 184,500 wells plugged and abandoned. These numbers represent data from the beginning of oil and gas activity in the state. The numbers in Table V were arrived at by using these numbers and then subtracting Kansas' estimates for pre-regulatory wells drilled and plugged and abandoned, to be consistent with the definitions used for this report. Kansas was unable to provide a figure for the total number of wells converted to Class II injection wells. In recent years, conversions have occurred at a rate of 200 per year for EOR and 50 per year for disposal. Wells idle without state approval where the operator is known is estimated based on a study of compliance with idle well requirements in a small number of fields, extrapolated to the state as a whole. The number of orphan wells is likely to be much higher than the 9,250 reported. That number represents orphan wells that are already known and documented. Kansas is currently completing a detailed inventory of abandoned wells and believes that the documented number of orphan wells could grow to as much as 48,000 by the time the inventory is complete.

Footnotes for Table V

10. Kentucky's figures for producing wells include a large number of wells that were drilled prior to regulation. The figure for wells drilled represents the number of wells drilled since regulation plus the number of wells drilled prior to regulation that have been brought under regulatory authority. The figure for wells plugged and abandoned represents the number of wells plugged since regulation, which includes the number of wells drilled prior to regulation that were plugged under regulatory authority. The figure for wells converted to Class II wells are estimates. The figure for idle wells with State approval includes 192 wells of unknown status, however, the majority of these are most likely secondary recovery oil producing wells. The figure for idle wells where the operator is known and solvent represents the number of idle wells in violation but with security intact. The figure for idle wells where operator is unknown or insolvent represents the number of idle wells with no security plus the number of idle wells in which security has been forfeited.
11. Louisiana's figures for wells converted to Class II wells, wells drilled, and wells plugged and abandoned are estimates (except for dry holes).
12. Maryland was not included in the original survey. Maryland does not break down well counts into oil, gas and service well categories.
13. Michigan classifies shut-in idle wells as producing wells. For the statistics in this table, shut-in wells have been subtracted from the number of producing wells.
14. The 1996 figures for Mississippi show significantly higher numbers of wells drilled and plugged and abandoned. This is because the 1996 figures are from the beginning of drilling in 1929, and the 1992 figures only included data from 1951.
15. Missouri's well counts for wells drilled and wells plugged and abandoned are lower than those in the 1992 report. This is due to double counting of some wells that occurred in the 1992 report. Missouri discovered this when it changed its computerized well tracking system and eliminated the double counting. Missouri's totals for approved idle wells include one dry hole and two of unknown status.
16. Montana's figures are estimates.
17. Nebraska's figure for wells drilled includes those drilled prior to regulation. Nebraska's figures for the number of wells drilled was higher in the original survey. The figures in the original survey were estimates, whereas the numbers in this survey are those obtained from the state geological survey, which are more accurate.
18. Nevada does not have any gas wells in the state, and does not differentiate between oil wells, service wells, and dry holes for wells drilled and wells plugged and abandoned.
19. New Mexico data are from the 1992 study. New Mexico is in the midst of installing a new computerized database system for tracking wells. Until this system is operational, no well count data are available.
20. New York did not begin full regulation until 1963. A large number of the producing/injecting and plugged and abandoned wells were drilled before regulation began.
21. Ohio does not categorize oil and gas wells separately; therefore, there is no breakdown on numbers of oil and gas wells in the various categories. Most wells in Ohio produce both oil and gas.
22. Oklahoma began regulating the oil and gas exploration and production industry in 1915. The Oklahoma Corporation Commission was provided the statutory jurisdiction to oversee that regulatory effort. The Corporation Commission did not maintain an annual well plugging activity statistics until January 1, 1971 but has hard copy records of the wells plugged since that date. The Corporation Commission believes that the remaining 176,910 non-active wells were properly plugged under the governing rules and standards in effect at the time. Oklahoma classifies known idle wells as producing wells. For the statistics in

Footnotes for Table V

this table, idle wells with state approval have been subtracted from the number of producing wells. Most of Oklahoma's 524 orphan wells are oil wells in northeastern Oklahoma.

23. Oregon was not included in the original survey.
24. During the approximately 100 years of oil and gas activity in Pennsylvania before regulation began in 1955, a large number of wells were drilled that are still producing. The figure for wells drilled represents only those wells drilled since regulation began. The 1992 report showed the significantly higher figure of all wells with records drilled in Pennsylvania, including those drilled pre-regulation. The figures for wells drilled, wells producing, and idle wells include wells that produce both oil and gas. These wells are broken down between oil and gas in these statistics based on the ratio of other oil to gas producing wells.
25. South Carolina was not included in the original survey. There is currently no oil and gas industry in the state.
26. South Dakota's counts for wells drilled and wells plugged and abandoned were higher in the 1992 study. South Dakota states that it used a different source for the statistics this time, which it believes to be more accurate.
27. Tennessee could only provide data on wells drilled since regulation began, and on producing wells. The 1996 data for wells drilled includes 2,167 wells drilled that are not classified by type. The 1992 data did not include this unclassified category, thus the number of wells drilled since regulation is higher in 1996. Tennessee does not break down orphan wells into oil and gas categories.
28. Texas did not report wells idle without state approval in 1992. The 18,895 idle wells without state approval represent all unapproved idle wells where the operator is known, regardless of whether they are solvent. The figure of 17,000 orphan wells (unknown operators) is a RRC estimate provided to the state legislature. These two figures (18,895 and 17,000) are indicative of known versus unknown operators instead of solvent versus insolvent operators.
29. Utah does not break down well counts into the oil, gas, and service well categories.
30. Virginia's figures for producing wells and idle wells with state approval are as of January 1, 1996.
31. West Virginia's numbers for wells drilled and wells plugged and abandoned are higher in the 1992 study than they are in this study. West Virginia has begun documentation of pre-regulatory wells, and the number of these wells is less than estimated in 1992, causing some numbers to be lower in the 1996 study. West Virginia uses an estimated 3:1 ratio of gas to oil wells for breaking down well counts into categories.
32. Wyoming did not provide an oil and gas well breakdown for idle wells.
33. For a number of states, totaling the reported numbers of wells producing/injecting, plugged and abandoned, and idle yields a number greater than the number of wells drilled since the inception of regulation in their state. Except where noted, this generally results from the inclusion of pre-regulatory wells in the numbers of producing/injecting, plugged and abandoned, and/or idle wells. Some states were unable to separate pre- and post-regulation wells into these categories. These states include Kansas, Kentucky, Montana, New York, Ohio, Pennsylvania, Texas, and Wyoming.

I. ENERGY AND ENVIRONMENTAL CONCERNS

Oil and gas producing states address idle wells as a factor in the balance of resource conservation, state revenue and potential liability, and environmental protection. This is reflected in the IOGCC mission to promote conservation and efficient recovery of domestic petroleum resources while protecting health, safety, and the environment.

Conservation statutes exist in producing states to ensure that oil and gas resources are developed in a manner that will prevent waste, which means they are not depleted prematurely through overproduction and depletion of reservoir pressure. Although currently idle, wells may still be capable of production or of use in an enhanced recovery project. Moreover, these wells may provide access to substantial volumes of oil and gas remaining in the reservoir that may not be recoverable under current technology or economic conditions, but that could become recoverable in the future. The premature abandonment of such wells would eliminate access to these resources.

States benefit substantially from oil and gas development through tax revenues, employment earnings, and other economic activity. Many states fund oil and gas conservation programs with percentages of severance or other taxes, or supplement such programs through fees for permits or other services provided by the regulatory agency. The decline in industry activity since the mid-1980s has severely affected funding for many states. The future development of oil and gas resources associated with wells currently idle could provide potential revenues. Furthermore, states have a strong incentive to avoid inheriting operator responsibility for plugging and abandoning wells that are no longer capable of producing.

State agencies are interested in protecting the environment, and the states consider the potential for contamination of groundwater or soils from idle wells. State plugging funds are geared toward the remediation of orphan wells and/or sites posing the greatest environmental risk. Regardless of well status or if funds from securities or financial assurance programs are available, most states have avenues to address and remediate wells that pose an imminent hazard to public safety, health, and the environment.

The IOGCC survey asked questions gauging state experience in these areas. Specifically, the survey requested information on the resource potential associated with wells that are currently idle and on any proven or suspected environmental damage resulting from idle wells. The following discussion focuses on the energy, economic potential, and environmental concerns associated with idle wells.

Energy and Economic Potential

This report identifies numerous oil and gas wells that are idle (see Section III-H), and many of these wells may be capable of returning to production or contributing to enhanced production through their use as an injection well. This section of the report addresses the production potential and economic value that idle wells could represent to states. Several states have enacted incentives to bring idle wells back into production, with positive economic benefits. These incentives are discussed in Section IV of this report.

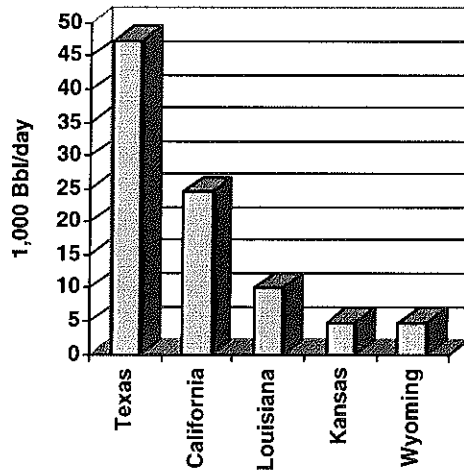
When providing the number of idle wells, states were asked to estimate the potential production associated with these wells. While a few states were able to do so, most were not. Therefore, a consistent, simplistic approach has been used to estimate the potential future production across all states. It was felt that using the average production volume from stripper wells in the state would overstate the production potential, since wells capable of that level of production would probably not be idle. Therefore, 1 barrel per day (bbl/d) or 10 thousand cubic feet per day (Mcf/d) has been used as an estimate of the potential of these wells. It should be noted, however, that in some states, the volume of production required to make a well economic to produce is higher than 1 barrel or 10 Mcf per day, while in other states the required production volume may be lower.

Assuming that the average idle oil well in the U.S. is capable of producing 1 bbl/d, the oil production potential represented by wells currently with state approval to be idle is over 107,000 bbl/d. This could represent an increase of nearly 2 percent in domestic oil production. Likewise, assuming that the average idle gas well is capable of producing 10 Mcf/d, the production potential represented by gas wells idle with state approval is over 275,000 Mcf/d, a small percentage nationwide, but one potentially significant in some states. The production from these idle oil and gas wells, if they were returned to production, could generate additional severance taxes for the states, revenue for producers, and jobs and benefits for the economy at large.

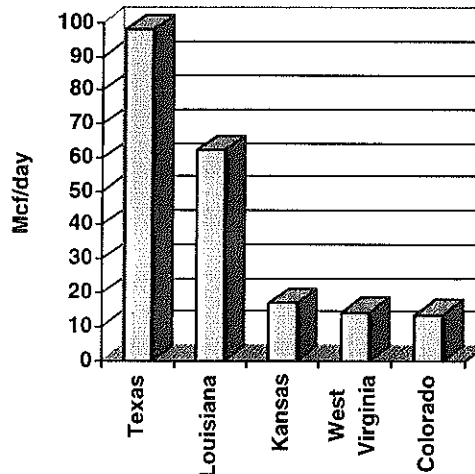
These estimates assume that all state approved idle oil and gas wells are placed back on production. Some of the wells listed as idle may be slated for conversion to injection wells for enhanced recovery or water disposal purposes, or may be incapable of production due to technical, economic, or lease-management constraints. Thus, some of the estimates developed in this analysis could be overstated. On the other hand, wells converted to injection would still be contributing to increased production. This increase in using enhanced oil-and gas-recovery processes may offset any loss in producing wells, making the above estimates reasonable.

Several states have enacted incentives for returning idle wells to production (see Section IV). These have been successful in creating economic benefits for the state. In 1992, the last year prior to implementation of Texas' "3-Year Inactive Wellbore" program, only 368 wells idle

States with Largest Oil Production Potential from Idle Wells



States with Largest Gas Production Potential from Idle Wells



for three years or more were brought back into production. Between September 1993 (when the incentive was enacted) and February 1996, over 5,700 wells that had been idle for three or more years were returned to production. On the average, nearly 2,450 wells per year have been returned to production. Texas estimates that these wells have an annualized production value of over \$575 million, resulting in an additional \$1.67 billion in economic activity throughout the state — enough wealth to create over 14,600 jobs.

Louisiana also enacted severance tax breaks for idle wells placed back in service, along with breaks for stripper wells (when prices fall below \$20 per barrel), newly drilled horizontal wells, new discovery wells, and gas from deep wells below 15,000 feet. While these breaks meant forgoing \$7.6 million in severance taxes by state and local governments, Louisiana State University estimates that the state gained \$4.9 million and local governments \$6.8 million in increased sales tax, nonseverance production taxes, royalties, and income taxes.⁸ LSU also estimated that over 1,000 new drilling jobs and over 600 new production positions were generated in the state through these incentives. [These figures include benefits of all severance-tax exemptions provided, not just those for reactivated wells.] Reactivated wells yielded nearly 2.9 million barrels of oil equivalent. While not quantified, other states are also experiencing the benefits of putting idle wells back to productive use.

Plugging of idle wells could result in premature abandonment of remaining oil and gas resources. Regaining access to an abandoned reservoir with new wells may be an expensive undertaking that could seriously undermine the economic viability of future enhanced recovery projects. Studies have shown that if wells must be redrilled, potential oil reserves may be reduced by up to one-third.⁹

The oil-resource potential associated with currently idle wells could be significant. [Data for gas wells are not available.] The U.S. Department of Energy has estimated that if oil prices remain near \$20 per barrel, wells currently idle with state approval could provide as much as 3.2 billion barrels of oil using conventional recovery techniques, and an additional 620 million barrels of potential reserves through enhanced recovery techniques.¹⁰ A simplistic methodology was utilized by DOE to develop upper-bound estimates of future resource recovery potential from idle wells (see Appendix C). Given the assumptions inherent in this methodology, these estimates of potential remaining reserves are optimistic.

Environmental Concerns

The states have a long and distinguished history of protecting the environment while ensuring appropriate development of energy resources. The first statute establishing well plugging techniques to protect groundwater was enacted in New York in 1895. Protection of groundwater pre-dates formal regulatory programs in numerous states.

⁸ Benson, M., "Drilling, Production Incentives Pay Off for Louisiana," *The American Oil & Gas Reporter*, May 1996.

⁹ Brashear, J.P., Biglarbigi, K., Becker, A.B., and Ray, R.M., "Effect of Well Abandonments on EOR Potential," *Journal of Petroleum Technology*, December 1991.

¹⁰ These numbers are larger than reported in the 1992 Idle Wells study, despite a comparable number of idle wells due to updated/improved data on reserves and recovery potential in DOE's analytical systems.

The potential for groundwater contamination is the primary environmental concern associated with idle wells. An open (unplugged) wellbore could potentially serve as a conduit for the migration of reservoir fluids into a groundwater aquifer. It is also conceivable that water from a highly saline aquifer could migrate to a current or potential source of drinking water. In some cases, fluids could potentially flow all the way to the surface, potentially contaminating surface soils surrounding the well.

Given these environmental concerns, the IOGCC survey asked states whether they had evidence of groundwater contamination by idle wells (those falling under the state's idle well program) or by improperly plugged and abandoned wells. In general, the states conclude that idle wells, regulated under existing state programs, pose minimal environmental risk. The current protections built into state requirements, including methods for temporarily abandoning or idling a well and testing mechanical integrity, further minimize these risks. Should unforeseen problems arise, state authority allows these problems to be addressed promptly to protect the environment. IOGCC survey responses show that improperly plugged and abandoned wells (typically very old wells abandoned before state plugging regulations were implemented) have been the source of some soil and groundwater contamination in a few states. States have established orphan well programs and state plugging funds to promptly address these wells and clean up any contamination that may occur (see Section III-C). Furthermore, many states actively seek to identify and remediate the wells before any contamination can occur.

The environmental risk posed by these wells is *variable*, based on wellbore and subsurface conditions. Mechanical barriers within the well (elements of the well's construction) are a key factor in preventing fluid migration. Another risk factor to be considered is the presence of pressurized formations that could encourage fluid migration. Several other factors could also potentially inhibit fluid flow within the well, although these factors may be somewhat difficult to assess: borehole restrictions such as drilling mud, sloughing shales, and collapsed formations; relatively long vertical distances between fresh water aquifers and pressurized formations; and the presence of extremely porous and permeable intervening formations. Under current underground injection control (UIC) requirements, when a new well is placed on injection status, all wells (active, idle, abandoned) within its area of review (typically a 1/4 mile radius) must be studied to determine whether they pose a risk of contamination. This information, where available, further allows states to assess the level of risk posed by idle wells.

The oil and gas industry has also been proactive in identifying the potential risks posed by idle wells and advocating appropriate management practices. In 1993, the American Petroleum Institute (API) issued environmental guidelines on well abandonment and inactive well practices.¹¹ API recommends that operators characterize the potential risks posed by an idle well based on wellbore construction and the existence of pressured formations that would encourage fluid migration. Once the risks are characterized, API suggests appropriate monitoring procedures for several different levels of risk, with greater frequency of monitoring for those wells that pose the greatest risk. For wells with significant levels of risk, API suggests immediate site investigation and potential plugging of the wellbore to protect the environment. The API guidelines are consistent with the approaches inherent in most state programs, reflecting the strong commitment by both industry and the states to ensure that wells can remain idle safely until they can again be reused to recover oil and gas resources. In addition, the API guidance document also specifies

¹¹ American Petroleum Institute, *Environmental Guidance Document: Well Abandonment and Inactive Well Practices for U.S. Exploration and Production Operations*, API Bulletin E3, January 31, 1993.

proper plugging and abandonment procedures to help operators ensure that wells with no production potential pose no future environmental risks.

The IOGCC has been proactive in assisting states to effectively regulate the management of wastes from oil and gas operations. In 1994, the IOGCC issued environmental guidelines for state oil and gas regulatory programs¹² that includes guidance on identifying, remediating, and funding the remediation of orphaned (abandoned) oil and gas sites. These guidelines include criteria for prioritizing abandoned sites for state action, such as: 1) the occurrence or potential for an imminent release from the site; 2) the nature, extent, and degree of contamination; 3) the proximity of the site to populated areas, surface water, and/or groundwater; 4) whether the site is in an environmentally sensitive area; and 5) wellbore lithology and condition. For information on some of the criteria currently used by states in setting plugging and remediation priorities for state funds, see Section III-C and Appendix B of this report.

Regardless of well age or status, the states have avenues to remediate or prevent contamination from any wells (active, idle, orphaned, or abandoned). States actively seek to prevent problems by focusing on high-risk wells, and promptly addressing any problems that occur. They protect the environment while enabling responsible development and production of the nation's oil and gas resources.

¹² Interstate Oil and Gas Compact Commission, *IOGCC Environmental Guidelines for State Oil and Gas Regulatory Programs*, May 1994.

IV. INNOVATIVE PROGRAMS, INCENTIVES, AND NEW LEGISLATION

State agencies often seek authority for actions that will help them to better meet their objectives of appropriate development of the state's energy resources and protection of the environment. In recent years, this has sometimes meant expanding authority to address idle or orphaned wells. States have also adopted innovative programs that encourage idle wells to be placed back into production or to be cleaned up and the well sites restored. This section summarizes some recent action in state legislatures and other state programs related to idle and orphan wells. For additional information on the innovative programs described below, contact the state representatives listed in Appendix F.

Innovative Programs

- Enlisting landowner assistance in plugging
- Allowing well plugging as community service in lieu of fines
- Industry education and site restoration funded through levy on production
- Saving wells scheduled for abandonment for research and future use

Expanded Authority or Funding

Several states have sought to support their well plugging efforts through increased funds. These increases often have been obtained through the imposition of fees on the oil and gas industry. Kansas has obtained new authority to require financial assurance from operators for wells to reduce the number of orphan wells. Other states have created new plugging funds. Louisiana has created site-specific restoration accounts.

California California now imposes a fee of \$100 per year on unbonded 5-year idle wells. These fees (around \$60,000 annually) are placed in a special fund used to plug orphan wells.

Kansas New legislation expands the financial responsibility requirements in Kansas effective January 1, 1998. Operators must now demonstrate compliance with one of the following:

- 1) Provide bond or letter of credit totaling \$0.75/foot of well depth of all wells operated in the state.
- 2) Provide blanket performance bond or letter of credit based on number of wells and well depth:
 - For wells < 2,000 ft: 1-5 = \$5,000; 6-25 = \$10,000; >25 = \$20,000
 - For wells > 2,000 ft: 1-5 = \$10,000; 6-25 = \$20,000; >25 = \$30,000
- 3) Have an acceptable compliance record over the past 36 months, no outstanding undisputed orders or unpaid fines and no officer or director

who is associated with another company having outstanding orders or fines, and pay a \$50/year nonrefundable fee.

- 4) Pay nonrefundable annual fee equal to 3 percent of otherwise required bond amount.
- 5) Give state first lien on tangible property that has a salvage value equal to or greater than required bond amount.
- 6) Provide other financial assurance approved by the Commission.

This legislation also provides \$1.6 million annually for plugging orphan wells and remediating contaminated sites. Funding for this program is a mix of industry assessments, state funds, and Federal mineral royalties.

Kentucky

The Division of Oil and Gas worked with the Kentucky legislature to draft two bills that were under consideration as this report was completed. The first, H.B. 736, would amend KS 353.550 to provide authority for the collection of production data. The Division currently lacks this authority, which is a key method for identifying idle wells. The second bill, H.B. 737, would amend state law to provide authority to sell all equipment removed from a wellsite for noncompliance. These sales would be conducted by sealed bid after proper notification.

Louisiana

Act 404, passed by the legislature in 1993 and amended by Act 297 of 1995, establishes an orphan well plugging and site restoration fund, which is overseen by an Oilfield Site Restoration Committee. This fund receives monies from a \$10 annual fee per nonproducing well (except temporarily abandoned or saltwater disposal wells in stripper fields) and a production fee totaling \$0.01 per barrel of oil or condensate and \$0.002 per thousand cubic feet of gas.

The bill also provides that, at the time of property transfer, a site-specific trust account may be established to provide funds for site restoration. These accounts are based on an assessment of the full cost of restoration following a detailed review of site conditions and disclosure of known problems by the seller. Once established, the accounts remain with the site through subsequent property transfers. If an account is established and fully funded, the transferring party shall not be held liable by the state for any future restoration costs.

The 1995 amendment provides that contractors bidding on plugging and site restoration projects shall take the salvage value of equipment left onsite into account in making a bid.

Michigan

An Orphan Well Fund was established in 1994 that authorizes the expenditure of funds for plugging of orphan wells and/or site restoration. Funds are generated through a severance tax on all oil and gas production, with two percent of the revenue received each fiscal year, but not less than \$1 million, is credited to the Orphan Well Fund. No money is to be credited to the Fund when the balance reaches \$3 million.

Pennsylvania In 1992, Pennsylvania established an Orphan Well Plugging Fund specifically to address wells that had been orphaned. Funds are generated by a surcharge on drilling permit applications of \$100 for an oil well and \$200 for a gas well.

West Virginia Legislation has been proposed providing more funding to plug orphan wells. The legislation would establish a per well fee on all producing or idle wells and would designate for orphan well plugging a percentage of severance taxes.

Tax Incentives

In 1994, the National Petroleum Council (NPC) completed a report assessing the costs and benefits of various incentives, particularly tax incentives, for maintaining production from marginal and stripper wells.¹³ State regulators worked with industry in the preparation of this report. This NPC report recommended four federal tax incentives that could encourage continued production from marginal wells. The NPC also recommended regulatory and royalty relief and state tax incentives as key elements in improving marginal well economics. However, not all states can avail themselves of this approach; some states do not currently impose severance taxes.

Recently, several states have enacted tax incentives for marginal production, typically reducing the amount of severance tax required. The primary purpose of these incentives is to prolong production from marginal wells, capture the economic benefits of this continued production, and prevent these marginal wells from becoming idle for economic reasons. Eight states (Arkansas, Kansas, Louisiana, Mississippi, New Mexico, Oklahoma, Texas, and Wyoming) have established specific severance tax reductions for placing idle wells back into production. These provisions are summarized below. California is considering enacting similar measures. Current tax and other incentives related to marginal and idle wells in oil and gas producing states, including incentives under consideration, are summarized in Table VI at the end of this section.

Arkansas Act 1093 was passed in 1995 to provide severance tax relief to certain projects designed to increase oil production in the state:

- ◆ Inactive oil wells (no production for 12 consecutive months) that are restored and reestablished as producing wells are exempted from severance taxes for 10 years from the date of renewed production.
- ◆ An inactive oilfield that is later returned to production is exempt from severance taxes for oil produced from all zones, horizons, and formations that once were productive but have ceased to produce.
- ◆ Enhanced oil recovery projects approved by the Oil and Gas Commission are entitled to a 50 percent reduction in severance taxes for the incremental volume of oil attributable to the project.

¹³ National Petroleum Council, *Marginal Wells*, July 1994.

- ◆ Increased (incremental) production due to application of new research technologies approved by the Oil and Gas Commission is exempt from severance tax.

Kansas

SB714, "Three Year Inactive Wells," was passed by the Kansas Legislature in 1994. It allows a 10-year exemption from severance tax for inactive wells returned to production. To qualify, a well must have been inactive prior to July 1, 1993, and must have produced for no more than 1 of the 36 months prior to filing with the Commission for approval. This bill applied only to wells placed back on production prior to July 1, 1996.

Louisiana

In 1994, legislation was passed to reduce the severance tax on several categories of wells:

- ◆ Oil wells incapable of producing more than 25 barrels of oil per day, which also produce at least 50 percent salt water daily, receive a 50 percent reduction in severance taxes. For wells incapable of producing more than 10 barrels of oil per day, regardless of water cut, the severance tax is reduced to 25 percent of the normal applicable level.
- ◆ Horizontally drilled wells or recompletions, new discovery wells, and gas or condensate produced from 15,000 feet or deeper have severance tax suspended for a period of 24 months or until payout of the well cost is achieved, whichever comes first.
- ◆ Wells that have been inactive for two years or longer, or have produced less than 30 days during the past two years, are exempted from severance tax for a period of five years. This program to return idle wells to production was scheduled to be applicable to wells returned to production between July 31, 1994 and June 30, 1996. Section III-I discusses the success of this program. Producers in the state are working with legislators to extend the program.¹⁴

Mississippi

Wells inactive for at least 2 years that are returned to production are exempted from severance taxes until 1999, or until oil prices reach \$25 per barrel or natural gas prices reach \$3.50 per mcf.

New Mexico

In 1995, New Mexico passed legislation to reduce the 3.75 percent severance tax on several categories of wells.

- ◆ Idle oil and gas wells returned to production receive a severance tax exemption for ten years. For a well to be classified as idle, it must have had less than 30 days of production for the two years between January 1, 1993 and December 31, 1994.
- ◆ Incremental production resulting from enhanced oil recovery (EOR) projects is taxed at a rate of 1.875 percent.

¹⁴ Benson, M., "Drilling, Production Incentives Pay Off for Louisiana," *The American Oil and Gas Reporter*, May 1996.

- ◆ Incremental production resulting from well workover projects is taxed at a rate of 1.875 percent.

Oklahoma

Oklahoma provides relief from the state's gross production tax for five types of operations:

- ◆ Secondary enhanced recovery projects beginning after July 1, 1993, and before July 1, 1998 — total exemption from 7 percent gross production tax on incremental production until project pay out is achieved, not to exceed 10 years. Project pay out includes capital expenses and 50 percent of operating expenses.
- ◆ Tertiary enhanced recovery projects beginning after July 1, 1993, and before July 1, 1998 — total exemption from 7 percent gross production tax on incremental production until project pay out is achieved, not to exceed 10 years. Project pay out includes capital expenses and 100 percent of operating expenses, excluding administrative expenses.
- ◆ Inactive wells placed back into production after two years or more of inactivity — exempt from the 7 percent gross production tax for 28 months from the date the well was placed back into service.
- ◆ Production enhancement projects — The incremental production from wells that are recompleted or worked over are exempted from the 7 percent gross production tax. Incremental production is any oil or gas produced in excess of the established base production. Base production in this instance means the monthly average production for the 12-month period immediately prior to the date of commencement of the project.
- ◆ Economically at-risk oil leases — An oil lease that operates at a net loss or net profit less than the total gross production tax remitted for the lease is eligible for an exemption equal to six-sevenths of the gross production tax levied.

The tax incentives for inactive wells placed back into production, production enhancement projects, and economically at-risk oil leases are only applicable when the weighted average price for Oklahoma crude oil is \$20 per barrel or less or the natural gas price is \$2.50 per MMBTU or less calculated on an annual basis. Refunds are eligible through an application and approval process after July 1 of the following year for these incentive categories.

Texas

In 1993, Texas established the "3-Year Inactive Wellbore" program to exempt from state severance taxes inactive wells returned to production between September 1, 1993 and February 29, 1996. The program applies to both oil and gas wells. To qualify, wells must have produced no more than one month during the prior three years. Production from these wells is exempted from severance taxes for a period of 10 years. Wells certified as qualifying inactive wells prior to February 29, 1996, may be placed back into production any time between the date of certification by the Commission and 10 years subsequent. These wells would be exempt from

severance tax from the date of renewed production until the end of the 10-year period from the date of certification. Section III-I discusses the success of this program, which was not extended beyond February 1996.

In 1989, Texas passed an incentive for enhanced oil recovery (EOR) projects that allows a 50 percent reduction of the state's 4.6 percent oil severance tax rate for all oil production from new EOR projects and incremental production from expanded EOR projects. Currently idle wells may be used on these new EOR projects. There is a two-step approval process to receive the severance tax credit. The first step requires oil and gas operators to seek approval of the project prior to active operation of the project. The second step requires certification, within a specific time frame, that there has been a positive production response to the technique being used. The reduced severance tax applies for 10 years following the certification of positive response. Applications for this credit will be accepted only through January 1, 1998.

Wyoming

Oil wells having no production for at least two consecutive years prior to January 1, 1995, that are returned to production are subject to a severance tax rate of only 1 percent (reduced from the normal 6 percent). This reduced severance tax applies for the first 60 months of renewed production or until the average price of oil reaches a level of \$25 per barrel averaged over the previous six months.

Innovative Programs

Several states have established innovative programs designed to keep marginal wells producing, including mechanisms to familiarize producers with new technologies that may enhance production. These mechanisms are designed to reduce the potential that these wells will become idle or orphaned. Other states have developed innovative ways of encouraging orphan wells to be plugged. Still others are attempting to find productive use for orphan wells and are exploring alternatives to plugging.

Missouri

In lieu of fines for regulatory violations, operators are offered the opportunity to do community service by plugging a comparable number of orphan wells selected by the state.

Ohio

A landowner grant program has been established for the plugging of orphan wells, and \$200,000 has been set aside to fund this program. Letters are being sent to eligible landowners offering them the opportunity to get the orphan wells on their land plugged sooner by taking a more active role in the plugging process. Landowners must get bids from contractors (for a plugging program that complies with state regulations) and submit an application to the state. If approved, the landowner can have the well plugged and the state will reimburse the cost of plugging. See Appendix E for more information on this program.

Oklahoma

Oklahoma has established a Commission on Marginally Producing Oil and Gas Wells. The duties of this Commission include collecting information on

marginal wells, distributing information to producers, proposing legislation and regulations to prolong production, and ensuring awareness of the economic contributions of marginal wells. A key aspect of the program is conducting workshops, on-site demonstrations, and access to technical-assistance materials designed to transfer technical expertise that can prolong production. The Commission is funded by a fee on petroleum production in the amount of \$0.002 per barrel of oil and \$0.001 per 10,000 cubic feet of natural gas and casinghead gas. Production exempted from severance tax is also exempted from this fee. Producers who elect not to participate may file at year's end for a refund of fees.

The Oklahoma Energy Resources Board was established in 1994 for the dual purpose of energy education and remediation of abandoned oilfield sites. OERB is currently funded by a \$0.02 per barrel assessment on crude production in the state. Recent legislation replaces that levy with a 0.01 percent assessment on the gross wellhead value of both crude oil and natural gas. This is anticipated to generate approximately \$4 million annually. OERB conducts educational programs for school-aged children, including explanations of the petroleum industry and oilfield safety. OERB's enabling legislation requires that at least half of the funds received must be expended for environmental restoration. Between January 1995 and May 1996, OERB has cleaned up 111 abandoned oilfield sites.¹⁵ The Oklahoma Corporation Commission has turned over to OERB 246 projects containing 378 sites in need of restoration.¹⁶ OERB also receives some funding from DOE, and in conjunction with DOE plans to use one of its remediation sites to evaluate new remediation technologies.

Texas

The Texas Experimental Research and Recovery Activity (TERRA) became effective January 1, 1996. This program gives the oil and gas industry and the Texas Railroad Commission (RRC) an alternative to prematurely plugging nonpolluting, mechanically sound wells. Operators with marginally producing wells that are uneconomic to operate may place their wells in the TERRA program by paying 75 percent of the RRC's estimated plugging costs in exchange for a release of plugging liability. Wells approved for plugging with state funds may be transferred to the TERRA program at 100 percent of the RRC's estimated plugging costs. The RRC requires that wells must meet certain criteria for acceptance into the TERRA program.

Operators or research institutions may be licensed to conduct research on enhanced recovery methods or to test new exploratory techniques without incurring a plugging liability on wells in the TERRA program. If circumstances change and the wells in the program become economic again, operators may remove wells from TERRA at a cost of up to 200 percent of the RRC's estimated plugging cost.

¹⁵ "OERB to Remediate Elk City Site," *E&P Environment*, June 10, 1996.

¹⁶ "OERB Campaign Shifts Into High Gear," *The American Oil & Gas Reporter*, May 1996.

The economic model for operation of the TERRA program has projected that at the end of 4 years, the program will have assets of \$9.6 million and liabilities of \$8.3 million. These projections are based on conservative estimates. The program is funded in the following ways: 1) industry wells accepted at 75 percent of the RRC's estimated plugging cost; 2) state-funded plugging wells transferred at 100 percent of the RRC's estimated plugging cost; 3) license fees to test a well or conduct research; 4) TERRA wells removed from the program at a cost of up to 200 percent of the RRC's estimated plugging cost; 5) salvage monies collected from equipment and hydrocarbons sold from wells plugged with state funds; 6) interest from the monies in the TERRA fund; and 7) contributions and donations to the TERRA fund. Appendix F provides additional information on the TERRA program.

West Virginia West Virginia is offering prizes to citizens who find and report abandoned wells in the state. A brochure tells prospective abandoned well hunters what to look for in spotting an abandoned well and what to make a note of, such as any identifying numbers, when an abandoned well is located. Contest prizes include tickets to football games, hunting and fishing licenses, and similar low cost, but valued, awards. The prizes provide an inexpensive way for West Virginia to provide incentives for people to report abandoned wells that could otherwise be difficult to locate. Appendix G provides details on this innovative program.

Table VI: State Incentives to Reduce or Prevent Idle Wells

State	Description of Incentive	Current Incentives		Incentives Under Consideration
		Tax	Other	
Alabama	<ul style="list-style-type: none"> Severance tax reduction from 8% to 6% on wells producing less than or equal to 25 bopd or 200 Mcfd. 	◆		
Alaska	<ul style="list-style-type: none"> Severance tax reduction for marginal wells. Tax reductions for certain wells with water cuts exceeding a specified value. Royalty reduction for marginal reservoirs and for low-gravity crudes. 	◆ ◆	◆	
Arizona	<ul style="list-style-type: none"> Severance tax reduction from 5% to 4% on wells producing less than 10 bopd. 	◆		
Arkansas	<ul style="list-style-type: none"> Severance tax reduction for incremental production resulting from enhanced oil recovery (EOR) projects or application of approved new technologies Ten-year severance tax elimination for idle wells brought back on line. Permanent severance tax elimination for wells in idle fields brought back on line. 	◆ ◆ ◆		
California	<ul style="list-style-type: none"> Reduction in the oil and gas assessment for production from idle wells brought back on line. 			◆
Florida	<ul style="list-style-type: none"> Severance tax reduction from 8% to 5% for wells producing less than 100 bopd. Severance tax reduction from 8% to 5% for tertiary production. 	◆ ◆		
Kansas	<ul style="list-style-type: none"> Ten-year severance tax elimination for idle wells brought back on line. To qualify, a well must have been inactive for 3 years. Severance tax exemption for production resulting from a "tertiary" recovery process. Severance tax exemption for marginal wells, as determined by oil and gas production and prices. Elimination of proration constraints on certain oil and gas fields. Extension of existing tax credits to investments made in restoring idle wells to active production. This could be achieved by relief from county ad valorem taxes, severance tax abatement, or sales tax relief for equipment purchased and used in Kansas to restore wells to active service. 	◆ ◆ ◆ ◆	◆	◆

Table VI. State Incentives to Reduce or Prevent Idle Wells (Continued)

State	Description of Incentive	Current Incentives		Incentives Under Consideration
		Tax	Other	
Louisiana	• Reduction of severance taxes on marginal wells.	◆		
	• Five year severance tax elimination for idle wells brought back on line. To qualify, a well must have been inactive for 2 years.	◆		
	• 50% severance tax reduction for wells incapable of producing more than 25 bopd, with at least a 50% water cut.	◆		
	• Wells incapable of producing more than 10 bopd, regardless of water cut, pay only 25% of the normal amount of severance tax.	◆		
Michigan	• <i>Severance tax reduction from 6.6% to 4% for wells producing less than 5 bopd.</i>	◆		
Mississippi	• Wells inactive for two years or more and returned to production are exempted from severance taxes until 1999, oil prices reach \$25/bbl, or gas prices reach \$3.50/Mcf.	◆		
Montana	• Severance tax exemption for first 3 bopd on wells producing less than 10 bopd.	◆		
	• <i>Severance tax reductions for incremental production from secondary and tertiary recovery projects.</i>	◆		
Nebraska	• <i>Severance tax reduction from 3% to 2% for wells producing less than 10 bopd.</i>	◆		
New Mexico	• Severance tax reduction from 3.75% to 1.88% for approved secondary or tertiary production.	◆		
	• Ten year severance tax exemption for idle wells returned to production.			
North Dakota	• Severance tax exemption for stripper wells.	◆		
	• Severance tax exemption for new wells drilled.	◆		
	• Severance tax exemption for new horizontal wells drilled or horizontal reentry.	◆		
	• Severance tax exemption for wells that have been inactive for at least 2 years that are returned to production.	◆		
	• Severance tax exemption for incremental production resulting from workover projects.	◆		
Oklahoma	• Severance tax exemption for secondary enhanced recovery projects until project payout.	◆		
	• Severance tax exemption for tertiary enhanced recovery projects until project payout.	◆		
	• Wells inactive for 2 years or longer that are placed back in production are exempt from severance tax for 28 months.	◆		

Table VI. State Incentives to Reduce or Prevent Idle Wells (Continued)

State	Description of Incentive	Current Incentives		Incentives Under Consideration
		Tax	Other	
<i>Oklahoma (continued)</i>	<ul style="list-style-type: none"> Oil leases operating at a net loss or yielding a net profit less than the amount of severance tax paid may have their severance tax reduced from 7% to 1% as long as prices are below \$20/bbl. 	◆		
	<ul style="list-style-type: none"> Incremental production from wells enhanced by means of recompletion or workover is exempt from severance tax. 	◆		
	<ul style="list-style-type: none"> Total gross production tax exemption for wells producing less than 3 bopd. The estimated cost of this proposal would be \$48 million per year. 			◆
<i>Pennsylvania</i>	<ul style="list-style-type: none"> Waiver of permit application fee for any orphan wells that an operator takes over in order to return them to production. 		◆	
	<ul style="list-style-type: none"> Withholding partial payment from state plugging contractors who are also operators of unbonded wells. The goal of this proposal would be to develop a blanket bond for that operator's wells. 			◆
<i>Texas</i>	<ul style="list-style-type: none"> Ten-year severance tax exemption for inactive wells brought back on line. A well must have been inactive for 3 years to qualify. 	◆		
	<ul style="list-style-type: none"> Severance tax reduction from 4.6% to 2.3% for incremental production from EOR projects. 	◆		
	<ul style="list-style-type: none"> Reducing the length of well inactivity required to qualify for a severance tax exemption from 3 years to 2 years. 			◆
	<ul style="list-style-type: none"> Incentives to increase production on wells producing less than 3 bopd. 			◆
<i>Utah</i>	<ul style="list-style-type: none"> Severance tax exemption for stripper wells. 	◆		
	<ul style="list-style-type: none"> Severance tax exemption on a portion of workover/completion expenses for operations. 	◆		
	<ul style="list-style-type: none"> Relaxation of severance tax burden. 			◆
<i>Wyoming</i>	<ul style="list-style-type: none"> Severance tax reduction from 6% to 4% for stripper wells and on incremental production resulting from tertiary oil recovery. 	◆		
	<ul style="list-style-type: none"> Severance tax reduction to 2% for production resulting from workovers/recompletions. 	◆		
	<ul style="list-style-type: none"> Five-year severance tax reduction from 6% to 1% on production from previously idle wells. Wells must be idle for two years to get this tax reduction. 	◆		
	<ul style="list-style-type: none"> Additional bonding requirement of \$2 per foot for existing idle wells. This is intended to either drive wells back into production or to encourage their plugging and abandonment. 		◆	

Incentives in italics were obtained from National Petroleum Council, *Marginal Wells*, July 1994.

V. BUREAU OF LAND MANAGEMENT BONDING AND UNFUNDED LIABILITY REVIEW

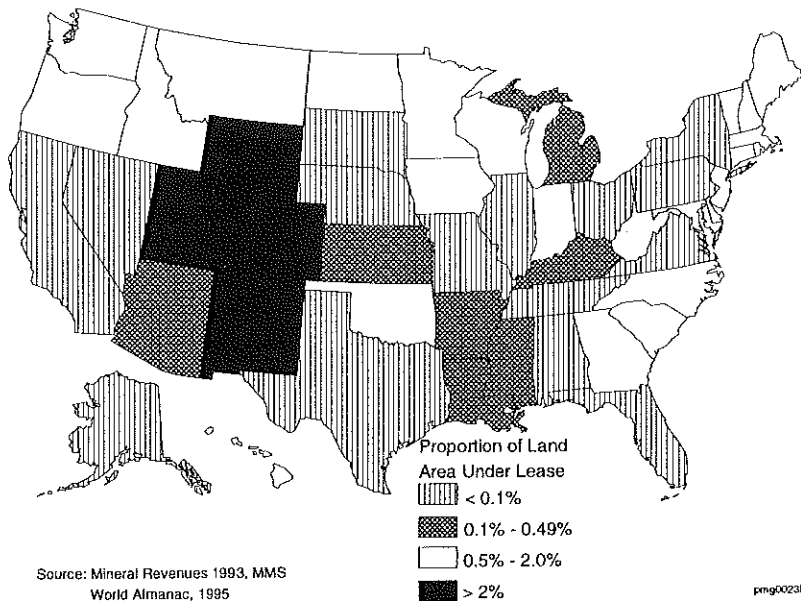
The Department of the Interior's Bureau of Land Management (BLM) is responsible for oil and gas operations on federal lands, and in conjunction with the Bureau of Indian Affairs (BIA), for most Indian lands. The major exception is the tribal lands of the Osage, where oil and gas operations are handled directly by the Osage Indian Bureau.¹⁷ The authority to regulate wells and bonding on federal lands is contained in Title 43 of the Code of Federal Regulations and in Title 25 for Indian lands. BLM has the authority for bonding requirements on federal lands, while the Bureau of Indian Affairs has the final responsibility and authority for bonding requirements on Indian lands.

Large areas of the Western U.S. are owned by the federal government and BLM has the stewardship role for appropriate development of oil and gas resources on these lands. As shown on the map, several Western states have a large portion of their acreage currently under federal lease for the production of oil and gas. Over 80,000 wells currently produce oil or gas on lands under BLM supervision.

Like the producing states, BLM has recognized that appropriate development of oil and gas resources sometimes necessitates allowing wells to remain idle until economic conditions improve or until the well can be used in an enhanced recovery project. BLM implemented a policy in 1986 to avoid premature abandonment of marginal or stripper wells. This policy grants a suspension of producing obligations on these marginal leases for up to one year, with a royalty payment of \$1 per acre per year. These suspensions can be extended with BLM approval. In 1992, BLM also reduced the royalty rate for stripper oil well properties to encourage operators of these properties to place marginal or uneconomic properties back in production and to provide an economic incentive to increase production by reworking marginal wells or implementing enhanced recovery projects.

BLM defines a shut-in (SI) well as a completed well which is physically and mechanically capable of production in paying quantities, but is currently nonproducing, or a well that is capable

Onshore Federal and Indian Oil and Gas Leases



¹⁷ Since BLM has no jurisdiction on Osage lands, all information in this chapter excludes wells and requirements on Osage Indian lands.

of service use, but not currently used for that purpose. Service use means a nonproductive completion used to support the production of oil or gas, such as injection, disposal, or observation purposes. All equipment for a shut-in well remains onsite and it can be produced or used for service by basically turning a valve or providing power to activate the pump. BLM reported approximately 11,000 shut-in oil and gas wells on federal and Indian lands as of September 30, 1994.

Under BLM's requirements, once a well is no longer capable of producing economic quantities of oil or gas or use as a service well, one of three possible actions should occur:

- ◆ It should be promptly plugged and abandoned,
- ◆ It should be approved for use as a service well for injection to recover additional oil or gas or for subsurface disposal of produced water, or
- ◆ It should be approved as a temporarily abandoned (TA) well.

BLM has approved the temporary abandonment of slightly more than 6,500 oil and gas wells on federal and Indian lands. BLM personnel determine the need for and frequency of mechanical integrity tests before a well is temporarily abandoned.

Concerns Regarding Federal Liability

As the number of wells granted shut-in status grew in the late 1980s, concern was expressed that these wells were creating a potential liability for the federal government. As a result, BLM's inactive wells program on federal and Indian lands was audited by the Department of the Interior's Office of Inspector General (OIG) in fiscal years 1988 and 1989. The audit report states:

- 1) Lease operators were not properly classifying wells or promptly plugging wells which were no longer capable of producing oil or gas in economic quantities,
- 2) The cost of plugging all wells which are no longer capable of producing oil and gas in paying quantities was estimated to exceed \$300 million, and
- 3) The government could be partially liable for the cost of plugging many of the 22,520 nonproducing wells nationwide (27 percent of BLM's inventory at that time).

As a result of the OIG audit report, a study was conducted by the BLM on the same subject. The BLM concluded that the OIG findings may have been somewhat overstated. In light of the findings from these two studies, the BLM Headquarters office issued instructions to its field offices requiring them, for all lands under supervision, to:

- ◆ Review all shut-in and temporarily abandoned wells
- ◆ Review all existing oil and gas bonds to determine if current bond coverage is adequate when weighed against the magnitude of level of risk for potential government liability for the plugging, abandonment, and reclamation of all wells under the bond, and
- ◆ To inventory open deserted (orphan) wells and leaking abandoned wells.

Bonding/Unfunded Liability Team

As part of Vice President Gore's National Performance Review, in June 1994 BLM undertook a review of its regulations, policies, and procedures. In light of the prior concerns about the adequacy of bonds and potential liabilities from inactive wells, a review team was established to examine these issues.¹⁸ In March 1995, the Bonding and Unfunded Liability Team, which included representatives from BLM, other Department of the Interior offices, Department of Energy, U.S. Forest Service, and the Environmental Protection Agency, issued its final report to the BLM Director. Included in the findings and recommendations of the report are the following items:

- 1) Empirical data indicated a need for significant improvement in the BLM's bonding policy and the way orphan wells are managed. There are more than 300 idle wells on BLM and Forest Service lands with no accountable operator or sufficient bonds. At the time the report was compiled, there were approximately 6,500 temporarily abandoned wells and about 11,000 shut-in wells, both categories of which could lead to more orphan wells. In the last four years, taxpayers paid \$1.6 million to abandon 131 wells. In 1988, \$460,000 was allocated to plug and abandon a single well in the North Dakota.
- 2) It was recommended that minimum federal bonds be raised from \$10,000 to \$20,000 for individual bonds and from \$25,000 to \$75,000 for statewide bonds. The nationwide bond of \$150,000 would not change. It was noted that the last increase in the minimum bond amounts on federal lands was in February 1960.
- 3) To complement the increase in individual and statewide bonds, operators with temporarily abandoned wells would be required to supplement their current bonding obligations, as follows:

After two years in approved temporarily abandoned status, operators would agree to plug wells on a schedule acceptable to the field office — and either increase the bond in place by \$2.00 per foot of depth per well, or agree to pay a yearly fee into a BLM-managed account that would be established to help offset the cost of abandoning orphan wells. This fee would be \$100 per well per year and would not be refundable.

- 4) Personal bonds, such as cash, certificates of deposit, letters of credit, etc., would continue. BLM will retain collateral for three years.
- 5) Work with Congress to establish a fund for the plugging of orphan wells on federal lands.
- 6) In-house direction to review assignments, raise bonds beyond the minimum, when warranted, and develop a database for shut-in wells were also recommended. There were also recommendations that would reduce federal and state bonding duplication and to work more closely with the U.S. Forest Service.

Members of the Bonding and Unfunded Liability team indicated that these recommendations represent a moderate but workable approach to the issues. They attempted to

¹⁸ In total, four issue resolution teams were established to address NEPA/Planning, Incentives, Bonding and Unfunded Liability, and Regulatory Review.

keep the suggested solutions and changes as administratively simple as possible and to be mindful of the need to ensure reasonable protective measures without unduly burdening industry or affecting the ultimate recovery of oil and gas resources. The Team attempted to involve everyone affected by these issues, including the general public, industry, environmental groups, sureties, and state and federal agencies.

These recommendations attempted to meet federal obligations for appropriate development and protection without unduly burdening industry or reducing the ultimate recovery of oil and gas reserves.

It should be noted that Department of the Interior and BLM management agree in principle with Team recommendations on raising minimum bond amounts on both individual and statewide bonds, and to require, after two years, operators with approved temporarily abandoned wells to plug the wells on a schedule acceptable to the field office. Management also supports the recommendation that the bond in place be increased for each temporarily abandoned well. However, the BLM has not yet decided on the amounts of increases. BLM is presently initiating a review of the appropriateness of the specific bond amounts as recommended by the Bonding/Unfunded Liability Review Team.

Incentives Team

The Incentives Team was asked to explore potential incentives for increasing gas production, reducing the decline in oil production, improving environmental performance, and addressing orphan wells, among others. These incentives were to be designed to encourage the desired outcome while protecting public interests.

Several of the incentives considered could have the effect of keeping marginal wells from becoming idle and could encourage some currently idle wells to be placed back into production. These options include:

- ◆ Royalty rate reduction for high cost production (such as wells with high water cut)
- ◆ Royalty rate reduction for new enhanced recovery projects
- ◆ Elimination of minimum royalty requirements for stripper wells
- ◆ Simplified production pooling
- ◆ Streamlined unitization process.

The Incentive Team recommendations will be considered by BLM for implementation. Any new incentives would supplement the existing provisions for stripper wells and idle wells discussed earlier in this section.

BLM has jurisdiction over a substantial volume of oil and gas resources. Like the states, BLM is working to assure that these resources are developed appropriately. Facing a growing volume of marginal production and concerns about potential liability from orphan wells, BLM is exploring options similar to those implemented in several states to assure that premature

abandonment of resources does not occur, but that when a well has no future use it is properly plugged and abandoned by its operator.

VII. APPENDICES

A. IOGCC GUIDANCE FOR STATE REGULATORY PROGRAMS WELL PLUGGING PRIORITIZATION SCHEDULE DECEMBER 1993

Introduction

In December 1992, the Interstate Oil and Gas Compact Commission (IOGCC), in cooperation with the U.S. Department of Energy (DOE), published *A Study of Idle Oil and Gas Wells in the United States*. The study is an effort to demonstrate the interest of state regulatory programs in addressing idle wells and improving state programs where necessary. A result of the study is eleven recommendations for state regulatory officials to consider. One of the recommendations is that states establish a well plugging prioritization schedule (Recommendation #4). Because of this recommendation, a committee was formed to develop a prioritization schedule the states might use to allow individual wells to be "scored" in an unbiased manner. As identified in the idle well study, this report is intended to apply to those wells the state will be responsible for plugging because the operator is unknown or not solvent (also known as orphaned wells).

This report represents the continuing effort of the IOGCC's Council of State Regulatory Officials to strengthen state regulatory programs that relate to oil and gas by providing advise, guidance, and openly exchanging information. As with any guidance report, this document represents a suggested priority schedule for the states, and recognizes that a variety of factors will affect each state's decision in establishing a schedule for plugging wells.

In establishing a prioritization schedule, the committee is well aware of the states' obligation in emergency situations where there is a risk to public health, safety, or the environment. It should be assumed that emergency situations will occur and require immediate response without the need for use of a priority schedule. Emergency situations are discussed in Section III of this report.

I. Inventory

One aspect of an effective state regulatory program to prioritize well plugging should include an up-to-date inventory control system. The inventory control system should consist of:

- a. A mechanism to identify abandoned wells. (Physical location as well as tracking through permitting, etc.)
- b. A database that contains information covered in Section III of this report, so it can be used to compare well plugging priorities.
- c. The state regulatory program should contain a plan on procedures that address abandon wells and their plugging. (See Section III A.1.(b)&(c) of this report.)

- d. The inventory control system is obviously intended to assist in prioritizing well pluggings other than emergency situations.

It is recognized that the cost of developing, implementing, and maintaining an accurate inventory control system may not currently be included in state agency budgets and, further, that this expense in some states may be very significant. It is recommended that state agencies investigate cost effective systems and use every means at their disposal to attempt to fund these activities.

II. Innovative Approaches To Conserve Oil And Gas Resources

As the original study on idle wells began to illustrate, state regulatory agencies are initiating efforts to identify idle wells. The original study did not address abandoned wells. Abandoned wells are that class of preregulatory wells, not plugged, and with no known operator. As the number of wells requiring plugging with state funds increases, states must look at multiple options to address them.

One of the priorities in this effort should be consideration of agendas that allow for continued access to the resource. As some states have already discovered, many idle and abandoned wells have value that operators want. In these cases, operators are willing to assume the plugging responsibility for the right to recondition and operate the well.

To identify those idle and abandoned wells that have potential value, state regulatory agencies need to have the ability to publish information on those wells. A central database that contained an inventory of those idle and abandoned wells would allow states to publish the entire array or specific wells in an area of interest.

Another innovative approach to conserving the resource is found in Texas where the legislature recently passed a law that exempted an operator from paying severance taxes for ten years for taking over an idle well that has not produced for three or more years.

California is proposing legislation to offer an incentive to operators who attempt to put orphaned wells back into production. In this process the operator would not normally incur plugging liability for the orphaned well.

III. Plugging

A. Emergency Situations

As mentioned in the introduction, "it should be assumed that emergency situations will occur and require immediate response," which places these wells at the top, or first, on any regulatory program's prioritization schedule. It may be necessary for the state to respond to an emergency situation for wells that have a solvent operator in place. All other well prioritization in this report deals with orphan wells.

1. Items to Consider to Prepare for Emergencies

- (a) First Priority - risk to public health, safety, or the environment, e.g., uncontrolled flow (H₂S, gas, oil); leaking well causing contamination of groundwater or surface water.
- (b) States must have the authority and means to address emergency situations. Clear statutory authority must be in place to allow the regulatory agency the ability to act on an emergency to include appropriate funding for these occurrences.
- (c) States must have mechanisms in place to address emergencies when they occur. This includes a properly educated staff, coordination mechanisms with other agencies, and a procedural contingency plan to ensure that a situation is dealt with efficiently and effectively.

B. Prioritization

Following is a chart for prioritizing well plugging. A points system should be developed to make the process as objective as possible. It is recognized that different conditions exist from state-to-state and within regions of a state (geology, climate, practices, etc.), and because of these conditions, each state will want to individualize a well plugging priority schedule to suit their needs.

C. Point System

A number of states have developed a points system to prioritize well plugging. Appendix B contains examples of several states' well plugging prioritization point systems.

Item	Well**		Site Location*	Remarks	Score
	Surface Condition	Subsurface Condition			
Leaking Well (circle each that apply): H ₂ S, Gas, Oil, Water, Brine (Volume may be factor)					
Well with Pressure					
Groundwater:					
Minor aquifer					
Major aquifer					
Public supply					
Surface Water:					
Public Supply					
Open Hole					
Geologic Consideration					
Reservoir					
Surface and groundwater					
Age of Well					
Environmental (circle each that apply):					
Wetlands					
Endangered species					
Public land					
Wildlife					
Domestic animals					
Land Use (circle each that apply):					
Distance to dwellings, people, rivers					
Agricultural land					
Number of people					
Roads or highways					
Other/Special Conditions (Complaints)					
Total Score					

* List letter (a) Distance to dwellings, people, rivers; (b) Type of dwellings; (c) Agricultural land; (d) Size of population; (e) Roads or highways

** For specific mechanical considerations, refer to API Bulletin E3 (BUL E3) First Edition, January 31, 1993 *Environmental Guidance Document: Well Abandonment and Inactive Well Practices for U.S. Exploration and Production Operations*

**B. PROCEDURES USED BY STATES FOR PRIORITIZING WELLS
TO BE PLUGGED WITH STATE FUNDS**

Louisiana's Orphaned Well Plugging Prioritizing System

No.	Factors	Score
1a	Leaking well – natural gas – within 100m of a public building or residence	32
1b	Leaking well – natural gas	14
1c	Leaking well – water or oil >1 bbl/day	30
1d	Leaking well – water or oil <1 bbl/day	10
2a	Hazard to navigation –well submerged or at surface	28
2b	Hazard to navigation – well in navigable waterway (boat hazard)	20
2c	Well in any other body of water (creek, stream, swamp, etc.)	12
3	H ₂ S possible or present	2
4a	Well not leaking but under pressure	8
4b	Well not leaking, pressure status unknown	6
5	Well not leaking, pressure > 500 psi	2
6	No wellhead or wellhead damaged	4
7	No production casing/open hole	2
8a	Production site/pit contaminated substantially	3
8b	Production site/pit contaminated minimally	1
9a	Within 100 m of public water supply (aquifer, well, or surface water)	8
9b	Within 100 m of public building/facility used by public on a recurring basis, or a residence	7
9c	Within 100 m of surface water or wetland	7
9d	Within 100 m of habitat containing rare, threatened, or endangered species (plants and animals)	4
9e	Within 400 m of residential or urban development	3
9f	Within 400 m of surface water or wetland	2
9g	On land actively managed for crops or forage (pasture)	1

Instructions:

1. Assign the appropriate factors to a site
2. For factors with more than one option in a category, e.g., 4a & 4b, assign only one option.
3. Total all the assigned factor scores for the site.
4. Use the total score and the priority table to set the site priority.

Priority Table	
Priority	Score
Priority 1	> 30
Priority 2	> 19
Priority 3	> 10
Priority 4	10 and under

Michigan's Well Plugging Priority System

Scoring Improperly Plugged Wells

Category I Actively Leaking Wells

First Priority, Water Wells contaminated

SAP SCORE

H₂S Concentration [1-10, 2; 11-300, 3; 301-1000, 4; >1000, 5; unknown, 4]

Second Priority, Leaking Oil, No Water Wells Contaminated

SAP SCORE

H₂S Concentration [1-10, 2; 11-300, 3; 301-1000, 4; >1000, 5; unknown, 4]

Third Priority, Leaking Brine or Gas, No Water Wells Contaminated

SAP SCORE

H₂S Concentration [1-10, 2; 11-300, 3; 301-1000, 4; >1000, 5; unknown, 4]

Category II Abandoned Unplugged Wells

SAP SCORE, if any

If no SAP SCORE:

Water Wells Within 1/4 Mile [Yes 2, No 0]

Potential Resources Affected [One Pt Each, GW, SW, Air, Wetlands, Soils]

Pressure @ Surface [1-10#,1; 11-100#,2; >100#,3; unknown, 2]

Age [<1940, 3; 1940-1973, 2; >1973, 1]

Vessels with Fluid Present [Yes 4, No 0]

Injection Wells completed in a formation equal to or shallower than within
mile [Yes 4, No 0]

Exproducer [Yes 2; No 0]

H₂S Concentration [1-10, 2; 11-300, 3; 301-1000, 4; >1000, 5; unknown, 4]

Cable/Rotary [Rotary 1, ; Combination 2; Cable 3]

Formation @ T.D. [< TR, 1; TR-DD, 2; DD-A₂, 3; A₂-PDC, 4]

Pennsylvania's Well Plugging Priority System

**Commonwealth of Pennsylvania
Department of Environmental Protection
Bureau of Oil and Gas Management
Orphan Well Priority Form**

BOGM Tracking # _____
API # _____
Date Reviewed: _____

	Points
A. With Public Lands - Parks (25), Game Lands (20), Forests (15), Other publicly owned land with no specified use (10)	_____
B. Private Land Use - Residential (20), Industrial (15), Agricultural (10), Other privately owned land with no specified use, such as a vacant lot or undeveloped tract (5)	_____
C. Within 200 Feet of Public Water Supply or Public Accessible Area or Building - Within 100 Feet (15), Within 200 Feet (10)	_____
D. Within 200 Feet of Private Water Supply or Occupied Private Building - Within 100 Feet (10), Within 200 Feet (5)	_____
E. Within 200 Feet of Stream or Body of Water - Within 100 Feet (6), Within 200 Feet (3)	_____
F. In Special Protection Watershed Exceptional Value (10), High Quality (8)	_____
G. Within a Wetland - (8)	_____
H. Other (0 - 6) _____	_____

TOTAL POINTS: _____

Comments: _____

Reviewer _____

**Commonwealth of Pennsylvania
Department of Environmental Protection
Bureau of Oil and Gas Management
Abandoned Well Priority Form**

BOGM Tracking # _____

Date Reviewed: _____

Points

- A. Public Water Supply Affected (0 - 20) _____
 - B. Private Water Supply Affected (0 - 15) _____
 - C. Public Safety Threatened - same conditions exist as under emergency action except current methods of control are effective and there is no imminent danger, but potential still exists (0 - 30) _____
 - D. Surface Water Affected (0 - 10) _____
 - E. Other Types of Water Supply Affected (0 - 10) _____
 - F. Ground Water Affected (0 - 10) _____
 - G. Well Integrity Threatened (0 - 10) _____
 - H. Other (0 - 10) _____

- TOTAL POINTS:** _____

Comments: _____

Reviewer _____

Texas' Well Plugging Priority Determination Procedures

Date: June 1, 1993
Revision: 2
Supersedes: August 2, 1988
Original: January 25, 1988

WELL PLUGGING **PRIORITY** DETERMINATION PROCEDURES

Attached is a copy of the approved well plugging priority system. The priority system includes twenty (20) environmental, wildlife, and/or human health factors. Factors for major and minor aquifer outcrop in county, major and minor aquifer in county, known sensitive wildlife areas in county, and county population have been determined for all the counties in the State by the Well Plugging Section and are also provided to the district offices. The remaining factors will have to be determined by the district offices.

- I. Submit only one (1) well plugging priority determination sheet with a recommendation for plugging with state funds. Use the enclosed format.

- II. Use only the factors that apply to a lease.

- III. For leases with multiple wells, use the factors that will assign the highest weight to a lease.

- IV. Add the weights assigned to all of the factors and determine the priority assigned to the lease based on the scale at the bottom of the well plugging priority determination sheet.

TEXAS' WELL PLUGGING PRIORITY SYSTEM

FACTOR	WEIGHT
1. Major Aquifer in County:	4
2. Major Aquifer Outcrop in County:	4
3. Minor Aquifer in County:	3
4. Minor Aquifer Outcrop in County:	3
5. Penetrates Coleman Junction Formation:	5
6. Penetrates Other SW-bearing Formation:	3
7. Within 100' of River, Creek, or Lake:	4
8. Within 1/4 Mile of River, Creek, or Lake:	3
9. Within 1 Mile of River, Creek, or Lake:	2
10. Known Sensitive Wildlife Areas:	3
11. Leaking Gas:	35
12. Leaking ≥ 100 bbls Oil or SW per Day:	37
13. Leaking < 100 but ≥ 1 bbl Oil or SW per Day:	36
14. Leaking < 1 bbl Oil or SW per Day:	35
15. Complaint-related:	1
16. Injection or Disposal Well:	1
17. Drilled Prior to 1965:	1
18. County Population $\geq 100,000$:	3
19. County Population $< 100,000$ but $\geq 10,000$:	2
20. County Population $< 10,000$:	1
Total Weight:	_____
Priority:	_____

Priority 1 = Total Weight ≥ 35

Priority 2 = Total Weight $\geq 25 \leq 34$

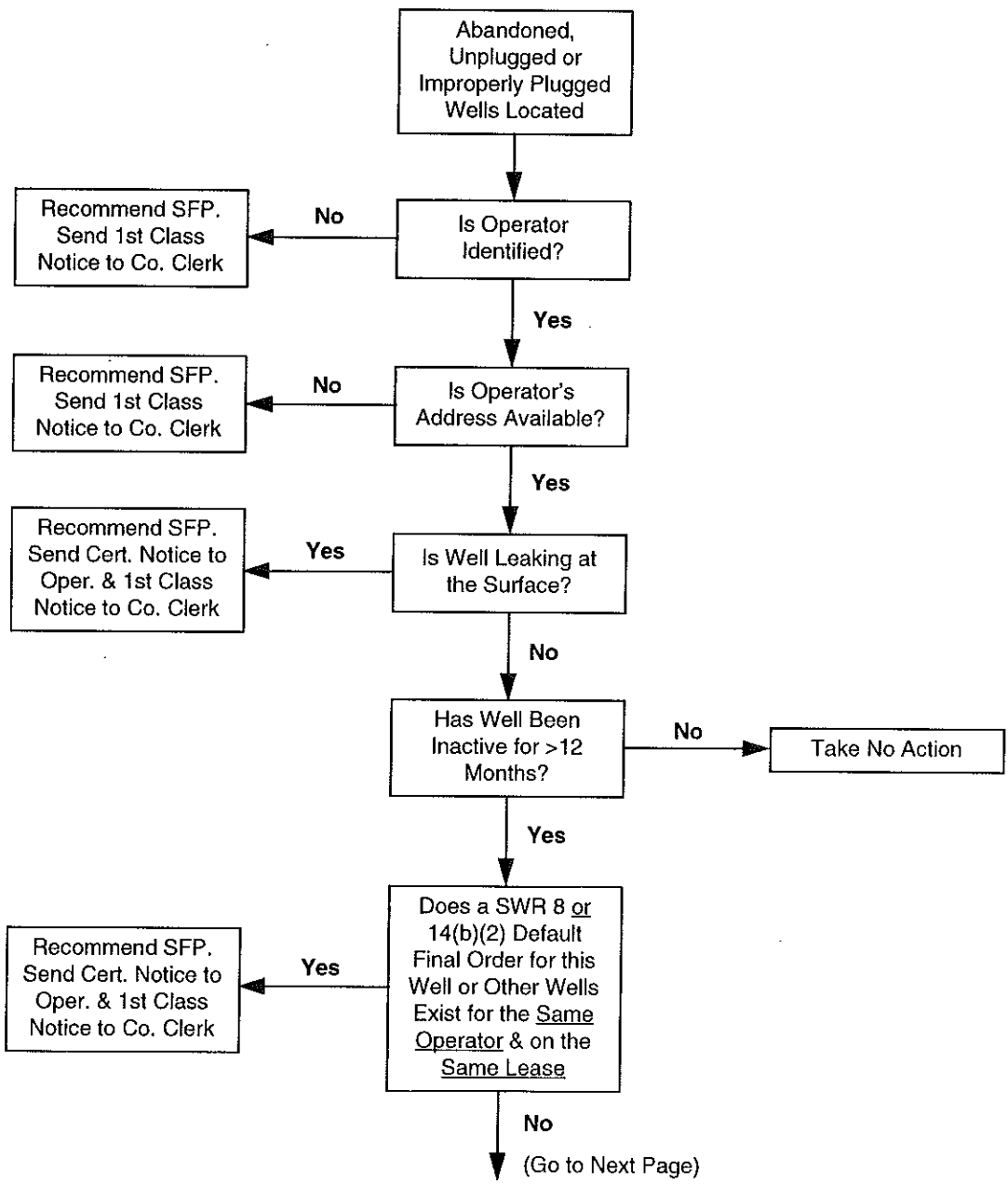
Priority 3 = Total Weight $\geq 15 \leq 24$

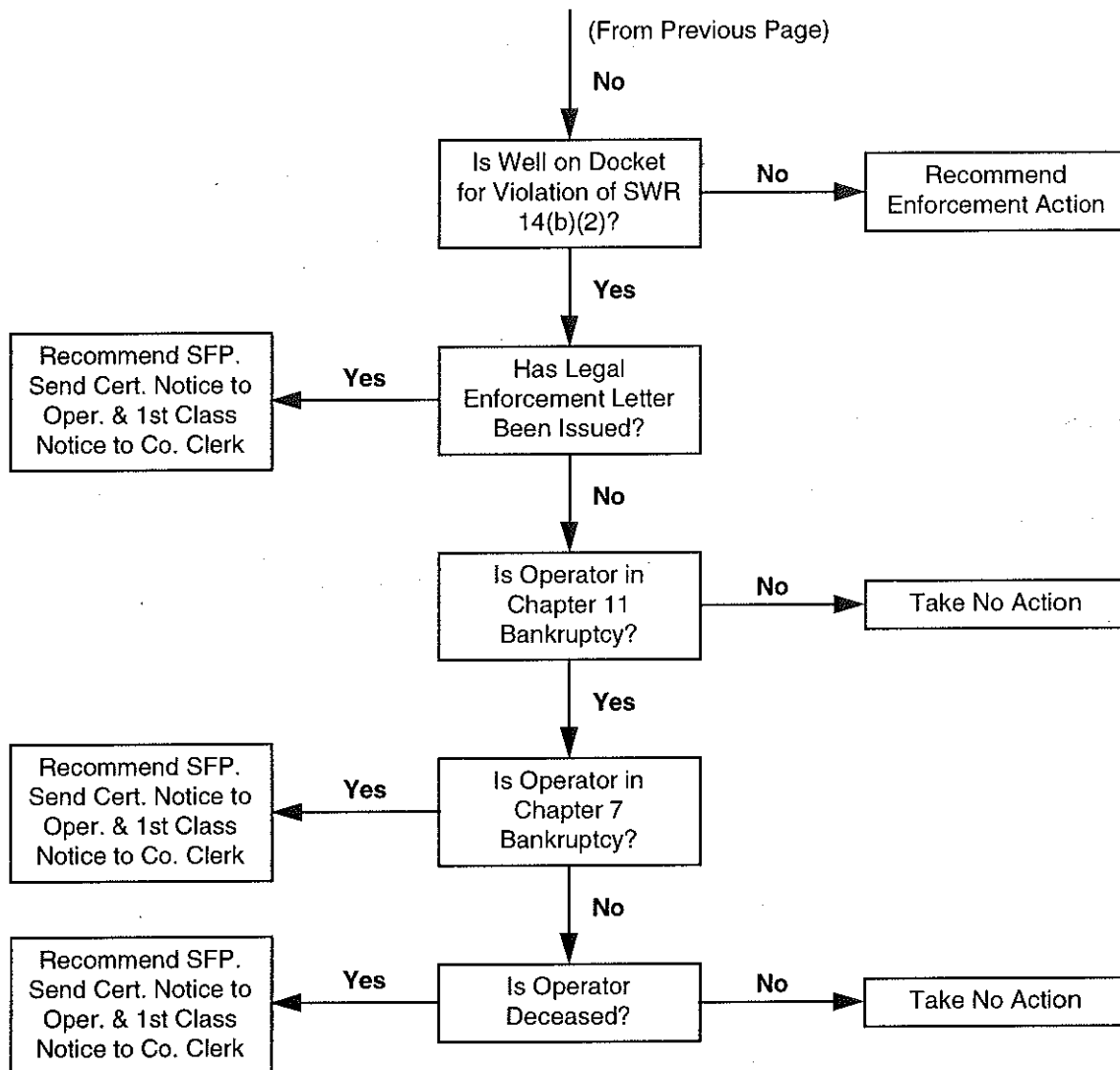
Priority 4 = Total Weight $\geq 8 \leq 14$

Priority 5 = Total Weight ≤ 7

Date: April 25, 1995
Revision: 2
Supersedes: October 3, 1994
Original: May 6, 1992

Flowchart for Determining Enforcement Action vs. State Funded Plugging Recommendation — Texas





Illinois' Well Plugging Prioritization System

Illinois PF Well Rating System

WELL CONDITION

<u>WELL STATUS</u>	<u>SUGGESTED POINTS</u>
Leaking H ₂ S or natural gas or under pressure with intact wellhead	12
Leaking water and/or oil or under pressure with intact wellhead	10
No production casing, open hole	8
Open hole, no wellhead unknown plugging conditions	6
Intact wellhead, plugging conditions unknown but surface problems (pits, fireballs, etc.)	4
Intact wellhead, plugging conditions unknown and no apparent surface or underground problems	3
Intact wellhead, plugging conditions known and no apparent surface or underground problems	2

WELL LOCATION

<u>WELL STATUS</u>	<u>SUGGESTED POINTS</u>
In a primary water supply aquifer or within 330 feet of public water supply well(s), or within 330 feet of surface water directly providing public surface water supplies.	7
Within 330 feet of any public building or area which may be used as a place of resort, assembly, education, entertainment lodging, trade, manufacture, repair, storage, traffic or occupancy by the public	6
Within 330 feet of a residence or private water supply well	5
Within 330 feet of surface water or wetland	4
Within 1/4 mile of residential or urban development	3
On active agricultural land	2
In forest, woodland or abandoned field	1

WELL STATUS

SUGGESTED POINTS

In a primary water supply aquifer or within 330 feet of public water supply well(s), or within 330 feet of surface water directly providing public surface water supplies.	7
Within 330 feet of any public building or area which may be used as a place of resort, assembly, education, entertainment lodging, trade, manufacture, repair, storage, traffic or occupancy by the public	6
Within 330 feet of a residence or private water supply well	5
Within 330 feet of surface water or wetland	4
Within 1/4 mile of residential or urban development	3
On active agricultural land	2
In forest, woodland or abandoned field	1

C. EPA MANAGEMENT AND MONITORING REQUIREMENTS FOR CLASS II WELLS ON
TEMPORARY ABANDONMENT STATUS



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 22 1992

OFFICE OF
WATER

MEMORANDUM

SUBJECT: Management and Monitoring Requirements for Class II
Wells in Temporary Abandoned Status - Underground
Injection Control Program Guidance #78

FROM: *f* James R. Elder, Director *James R. Elder*
Office of Ground Water and Drinking Water (WH-550)

TO: Water Management Division Directors
Regions II - X

BACKGROUND

One of the more longstanding issues associated with the Underground Injection Control (UIC) program concerns the establishment of consistent policy with regard to regulation of temporarily abandoned Class II injection wells. Although all State and Direct Implementation programs recognize both the existence of and need for temporary abandonment of injection wells, policy decisions and procedures for regulating these wells are not consistent from State to State. Definitions, notification requirements, inspection/monitoring activities, and reporting practices vary widely among the UIC programs. The only common characteristics of those wells defined as being "temporarily abandoned" is that injection operations have ceased for some measurable period of time and that the wells have not been permanently plugged.

Major concerns, relative to temporarily abandoned wells, raised by the Mid-Course Evaluation workgroup include:

- o relaxing of or completely exempting wells from monitoring standards and safeguards that are required of operating injection wells;
- o the absence of specific Federal and (in many instances) State regulations that require operators to notify the appropriate regulatory Agency when and under what circumstances a well has been temporarily abandoned;
- o the lack of a single common definition or class of

definitions (e.g., "shut-in" versus "temporarily abandoned") stating what constitutes a temporarily abandoned well.

The workgroup recommended that EPA develop a guidance to address these issues. A draft guidance was developed by the UIC Branch and has been reworked by the Class II Advisory Committee chartered on June 6, 1991. This Guidance has been endorsed by the Advisory Committee.

PURPOSE

The purpose of this Guidance is to set forth suggested minimum guidelines and procedures to promote a greater degree of consistency and standardization among the UIC programs in the regulation of temporarily abandoned Class II wells. In cases where State regulations are more stringent, then those regulations will take precedence over these guidelines.

Wells can be temporarily abandoned for several reasons. In some cases, they lack mechanical integrity, and it is not cost-effective for the owner/operator to repair them immediately. These wells are discussed in Guidance #76. This guidance only addresses wells which have been temporarily abandoned for other reasons, such as changes in production patterns or cessation of injection into a reservoir for economic reasons.

For the purpose of this guidance, EPA is using the term "temporarily abandoned" to connote a well in which injection will not take place for several months or years. A temporarily abandoned well is different from a "shut-in" well, which connotes an abrupt, short term cessation of injection in response to mechanical integrity failure or other mechanical problems or for the purpose of performing a well workover. EPA recognizes that the various States have different terminologies for "temporarily abandoned" wells. Accordingly, EPA does not believe that it is necessary to use a uniform definition as long as requirements are in place to assure that wells in which injection is not occurring for a prolonged period of time are not endangering underground sources of drinking water (USDWs).

GUIDANCE

Wells can be temporarily abandoned in either of two ways: "as is", that is with all tubular goods, valves, gauges, and other wellhead hardware in place, or the tubing-packer assembly may be pulled, along with some of the wellhead equipment. States may require that wells be temporarily abandoned in one specific way or another. For Direct Implementation programs and in most States, the procedure used to temporarily abandon the well is at

the operator's discretion.

1. For wells temporarily abandoned in an "as is" condition, the owner/operator should continue monitoring and testing of the wells as required in his permit. This would include monitoring of annulus pressure (if required), injection pressure and flow rate ("zeros" on the reporting forms would allow the UIC Director to ascertain the TA status of the well). In addition, the operator must perform mechanical integrity tests as required by the permits [40 CFR 144.28 (c)(2)(iv)(B)].
2. Where the operator chooses to change the configuration of the well during TA status, such changes must be approved by the UIC Director. If the changes make it unfeasible to continue the monitoring and testing procedures prescribed in the permit, the UIC Director should establish alternative monitoring and testing requirements.

Financial responsibility demonstration updates as required by UIC Program Guidance #65 (Guidance for Financial Responsibility in Federally-Administered UIC Class II Programs, March 29, 1989) must also be made for these wells. This is particularly important if production from the particular field or reservoir, in which the well is located, is not taking place presently and will not take place in the foreseeable future. It is important to ascertain that the owner/operator has other assets or means to properly plug and abandon the well in the event injection operations are not resumed.

All monitoring and testing programs should remain in force until such time as the wells are either put back in service or properly plugged and abandoned. The operators are required to notify the Director prior to returning a well to active injection status [40 CFR 144.28 (c)(2)(v)]. Where putting the wells back into service includes major changes to the well configuration (e.g., running the tubing and packer assembly back into the well) the operator must demonstrate mechanical integrity before injection operations can resume.

GUIDANCE IMPLEMENTATION

This document provides guidance to both primacy State and direct implementation UIC Directors on procedures to be followed with respect to Class II wells placed into temporarily abandoned status. The guidance is a general statement of policy. It does not establish or affect legal rights or obligations. It is not finally determinative of any or all of the issues addressed.

Agency decisions in any particular case will be made on the basis of specific facts and actions required to prohibit endangerment of USDWs.

Regional and State UIC program Directors are requested to take all appropriate action to incorporate this guidance into their programs. Implementation of the recommendations of this guidance will be discussed as part of the FY 1992 evaluation of State and Regional programs.

Questions and comments on this guidance should be addressed to Françoise Brasier, Chief of the UIC Branch at (202) 260-7077 or Jeff Smith of her staff at (202) 260-5586.

D. RESOURCE POTENTIAL OF IDLE WELLS

The U.S. Department of Energy (DOE) analyzed the resource potential possibly represented by idle wells in the IOGCC survey. The DOE estimated potentially remaining crude oil resources that could be accessible through both conventional and enhanced recovery techniques. Data are not available to perform a similar analysis of remaining gas resource potential.

Methodology

Remaining oil resources associated with idle wells have been estimated for most producing states. The estimation methodology draws upon several primary data sources: the IOGCC estimates of idle wells and total producing wells; estimates of remaining recoverable reserves and potential enhanced oil recovery (EOR) resources developed using DOE's Total Oil Recovery Information System (TORIS) database and recovery process models; conventional production decline curves based on data from Petroleum Information (PI) Corp.; and data on original oil in place (OOIP) by state from the American Petroleum Institute (1979), updated with data from the Energy Information Administration. Since the 1992 idle wells analysis, the TORIS database has been updated to have greater coverage, which increases the resource potential associated with this analysis.

The resource potential associated with wells idle with state approval was estimated using the following methodology:

- ◆ The percentage of total wells (idle and producing) that are idle was determined, based on results of the IOGCC survey. The calculation was performed as $[\text{idle wells} / (\text{idle wells} + \text{producing wells})]$ to determine the percentage of total wells that are idle in each state.
- ◆ Remaining conventional reserves and potential resources that could be recovered through EOR techniques were estimated, assuming a \$20/bbl oil price and existing levels of technology development. Remaining reserve estimates were multiplied by the percentage of total wells that are idle to determine the volume of remaining conventional and EOR reserves that may be associated with idle wells.¹⁹
- ◆ Reserves figures were extrapolated on an OOIP basis to account for reservoirs not covered by the TORIS database, adjusting for the selected, high potential reservoirs that were removed from the analysis.

¹⁹ Reservoirs in the Permian Basin and heavy oil reservoirs in California were removed from the total reserves considered in performing this analysis. The substantially larger enhanced recovery potential of these reservoirs (compared with other reservoirs in those states) would tend to overstate the potential associated with idle wells.

Caveats

Inherent in this methodology are many assumptions, most of which will tend to make optimistic this estimate of potential resources associated with idle wells. These assumptions include the following:

- ◆ Idle wells are assumed to be evenly distributed across all reservoirs in each state according to the statewide ratio of idle to producing wells. In fact, one might expect to find a larger ratio of idle wells in older, less productive fields.
- ◆ Estimates of statewide conventional recovery and EOR potential for TORIS reservoirs, as a percentage of OOIP, are assumed to be applicable to reservoirs not included in the TORIS database (based on their OOIP). However, the TORIS database focuses on the larger reservoirs, particularly those with enhanced recovery potential. Reservoirs not in the TORIS database are typically smaller and less likely to support EOR projects. The removal of the Permian and heavy oil California reservoirs with substantial known EOR potential from the analysis helps to mitigate, but does not eliminate, this overstatement. On the other hand, remaining conventional recovery, as a percentage of OOIP, may be higher in the smaller, more recently discovered non-TORIS reservoirs than is estimated by applying a TORIS-based multiple.
- ◆ The methodology implicitly assumes that the reserves assigned to idle wells would not be recoverable from currently producing wells. In fact, a percentage of these resources may be recoverable from wells still producing, although over a longer period of time. This overstates the actual incremental resource potential associated with idle wells.
- ◆ The advanced recovery estimates are based on EOR potential only, which could somewhat understate future recovery potential. Some advanced secondary recovery (ASR) potential may also be associated with these idle wells. While most ASR potential is attributable to infill drilling, which would require new wells, some currently idle wells could be converted for use in other types of ASR projects such as polymer-assisted waterflooding or profile modification.
- ◆ All idle wells are assumed to be economically reworkable and capable of production. This is probably not true due to location, mechanical/technical problems, the length of time the well has been idle, and lease management concerns.

Taken together, these assumptions define an upper boundary on the remaining oil resource potential associated with wells currently idle with state approval. Accounting for the over/under-statements implied by these assumptions would have required arbitrary adjustments to the results that would have been difficult to justify. Therefore, defining the estimate as an upper bound is a more reasonable approach.

Results

Table 1 provides a summary of the estimates of resource potential by state. The table includes the potential associated with state approved idle wells based on the reservoirs in the TORIS database and an extrapolated value representing the statewide total. Total remaining conventional recovery potential associated with idle wells could be as high as 3.2 billion barrels.

Application of EOR techniques using these idle wells could add nearly 620 million barrels in incremental future recovery. Idle wells provide the reservoir access through which this remaining potential can be exploited. Without these wells, this recovery potential could be lost.

Table 1
Estimated Oil Resource Potential Associated with Idle Wells¹
At \$20/bbl Oil Price
(Million Barrels)

	TORIS Reservoirs		Statewide ²	
	Conventional Recovery	EOR	Conventional Recovery	EOR
California	1,097	120	1,290	141
Louisiana	174	51	260	76
Montana	67	2	160	5
New Mexico	24	11	39	17
Oklahoma	14	2	26	4
Texas	552	156	937	264
Utah	36	23	60	38
Wyoming	92	23	214	54
Other States ³	83	6	234	20
Total U.S.	2,139	394	3,220	619

¹ Includes wells idle with state approval only.
² Data are extrapolated from TORIS reservoirs based on original oil in place.
³ Alabama, Arkansas, Colorado, Kansas, Kentucky, Michigan, Mississippi, Nebraska, and North Dakota. Available information for these states provides a less reliable basis for extrapolation.



E. OHIO LANDOWNER WELL PLUGGING PROGRAM

George V. Voinovich • *Governor*
Donald C. Anderson • *Director*

April 10, 1996

Dear Landowner:

The well(s) on your property is eligible for plugging under the Division of Oil and Gas plugging program. Recent legislation has created a second program we refer to as the landowner grant program. You are also eligible for this new program. While the new program requires you to have more active involvement in the plugging of the well, you may be able to get your well plugged sooner than in the traditional program. If you do not apply or your application is rejected, the well will remain in the traditional program.

Two hundred thousand dollars has been set aside for the landowner grant program. Applications for the program are being sent to all landowners with wells that qualify. Wells will be approved in the order they are received subject to the following conditions:

1. Your plugging proposal must comply with state plugging rules.
2. The plugging cost must be reasonable.
3. The proposed contract, with the plugging contractor, is a bona fide, arms length contract.

A landowner is not required to get more than one price quote, but if you have doubts whether a price quote is reasonable, you may want to get additional estimates to ensure you are submitting a reasonable price quote.

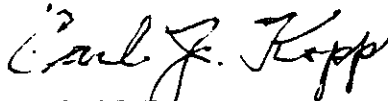
Forms for making application for the landowner grant program are enclosed. To participate in the program complete the forms as outlined below:

1. Complete the Idle and Orphan Well Landowner Grant Application.
2. Have a qualified plugging contractor prepare a cost estimate for plugging the well, or wells, on your property. A Contractor Proposal form has been provided for your convenience.
3. Complete the Plugging Specification form. If the plugging contractor does not know where cement plugs must be placed he will need to contact the Division of Oil and Gas or in coal bearing areas the Division of Mines and Reclamation.
4. Submit the items under 1, 2 & 3 above to the Division of Oil and Gas, 4383 Fountain Square Court, Bldg. B-3, Columbus, Ohio 43224 for processing. The landowner will be notified by letter within 30 days of the Division receiving the application, of its approval or denial.

5. After the Division provides the landowner with a written letter of approval, then an agreement or contract between the landowner and the Division of Oil and Gas must be signed. After the contract is signed, the Division will transfer ownership of the well equipment to the landowner.
6. If a well survey is not on file at the Division of Oil and Gas, a survey of the well location will be required to obtain the plug permit. This service must be provided by a surveyor registered in the State of Ohio. The cost of this survey should be included in your price quote, if a survey is not on file with the Division of Oil and Gas.
7. After receiving the plat, the Division will issue the plug permit to the landowner within approximately 7 to 10 days. The date the plug permit is issued is the start date for the 180 day period in which work must be completed.
8. The Division should be notified when work is complete so the payment process can proceed.

If you have any questions, please contact me at (614) 265-6925.

Sincerely,



Carl J. Kopp
Geologist
Division of Oil and Gas

CJK:er

Enclosures:

Landowner Grant Application
Contractor Proposal
Plugging Specifications

Division of Oil and Gas
Idle and Orphan Well Section
 Landowner Grant Program
 Plugging Specifications

Well Data: County: _____ Township: _____
 Sec./Lot: _____ Permit No.: _____
 Depth: _____ Formation: _____
 Well No.: _____ Location: _____

Landowner: (Name) _____
 (Address) _____

 Telephone No.: () _____

PLUGGING REQUIREMENTS:

1. Pull tubing, rods, and all casing except the conductor pipe which have not been cemented in place. Clean out well to _____ feet. Well bore shall be cleaned out or reamed to original diameter.
2. If a string of casing which would normally be pulled cannot be removed, the Contractor shall log the well and perforate the casing in accordance with the Chief's instructions so cement can be circulated behind the casing.
3. If the well is open below the specified depth, a 25 foot stone bridge shall be set and tamped with drilling tools for 30 minutes, **OR** a 25 foot cement plug shall be set and allowed to harden before placing cement plugs. If inside cemented pipe, a mechanical bridge can be set.
4. Cement shall be used for plugging (bottom plug may be clay or cement); and must be placed at the following intervals:

A: Cement

B: Clay (bottom plug only)

- a) _____ feet to _____ feet
- b) _____ feet to _____ feet
- c) _____ feet to _____ feet
- d) _____ feet to _____ feet
- e) _____ feet to _____ feet

a) _____ feet to _____ feet

5. Mud laden fluid weighing not less than nine (9) pounds-per-gallon with not less than forty (40) API funnel viscosity shall be placed in all portions of the well not filled with cement.

6. Fill the well with cement from contract depth to surface. All cement shall be pumped through tubing, 1-1/2 inch or larger, as approved by the Chief.
7. After placement of cement, the well shall be shut in gas-tight a minimum of 12 hours after which the well shall be refilled with cement to within 36 inches of ground level.
8. A) The casing shall be cut-off 36 inches below the ground surface. A steel plate, a minimum of 1/4 inch thick, shall be tack welded on top the casing. The well's permit number shall be welded on the plate, in numbers as large as practical. Numbers shall have a minimum relief of 1/8 inch.

B) Cut off casing 3 feet below grade using a cutting torch or other approved method. Weld vent, constructed of three-inch galvanized steel tubing, to casing forming a gas-tight seal and extend vent vertically at least 14 feet above grade. Vent must have an approved weather cap and 1/2 inch brass inspection plug located four (4) feet above grade. Vent pipe above ground shall be primed with a galvanized steel paint primer and painted with two coats of an oil-based paint which blends with the surroundings (color to be approved by Division).
9. The Contractor shall give a minimum of 48 hours notice to the landowner and the Division's Central and Regional Offices before commencing work. In a coal bearing area, he shall also notify the Division of Mines and Reclamation at 1855 Fountain Square Court, Bldg. H, Columbus, Ohio 43224-1327, Telephone (614) 265-6633. Notice may be written or oral. The Contractor shall contact the Ohio Utilities Protection Service (1-800-362-2764) and each utility company which may have underground facilities at least two (2) working days prior to commencement.
10. The Contractor will be responsible for providing adequate access to the well site for his drilling rig and equipment. Access roads will be chained or cabled to prevent unauthorized use, if requested by the landowner or his authorized representative. Special attention shall be given to maintaining trees and other vegetation that have scenic value, provide shade, reduce erosion and runoff, or add to the aesthetics of the area. No trees six (6) inches or larger in diameter shall be removed without the landowner's permission. Placement of all tanks and equipment shall be approved by the Division. Any alterations to the natural topography required to provide ingress and egress to the well site must be approved by the landowner before work begins.

OPTIONS:

1. An approved control head and oil saver, in good working condition, must be installed on the surface casing or conductor pipe.
2. The Division reserves the right to require the removal of any rods, tubing, casing, or liners deemed necessary to properly plug and abandon the well.

3. The Contractor shall run an operational string of casing when casing of the well prevents clean out to contract depth. If the contract depth cannot be reached, an adjustment may be made for materials and labor not required.
4. The Contractor shall be responsible for cleaning out and plugging any water well or closing any pit associated with the oil or gas well.
5. Cement used for plugging must be API Class A or State Transportation approved ASTM Type (ASTM C150). All cement, except nine-sack grout ready-mix, must be mixed on location. Air-entraining cements shall not be used for plugging. Cement shall not contain bentonite, fly ash, or other extenders which retard set time or decrease compressive strength. Cement slurry shall be mixed at the API recommended weight, but under no condition shall the average weight be less than 15 pounds per gallon. The Contractor shall be responsible for providing a mud scale for weighing the cement slurry. Water used for cementing shall be free of any impurities which would adversely affect set time and compressive strength. A cement slurry used for plugging must develop a minimum compressive strength of 1,000 p.s.i after 24 hours at well bore temperature.

RESTORATION:

1. All fluids and salvaged well materials shall be removed from the site when plugging has been completed. Fluids in steel tanks shall be removed within 72 hours after plugging.
2. Construction areas with slopes greater than five degrees left over the winter or areas with a slope greater than 10 degrees left exposed for a period of greater than 60 days and subject to erosion shall be seeded with a temporary protective seeding (rye or wheat) prior to October 1. If seeding cannot be done prior to October 1, the area will be mulched at the rate of three tons of clean, unweathered straw per acre. IF, IN THE OPINION OF THE CHIEF OR HIS AUTHORIZED AGENT, PROPER CONTROL OF SOIL EROSION IS NOT BEING PROVIDED BY THE CONTRACTOR, CORRECTIVE MEASURES MAY BE TAKEN BY THE DIVISION AND THE COST OF SUCH SERVICES DEDUCTED FROM ANY MONEY WHICH MAY BE DUE OR BECOME DUE THE CONTRACTOR.
3. All damage caused by the carrying out of this Contract to any public or private property of any nature whatsoever, including trees, shrubs and crops, shall be made good to the Division's satisfaction at the expense of the Contractor. If crops are damaged and the Contractor and landowner, or tenant, cannot reach a settlement, the County Cooperative Extension Service shall set a fair price for crop damages, and the decision shall be final and binding upon all parties. All subsequent payments due the Contractor shall be withheld until the Contractor provides proof of payment of any such claim.

**Division of Oil and Gas
 IDLE AND ORPHAN WELL SECTION
 Landowner Grant Program**

CONTRACTOR PROPOSAL

Contractor: _____

Telephone No.: (____) _____ Well No: _____

Well Location: County: _____ Township: _____

Section/Lot: _____ Permit No: _____

Landowner: _____

Contractor shall furnish all the materials, equipment, work, and labor necessary to properly plug the well in accordance with rules of Section 1501:9-11-01 of the Ohio Administrative Code.

- | | | |
|----|--|--------------------|
| 1. | Property survey
(required if not on file at Division) | Cost \$ _____ |
| 2. | Clean out and condition the well
to a depth of _____ feet. | Cost \$ _____ |
| 3. | Plug with cement at the following intervals: | |
| | a) _____ feet to _____ feet | |
| | b) _____ feet to _____ feet | |
| | c) _____ feet to <u> 0 </u> feet | Cost \$ _____ |
| 4. | Clean-up and removal from site of
all equipment and restoration of the
land surface. | Cost \$ _____ |
| | | Sub-Total \$ _____ |
| 5. | Salvage Value for Equipment on site (Credit) | \$ _____ |
| | TOTAL | \$ _____ |

Note: If a plat of the well location is not on file with the Division of Oil and Gas, one must be prepared before a plug permit can be issued. This will require the services of a surveyor registered in the State of Ohio.

IDLE AND ORPHAN WELL LANDOWNER GRANT APPLICATION

Ohio Department of Natural Resources
Division of Oil and Gas
4383 Fountain Square, Bldg. B-3
Columbus, Ohio 43224

Form 4/96

1. Applicant's Name: _____
Address: _____
Mailing Address (if different): _____
Home Phone (____) ____ - ____ Work Phone (____) ____ - ____
Social Security ____ - ____ - ____
2. Permit Number (if known): _____
Well Name (if known): _____
3. Owner No. _____ (To be completed by Division of Oil and Gas)
I&O Case No: _____ (To be completed by Division of Oil and Gas)
4. County _____ 5. Township _____
6. Emergency department telephone numbers:
Fire (____) - ____ - ____ Ambulance (____) - ____ - ____
7. List roads to be used for entry: _____

8. List roads to be used for departure: _____

9. Is plugging bid attached? Yes ___ No ___

Landowner's Statement

I the undersigned, being first duly sworn, state under penalties of law that I am authorized to make this application, that this application was prepared by me or under my supervision and direction, and that dates and facts stated herein are true, correct and complete to the best of my knowledge. I am the owner of the land on which the above referenced well is located.

I understand that Section 1509.071(D)(2)(d) of the Ohio Revised Code requires that if the above referenced well is not plugged in accordance with applicable requirements and Ohio law within 180 days after my receipt of the permit to plug, I have no right for reimbursement for the plugging and restoration of this well. I further understand that, if the plugging is not completed within said 180 days pursuant to applicable Ohio law, I am obligated to transfer to the State of Ohio title to and possession of the equipment appurtenant to the well and, if any such equipment has been sold, I will pay the amount received from the sale to the Chief.

I also understand that the Chief may establish an annual limit on the number of wells that may be plugged under Ohio Revised Code 1509.071(D)(2) or on the expenditures to be made thereafter.

I hereby agree to conform with all provisions of Chapter 1509. of the Ohio Revised Code, Ohio Administrative Code Chapter 1501. and orders issued by the Chief, Division of Oil and Gas.

Signature of Applicant _____

Sworn to and subscribed before me this _____ day of _____ 19 _____

(Notary Public)

(Date Commission Expires)

F. TEXAS' TERRA PROGRAM

TERRA

Texas Experimental Research and Recovery Activity

Austin, Texas

January 1996

The Railroad Commission of Texas announces **TERRA** - the Texas Experimental Research and Recovery Activity. If you are considering plugging one of your wells, TERRA may present an attractive alternative. The Commission went to the 74th Texas Legislature with a proposal to preserve non-polluting wells for beneficial use. The legislature supported it.

Most wells that are plugged are still physically productive, but are not economically productive. With a change in the price of oil or gas or the introduction of new technologies, they could be economically productive. If, however, a well has been plugged, the oil and gas cannot be recovered except by the drilling of a new well or an expensive re-entry.

The TERRA program has three components: (1) the transfer by the operator of a well into TERRA, (2) the issuance of a research license for a TERRA well, and (3) the release of a well from TERRA to an operator.

The Transfer of a Well to TERRA. The operator will first obtain a TERRA packet from the district office in which the well is located or request a packet from the office in Austin. After reviewing the packet, the operator then will determine if the well is a candidate for the TERRA program. After the operator performs all the requirements and final approval is received by the TERRA staff, a fee of 75 percent of the estimated plugging cost is paid and the well is placed into TERRA. The commission will see that the TERRA Agreement is recorded at the courthouse of the county where the well is located.

The Issuing a License for a TERRA Well. While a well is in TERRA, it may be licensed for research purposes such as gathering data, performing production tests, and developing and testing enhanced or advanced recovery techniques. These projects will ultimately enable mineral interest owners to realize any commercial potential that may be found in the wellbore as technology and circumstances change. The license applicant files a Form W-8(b), "TERRA Wellbore Research Project Application Cover Sheet." Any hydrocarbons produced during the license period are exempt from state severance taxes.

Release of a Well from TERRA. If circumstances and technology change, an operator may seek release of a well from TERRA. If the well was in TERRA a year or less, the operator may assume

responsibility for the well by paying the estimated avoided plugging cost at the time of release. If the well was in TERRA more than one year, the release fee can be in the amount up to twice the estimated plugging cost at the time of the release. Either amount may be reduced by the initial TERRA entry fee, if release is to the person who is bound by the TERRA Agreement and who owned at least 50 percent interest at the time the well went into TERRA. Hydrocarbons produced from a well released from the TERRA program after having been in it two years or more are exempt from state severance taxes.

Information on wells accepted into TERRA will be made available in hardcopy and electronic formats. Notice of availability will be made later.

If you have any questions pertaining to the TERRA Program, please call the TERRA Coordinator in Austin at (512)463-6831.

AN OVERVIEW FOR OPERATORS

I. Why Oil and Gas Operators Should Consider TERRA

When an oil and gas operator participates in TERRA several good things happen:

- ◆ The operator may be able to save money by placing the well in TERRA instead of plugging it.
- ◆ The wells in TERRA, instead of being lost, are made available to industry for testing, seismic, and research purposes, without the necessity of first executing a lease.
- ◆ Individual operators may buy wells out of the TERRA program if they believe that they can be economically used.
- ◆ Wells bought out of TERRA after two years and returned to production will produce without paying severance tax.
- ◆ Wells returned to production from TERRA benefit the citizens of Texas through the additional recovery of the resource base and the new wealth created.
- ◆ TERRA wells used in research, testing, and seismic programs benefit the entire industry by increasing our knowledge and technological capabilities.
- ◆ Operators placing their wells in TERRA are relieved of any future state plugging liability. When an operator buys a well or wells out of the TERRA Program, the purchasing entity assumes the plugging liability for the well or wells purchased.

As an oil and gas operator in Texas, you have participated first hand in the difficulties this industry has experienced in the last decade. There have been many calls for something to be done to reverse these trends. The TERRA program represents one step taken by the Railroad Commission to assist the industry into a beneficial future. While this program is completely voluntary, the Railroad Commission urges every operator about to plug a well to consider this alternative for a better future. This is your opportunity to fight back and buck the trends for the industry providing so much for Texas.

II. STEPS TO TAKE

1. Obtain an Operator Application Package from the TERRA group, Railroad Commission of Texas, Oil and Gas Division, P. O. Box 12967, Austin, Texas 78711-2967, phone (512) 463-6831 or from the district office in which the prospective TERRA candidate well is located.

2. Review the Schedule of TERRA Plugging Costs applicable for your well, the TERRA Agreement, and other documents in the package and decide whether you wish to complete the application to place the well in TERRA.
3. Obtain the present possessory mineral interests owner's signatures for the individual TERRA Agreements. The law requires us to have a TERRA agreement from the owners of at least 50 percent of the present possessory mineral interests. (Note: to apply for placement of a well in TERRA, you must have such an interest.) In addition, we will require that the owners of at least 50 percent of the fee mineral interest and any other non-possessory mineral interest that may become possessory after your interest lapses, be notified with the Mineral Interest Notification letter and the Overview for Mineral Interest Owners included in this packet.
4. Call the appropriate district office to request a witness for the fluid level test and wireline run. Perform the test and wireline run in the presence of a Railroad Commission representative. Bring a filled-out Form W-8(a)1, "TERRA Fluid Level & Wireline Run Affidavit" to the wellsite. It will be signed and completed at the site by you and the RRC representative. You will be given a copy of the report.
6. Remove all downhole equipment (rods, tubing, packers, etc.) if you plan to do a fluid level test. If, however, you anticipate doing a mechanical integrity test, wait until after the test to remove the equipment.
7. Send your completed application to the TERRA group in Austin. The package will consist of the Form W-8(a), "Application to Place Wellbore in TERRA," one or more TERRA Agreements, a copy of your lease agreement, and a list of all mineral interests signing a TERRA Agreement (including name, address, phone number, and percent of interest).
8. The TERRA group will advise you if the well can be accepted into TERRA. If so, you will be advised of the TERRA fee you are to remit. The fee will be 75 percent of the applicable average plugging cost as indicated on the schedule in your Operator's Application Package.
9. When you send in your TERRA fee, you will be requested to send in historical well documentation (electric logs, inclination surveys, workover information, etc.)
10. The Commission will file the TERRA Agreements with the clerk of the county in which the well is located.

TERRA — Texas Experimental Research and Recovery Activity
An Overview for Mineral Interest Owners

**WHY MINERAL INTEREST OWNERS SHOULD CONSIDER
THE TERRA PROGRAM**

The Railroad Commission has developed an incentive program that will preserve non-polluting wells for future beneficial use. Wells that are about to be abandoned and do not represent an environmental risk may be considered for the TERRA program which stands for the Texas Experimental Research and Recovery Activity.

Why Should I Participate?

As an owner of mineral interests, you are confronted with this situation: a well in which you have an interest is about to be plugged. Frequently, this is because the current economic situation has rendered this well unprofitable. The well may need an expensive work-over, or it may produce too much water, or, for other reasons, the well may have reached its economic limit—the point at which it is no longer profitable to operate.

In many cases only one-third (or less) of the original oil and gas in the ground has been recovered. When your well is plugged, access to the remaining reserves is hindered. In order for any more oil and gas to be recovered, a new well—costing potentially hundreds of thousands of dollars—must be drilled, or a risky and expensive re-entry must be successfully carried out. In either situation, ready access to the remaining reserves is much more difficult to achieve. In effect, a barrier to the recovery of the remaining reserves and the money is created whenever a healthy well is plugged. Plugging such wells is not in the best interest of the mineral owners or of the economic well-being of Texas.

TERRA provides an alternative—if the Commission finds that a well is sound and has potential future value, mineral owners may execute a TERRA Agreement with the Commission, and the wellbore will be placed in the TERRA program for future use.

What Could Happen To Make The Well Profitable?

First, in the past few years we have all seen the prices of oil and gas cycle up and down. Many wells that are not profitable today would be if oil moved to higher price levels. If, in a few years, the price of oil and gas increases substantially, many of these wells would again become assets with value for the interest owners and the State of Texas.

Second, under TERRA, the Commission will act as the agent of the signing mineral interest owners. The Commission will have the ability to attract persons or corporations interested in gathering data from the well or developing new technologies enabling additional recovery of oil and gas. Even if your well is never used in a TERRA research project, the technologies developed

or the data gathered in other TERRA wells may be made available for use on your well to make it economical again.

Third, it is possible that other wells near this well may be recompleted or deepened to new zones, making your well an attractive asset once again.

Fourth, many oil and gas companies in Texas are interested in old wells. These companies may check all relevant TERRA records on your well and consider testing it for productive potential in any zone. These companies may obtain a Commission license to conduct a limited production test under the TERRA program, without the necessity of a lease, to see if your well meets their requirements.

Any money from oil and gas produced during the test is shared equally between the operator testing the well and the mineral interest owners (for Relinquishment Act land, the landowner and the State split their fifty percent share). Production during a research project is exempt from state severance tax. If the test proves the well as an economic producer, a conventional lease of the property from the mineral owners will be required, at which point the well would come out of TERRA. Production from a well released from TERRA after participation for two years or more, is exempt from severance taxes.

How Does TERRA Work?

—Entry Requirements

TERRA wells held by the State on behalf of the mineral owners must be environmentally and mechanically sound. The Railroad Commission will review a well to determine if it is acceptable for the TERRA program.

After acceptance of a well into TERRA, the operator or interest owner must submit a fee equal to 75 percent of the estimated plugging costs of the well. That amount is set by the Commission based on estimated plugging costs for like wells in the RRC district that the prospective TERRA well is located. The Commission must also be satisfied that there are no outstanding liens or other financial obligations secured by equipment at the wellsite. Copies of available logs or wellbore documentation must be submitted.

Acceptance into TERRA represents an immediate up-front savings of at least 25 percent of the cost that the operator or lessee would otherwise pay to plug the well. Acceptance of the well frees the operator and the mineral interest owners from plugging liability, which is assumed by the Commission while the well is in TERRA.

—TERRA Agreement

At least 50 percent of the present possessory mineral interest (typically, the lessee or operator, if the tract is leased, or the mineral owner if the tract is not leased) must sign a TERRA Agreement to place the well into the program. The Commission may require any vested mineral interests that may become possessory (typically, the mineral owner or lessor, while a tract is leased) to also be a party to the agreement. The more interest owners who sign a TERRA Agreement, the more likely the well will be accepted by the Commission. Unfortunately, the mineral interest ownership of some wells is so fragmented that the cost and difficulty of obtaining

sufficient signatures on a TERRA Agreement outweighs the savings from placing the well in TERRA; in these situations, the operator would elect to plug the well.

—Licensed Uses of a TERRA Well

TERRA wells may be used for research, production tests, or data-gathering projects if approved and licensed by the Commission. Licenses will be issued only for the time needed to carry out the project—licensees will not be allowed to occupy a well indefinitely while the well is in TERRA. Should they want to do so, they will be required to obtain an oil and gas lease from the mineral owners and assume full responsibility for the well.

Once in TERRA, a well will remain in TERRA until it is either released to another operator or plugged by the Commission. (After seven years, the owners(s) of at least 50 percent of the surface interest may request that wells be plugged by the Commission.) The well may also be released to the mineral owners or to a new operator who has an oil and gas lease from the mineral owners. The new operator or the mineral owner will acquire the well at no cost if it intends to plug the well. For wells in TERRA for less than 1 year, the fee may be up to the estimated plugging costs; for wells in TERRA over a year the amount can be up to twice the plugging costs. Parties to a TERRA agreement who seek a release of a well will have this fee reduced based on the amount of the initial fee required when the well was placed in TERRA.

The ability to get wells out of TERRA is especially attractive because it allows an operator to acquire a mechanically-sound wellbore (which would have been plugged, except for the TERRA program) for a tiny fraction of the drilling costs of a new well. An operator taking over a well becomes responsible for plugging the well just as if it were a newly drilled or newly acquired well.

Money received from operators for TERRA wells is placed in the TERRA fund and is used to make up the difference between the fraction of plugging costs received when a well is accepted into TERRA and the full costs to plug TERRA wells that are not returned to productive use. Money from the fund will also be utilized to administer the program.

Do I Have To Participate in TERRA?

No, TERRA is a **VOLUNTARY** program for everyone. The Commission's objective is to achieve the maximum recovery of the oil and gas resources in Texas and to derive the maximum economic benefits from this resource for its citizens. If the owners of 50 percent or more of the possessory mineral interest sign a TERRA Agreement, and if the well is acceptable to the Commission, then it may be placed in the TERRA program. Owners of possessory mineral interests who have not signed a TERRA Agreement will still be entitled to join in any conventional lease that may be signed and may claim their share of any oil or gas recovered (during a strictly limited production test) while the well is in TERRA. If they do accept such production, they will be considered to have ratified the TERRA Agreement.

How Will the Railroad Commission Assist This Well Back to Productive Use?

Every day, hundreds of people come to the Railroad Commission and explore for oil and gas in the records and archives that the Commission has maintained since the early 1920's. The Commission will use every opportunity to publish lists of the TERRA wells to ensure that the well in which you have an interest receives every possible consideration for future beneficial use.

These lists will also be available to research firms and seismic companies.

What's the Downside?

We do not see much. Operators save money by placing the well in the TERRA program, and they will no longer be required to plug the well. Mineral interest owners may share in the proceeds of any hydrocarbons produced from the well under the TERRA program, may still lease their minerals to operators finding the prospect attractive, and may earn royalties if the tract resumes commercial production. Industry has an opportunity to use these TERRA wells to develop new techniques that get more oil and gas out of the ground. Finally, TERRA ensures a means to plug wells at the appropriate time. TERRA benefits Texas citizens and the State of Texas.

If you think the site looks dangerous, just note the general area and stay clear of the well or pipeline. Then you can report your find to the Office of Oil and Gas (OO&G). To report an abandoned well or pipeline, complete the reporting form and send it to OO&G in the postage-paid envelope. For more information, call 1-800-517-3396.

Office of Oil & Gas
would like to thank
Class VI River Runners
for co-sponsoring the contest.



Office of Oil & Gas



WEST VIRGINIA
Division of Environmental Protection

*To use all available resources to protect and restore
West Virginia's environment in concert with the needs
of present and future generations.*

DEP is an equal opportunity/affirmative action employer.



The Hunt for Abandoned Wells

The Division of Environmental Protection is offering a reward for your help to find the thousands of abandoned oil and gas wells in West Virginia.

The Abandoned Well Fix

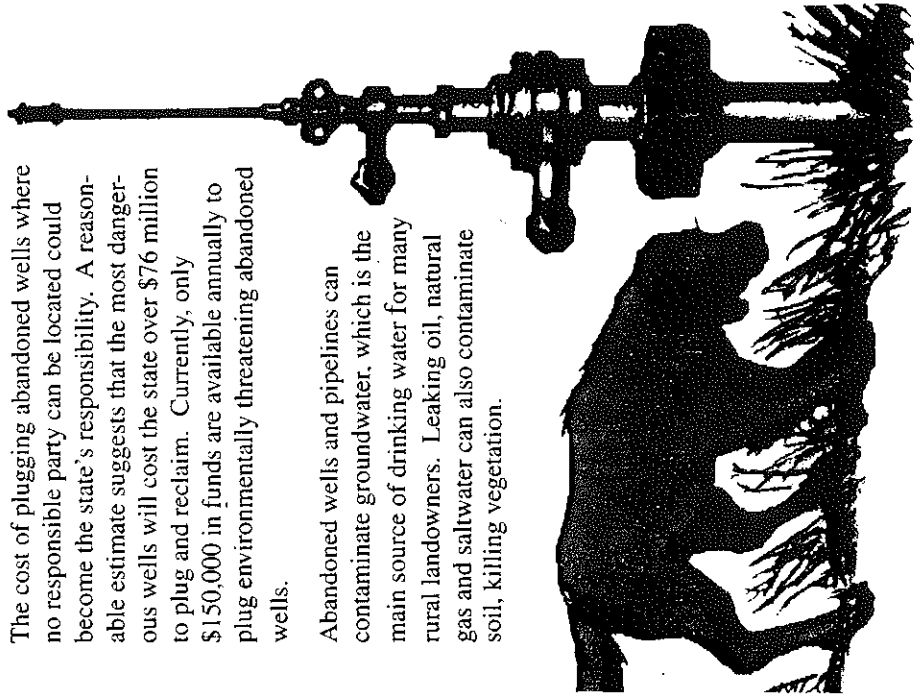
Over the last 100 years more than 125,000 oil and natural gas wells have been drilled throughout West Virginia. Many of these wells are no longer active and have not been plugged or have been improperly plugged. In addition to the wells, there are many miles of abandoned pipelines that have not been purged of oil. Collectively, these present a significant threat to environmental health and human safety.

In a project with the West Virginia Geologic and Economic Survey (WVGES), the Office of Oil and Gas (OO&G) estimates that the state has over 19,000 abandoned wells. Approximately 20 percent of those wells are thought to pose an imminent danger to the environment.

Perils of improper plugging and purging

The cost of plugging abandoned wells where no responsible party can be located could become the state's responsibility. A reasonable estimate suggests that the most dangerous wells will cost the state over \$76 million to plug and reclaim. Currently, only \$150,000 in funds are available annually to plug environmentally threatening abandoned wells.

Abandoned wells and pipelines can contaminate groundwater, which is the main source of drinking water for many rural landowners. Leaking oil, natural gas and saltwater can also contaminate soil, killing vegetation.



A serious safety concern is leaking natural gas which can cause an explosion. These hazards can be abated by finding and plugging the most dangerous abandoned wells and pipelines.

Locating lost wells

Many abandoned oil and gas wells have yet to be discovered. The OO&G is constantly searching for abandoned wells in order to assess their danger to the environment. The wells are then plotted on a map and classified according to their condition. One of the most efficient ways to begin this process is by asking those who know the land best: the landowners.

Here's how you can help. While out hiking or scouting out a good hunting spot, pay attention to these clues:

Any pipes sticking out of the ground

Pipeline that looks abandoned

Detection of natural gas odor or puddles of crude oil

Make a note of the location, picking out an easily recognizable landmark so the site can be found again. Check to see if the well or pipeline is marked with a number and write it down. **Call the OO&G at 1-800-517-3396 to receive information on how to report an abandoned well or pipeline.**

Reporting and responsibility

Keep in mind that finding and reporting an abandoned well or pipeline in no way makes you liable for the cleanup and plugging of the well if you are not responsible for the well or pipeline. Known operators of wells may be held liable for the cleanup and plugging of an abandoned well or pipeline. An operator is anyone who proposes to or locates, drills, operates or abandons any well.

You are an important part of the mission to maintain a healthy environment. Being conscientious about the environment now will enable you to enjoy a healthy environment later. Preventative maintenance is the key. Finding abandoned wells and pipelines gets us all one step closer to a cleaner environment.

The Hunt For Abandoned Wells

The search is on to reveal the thousands of abandoned oil and gas wells in West Virginia. The Division of Environmental Protection (DEP) is offering a reward for your help. The grand prize is the assurance of a cleaner environment with the location of abandoned wells and protection from the dangers abandoned wells and pipelines can pose. Talk about a gift that keeps on giving!

In addition to the grand prize in the contest you can win:

1st prize: Your choice

WV lifetime hunting license
\$300 shopping spree at a favorite mall

\$300 in groceries
WVU or Marshall season football tickets for two

2nd prize: Your choice

Two tickets to a WVU or Marshall football game
Whitewater rafting trip for one

Consolation prizes

T-shirts and coffee mugs

Here's how you can hunt to win. While out hiking or scouting out a good hunting spot, pay attention to these clues:

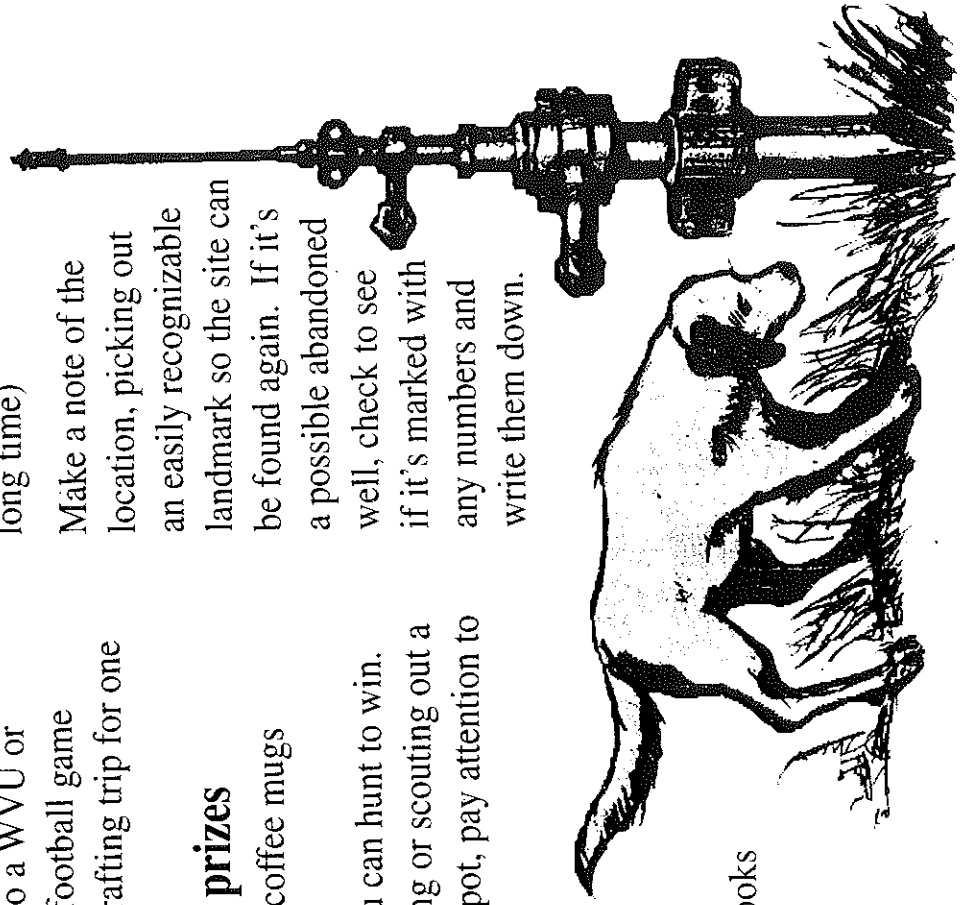
Any pipes sticking out of the ground

Pipeline that looks abandoned

Detection of natural gas odor or puddles of crude oil

Wells that don't look active (pump jack doesn't run or it hasn't been tended to in a long time)

Make a note of the location, picking out an easily recognizable landmark so the site can be found again. If it's a possible abandoned well, check to see if it's marked with any numbers and write them down.



H. DEREK: THE IOGCC'S ELECTRONIC BULLETIN BOARD

The IOGCC has an electronic bulletin board, called DEREK, to facilitate communication among members and with IOGCC headquarters. DEREK provides easy access to information even for those unfamiliar with the workings of the Internet. DEREK contains information about state oil and gas statutes, recent IOGCC publications, and much more. The main system menu provides a number of options for those using DEREK:

- ◆ Teleconference — This option allows you to enjoy a real-time, on-line "chat" with someone else who is logged in to DEREK, even if they are across the country
- ◆ Information Center — This is an area to locate general information about the IOGCC and DEREK.
- ◆ Forums — This is a public message area, similar to a bulletin board, where you can read or post messages of general interest. There are a number of general-purpose forums and several IOGCC committee forums to provide interaction with and among committee members.
- ◆ Electronic Mail — This area allows you to send messages to other registered users of DEREK.
- ◆ File Libraries — This area contains IOGCC files available for anyone to download to their own computer. It is also possible to upload files to the file libraries from here.
- ◆ Account Display/Edit — This option allows users to change their password or edit any other data in their account.
- ◆ Registry of Users — This area contains a list of all DEREK users.

Accessing DEREK requires a computer with communications software and a Hayes-compatible modem rated at 2400 baud or higher. The correct settings are: parity – none; data bits – 8; stop bits – 1. If you are a Windows user, the IOGCC can provide you with a free copy of Worldgroup Manager software, which allows you to view DEREK in a point and click, graphical environment, and allows TELNET users to upload and download (an option not possible with many types of TELNET software). Please call IOGCC headquarters at 405-525-3556, ext. 109, for a copy of the software and instructions.

There are two ways to connect to DEREK: 1) via modem at 405-525-0206; or 2) via TELNET at [iogccbbs.oklaosf.state.ok.us](telnet://iogccbbs.oklaosf.state.ok.us)

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About the **INTERSTATE OIL and GAS COMPACT COMMISSION**

The Interstate Oil and Gas Compact Commission (IOGCC) represents the governors of 36 states — 29 member and seven associate states — that produce virtually all the domestic oil and natural gas in the United States, and one international affiliate. The organization's mission is to promote the conservation and efficient recovery of domestic oil and natural gas resources, while protecting health, safety and the environment.

Since its creation in 1935, the IOGCC has assisted states in balancing a multitude of interests — maximizing domestic oil and natural gas production, minimizing the waste of irreplaceable natural resources, and protecting human and environmental health — through sound regulatory practices. The IOGCC plays an active role in Washington, D.C., serving as the voice of the states on oil and natural gas issues and advocating states' rights to govern the resources found within their borders.

For more information about the IOGCC, please call 405/525-3556, or send electronic mail to iogcc@oklaosf.state.ok.us.

Member States

Alabama (1945)
Alaska (1957)
Arizona (1955)
Arkansas (1941)
California (1974)
Colorado (1935)
Illinois (1935)
Indiana (1947)
Kansas (1935)
Kentucky (1942)
Louisiana (1941)
Maryland (1959)
Michigan (1939)
Mississippi (1948)
Montana (1945)
Nebraska (1953)
Nevada (1955)
New Mexico (1935)
New York (1941)
North Dakota (1953)
Ohio (1943)
Oklahoma (1935)
Pennsylvania (1941)
South Dakota (1955)
Texas (1935)
Utah (1957)
Virginia (1982)
West Virginia (1945)
Wyoming (1955)

Associate States

Georgia (1946)
Idaho (1960)
Missouri (1995)
North Carolina (1971)
Oregon (1954)
South Carolina (1972)
Washington (1967)

International Affiliates

Alberta (1996)



Interstate Oil and Gas Compact Commission

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