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Disclaimer: This manual has been written for the purposes of a training tool and as a reference guide for the auditor. Any references to taxability, administrative policies, laws, and rules are subject to change due to administrative hearings and actions of the courts or legislature. While the content of the manual is current as of the revision date, the reader is responsible for any changes occurring after this date and should verify the current status of any information by contacting the Comptroller of Public Accounts toll free at 800-252-5555.

Preface
Well Servicing

This manual has been written for the auditor. It is to be used as a training tool and as a reference guide. Any schedules included in the manual are for illustration purposes only and are not to be construed as the accepted format. Audit exams/schedules will need to be tailored to the audit situations encountered and to the auditors' needs. The intent of the manual is for the auditor to be familiar with the activities of a well servicing company and to outline the taxability of these activities. Knowledge of the oil and gas industry is essential to the understanding of the material in this manual, and the auditor should be familiar with the glossary at the end of the manual.

Users of this manual are responsible for any changes that occur after the printing or posting of the manual. Before relying on this information, all users should verify the current status of any information by contacting the Comptroller of Public Accounts. Call toll-free: 800-252-5555. The regular number in Austin is: 512-463-4600.

Chapter 1
Introduction to Well Servicing

Introduction

Although the reservoirs containing the fluids were formed millions of years ago, it has only been since the 1900's that the value and usefulness of oil and gas has been fully realized. Today, we depend on petroleum products for thousands of consumer items ranging from transportation fuel to plastic products. Unfortunately, the huge demand for petroleum is causing the once immense reserves to dwindle rapidly. We realize the importance of drilling companies locating and opening new oil and gas wells in order to continue adding to our reserves. In addition, the role of the well servicing companies in recovering the maximum benefit from every well drilled is becoming more important.

Well Completion

When an oil or gas well is drilled, testing and logging must be performed in the borehole to determine if a formation is productive and, if so, to evaluate the potential of the zone. If the formation is found to be productive, then the drilling is completed and the casing set.

If the well has sufficient natural drive, it will begin flowing freely. If not, some form of well stimulation may be needed to start production.

After the well has been developed and has been producing, it may need cleaning (workover) in order to clear the well of deposits or correct problems. Or, the well may need repairs since parts are subject to wear, corrosion, and breakage. In addition, a producing well may begin to lose some or all of its natural drive, and well stimulation and/or artificial lift may be necessary in order to recover the remaining liquid hydrocarbons in the formation until it is abandoned.

In order to accomplish these stages in the life of a producing formation, many specialists will be needed:

- The driller who may be solely in the business of drilling and reworking an oil or gas well or who may also be the producer
- The oil or gas producer who actually operates the well and recovers the oil and gas liquid hydrocarbons
- The well servicing company who performs activities to aid the producer such as testing and logging, well stimulation, and repairs

The driller, if engaged solely in the occupation of drilling, is not covered by any state occupation tax. The oil or gas producer is covered by the provisions of the oil and gas production taxes, which will be covered in another manual. The well servicing company is covered by the provisions of TEX. TAX CODE ANN. Chapter 191, Subchapter E of the Miscellaneous

Occupation Tax. These laws and how they relate to the well servicing company are discussed in this manual. Of course, well service companies also have sales and use tax responsibilities, especially regarding the purchase of equipment and supplies.

Purpose of a Well Servicing Company

The well servicing company's basic purposes are:

- To perform testing and logging in order to locate productive formations and to determine a well's potential
- To stimulate an old or new well in order to obtain an acceptable production rate
- To keep a well in production after discovery and development
- To perform maintenance work on an oil or gas well in order to maintain or improve the production in an already producing formation
- To install down-hole equipment needed for artificial lift operations

Types of Services Available

The well servicing company performs services in four basic areas:

- Logging
  - Potential tests
  - Well logging
- Well stimulation
  - Cementing
  - Fracturing
  - Acidizing
- Repairs and workovers
  - Swabbing
  - Sucker rods
  - Tubing
  - Fishing
- Artificial lift equipment installation
  - Gas lift
  - Sucker rod pumps
  - Hydraulic pumps
  - Saltwater injection
  - Steam injection

More details about each of the above services are provided in Chapter 4 of this manual.

Permits

According to TEX. TAX CODE ANN. SEC. 191.089 of the Miscellaneous Occupation Taxes, every person taxed under this chapter must have a permit as required by Sec. 182.086 to transact business. The comptroller issues the permit in a form prescribed by the Texas Attorney General.

The permit must show:

1. The name of the person to whom it is issued
2. The business to be transacted; and,
3. That the holder has complied with the Miscellaneous Gross Receipts Taxes law

Equipment Used

A well servicing company may use many different types of equipment to perform the services outlined in the preceding paragraph, such as:

- Well servicing units
- Hoisting machinery to pull sucker rods or tubing
- Workover rigs
- High pressure pumps
- Logging equipment
- Trucks to carry acids, chemicals, etc.

More details about the above types of equipment are provided in Chapter 4 and in the Glossary section of the manual.

Procedure

Generally, a well servicing company will purchase materials and supplies from a wholesaler. The company will then travel to the well site with its own equipment and manpower in order to provide the service. The well servicing company will then bill the producer of the well for the activities performed, sometimes separately stating labor and materials on the service invoice.

Chapter 2
Well Servicing Tax

Imposition of the Tax

The well servicing tax is an occupation tax upon the business of furnishing any service or performing any duty in connection with the drilling and completion, reworking, or reconditioning of any oil or gas well. This tax was originally enacted in 1941. Sec, 191.087 was last amended in 1983.

There are certain criteria that must be met before a service is considered to be taxable:

- The service must be provided by a person engaged in the business of furnishing a service or performing a duty for others for a consideration with equipment owned, controlled, or furnished by such person.
- Uses any chemical, electrical, or mechanical process in providing the service at any oil or gas well during and in connection with the drilling and completion, or reworking or reconditioning, of the well.

AND,

The service must be one or more of the following:

- Cementing the casing seat of any oil or gas well,
- Shooting, fracturing, or acidizing the sands or other formations of the earth in any oil or gas well,
- Surveying or testing oil or gas well formations, or the contents thereof, in any such well through the use of instruments or equipment at least a portion of which the instruments or equipment is located within the wellbore when the survey or test is made

Note: The tax does not apply to persons engaged in the business of drilling or reworking any oil or gas well.

Taxable Value

Briefly, the tax imposed is upon the taxable value:

Gross amount received for taxable services*
Less: Value of material used
Taxable value (labor or "service charge")
*A list of examples of taxable services is provided later in this chapter.

Tax Rate

The tax will be at the rate of 2.42 percent of the gross amount received for the service after deduction for the reasonable value at the well of material used, consumed, or expended in or incorporated into the well. See "Taxable Value" above.

Tax Report Due Date

The tax is to be reported and paid on or before the 20th day of the month following the end of each calendar month in which the taxable service was performed. An example of the Texas Gross Receipts Tax Report - Oil and Gas Well Servicing is included later in this manual.

Example:
Taxable well servicing activities for April 2004 will be due and payable on or before May 20, 2004. The well servicing receipts to be reported for April 2004 are the receipts recognized by the service provider, utilizing whatever accounting method the taxpayer uses to recognize receipts. For example, if the service provider uses the cash basis of accounting, April's well servicing receipts will be the cash received for the services. If the service provider uses the accrual basis of accounting, April's well servicing receipts will the amount recognized on the books for those services.

Penalty

If a person taxed under this subchapter fails to file a report required by this subchapter or to pay the tax imposed by this subchapter when due, then a penalty will be imposed in the amount of:

- Five percent of the amount of tax due if the report has not been filed and/or tax paid within 30 days of the due date
- An additional 5 percent of the amount of tax due is imposed if the person still has not filed a report and/or paid the tax due after 30 days of the due date
- The minimum penalty imposed by this section is $1

In addition, per section 191.086 of the Miscellaneous Occupation Taxes imposes an additional penalty of not less than $25 and not more than $500 on a person who violates the provisions of Chapter 191. A separate offense is committed each day on which a violation occurs.

Note:
The penalty imposed by 191.086 is a civil penalty which is to be assessed by a court of competent jurisdiction and is to be recovered by the Texas Attorney General. This penalty is not to be included in an audit by the Comptroller. The issue was addressed in Attorney General Opinion No. MW-19 dated May 9, 1979 and in Harvill v. State, 188 SW 2d 869 (Tex. Civ. App. – Austin 1945, writ ref'd).

Interest

Interest begins on the 61st day after due date

- At 12% per annum for reports due on or before 12/31/1999
- For reports due on or after 01/01/2000, rate varies annually based on prime interest rate + 1%

Tax Reimbursement

There are two types of tax reimbursement possible in well servicing:

- Reimbursement of use tax on materials and supplies – Type I
- Reimbursement of the well servicing tax – Type II

Type I

Generally, a well servicing company purchases the materials from a vendor and either pays sales & use tax to the vendor or accrues sales and use tax on the materials. The well servicing company will then bill the producer for the labor and materials used on the job. However, the price of the materials stated on the invoice has actually been marked-up above the actual cost. The well servicing company will also charge the producer for a sales tax reimbursement on the price of the materials shown on the invoice. The consequence of the transaction is that the sales tax reimbursement may either equal the sales or use tax paid by the well servicing company to its vendors or the reimbursement may actually exceed the sales and use tax actually paid.

Sales and use tax reimbursement equal to what was actually paid by the well servicing company is **not** taxable under any law pertaining to well servicing tax. However, any excess reimbursement which is not refunded to the producer is considered to be **error tax** and is due to the State of Texas in a sales and use tax audit. Sales and use tax Rule 3.324 for Oil, Gas, and Related Well Service gives more details about well servicing companies in relation to sales tax.

Type II

In addition, a well servicing company may bill the customer for reimbursement of the well servicing tax. If this charge is separately stated on the invoice, this tax reimbursement should be included in taxable gross receipts for well servicing tax.

Example #1:
The following would be a sample invoice between a well servicing company and a customer:

$1,000.00 Labor

500.00 Materials and supplies

10.00 2% reimbursement on materials

24.20 2.42% well servicing tax on labor

$1,534.20 Total Billing

For oil well servicing tax we will consider the following to be taxable:

$1,000.00 Labor

24.20 Well servicing tax reimbursement

$1,024.20 Gross Taxable Receipts

x .0242 Tax rate

$24.79 Well servicing tax due

Example #2:

Same invoice as Example #1 except that the well servicing company billed somewhat differently:

$1,000.00 Labor

500.00 Materials and supplies (marked up)

8.25 8.25% sales tax reimbursement on cost of materials ($100)

24.20 Well servicing tax reimbursement

$1,532.45 Total Billing

The Gross Taxable Receipts and the well servicing tax due would be the same as in Example #1. However, the excess sales tax reimbursement of $1.75 ($500 x 2% - $100 x 8.25%) that the well servicing company charged the producer is error tax and should be included in the well servicing company's sales & use tax audit.

Taxable Receipts

The computation of the well servicing tax would generally include the following services:

- Services for cementing the casing seat of any oil or gas well
- Services for shooting, fracturing, or acidizing the sands or other formations of the earth in any oil or gas well
- Services for surveying or testing the formations or contents of any oil or gas well through the use of instruments or equipment at least a portion of which are located within the well bore when the survey or test is made
- Services in direct connection with the addition of materials to aid in fracturing or acidizing
- Services for casing pumps to keep packers in place during fracturing and acidizing operations
- Services for mixing, blending, or proportioning whenever the activity is performed by means of equipment connected to the well either directly or indirectly
- Reimbursement for well servicing tax

NOTE: If taxable and non-taxable services are performed simultaneously, then the total amount of the services is taxable. A non-taxable service must be performed separately (or in conjunction with another non-taxable service) in order for it to be non-taxable.

Non-Taxable Services

There are various charges which are not taxable under the statute provided they are invoiced separately or otherwise substantiated. Some examples include:

- Any receipts for equipment taken to the well location but not connected in any way to the well or other equipment
- Receipts associated with services performed in converting an oil or gas well into an injection well
- Sales tax reimbursement **equal** to that actually paid for sales and use tax on materials and supplies
- The value of materials used, consumed, expended in or incorporated into the well during the performance of a taxable service. If the charge for the well service is not separately stated to the customer, the value of the service must be determined and deducted from the total amount in order to arrive at the taxable amount of the service charge. In determining the value of the materials, all reasonable or necessary elements of the value of the materials should be considered, including the cost of the materials, transportation, handling, profit on the sale, overhead, etc.
- Charges for "waiting time" or "stand-by time" are not taxable since no service is being performed
  - "Waiting time" is the period of time when a piece of service equipment (pump, lines, or tanks) was connected to other service equipment during a cementing, acidizing, or fracturing job, but which was not put to immediate use
  - "Stand-by" time is the period of time when a piece of service equipment is at the well but which is neither used nor connected to other service equipment. This may be before the service begins or during the time when no service is being performed due to causes beyond the control of the service company
  - Receipts for services performed before or after a taxable service has been commenced or completed, such as
  - Use of jet guns or other similar devices to perforate or to clean perforations in preparation of fracturing or acidizing, and
  - Surveying in preparation to fracturing or acidizing when not for location or determination of a producing formation
- The portion of any receipts which represents the value at the well of any materials used, consumed, expended, or incorporated into the well, and
- Receipts for frac tank services
- Receipts for reasonable mileage charges

NOTE: Receipts listed as not subject to the oil and gas well servicing tax may be subject to the limited sales and use tax.

Chapter 3
Description of Oil and Gas Well Services

As described in TEX. TAX CODE ANN. Chapter 191, Subchapter E, the taxable services are:

- Cementing the casing seat
- Shooting the formation
- Acidizing the formation
- Fracturing the formation
- Surveying a well
- Testing the formation

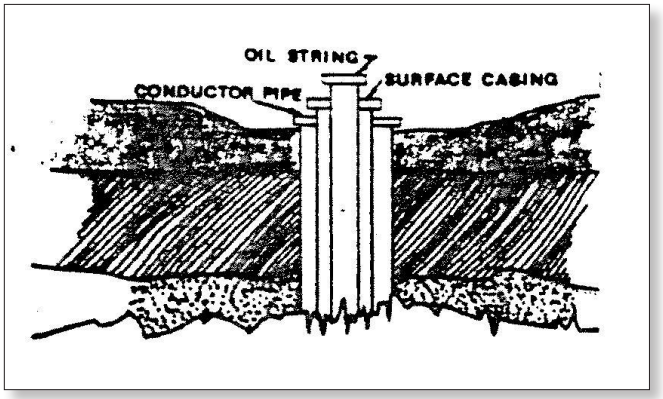
Each of these services will be described in depth in this chapter. Within each section there will be information on the history and background of the service, a description of the service, and discussion of taxable and non-taxable areas.

Cementing

Description of the Process

An oil or gas well usually requires as many as three concentric (having a common center) strings of pipe or casing which are all cemented in place. These are:

- The conductor pipe
- The surface casing
- The oil string



Conductor Pipe

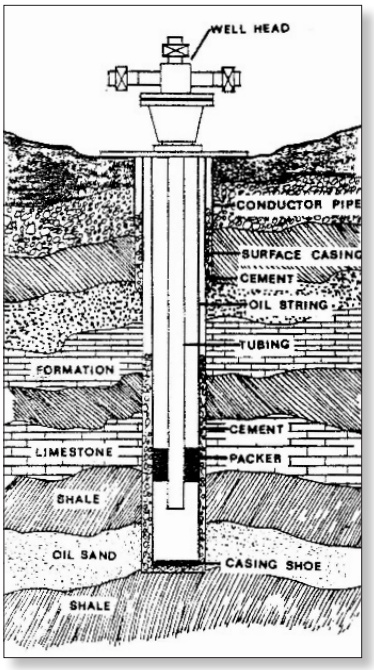
The conductor pipe is needed to prevent the wellbore from caving in at the surface. In very soft ground, the conductor pipe may extend down from the surface to 100 feet or more, but generally not more than 20 feet is required. The conductor pipe is usually cemented in place, but occasionally it is driven into place by means of a pile driver. Cementing of the conductor pipe is not a taxable oil and gas well service.

Surface Casing

The surface casing provides protection for freshwater formations, prevents loose shale, sand, or gravel from falling into the hole, and affords a means of controlling the flow of drilling fluids from the well. The surface casing is run to a greater depth than the conductor strings but does not run to the producing zone. Cementing of the surface casing is not a taxable oil and gas well service.

Oil String (Production String)

The final casing for most wells, in order to prepare the well for production, is the production string or oil string. In most wells the production string of casing is the last column of casing placed in a well and will extend from the surface through the producing or "pay" zone.

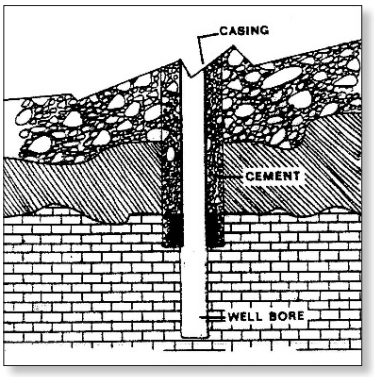


In some cases where the producing formation is tightly consolidated, the production string is run only to the top of the producing formation, and the hole is left open below that point. This is an "open-hole completion" or a "barefoot completion."

In other instances it is found desirable, for economic reasons or to facilitate subsequent operations, to run a shortened string of casing in the bottom portion of the hole that will not extend to the surface but only to a portion already cased. This casing, used to extend the casing from the producing zone to a point already cased, is usually called a "liner."

In addition to the conductor pipe, surface casing, and the oil string, an intermediate string of casing is often needed as a precautionary measure in nearly every deep well, and it is often needed in other wells when high pressure or troublesome formations are encountered. This casing is set in the wells after the surface casing and before the oil string.

In all methods of preparing the well for production, the column of casing at the bottom of the producing string is referred to as the "casing seat" or "shoe." Cementing of the casing seat is the operation by which cement is placed between the bottom of the casing and the sides of the wellbore for the purpose of securing the casing in place and excluding water and other fluids from the hole.

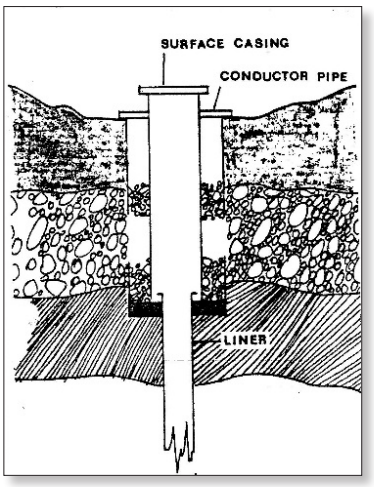


The cementing of a casing seat commences with the placing of the production string in the well and ends when the cement is in place.

Several different types of cement or cementing material may be used for this purpose, and several methods have been developed for placing the cement in the well. The cementing material is mixed in a liquid state (slurry) at the surface and usually is either:

- Hydraulically pumped to the bottom of the wellbore through the casing or through auxiliary tubing and is forced up behind the casing; or
- Lowered to the bottom of the hole in a bailer and dumped.

In the latter case, sufficient cement is dumped so that some of the cement will rise in the hole behind the casing or the casing may be lowered into the liquid cement after it has been dumped. In either method, after the cement is placed behind the casing, it is allowed to harden.



Taxable Services

Services which are subject to tax when performed or made available during or in association with cementing of casing seat or the seat of liners include, but are not limited to:

- Mixing of the cement slurry at the well
- Blending of additives or inhibitors into the slurry at the well
- The placing of cement packer or hangers, if placed by the service company during the cementing operation
- The pumping of the cement slurry from the mixer or blender to the pump at the well head
- Charges for the use of the pumping equipment used to pump the cement into the well

Non-Taxable Services

The following types of cementing services are non-taxable:

- Cementing to control wells or to correct lost circulation. On occasion it may be necessary to pump cement into a well for the purpose of:
  - Bringing the well under control
  - Shutting off undesirable flows of fluids
  - Sealing off intervals in the hole where drilling fluid is being lost
- Plug back operations. A plug back operation is one in which the bottom section of the wellbore is cemented off to prevent the inflow of fluid from that portion of the hole
- Cementing for abandonment. Before abandoning a well, cement plugs are placed in the hole to prevent escape of fluid from one formation to another and to protect freshwater sands.
- Squeeze cementing operations. "Squeeze cementing" is an operation in which a fluid cement, after being placed in the desired position in a well, is subjected to high pump pressure to force some of the cement into the surrounding formations
- Cementing to repair defective casing or cementing liners for repair operations. Casing that is defective when run in the hole or which becomes defective after being in the hole may permit unwanted fluids to enter the well or allow well fluids to escape from the well. When such defects cannot be repaired by cementing alone, then a liner may be cemented through the defective section.
- Cementing for whipstock operations. It frequently becomes desirable to deflect or change the direction of the hole for one of several reasons:
  - To complete drilling in a predetermined target area
  - To correct a "crooked hole" condition that has developed during the course of drilling; or
  - To drill around an obstacle (lost tools, pipe, etc.) that cannot be removed from the hole

A deflecting tool which permits directing the course of a well is known as a "whipstock". A whipstock is a long, slender, tapered steel wedge which is supported in the well in such a position that the drilling tools are deflected from their previous course and in the desired direction. Whipstocks are sometimes cemented in place.

- Cementing of the conductor pipe
- Cementing of an intermediate string of pipe

Shooting

Introduction

Of the three methods developed to enlarge or open the oil or gas formation, shooting is the oldest. Shooting is a method of well stimulation whereby nitroglycerine or other explosives are detonated within a formation to increase or commence the flow of oil. Acidizing and fracturing are discussed later in this chapter.

Background

In the years between 1890 and 1950, the oil industry used liquid and later solidified nitroglycerin to stimulate wells by detonating an explosive charge in the wellbore. The object of shooting a well was to fracture the oil or gas bearing formation in order to increase both the initial flow and the ultimate recovery of oil. This operation was performed any time during the life of the well whenever the operator believed he could commence or increase the flow of oil or gas into the wellbore. Shooting of the formation with explosives was very hazardous to those working with the explosives and frequently damaged the well casing, preventing subsequent selective treatment of the producing zone. Then with the advent of commercial hydraulic fracturing in 1948, shooting an oil or gas well was practically eliminated.

There are instances where shooting is still preferred over acidizing and hydraulic fracturing. Some examples of situations are:

- Extremely tight formations do not respond readily to either acidizing or hydraulic fracturing
- Experience has shown that some of the older wells that were shot are still producing commercially while wells that were hydraulically fractured or acidized are not
- Modern techniques and explosive materials have been developed to do a better and safer job than had been previously possible

Description of the Process

After the casings have been cemented in place and the drilling completed, the formation may not begin to flow naturally. Shooting is a method of well stimulation which is to enlarge the formation pores through which the oil and gas fluids can pass. The work is usually done with fifty-quart shots of solidified nitroglycerin or gelatin, and the shots are detonated by electric time bombs. The shots are lowered into the open hole below the lowest string of casing and packed with about fifty feet of gravel. The wellbore is filled with water, and the charge is exploded. When the shooting is completed, the casing string is lowered in the formation to enable the formation fluids to pass to the surface.

The service of shooting commences with the preparation of a well to receive the explosive and ends when the explosive is detonated.

Taxable Services

The fracturing of a producing formation by placing an explosive or any other device down the wellbore of an oil or gas well would be a taxable service subject to the oil and gas well servicing tax.

Non-Taxable Services

The following types of shooting services are not subject to the oil and gas well servicing tax:

Perforating pipe to provide an opening in the pipe, casing or tubing, is not taxable.

In oil field terminology, shooting for the purpose of perforating pipe is the creation of openings or holes in the pipe by means of explosives, using projectiles and shaped charges or jets.

A device called a gun, or perforating gun, which contains a number of explosive charges, is lowered to a predetermined depth in a well and fired. Openings or holes are created by detonation of the charges causing the projectiles or jets to pierce the pipe. This operation is not the shooting of the formation in an oil or gas well, and, therefore, not subject to the oil and gas well servicing tax.

Shooting off pipe or casing (cutting) or shooting to recover casing is not subject to the oil and gas well servicing tax. These shooting operations are performed generally during salvage operations which may be necessary because of various occurrences:

- In a dry hole where casing has been installed and cemented in the wellbore, and it is desirable to recover as much of the casing as possible for use elsewhere
- Drill pipe has been stuck in the well due to the sloughing of the formation into the wellbore, and it is desirable to recover as much of the string of pipe as possible
- Well has produced its ultimate recovery and can no longer be produced economically, and it is desirable to recover as much of the casing as possible for use elsewhere.

In all of the above cases, the casing or pipe is cut with an explosive charge lowered on a wire line. The form of the explosive charge may vary widely, consisting of dynamite, solid or liquid nitroglycerin, or specially designed charges known as jet casing cutters.

Shooting to recover or remove fish in fishing operations is not subject to the oil and gas well servicing tax. “Fish” are any obstructions in a wellbore which are not natural. These may include drill bits or parts of them which have been broken off or otherwise disconnected from the drill pipe. The fish may be any number of sections or pipe and drill collars which have twisted off in the threads or broken in half along their length. The fish may be hand tools or other metal objects which have fallen into the wellbore from the surface. Shooting to recover or remove fish is done for the purpose of breaking these obstructions into small pieces with an explosive charge. The smaller pieces are picked up more readily by magnets or special baskets. The disintegration can be accomplished by lowering an ordinary nitroglycerin charge, shaped charge gun, or other explosive device into the well and exploding it in contact with the fish.

String shot shooting to open screen or perforations is not subject to the oil & gas well servicing tax. “String Shot”, “Cord Shot”, or “Primacord Shot” are similar terms used to describe an explosive charge lowered into the well to clean the plugged openings of the screen or perforations.

- “Cord” is an abbreviation of “Primacord”
- “Primacord” is the trade name for an impregnated fuse cord which has explosive power. Normally used as a booster explosion for detonating dynamite, it has enough power of its own to do clean-out jobs without rupturing screens or casing
- “String Shot” is a colloquialism which describes the cord

When the string shot is detonated, fluid is forced through the openings in the screen or the perforations, removing the solid matter from the exterior surfaces. This is an operation to improve the efficiency of the well equipment and is, therefore, not subject to the oil and gas well servicing tax.

NOTE: Shooting to recover or remove fish and string shot shooting to open screens or perforations are not common practices in the oilfield industry at this time. Newer techniques have been developed for these operations.

Acidizing

Introduction

Acidizing is the second of the three methods discovered to promote well stimulation. Acidizing is injecting an acid under pressure into a formation to enlarge the pore spaces and passages in order to increase productivity.

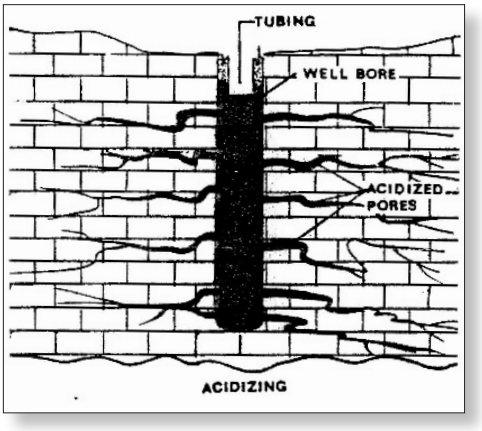
Background

Acidizing was first performed in 1932 by the Pure Oil Company in cooperation with Dow Chemical Company. By 1934 acidizing was commonly used in addition to shooting, and these were the only two known methods for well stimulation until fracturing was invented in 1948. Today it is known that certain kinds of formations respond better to acidizing than the other methods. Acidizing is still widely used to:

- Dissolve rocks in the productive formations
- Open new channels to the wellbore
- Reduce formation resistance to the wellbore

Description of the Process

In the acidizing process, acids such as hydrochloric acid, formic acid, and acetic acid are pumped into the wellbore under pressure so as to allow the acid to react chemically with the rock in order to enlarge existing channels or to create new ones. There are two basic types of acidizing treatment:



- Low pressure acidizing to avoid fracturing the formation and allow the acid to work through the natural pores of the rocks
- High-pressure acidizing, also called “acid fracturing”, where sufficient volume and pressure is maintained in order to keep the fractures open while the acid is injected

The acid used for the treatment must create products of the reaction that are soluble and which can be easily removed from the well. Since large volumes of the acid are used, it must be relatively inexpensive and safe to handle. Additives are used with the acids for several purposes, but the most important purpose is to inhibit the acid from attacking the steel tubing or casing in the well. There are several types of additives used:

- Inhibitors are used to prevent the acid from working on steel for several hours
- Surfactants are mixed in small amounts with the acid to make it easier to pump the acid into the formation and prevent the acid and oil from forming emulsions
- Sequestering agents are added to control the precipitation of iron deposits from spent acid solutions and from scales of iron sulfide, iron oxide, and iron carbonates found in well tubing and casing
- Suspending agents are used to suspend the fine clay and silt particles that may remain in the well

Oil reservoir rocks most commonly acidized are limestone-calcium carbonate, dolomite (a mixture of calcium and magnesium carbonates), and calcareous sands.

The service of acidizing the formation of a well begins with the perforating of the well casing with an acid jet gun, or, if the casing is already perforated, the service begins with the setting up of all the equipment necessary for servicing the well and ends with the removal of the equipment required to perform the acidizing service.

Taxable Services

Acidizing the formation of an oil or gas well to stimulate, enhance production, prevent scaling, or to prepare a formation for a scale-inhibiting or chemical treatment is subject to the oil and gas well servicing tax as the service is performed during the drilling, completion, reworking, or reconditioning of an oil or gas well.

Some examples of acidizing services subject to the tax include, but are not limited to:

- Perforating the well by the service company performing the acidizing job if performed simultaneously with acidizing
- Mixing of the acid solution at the well
- Blending of additives and/or inhibitors at the well
- Plugging perforations in the multi-zone acid jobs
- Pumping the acid, water, additives, and/or inhibitors from storage tanks to the blender
- Charges for the mixer
- Pump charges from the mixer or storage tanks
- Pumping of the acid solution into the well

Non-Taxable Services

The following are services which are not subject to the oil and gas well servicing tax as not all acidizing treatments are considered to be acidizing of the formation:

- Acidizing to recover fish or stuck pipe. During drilling operations it is not uncommon for the drill pipe to become stuck in the hole. This may be caused by sloughing of the material around the borehole, insufficient mud circulation to remove the bit cuttings from the hole, or numerous other reasons. Through the proper use of acids, it is possible sometimes to dissolve the material causing the sticking and thereby release the drill pipe so that the drilling may continue. Similarly, the casing sometimes becomes stuck while being lowered in the borehole due to the same conditions causing the drill pipe to stick. Acids may be used to dissolve the material so that the running of the casing may continue.
- When tools or other objects are dropped or "lost" in the borehole, acids may be used as an aid to fishing tools. In this case, dissolving of the formation or other substances may allow the fishing tools to function as desired. The goal is to recover the lost objects so that drilling may continue.
- Acidizing to clean screens. In some wells it is necessary to use screens or strainers or pipes positioned in the well to prevent encroachment of undesirable substances. Acid is frequently used to clean these screens or strainers of drill mud, carbonate scales, sulfate scales, iron sulfide, or other substances which have plugged the screens or strainers.
- Acidizing to dissolve mud sheaths. A function of drilling mud used in drilling or rework operations is the forming of a mud cake or sheath on the wall of the hole in order to prevent sloughing of the formations into the borehole. While this is desired during the course of drilling operations, this mud cake must be removed from the productive formation when completing the well so that the natural fluid flow in the formation will not be restricted. Acid mixtures, commonly called mud acid, are used to dissolve and remove this mud cake. The objective of such acid mixtures is to dissolve the mud sheath and not the productive formation.
- Acidizing soluble metals. Pipe or special tools made from certain metals are soluble in acids. Should their removal from the wellbore be desired, it is accomplished through the use of acids.
- Acidizing to dissolve paraffin deposits in the tubing. This acidizing is not for the purpose of acidizing the formation nor is it performed during the drilling, completion, and/or reworking or reconditioning of the well.

Fracturing

Introduction

Fracturing is one of the methods of well stimulation in addition to shooting and acidizing. In fracturing, commonly called a "frac job," sand and a fluid mix are forced into the formation to open cracks. When the fluid is removed, the sand particles remain in the cracks in order to keep them propped open so that the liquid hydrocarbons can flow into the wellbore.

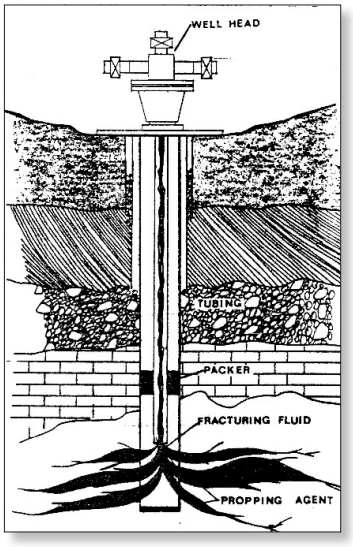
Background

Fracturing was the last of the three known methods of well stimulation to be introduced. It was first used in the Hugoton gas field in western Kansas in 1948, and has since gained wide acceptance in the oil and gas industry. It is commonly called

"hydraulic fracturing' due to the use of hydraulic equipment to create the extremely high pressures needed to crack open or break the tight formations. Today, hydraulic fracturing is used to accomplish four basic jobs:

- Overcome wellbore damage
- Create deep penetrating reservoir fractures in order to improve the productivity of a flowing well
- Aid in secondary recovery operations in order to enhance the productivity of a well
- Assist in the injection or disposal of brine and industrial waste material

Description of the Process



The fracturing process consists of the application of hydraulic pressure against the formation by pumping fluid (gel) laden with some type of particle into the well. The formation is actually split by the pressure of the fluid. The amount of pressure, sometimes as high as 10,000 pounds per square inch (psi), and the equipment necessary to furnish the pressure vary according to the requirements of each situation. The fluid pumped or injected into the well contains sand or other solids (glass beads, walnut shells, etc.) called "propping agents" which are deposited into the cracks and fissures created by the pressure. The sand or other solids injected into the well act as props after the pressure is released. The most common fracturing fluid is diesel fuel, but refined oil, crude oil, salt water, acids, and emulsifiers are some other fluids used.

Some examples of ways in which hydraulic fracturing can be applied to a producing well are:

With a single packer in the hole

- Pulling the tubing so that the fluid can be pumped down the open casing. This allows much more fluid to be pumped down the hold without exceeding the rated maximum pressure of the wellhead fittings.
- Pulling the tubing and using a "straddle packer." This makes it possible to isolate one zone from another and selectively fracture several zones by simply changing the position of the packer
- Where perforated casing is involved, sealing balls may be injected into the fluid. The high velocity of the fluid will transport the balls to perforations which are "taking fluids," seal them off, and direct the hydraulic fluid to other perforations in order to create multiple zones. If the perforated zone is to be abandoned, various-sized balls are used to plug the perforations. When the injection is stopped, all remaining excess balls will fall to the bottom of the well.

The service of fracturing a well begins with the setting up of all the equipment required to perform the fracturing service, and it ends with the removal of that equipment.

Taxable Services

All fracturing operations performed on an oil or gas well are subject to the oil and gas well servicing tax whether used to stimulate production in newly completed wells or to increase production in older wells. The fracturing of a well includes:

- The mixing of the propping agent and the carrying fluid at the well
- The blending of additives or inhibitors into the fluid at the well
- The pumping of fluids, additives, inhibitors, and propping agents from storage tanks to the mixer, blender, and/or main injection pump at the wellhead
- Sealing perforated casing in multiple fracturing jobs
- Pumping the fracturing fluid down the well

Non-Taxable Services

The only fracturing service not subject to the oil and gas well servicing tax is:

Fracturing of injection or disposal wells

Surveying

Introduction

Surveying the formation means that an instrument is run into an oil or gas well to measure, locate, or determine the depth and character of the formation. These measurements are generally called "logs" or "surveys" of which there are many different types.

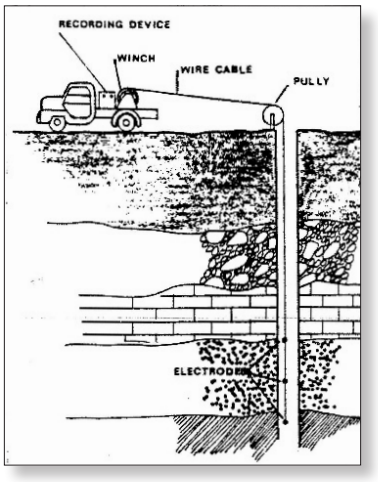
Background

In the early years of the oil and gas industry, there were not any mechanical devices to use in order to measure or estimate the formation characteristics. Instead, the oil well drillers and producers only had the rocks and cuttings to examine. The cuttings would be washed free of the drilling mud, dried, put into envelopes, and later examined under microscopes. Today, modern mechanical and electrical devices provide much more necessary information.

Logs are used for many purposes, including:

- Providing a permanent record of the formation
- Providing information needed by geologists in the search for oil and gas
- Providing data to use in evaluating the productivity of the formation, fluid saturation, thickness, etc.
- Determining the result of cementing jobs
- Obtaining data about the casing and other equipment in the wellbore
- Providing information to petroleum geologists with which to compare formation characteristics between wells
- Providing information to producers to aid in solving problems
- Providing information to drillers to aid them in planning the drilling

Description of the Process



When a well is drilled, logging (surveying) of the well is done through the use of a specially designed instrument, called a sonde, which is lowered into the wellbore on the end of an insulated wire cable. The instrument will measure the desired element and relay the results to a recording device at the surface where the measurements are logged (recorded) as the instrument is moved along the wellbore. These transmitted signals are plotted against the depth to produce "curves" on a roll of photographic film. Some logs or surveys may only be conducted in an open or uncased hole, while others may be conducted in either cased holes or uncased holes.

There are many different types of logs and surveys, including:

- Electric logging (ELS) which measures formation resistance or conductivity to the passage of electrical current for evaluation of the formation. Electric logs can only be used in an **uncased** hole. In addition to the resistivity log curve, a Spontaneous Potential log (SP log) curve is normally included which complements the resistivity curves for correlation, lithology identification, and reservoir analysis. Electric logging includes many types, such as:
  - Microlog
  - Laterolog
  - Dual laterolog
  - Induction log
  - Dual induction log
  - Microlaterolog
  - Micro spherical log
  - Focused log
  - Proximity log
  - Spherical focused log
- Gamma Ray log which measures the gamma rays of the natural radiation of different deposits in a formation. Certain naturally radioactive elements are continually going through a disintegration process, and, as they do, they emit gamma rays. The gamma rays emitted by different deposits differ in radioactivity. By interpretation of a gamma ray log,

identification can be made of the elements making up the formation. Gamma ray logs are used in cased holes. Uses of the gamma ray log include:
  - Identification of formation material
  - Locating cased-off production zones in old wells
  - Correlating zones from old wells to electric logs in adjacent new wells
  - Permeability studies
  - The gamma ray log as a correlation tool to locate productive intervals as determined from the open hole log prior to perforating operations
- Neutron Log. In the formation, neutrons are emitted and collide with the formation elements. The Neutron Log measures the effect of the moving neutrons in collision with the formation elements. Uses of this log include:
  - Correlating with electric logs
  - Locating cased-off production intervals in old wells
  - Correlating the geology of new wells with old wells in the same area
  - Determining formation porosity, depth, and thickness in new wells
- Density Log which is an induced nuclear log. Medium-energy gamma rays are emitted into the formation elements which collide with the electrons in the formation. By measuring the effects of the electrons on the gamma rays scattered back in the direction of the tool, information about the formation can be obtained. Uses of the Density Log include:
  - Determining formation porosity
  - Determining fluid content
  - Detecting gas
  - Identifying minerals
- Chlorine Log, which is an induced nuclear log. Radioactive neutrons are emitted into the formation. Chlorine is the strongest neutron absorber and is present (as sodium chloride) in the water in the formation. When neutrons are emitted into the formation and their population decrease is measured, the formation water saturation can be measured. Uses of the Chlorine Log include:
  - Evaluation of old wells
  - Diagnosing production problems
  - Following reservoir performance
- Compensated Neutron Log which is similar to the Neutron Log but which uses a more accurate detector system. This log minimizes wellbore effects such as borehole size, salinity, mud cake thickness, and casing sizes.
- Acoustic Log, also called sonic log, which measures sound waves which are generated by transmitters in the log device. The Acoustic Log is used to measure formation porosity by measuring the time required for sound waves to travel through the formation adjacent to the wellbore
- Tracer Log in which a radioactive fluid is placed down the well, and a gamma ray log is used in conjunction with it
- Temperature Log in which an electrical resistance thermometer is placed down the wellbore to measure temperature variations. Uses of the Temperature Log include:
  - Locating oil or gas-bearing limestone formations
  - Differentiating between oil and gas
  - Determining gas flow from the formation or gas entry into the wellbore
  - Evaluating the condition of the formation after an acid treatment
  - Locating water in a producing formation
  - Checking mechanical equipment in the wellbore
  - Taking temperature profiles of water-injection wells
  - Surveying to locate cement tops and cement bonding
- Fluid Level surveys in which a sonic sound device is used to record reflected sound waves from the well equipment and from the fluid itself. The sound is generated at the surface, and the data recorded permits the determination of the depth from the surface to the level of the fluid.
- Dip Meter surveys in which an instrument is run into an uncased hole on an insulated wire cable. Uses of the Dip Meter survey include:
  - Determining formation thickness
  - Determining the dip or inclination of the formation

- Fluid ingress or egress surveys in which a mechanical device is lowered into the hole to measure the relative volume of fluid flowing at any given point in the well. This survey is used when it is suspected that fluid is entering or leaving a well at an undesirable point. This survey is sometimes referred as "spinner survey" or "water flow survey."
- Deflection or deviation surveys in which an instrument on a wire line or pipe is used to determine the angle of the wellbore
- Depth survey in which a weighted wire and a calibrated measuring device are used to determine the depth of the well
- Surveys to locate free point of stuck pipe. The stretch of the pipe is measured at various depths until no further stretch is indicated. The purpose of this survey is to locate the point at which the pipe is stuck in the wellbore.
- Caliper logs, also referred to as "section gauge." A device with mechanical feelers or arms is run in an uncased hole in order to determine the diameter of the borehole
- Collar Locator logs in which the depth of the collars in the production casing string is measured mechanically or electrically
- Corrosion surveys in which a mechanical or electrical device is lowered into the casing to determine the extent of corrosion of the metal – pits, holes, cracks, broken collars, etc.

The above is not an all inclusive list. In addition, an oil and gas well servicing company may refer to the logs or surveys by different names although the same basic principles may apply.

Taxable Services

A survey/log is subject to the oil and gas well servicing tax when:

- The survey is **of the formation or the contents of the formation** of an oil or gas well, **and**
- A portion of the surveying instrument is located **within the wellbore** during the surveying

Some examples of surveying services subject to the oil and gas well servicing tax are:

- Electric logging used for surveying formation or its contents
- Gamma ray logs used for surveying the formation or its contents
- Neutron logs used for surveying the formation or its contents
- Density logs
- Chlorine logs
- Compensated Neutron logs
- Acoustic log when used for surveying the formation or its contents, or when the acoustic log-nuclear log is used to conduct cementing bond surveys, lithology surveys, and porosity surveys simultaneously
- Tracer logs when the purpose of the survey is to detect possible communication between the various zones in a formation, or when the tracer survey is conducted for more than one purpose and any part of that operation is subject to taxation
- Temperature logs when used to obtain data from a producing formation or its contents
- Dip meter surveys when used to obtain the thickness of the formation
- Fluid ingress or egress surveys used to locate or measure fluids other than drilling fluids

NOTE: Most surveys are run with a combination of several tools to save time and expense in obtaining the desired information. If a non-taxable service is run simultaneously with a service to survey the formation, the **entire operation** is subject to taxation if it is in direct connection with a primary taxable service.

Non-Taxable Services

The following services connected with surveying and logging are not subject to the oil and gas well servicing tax:

- Electronic logs used only for locating junk or fish in a wellbore
- Acoustic logs used to survey a cement job
- Tracer logs used only to detect channels behind the casing or plot an injection profile
- Temperature surveys used to check mechanical equipment in the wellbore, "temperature" profiles of water-injection wells, or surveys to locate cement tops, and cement bonding surveys
- Fluid level surveys conducted with a sonic sound device located only at the surface or surveys of water-injection wells in secondary recovery operations
- Fluid ingress or egress surveys used to locate or measure drilling fluids

- Deflection or deviation surveys
- Depth surveys
- Surveys to locate free point of stuck pipe
- Caliper logs
- Collar locator logs
- Corrosion surveys
- Dip meter surveys used to determine where to drill a subsequent well or wells
- Any surveying run in an injection well
- Gamma Ray logs used for only collar location or as a correlation log if used merely to correlate with a previously run log to locate where to perforate casing
- Neutron log if used for any purpose other than surveying the formation or its contents

Testing

Introduction

Testing of the formation is a direct means of obtaining information concerning the liquids and pressures penetrated by a wellbore. During the drilling or reworking of an oil or gas well, the geologist and exploration experts can determine that a formation might be productive. Core samples and cuttings may give indications of oil or gas, but only a formation test or the completion of the well will tell if the formation will produce enough oil or gas to be commercially worthwhile. Formation testing, which costs only a fraction of the cost of well completion, is therefore performed before a decision is made to complete a well.

Background

As previously described in the background of surveying, in the early years of the industry, there were not any mechanical devices to measure or estimate formation characteristics. The drillers and producers had to rely on rocks and cuttings which created faulty estimates, at best. Formation testing was first introduced in 1926. It has now become one of the most useful services available to help determine the potential productivity of a formation.

Formation testing and bottom hole pressure can be used together to determine the amount of oil or gas that might be produced, thus yielding information as to how a particular well should be completed. For example, if it is estimated that a well will only produce a small amount of oil or gas, smaller casing and a minimal amount of equipment will be used in order to reduce completion costs.

Description of the Process

Testing may be performed in either a cased or an uncased (open) hole, and it is performed with a test tool attached to the drill pipe. The basic tool assembly consists of:

- A packer, which can be expanded against the hole wall to segregate the formations above and below the packer, and
- A tester valve which can be closed to prevent entry of well fluids into the drill pipe when the testing tool is lowered into the hole and then opened to allow formation fluids to enter the drill pipe during the test, and
- A bypass valve which can be opened to allow equalization of pressure across the packer when the test is complete

The testing procedure requires the opening of a section of the wellbore to atmospheric or reduced pressure. The testing string is lowered into the hole on drill pipe with the test valve closed to prevent entry of well fluids into the drill pipe.

When the tool reaches the bottom of the well, the packer is expanded by placing the weight of the drill string upon the anchor pipe resting on the bottom of the hole. This provides a seal above the zone to be tested. At shallow depths the packer may also be expanded by forcing air into it through an air line from the surface, blowing the packer up like a balloon. The tester valve is then opened. The packer then supports the hydrostatic pressure of the well fluids. The formation below the packer is relieved of this pressure, and it is exposed, through the open tester valve, to the atmospheric pressure in the empty drill pipe. The formation's ability to produce fluid can be determined. After a specified time interval, the formation is closed in order to measure its rate of pressure build-up. At the end of the test, the tester valve is closed and pressure is equalized across the packer to permit the testing tool to be removed from the hole. Formation fluids recovered during the test can be removed by pulling the drilling string from the hole and examining the fluid recovered. Or, the fluid can be recovered without removing

the drill pipe and test tool by reverse circulation. Reverse circulation consists of pumping fluid into the annulus of the well at the surface, forcing it to circulate down the annulus and up the drill stem, and then recovered at the surface.

Formation testing helps provide a more accurate evaluation of a formation than any other known method with the exception of the actual production of a completed well. There are several types of formation tests which can be conducted:

- Drill stem testing is a formation test where a drill stem tester is lowered into the hole on the bottom of the drill pipe. The tool design permits the device to be set any desired depth and also to be opened and closed from the surface. Any fluid produced is either trapped in the pipe or flows to the surface. In either case, the fluid is measured and identified at the surface. The fluid producing rate may be established by recording the time the tool is permitted to remain open. The common use of drill stem tests is to determine whether oil or gas has been encountered during drilling. These tests also may be employed in old producing wells to determine whether fluids are entering a well and the nature of such fluids.
- The basic types of drill stem tests are:
  - Open-hole single packer test, which is used when it is desired to only test the formation below the packer
  - Open-hole straddle packer test, which is used when it is desired to isolate formations both above and below the zone to be tested
  - Hook-wall packer test, which is used inside casings
- Bottom-hole or depth pressure testing is a formation test where an instrument is lowered into the wellbore on a wire line. In most cases, the instrument is run inside the tubing of a well, although it may be run with a drill stem tester during drilling operations or in wells not having any tubing. In the operation of a bottom-hole or depth pressure instrument, external pressure is applied to a gauge which causes a stylus to mark a chart in relationship to the amount of pressure exerted to the depth. Recorded information is used in either tabular or graphic form to determine tubing pressure, weight of the gas column, gas or oil contact, weight of the oil column, oil-water contact, weight of the water column, and the maximum pressure recorded in the wellbore.
- Productivity index tests are run at any time during the life of the well. These tests may be made by using the same instrument used for bottom-hole pressure tests. The well is shut in and the bottom hole and surface pressures are permitted to build up until they are constant, or nearly so. The well is then produced on a given size choke until the pressure and production are constant, or nearly so. When this stabilized condition has been reached, a new choke size is used to obtain another stabilized flow rate. Usually, four such flow rates are taken. After the flow rate date has been established, the well is then shut in, and the built-up pressure and maximum shut-in pressure are obtained. The data is compiled into tabulated form, calculations made, and the report presented with graphic demonstrations of the well performance. Productivity index tests are for the purpose of determining the producing characteristics of an oil well, and they are usually expressed in barrels of oil produced per pound of pressure decline. These tests include such things as volume of fluid produced, bottom hole pressure, surface pressures, and fluid temperatures. By proper calculations and analysis of data obtained, it is possible to design and specify equipment for artificial lifting, to determine the necessity of remedial work, and to aid in the solution of many other producing problems.
- Open flow potential tests, which are run at any time during the life of a gas well, are conducted for gas wells in the same manner as productivity index tests for oil wells. Unlike productivity index tests, however, these tests may be made without the use of subsurface recording instruments by using surface pressure gauges. Open flow potential tests are for the purpose of determining the producing characteristics of a gas well and are usually expressed as calculated well capacity in mcf's (thousands of cubic feet) of gas produced per day.
- Analyses of cuttings, cores, and fluids conducted inside the well are not being conducted at this time, but experiments are being made where such analyses will be conducted inside the well.
- Gas-oil ratio tests measure the relative volume of gas and oil produced from a well. This data is helpful in the design of well equipment, completion or reworking of a well, and the operation of wells, leases, and entire fields. Since these tests are required by the Texas Railroad Commission, in many instances they are run simply to satisfy the Railroad Commission. Gas-oil ratio tests are conducted at separators or tanks, and they may be made at any time during the producing life of a well. Any method or equipment which will independently measure the oil, gas, and water recovery from a well suffices for a gas-oil ratio test. The gas volume produced divided by the oil volume equals the gas-oil ratio.
- Analyses of cuttings, cores and fluids conducted outside the well are types of formation tests. Analyses of cuttings are visual inspections made either at the laboratory or the well site. The usual tests run on cores include the determination of porosity and permeability. In a few cases, a screen analysis of the sand grains is made. Porosity is the ratio of the volume of porous space to the total bulk volume, and it is expressed as a percentage. There are several methods of determining

porosity. In general, the fluids are removed from the core with solvents, and the sample is dried. The pore space is then filled with a measured volume of water or mercury. By means of the data obtained, porosity can be calculated.
- The permeability of a porous medium to fluids is a measure of the capacity of the medium to transmit fluids. The measurement of permeability is a measurement of the fluid conductivity of a porous rock, sand, or formation.
- Analyses of fluids mean the analyses of the produced oil, water, and gas. Oil and gas analyses are made, in some cases, because of regulatory requirements. They are also useful for research use in preparing reconstructed or recombined samples in the study of the mechanics of oil and gas recovery. Oil and gas sample analyses are also needed to help set up the value of the material and to design the refining process necessary for market preparation.
- Mud logging is one of the more common analyses which may be conduced outside the well. Mud logging is a test of the drilling fluid from the borehole to determine the amount of natural gas that has escaped from the formation, and it is conducted while the drilling is in progress.
- Surface or subsurface sample taking of fluids, sands, or formation cores are formation tests. Surface sample taking of fluids is the process of taking a small volume of the well fluids and placing them in containers for transfer to a laboratory. Any method of sample taking may be used and wherever the fluids are available, such as the wellhead or at the storage tank. Subsurface sample taking of fluids is done in the well. This single sample can be used in the laboratory as representative of what is in the wellbore.
- Coring operations are those involving the taking of samples of the formation through which a well is being drilled or which has been previously penetrated by the drill. The mechanics are complex and are accomplished with various devices and tools. Regardless of the type of device used or the type of core (conventional, sidewall, etc.), this is another example of a sample taking procedure.
- Analyses of cuttings, cores, and fluids require laboratory testing.

Taxable Services

A test subject to the oil and gas well servicing tax must be one of the formation or the contents of the formation, and it must be conducted during the drilling, completion, reworking, or reconditioning of a well. A portion of the testing instrument or equipment must be located within the wellbore. Some examples include:

- Drill stem testing
- Bottom hole or depth pressure tests which are made during the drilling and completion or reworking/reconditioning of an oil or gas well. This is a test of the contents of a formation, although the contents being tested are not in the formation at the time.
- Productivity index tests
- Open flow potential tests when instruments are run in the well
- Gas condensate tests which measure the relative volume of gas and liquid hydrocarbons produced from a gas well. These tests are made for the same purpose as gas-oil ratio tests in the case of oil wells. These tests are sometimes made by the use of equipment, a portion of which is located within the tubing or drill pipe where tanks and separators are not available. This test is subject to the oil and gas well servicing tax when conducted during the drilling and completion or reworking/reconditioning of the well.

Non-Taxable Services

The following testing services are not subject to the oil and gas well servicing tax:

- Gas-oil ratio tests which are **not** conducted through the use of instruments at least a portion of which are located within the wellbore
- The analyses or testings of cuttings, cores, and fluids conducted outside the well without any equipment located inside the well at the time the tests
- Analyses of cuttings, cores, and fluids conducted outside the well.
- Testing of material used or to be used in the well as this is not a test of the formation or its contents

Chapter 4
Audit Procedures and Techniques

Pre-Audit Research and Review

This chapter covers some of the activities that will be helpful when conducting these audits. This chapter is meant to be all-inclusive.

Terminal Inquiry

The following terminal inquiries are available on the CICS system. These inquiries may prove useful and provide information on the specific taxpayer identification number. Inquiries on related entities may also provide information on outlet locations and business activities pertinent to the audit.

- XICOLL.taxpayer#.tax type. – displays period and audit collection balances, both open and closed.
- MTSUMM.taxpayer #. – displays mater inquiry and summary status for all applicable taxes, indicating the taxes the taxpayer is currently set up for n the system.
- MTBALS.taxpayer #. – cross-references assigned refunds and successor/predecessor liabilities.
- XIXREF.taxpayer#. – cross-references assigned refunds and successor/predecessor liabilities.
- XIREFS.taxpayer#.tax type.sub-type#. – displays refunds for a specified period.
- MTIGDI.taxpayer#. – displays multi-tax document index transactions by taxpayer.
- LISUMM.indicator.case id or bankrupt id. – displays bankruptcy summary information.
- NAMNUM.search code.exactness code.zip code.taxpayer name. – displays name vs. number.
- Search Code:
  - Personal
  - Business
  - Bond Company
- Exactness Code
  - Personal Code Match
  - Narrow Search
  - Wide Search

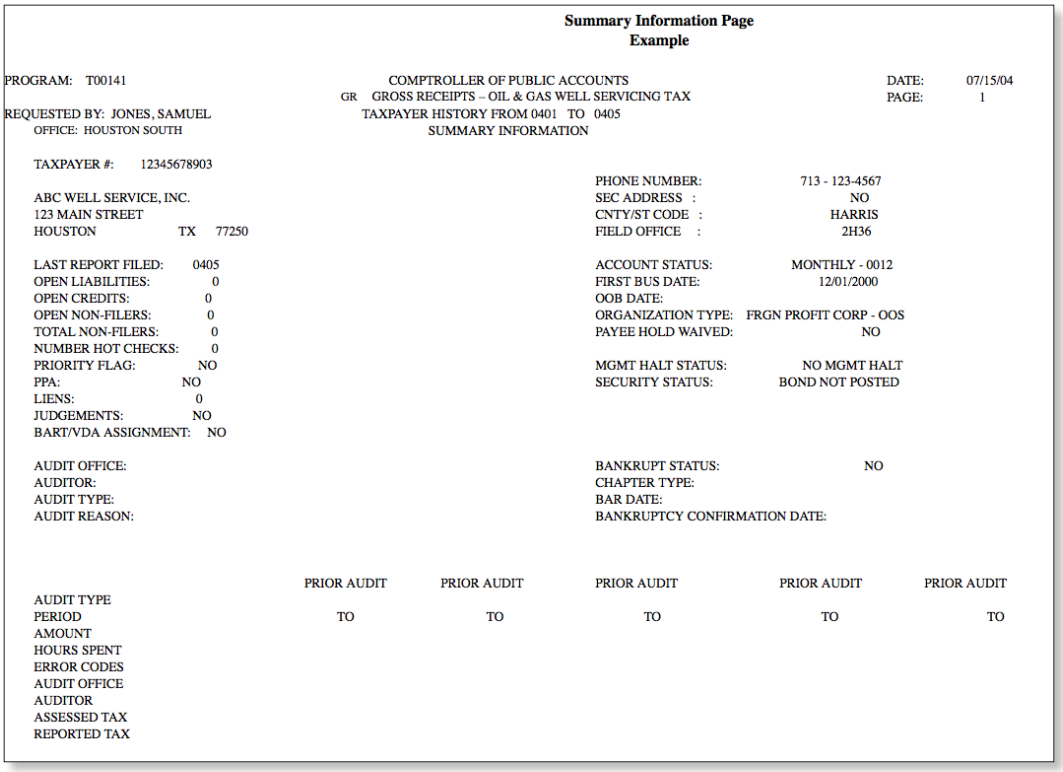
Audit History

The Audit History is a computer-generated summary of all transactions relating to a particular tax account. Each report filed by a taxpayer becomes a part of the history. Audit History is divided into the following sections:

- Summary Page
- Report Information
- Data Information
- Payment Information
- Collection Information
- Status of Refund Claims

The history information in the *Auditing Fundamentals Manual* is also applicable to Oil and Gas Well Servicing. An audit should not be started without a current Audit History. As with all other taxes, an Audit History for the Oil and Gas Well Servicing Tax is requested via XIRPTS on the CICS System (Tax Code 19).

Summary Information Page - Example



Summary Information Page
Example

PROGRAM: T00141
COMPTROLLER OF PUBLIC ACCOUNTS
GR GROSS RECEIPTS – OIL & GAS WELL SERVICING TAX
TAXPAYER HISTORY FROM 0401 TO 0405
SUMMARY INFORMATION
DATE: 07/15/04
PAGE: 1

REQUESTED BY: JONES, SAMUEL
OFFICE: HOUSTON SOUTH

TAXPAYER #: 12345678903

ABC WELL SERVICE, INC.
123 MAIN STREET
HOUSTON TX 77250

PHONE NUMBER: 713 - 123-4567
SEC ADDRESS : NO
CNTY/ST CODE : HARRIS
FIELD OFFICE : 2H36

LAST REPORT FILED: 0405
OPEN LIABILITIES: 0
OPEN CREDITS: 0
OPEN NON-FILERS: 0
TOTAL NON-FILERS: 0
NUMBER HOT CHECKS: 0
PRIORITY FLAG: NO
PPA: NO
LIENS: 0
JUDGEMENTS: NO
BART/VDA ASSIGNMENT: NO

ACCOUNT STATUS: MONTHLY - 0012
FIRST BUS DATE: 12/01/2000
OOB DATE:
ORGANIZATION TYPE: FRGN PROFIT CORP - OOS
PAYEE HOLD WAIVED: NO

MGMT HALT STATUS: NO MGMT HALT
SECURITY STATUS: BOND NOT POSTED

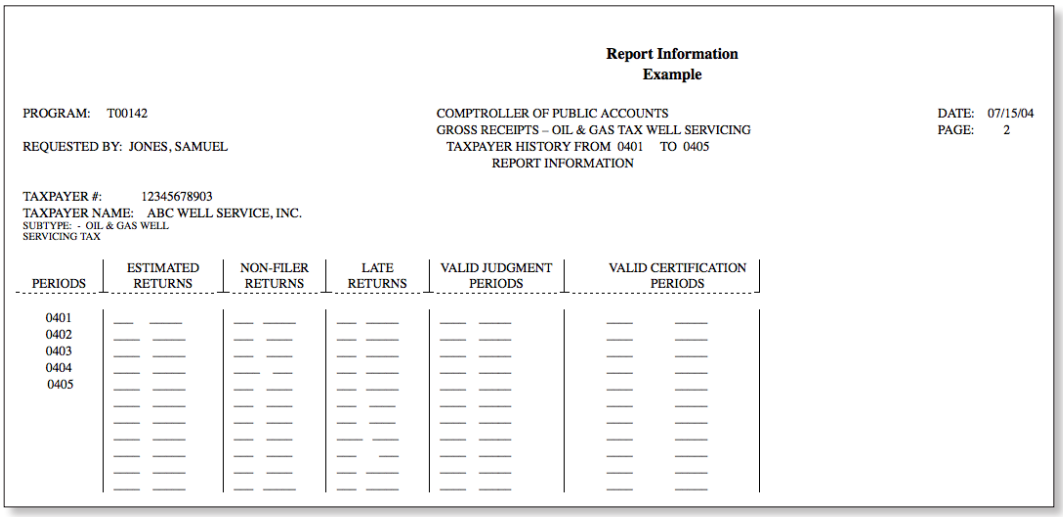
AUDIT OFFICE:
AUDITOR:
AUDIT TYPE:
AUDIT REASON:

BANKRUPT STATUS: NO
CHAPTER TYPE:
BAR DATE:
BANKRUPTCY CONFIRMATION DATE:

	PRIOR AUDIT	PRIOR AUDIT	PRIOR AUDIT	PRIOR AUDIT	PRIOR AUDIT
AUDIT TYPE					
PERIOD	TO	TO	TO	TO	TO
AMOUNT					
HOURS SPENT					
ERROR CODES					
AUDIT OFFICE					
AUDITOR					
ASSESSED TAX					
REPORTED TAX					

Besides useful taxpayer information, prior audit information would be listed on this page.

Report Information - Example



Report Information
Example

PROGRAM: T00142
COMPTROLLER OF PUBLIC ACCOUNTS
GROSS RECEIPTS – OIL & GAS TAX WELL SERVICING
TAXPAYER HISTORY FROM 0401 TO 0405
REPORT INFORMATION
DATE: 07/15/04
PAGE: 2

REQUESTED BY: JONES, SAMUEL

TAXPAYER #: 12345678903
TAXPAYER NAME: ABC WELL SERVICE, INC.
SUBTYPE: - OIL & GAS WELL SERVICING TAX

PERIODS	ESTIMATED RETURNS	NON-FILER RETURNS	LATE RETURNS	VALID JUDGMENT PERIODS	VALID CERTIFICATION PERIODS
0401					
0402					
0403					
0404					
0405					

The Report Information section will list any "Estimated Returns." "Non-Filer Returns," "Late Returns," "Valid Judgment Periods," or "Valid Certification Periods" during the requested period. An "X" will appear in the applicable period and category. XIDATA or XIPMTS inquiries on CICS should be run to ensure that there were not any amended returns during the period. The DUEDAY inquiry can be used to determine the correct due date for a report period. Returns should not be considered late if no Taxable Receipts were reported ("zero returns").

Data Information - Example

Data Information
Example

PROGRAM: T19140
REQUESTED BY: JONES, SAMUEL

COMPTROLLER OF PUBLIC ACCOUNTS
GROSS RECEIPTS - OIL & GAS WELL SERVICING
TAXPAYER HISTORY FROM 0401 TO 0405
DATA INFORMATION

DATE: 7/15/04
PAGE: 3

TAXPAYER #: 12345678903
TAXPAYER NAME: ABC WELL SERVICE, INC.

PRD	POSTMARK DATE	TOTAL TAXABLE RECEIPTS	TAX RATE	TAX DUE
0401	02/20/2004	2,658,763.22	0.0242	64,342.07
0402	03/22/2004	2,012,542.60		48,703.53
0403	04/20/2004	2,638,675.20		63,855.94
0404	05/20/2004	2,263,731.81		54,782.31
0405	06/21/2004	2,023,256.20		48,962.80

A=AMENDED PERIOD
E=ESTIMATED PERIOD
T=TRANSFERRED OUT

The Data Information will list the "Total Taxable Receipts," "Tax Rate," and "Tax Due" by period. In addition, the "Postmark Date" for the report filed will be listed. The auditor should examine all reported amounts for any fluctuations that appear to be unusual. These fluctuations may indicate a change in personnel, accounting procedures, or internal control. These fluctuations need to be considered when choosing periods for preliminary testing or sampling.

Payment Information - Example

Payment Information
Example

PROGRAM: T00145
REQUESTED BY: JONES, SAMUEL

COMPTROLLER OF PUBLIC ACCOUNTS
GROSS RECEIPTS - OIL & GAS WELL SERVICING TAX
TAXPAYER HISTORY FROM 0401 TO 0405
PAYMENT INFORMATION

DATE: 7/15/04
PAGE: 4

TAXPAYER # : 12345678903
TAXPAYER NAME: ABC WELL SERVICE, INC.

PERIOD	PMK DATE	PAYMENT DESC	AMOUNT	XFER TAX	XFER PER	XFER TP#	CANCEL DATE	CANCEL REF
0401	2/20/2004	LC-REPORT PAYMENT	64,342.07					
		TOTAL	64,342.07					
0402	3/19/2004	LC-REPORT PAYMENT	48,703.53					
		TOTAL	48,703.53					
0403	4/20/2004	LC-REPORT PAYMENT	63,855.94					
		TOTAL	63,855.94					
0404	5/20/2004	LC-REPORT PAYMENT	54,782.31					
		TOTAL	54,782.31					
		GRAND TOTAL	231,683.85					

This report lists the postmark dates and types of payments made during each period. The Oil & Gas Well Servicing Tax is due on a monthly basis.

Collection Information - Example

Collection Information
Example

PROGRAM: T00148 — COMPTROLLER OF PUBLIC ACCOUNTS — DATE: 7/15/04
TAXPAYER HISTORY FROM 031 TO 034 — PAGE: 5
REQUESTED BY: JONES, SAMUEL — COLLECTION INFORMATION

TAXPAYER # : 12345678903
TAXPAYER NAME: ABC SULPHUR, INC.

PERIOD	AUD #	TAX DUE	PENALTY DUE	INTEREST DUE	BALANCE DUE	DESCRIPTION
GROSS RECEIPTS - OIL & GAS WELL SERVICE TAX - TAX CODE 19:						
0405		0.00	2,448.14	0.00	2,448.14	UNDERPAID AUDIT
0406		0.00	0.00	0.00	CANNOT COMPUTE	RETURN NOT DUE
LIMITED SALES, EXCISE, AND USE TAX - TAX CODE 26:						
033		2,569,187.09-	0.00	0.00	CANNOT COMPUTE	PARTIAL FILER
042		2,386,625.33-	0.00	0.00	CANNOT COMPUTE	PARTIAL FILER
DIRECT PAYMENT SALES TAX - TAX CODE 27:						
0405		6,539.73	0.00	0.00	7,865.79	UNDERPAID RETURN
0406		0.00	0.00	0.00	CANNOT COMPUTE	RETURN NOT DUE
DIESEL FUEL TAX - TAX CODE 90 - 07:						
042		0.00	0.00	0.00	CANNOT COMPUTE	RETURN NOT DUE
043		0.00	0.00	0.00	CANNOT COMPUTE	RETURN NOT DUE
044		0.00	0.00	0.00	CANNOT COMPUTE	RETURN NOT DUE

*** END OF COLLECTION INFORMATION ***

This section of the Audit History lists any collection activity for the taxpayer during the requested period for all taxes.

Status of Refund Claims - Example

Status of Refund Claims
Example

PROGRAM: T00149 — COMPTROLLER OF PUBLIC ACCOUNTS — DATE: 7/15/04
OIL & GAS WELL SERVICING TAX — PAGE: 6
REQUESTED BY: JONES, SAMUEL — TAXPAYER HISTORY FROM 0401 TO 0405
STATUS OF REFUND CLAIMS

TAXPAYER # : 2345678903
TAXPAYER NAME: ABC WELL SERVICE, INC.

PROCESS DATE	UNIQ NO	DLN	BEGIN PERIOD	END PERIOD	PURCHASES	STATE TAX PAID ON PURCHASES	AMOUNT OF REFUND CLAIM	AMOUNT OF CLAIM PAID	CLAIM PAID
*** DIESEL FUEL									
2/8/04	1	2037132809	1/01/03	01/31/03	0.00	0.00	3,161.68	3,161.68	4/6/03
STATUS: PAID ALL OF APPROVED AMOUNT									
4/21/04	1	167230124	6/01/03	6/31/03	0.00	0.00	2,080.41	2,080.41	8/25/03
STATUS: PAID ALL OF APPROVED AMOUNT									

*** END OF REFUND CLAIMS ***

This section of the Audit History lists the status of refund claims by the taxpayer for all taxes.

Entrance Conference

The entrance conference section (Chapter 4) of the *Auditing Fundamentals Manual* also applies to the Oil & Gas Well Servicing Tax. Some items to discuss with the taxpayer's representative(s) that are peculiar to Oil & Gas Well Servicing are:

- In the audit plan, list the taxpayer's representatives who attend the entrance conference
- A discussion of the specific tax to be audited
- A discussion of any other taxes for which the taxpayer is responsible
- The taxpayer's interpretation of the tax should be obtained
- Review of reporting procedures to determine how taxable receipts were determined – also should be discussed with person that prepared the tax reports

- Determine all activities performed by the taxpayer
  - The different types of well services performed
  - Location of records necessary to conduct the audit
- Discussion of audit procedures
  - Audit period
  - Sampling and projection procedures
  - Possibility of obtaining statute extension agreement

Records to be Examined

Generally, the records to be examined consist of:

Service catalogs

> These catalogs may be formatted differently by the various well service companies, but are generally used as the prospectus for potential customers to describe the types of services available

Price lists or brochures

> The well servicing company may have a brochure or list which itemizes all of the various charges for a particular type of service. These lists usually include a minimum charge and an hourly rate.

Field tickets (field receipts, service orders, work orders, etc.)

> These documents are prepared by the foreman of the service in the field, at the wellsite, and describe what services were performed, what materials were used, and other charges, such as stand-by time. These tickets may or may not have the values extended and totaled. Examples of field tickets for various services are included later in this chapter.

Invoices

> These documents are prepared by office personnel of the well servicing company, and are usually mailed to the customer as a billing. Invoices list the services which were performed, materials used, other charges shown on the field tickets, and may include reimbursement for taxes paid on materials and/or the well servicing tax. The billing invoice may be an extended copy of the field ticket, or it may be a completely new document prepared by the office personnel. Examples of invoices for various services are included later in this chapter.

Below are some examples of field tickets and service invoices. **These are for illustration of the types of records auditors may encounter and are not meant to demonstrate the correct taxability.**

Example #1, Field Ticket

Example #1, Field Ticket

$ DAYS INDUSTRIES
P.O BOX 08, AUSTIN 78775

No. 26

FOR TRANSFER ONLY		TO BE USED FOR SALES ONLY					
TRANS DIR	REC DIR	CUSTOMER		DEALER		BILL	TAX
WHSE NO.	WHSE NO.	NUMBER	SUFFIX	WHSE NO.	STATE	CODE	DISC.
				YGBG	42	1	

SERVICE REQUESTED
Oil Well

Acid

SOLD OR TRANSFERRED TO	DATE COMPLETED
Great Star Oil Co.	3-5-04
P.O BOX ADDRESS	CUSTOMER ORDER NO.
7689	
CITY AND STATE	LOCATION NAME/CODE
Midland, Texas 79700	Levelland/KGBL
WELL NAME/LOCATION	COUNTY/PARISH
Jacobson #18	Hockley

UNIT NO.	DESCRIPTION		QUANTITY	PRODUCT CODE	UNIT PRICE	AMOUNT
	PUMPERS STANDARD PUMPER		1	0358	460.00	460.00
	BLENDER 0-10 BPM		1	0370	535.00	535.00
	CO2 PUMPER					
	PRESSURE SUCTION					
	FRAC TANK					
	CO2 CARTAGE					
	MILEAGE 4 UNITS FOR 18 MILES		72	0400	1.95	140.40
	STAND BY					
	SAND CARTAGE MIN. CHARGE		MIN.	0694	40.00	40.00
	MATERIALS USED					
15% HCL		GALS.	5000	0526	0.52	2,600.00
15% HCL		GALS.	5000	0542	0.50	2,500.00
15% HCL		GALS.	1,000	0549	0.48	480.00
T-11		GALS.	44	0639	19.85	873.40
NE-12		GALS.	11	0671	21.75	239.25
C-100		GALS.	33	0653	17.30	570.90
CL2-BAN		GALS.	25	0813	13.80	345.00
LFW-42		LBS.	91	0756	4.00	364.00
100 MESH SALT	18,000	LBS.	18000	0883	0.12	2,160.00
7/8" SPHERESEALS		EA.	60	0887	1.40	84.00
SPHERESEALS INJECTOR		EA.	1	0445	100.00	100.00
				TOTAL SERVICE		11,491.95

THIRD PARTY CHARGES

TOTAL THIRD PARTY **SURCHARGE**

CUSTOMER SIGNATURE

SALES TAX REIMBURSEMENT	204.33
WELL SERVICING TAX (0.0242)	26.50
GRAND TOTAL	11,722.78

Example #2, Field Ticket

Example #2, Field Ticket

ZERO COMPANY

11144 NO. MAIN, GOSLO, TEXAS **No. 20**

FIELD RECEIPT

FOR ACCOUNTING USE ONLY						
58	3872 – 00	307	LP4	1	21	6

CUSTOMER: Balch Love

MAIL INVOICE TO: Box 882 | CITY: Midland, | STATE: Texas

DATE WORK PERFORMED: 01/20/2004 | SERVICES FROM OUR DISTRICT AT: Odessa, Texas | WESTERN SERVICE ENGINEER: Cole

FOR SERVICING WELL NAME: University | COMPANY NAME: First Oil Company

LOCATION: #1 | POOL: Swanson | SIGNED BY:

COUNTY: Winkler | STATE: Texas | PURCHASE ORDER NO.:

UNITS	CODE	DEPTHS AND DESCRIPTION	UNIT PRICE	AMOUNT
P.L.O.	7001	Acidmaster	275.00	275.00
1800	4200	10% Acotic Acid	0.40	720.00
15	4661	I-18 Inhibitor	8.00	120.00
20,000	4100	20% Series "92" Acid	0.48	9,600.00
160	4044	I-71 Inhibitor	14.75	2,360.00
2450	7144	Hydraulic Horsepower 8000-9000	1.95	4,777.50
P.L.O.	7200	Master Mixer 10BPM	165.00	165.00
108	6054	FR-6	2.80	302.40
16	6180	Formex	7.50	120.00
18	6204	7/8" Pheuslic Ball Sealers	1.05	18.90
1	7501	Manual Injector	48.00	48.00
1	7300	Misc. Back-up Pump	232.00	232.00
6334	6336	CO2 Pump Charge - 100 SCF	0.10	633.40
550	7114	CO2 Hydraulic Horsepower 8000-9000	1.95	1,072.50
			TOTALS	$20,444.70

APPROVED

COMPLETION:	X
REWORK:	
ADDITIONAL:	
NON-ADDITIONAL:	X
PROCESS LICENSE FEE:	

Example #3, Invoice

Example #3, Invoice

PETRO, INC. **DATE:** 02/28/2004 **INVOICE NO.**

P.O. BOX 75,
SEAWALL,
TX.

FIELD INVOICE NO.
CUSTOMER'S ORDER #
ORDERED BY
SERVICE ENG.
LEASE AND WELL NO.

Service Charge	02/18/2004		$350.00
Gammaray Neutron Logging Service with Temperature Survey			
	Depth Charge from surfact to greatest depth recorded at 9370' at .16 per foot		1,499.20
	Logging charge per foot of section logged from 9370' to 6400' at .16 per foot		475.20
Temperature Survey to locate Cement Top at 6605' & 3175' (minimum charge)			200.00
Service Charge	02/20/2004		350.00
Selective Fire Jet Perforating Service			
	Dean: 8985, 9007, 9035, 9075, 9078, 9093, 9105, 9132, 9140, 9142, 9713, 9175, 9177, 9179, 9201, 9214, & 9234	(17)	1,713.00
	J.M.: 8354, 8364, 8373, 8376, 8380, 8383, 8391, 8418, 8425, 8461, 8483, 8488, 8509, 8511, 8517, 8559, 8575, 8578, 8588, 8591, 8596, 8601, 8621, 8623, & 8637	(25)	775.00
	L.S.: 7854, 7859, 7891, 7894, 7898, 7919, 7928, 7932, 7947, 7968, 7977, 7979, 8021, 8023, 8046, 8058, 8073, 8084, 8250, 8256, 8260, 8278, 8290, & 8296	(24)	732.00
	U.S.: 7708, 7712, 7714, 7717, 7720, 7727, 7757, 7759, 7763, 7769, 7773, 7780, 7782, 7784, 7791, 7793, 7807, 7809, 7827, & 7829	(20)	600.00
Portable Mast Unit (300.00), Wire Line Blow Out Preventer (200.00), & Pressure Head and Pressure Lubricator Charge (300.00)			800.00
Running in against pressure up to 3000 PSI (500.00) & Running in HCL Acid (150.00)			650.00
Stage Ring charge for three rings and Stage Bomb charge for three Bombs at 50.00 each			300.00
Depth charge to fish Bombs at 8331" & 8814" at .05 per foot			857.25
2" Go Winder Guns Shot in Dean at 17.00 each x 17 Barrels			289.00
Air Freight to mail logs to Dallas			30.00
	THANK YOU!	**TOTAL**	$9,620.65

Example #4, Invoice

Example #4, Invoice

DEEPHOLE
WELL SERVICES
AUSTIN, TX.

TO: ABC Drilling
Rt. 2, Hwy. 141
Giddings, Texas

INVOICE NO.	OUR RECEIPT NO.	SERVICE FROM OUR STATION AT	OUR ENGINEER	SIGNED FOR YOU BY
07-004-3672	Deephole #131	Austin	Sam Jones	Ray Smith

FOR SERVICING WELL NAME		COUNTY	STATE	YOUR ORDER NO.	
Johnson		Lee	Texas	ABC #4002	
UNITS	**CODE**	**DEPTH AND DESCRIPTION**		**UNIT PRICE**	**AMOUNT**
15.0	40410	I-6, Per Gal.		8.000	120.00
160.0	40440	I-11 Organic Hi-Temp Inhibitor/Gal.		14.750	2,360.00
20,000.0	41060	20% Series 72 Acid 1-20-73 Gal.		0.480	9,600.00
1,800.0	42060	10% Acetic Acid Per Gal.		0.400	720.00
100.0	60540	FR-6 For. Acid, Per Lb.		2.800	302.40
16.0	61200	Foamex, Per Gal.		7.500	120.00
18.0	62040	7/8 Rubber Coated Hi. Temp. Balls, Ea.		1.050	18.90
6,334.0	63360	Carbon Dioxide Handling Charge		0.100	633.40
1.0	70010	Acid Master 1-19-73		275.000	275.00
550.0	71140	Frac Pump Over 700 HHP 8001-9000 PSI		1.950	1,072.50
456.0	71140	Frac Pump Over 700 HHP 8001-9000 PSI		1.950	4,777.50
1.0	72000	Master Mixer 10 RPM		165.000	165.00
1.0	73000	Miscellaneous Pump - 1st 4 Hrs.		232.000	232.00
1.0	75010	Manual Injector - 1st 4 Hrs.		48.000	48.00
			SUB-TOTAL		20,444.70
	96550	Texas Materials (2%)			264.83
	96600	Texas Occupation Tax (2.42%)			149.39
			PAY THIS AMOUNT		20,858.92

Example #5, Invoice

Example #5, Invoice

THE ZIPP COMPANY
P.O. BOX 3445, HOUSTON, TEXAS

SOLD TO: 123 Oil Producer
111 N. Main
Houston, Texas

INVOICE DATE: 03/09/2004
INVOICE NO. Z-0983

PLEASE RETURN COPY OF THIS INVOICE OR SHOW INVOICE NUMBER ON YOUR REMITTANCE TO INSURE PROPER CREDIT FOR YOUR ACCOUNT

SHIPPED FROM: Houston
DATE SHIPPED: 03/02/2004

DESTINATION OR WELL NAME: Caldwell

REFERENCE	QTY.	UNITS	PRODUCT CODE	DESCRIPTION	UNIT PRICE	AMOUNT
31219	1	1.00	0358	STD. PUMP BASIC	460.00	460.00
31219	40	40.00	0400	MILEAGE CHG.	1.95	78.00
31219	4	4.00	0634	I-11	19.85	79.40
31219	2	2.00	0671	NE-12	21.75	43.50
31219	18	18.00	0546	S-20 ACETIC ACID	9.00	162.00
31219	20	20.00	0980	PICKUPS	1.20	24.00
31219			7648	TAX REIMB.		5.70
31219			8599	OCCUPATION TAX		11.13

Audit Procedures and Techniques

This section will include several steps in the audit process, each of which will be discussed in detail. The steps are:

- Determining what services are offered by the taxpayer
- Determining what services are subject to the tax
- Determining the taxpayer's method of billing
- Determining the taxpayer's method of reporting the taxable receipts and the tax due
- Testing the taxpayer's records
- Conducting an examination of the records
- Scheduling audit adjustments

Determining What Services Are Offered

If the company has a service catalog, it should be examined first in order to determine what services the company performs. If a service catalog is not available, price brochures/lists can be used. If printed materials of any kind are not available, a detailed discussion with a company representative needs to be conducted to determine the services being performed. If the taxpayer has an internet website, much useful information can be obtained, particularly the types of services performed. The internet also has numerous helpful sites which explain much of the oilfield jargon.

Determining What Services Are Taxable

After determining what services are performed by the company, the auditor needs to determine which are taxable. Information available in this manual and information learned during the pre-audit research will help in this area.

Determining Taxpayer's Method of Billing

The company's field tickets and invoices should be examined, and the auditor should discuss the preparation of the invoices with the individual responsible for preparing them. The auditor should determine how the invoices are prepared and who makes the decision as to the taxability of a service or a charge. This person's understanding of the taxability of the various services performed should be ascertained. If any misunderstandings arise over the taxability issue, these should be resolved during the entrance conference, if possible.

Determining the Method of Reporting Taxable Receipts and Tax Due

The individual responsible for preparing the tax reports should be asked to explain the process. Any changes in personnel regarding this job duty should be determined and the date(s) noted. If a sample audit is being performed, this may necessitate stratification of the audit period.

The auditor should determine if the taxpayer is using the calendar month for reporting purposes, or if an earlier cut-off date is being utilized.

Testing the Taxpayer's Records

The taxpayer's records may be maintained by:

- Customer name
- Numerical invoice number
- Date of invoice
- A combination of the above

The initial review of the taxpayer's records should always be on a test basis in order to determine whether adjustments to the account are needed. Consult the *Sampling Manual* for selecting sample periods and for the Comptroller's sampling procedures and standards.

For each test period, the auditor should compare all field tickets to all invoices to determine if there are any discrepancies between them.

- If there are not any discrepancies between the field tickets and the invoices, the auditor should use the invoices to compare to the tax reports to determine if all taxable receipts have been reported
- If there are not any discrepancies between the invoices and the tax reports, and, if the auditor has tested enough sample periods to satisfy himself/herself that there are not any unreported receipts, then a "No Tax Due" audit can be prepared.
- If there are discrepancies between the invoices and tax returns, the auditor needs to determine whether to perform a detailed audit or to use sampling techniques.

Conducting a Detailed or Sample Examination

A detailed audit, where the auditor examines all of the applicable records for the entire audit period may be performed. However, if any of the following three conditions, as listed in the *Sampling Manual* exist, a sample audit is the preferred method:

- The taxpayer's records are so detailed, complex or voluminous that an audit of all detailed records would be unreasonable or impractical
- The taxpayer's records are inadequate or insufficient, so that a competent audit for the period in question is not otherwise possible
- The cost of an audit of all detailed records to the taxpayer or to the state will be unreasonable in relation to the benefits derived, and sampling procedures will produce a reasonable result

The various principles, standards, and procedures as discussed in the Audit Division's **Sampling Manual** apply to oil and gas well servicing.

Exit Conference

An explanation needs to be made to the taxpayer as to the audit procedures performed. This would include a discussion of the following:

- All records examined
- A detail description of audit procedures utilized, audit adjustments, and the flow of the audit package
- Minor errors for which adjustments were not made
- Applicable law, rulings, and proper reporting procedures
- Additional information the taxpayer may obtain to reduce the liability
- Taxpayer's disagreements with the audit – these should be clearly understood by the auditor and documented in the audit plan
- An Independent Audit Review Conference should be offered if the taxpayer disagrees
- The *Contesting Disagreed Audits* brochure should be given to the taxpayer
- Other procedures which should be discussed with the taxpayer include:
- The billing process (whether penalty waiver will be recommended and policies and procedures pertaining to penalty and interest)
- Payment should be requested
- Redetermination procedures must be explained

Audit Plan (Audit Doc in CATS)

The **Record of Audit Planning, Activities and Results** is the form that documents the audit plan for every audit and should be completed as the audit progresses. Continuation pages are available for use and generally will be necessary to record all information. It is important for the auditor to document all appropriate and pertinent information. Refer to the *Auditing Fundamentals Manual* for documentation that is required.

Audit Checklist

The following items are examples to be included in an audit plan checklist. The checklist should as be used a guideline to completing the audit plan. The items on the checklist are not to be considered as all-inclusive. Other items, not listed, may need to be examined and verified, and the audit plan should be adapted.

I. Pre-Audit Research
   1. Verify that the Notice of Routine Audit letter and the Audit Questionnaire were sent to the taxpayer
   2. Examine the Audit Questionnaire completed and returned by the taxpayer to determine:
      - Person(s) to contact in order to begin the audit
      - Person who has authority to accept legal documents – Statute Waiver Form, Sampling Procedures Notification, etc.
      - Location of the necessary records
      - Description of the business activity, noting taxable and nontaxable services
      - Availability of computer records
   3. Examine prior audits, if any, for:
      - Prior periods audited
      - Business description and types of activities conducted
      - Method of accounting
      - Errors noted in the previous audit
      - Possible contact and location of records
      - Prior audit procedure employed and the results
   4. For research on taxable and nontaxable services, review:
      - Statute
      - Rules
      - Hearings decisions
      - Attorney General opinions
      - Court cases
      - Audit procedure manuals
      - STARS

5. Examine any other documents for additional information including:
   - Account Information Cards, if applicable
   - Correspondence with others in reference to the taxpayer

II. Entrance Conference
1. List taxpayer's representative who attended the entrance conference
2. Determine the taxpayer's knowledge of the tax law
   - What services does the taxpayer consider to be taxable and nontaxable
   - How are the reporting procedures set up?
   - Have there been any changes in personnel, business organization, or activities during the audit period
3. Discuss the taxpayer's accounting system and reporting activities
   - If the records are kept on the cash or on the accrual method
   - If the accounting system is manual or computerized
   - What types of records are needed to conduct the audit
   - Location of the records needed to conduct the audit
   - Who are the personnel who prepare the tax report and have there been any changes?
   - The step-by-step procedures used by the taxpayer to prepare the tax report
   - Internal control checks to ensure that all Texas receipts are included on the tax report
4. Advise the taxpayer of the permit process if taxpayer is not permitted

III. Audit Procedure
1. Determine what records are available and examine:
   - Service catalogs to determine types of services available
   - Price lists and brochures to determine what types of services, minimum charges, hourly rates, etc.
   - Field tickets or work orders to determine what services were performed, what materials were used, what other charges were made, if there was any stand-by time, etc.
   - Invoices to determine what services were performed, what materials were used, what other charges were made, if there were any reimbursements for taxes paid on materials and/or the well servicing tax
2. Determine which of the services performed are taxable utilizing available sources
3. Determine if taxable and nontaxable services are being performed simultaneously
4. Determine the taxpayer's method of billing, and
   - Discuss preparation of the invoices with the personnel who prepare them
   - Determine how the invoices are prepared and who determines the taxability of a service or charge – determine that person's level of familiarity with the tax law
   - Determine how reimbursements for taxes paid on materials and/or the well servicing tax are calculated and accounted
5. Determine the taxpayer's method of reporting taxable receipts and the taxes due
   - If there were any changes in personnel during the audit period, determine the dates of changes in case stratification is necessary
   - Is the taxpayer using the calendar month for the cut-off date or is some earlier date being utilized?
   - Are service charges being prorated? If so, how?
   - Are charges for stand-by time and/or waiting time segregated?
6. Testing of the taxpayer's records should be performed to determine whether adjustments to the account are needed
   - Select the test periods randomly following Comptroller procedures and guidelines
   - Compare all field tickets, work orders, etc. for the test period(s) to the respective invoices to determine if there are any discrepancies
   - Trace all invoices to the respective tax reports to determine if all taxable receipts have been reported – if discrepancies exist decide whether to perform a detailed audit or to utilize sampling procedures, following Comptroller guidelines

IV. Exit Conference
1. Explain the audit procedures performed, which should include a discussion of:
   - All records examined
   - A detailed description of audit procedures utilized, audit adjustments, and the flow of the audit package
   - Minor errors for which adjustments were not made
   - Applicable law, rules, etc.

- Proper reporting procedures
- Any additional information the taxpayer may obtain in order to reduce any liability
- Taxpayer's method of correcting errors noted in the audit
- Provide copies of any printed materials/correspondence which the taxpayer does not have
- Taxpayer's disagreements with the audit – should be clearly understood by the auditor and properly documented in the audit plan

2. Other procedures which should be discussed with the taxpayer :
   - The billing process
   - Payment procedures
   - Redetermination procedures
   - Right to Independent Audit Review Conference
   - Policies and procedures pertaining to penalty and interest – auditor should know at this point whether or not penalty will be waived

Chapter 5
Audit Write-Up

Introduction

The result of an audit will be either a deficiency (tax is due to the state), a credit audit (taxes are due to the taxpayer), or a no tax change audit. A no tax change means that the reported amounts were correct and that no audit adjustments are required. The write up procedures are different depending on the audit results.

The write up of a oil & gas well servicing tax audit is considered a manual audit write up as opposed to a limited sales and use tax audit (an uploaded audit) which is an automated tax. Since the oil & gas well servicing tax is not automated on the system, the actual tax amounts need to be calculated by the auditor on Excel schedules. These schedules are discussed later in this chapter.

A deficiency audit results when a taxpayer owes additional oil & gas well servicing taxes to the State of Texas. In addition to the additional tax, the taxpayer will also be assessed penalty and interest. The taxpayer has the right to disagree with the audit results if he/she feels that the audit is not accurate in its assessment.

An amended audit is an adjustment to a completed audit, usually as a result of a hearings decision. Refer to the *Auditing Fundamentals Manual* for specifics.

If an audit results in a credit due the taxpayer, credit interest will accrue on reporting periods due on or after January 1, 2000.

When an audit examination results in no adjustments, then a No Tax Change audit should be prepared. Refer to the *Auditing Fundamentals Manual* for specifics.

Schedules and Forms

Audit write-up includes completion of the following:

- Record of Audit Planning, Activities, and Results
- Exhibits, if any
- Exams (schedules) and Supplemental Exams (supporting schedules)
- Index to Working Papers (Template)
- Audit Adjustment Report (Form)
- Tax Adjustment Summary (Auditor generated Exam)
- Audit Cover Letter (Template)
- Audit Report (Template)

See the *Auditing Fundamentals Manual* for specific examples or explanations of the documents, exhibits, templates, and/or forms listed above.

A few of these documents are shown below.

Audit Cover Letter, Example

TEXAS COMPTROLLER OF PUBLIC ACCOUNTS

P.O. Box 13528 • Austin, TX 78711-3528

July 27, 2004

Richard B. Smith
Vice-President of Finance
ABC Well Service, Inc.
123 Main Street
Houston, Texas 77250

RE: Taxpayer Number 17412345678

Dear Mr. Smith:

Our audit, conducted in accordance with the Miscellaneous Occupation Tax (Oil Well Servicing) Statute, is complete. The audit covered the period June 1, 2000 through May 31, 2004 and resulted in an adjustment in the amount shown on the attached Texas Notification of Audit Results. We have included a pre-addressed envelope for your payment convenience. For an explanation of the interest calculations, contact the Audit Processing Section of the Revenue Refund Division at 800-531-5441 extension 3-4479.

The tax adjustment shown on the audit workpapers was affected by credit applications within the audit period, resulting in a different amount shown on the Texas Notification of Audit Results.

We have waived the penalty for periods which were originally filed on time. However, we have not waived interest. Interest waiver is considered only where written, documented proof exists that a taxpayer relied to its detriment on misinformation from the State. If you disagree with our decision, you may request a redetermination hearing by our Legal Services Division.

Audit adjustments are explained on the enclosed Audit Report.

At the exit conference, you agreed with the audit results. You were provided with the brochure "Contesting Disagreed Audits" (Form 96-1253) and advised of your right to meet with an Independent Audit Reviewer. You were also advised of the requirements necessary to initiate a formal redetermination hearing.

If you have any questions please contact me in the Houston North Audit Office at 713-864-0276. Thank you for your cooperation during the audit.

Samuel Jones

Auditor

NOTE: Auditors need to use the "Form Option" for the cover letter template when printing the cover letter to submit the Euless Processing Center. The Euless Processing Center (RPC) takes the form letter submitted with the audit package and generates a new letter and mails it to the taxpayer.

Audit Report, Example

AUDIT REPORT
ABC Well Service, Inc.
Taxpayer Number 17412345678
June 1, 2000 through May 31, 2004
This report summarizes the adjustments made in the audit.
1. A detail examination was completed for Exam 101. Adjustments were made for additional Taxable Receipts.

Index to Working Papers, Example

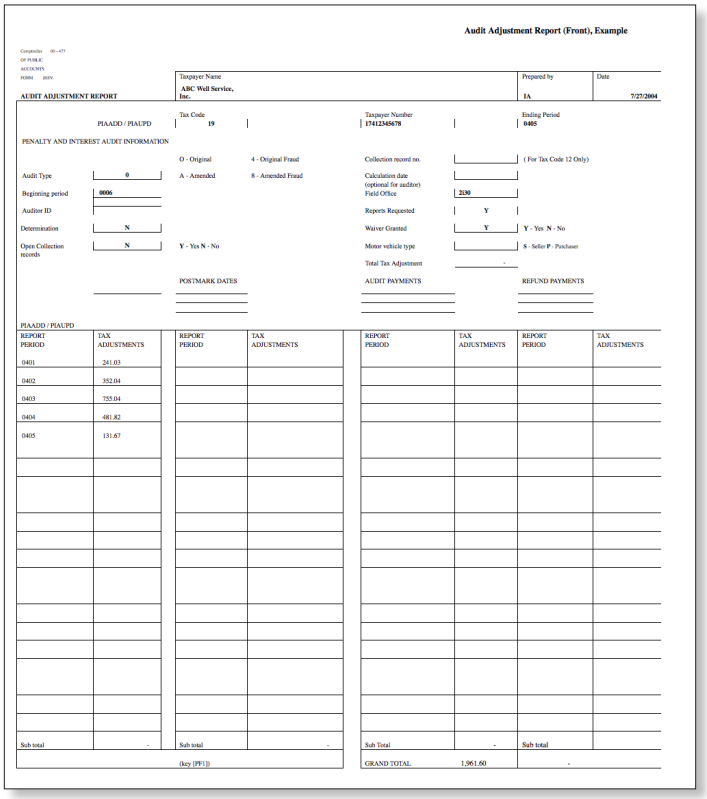
ABC Well Service, Inc.
Houston, Texas
TP#17412345678
INDEX TO WORKING PAPERS
DESCRIPTION PAGES
Audit Adjustment Report 1
Tax Adjustment Summary 1
Exam 100 ADDITIONAL TAXABLE GROSS RECEIPTS 1

Audit Adjustment Report

The Audit Adjustment Report (AAR) is a form that needs to be completed by the auditor. The amounts on this form should be subtotaled by column. The AAR shown on Index to Working Papers is the automated computer printout that the Euless Processing Center will add to the final audit package that is mailed to the taxpayer. This is the result from the information input by the Euless Processing Center from the manual form prepared by the auditor.

The auditor needs to verify the amounts shown on the AAR manually to ensure that the tax entered on that form is the correct tax amount as shown on the Exam schedules. Differences could be from rounding formulas in the Excel spreadsheet.

Audit Adjustment Report (Front), Example



Audit Adjustment Report (Front), Example

Comptroller 00 - 477
OF PUBLIC
ACCOUNTS
FORM (REV.

AUDIT ADJUSTMENT REPORT

Taxpayer Name	Prepared by	Date
ABC Well Service, Inc.	IA	7/27/2004

PIAADD / PIAUPD	Tax Code	Taxpayer Number	Ending Period
	19	17412345678	0405

PENALTY AND INTEREST AUDIT INFORMATION

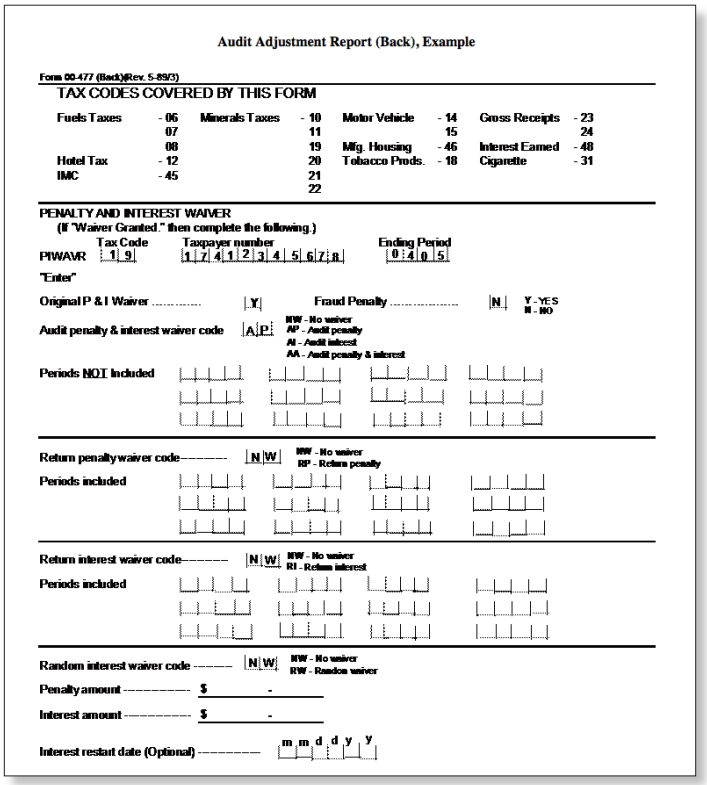
		O - Original	4 - Original Fraud	Collection record no.	(For Tax Code 12 Only)
Audit Type	0	A - Amended	8 - Amended Fraud	Calculation date (optional for auditor)	
Beginning period	0006			Field Office	2130
Auditor ID				Reports Requested	Y
Determination	N			Waiver Granted	Y Y - Yes N - No
Open Collection records	N	Y - Yes N - No		Motor vehicle type	S - Seller P - Purchaser
				Total Tax Adjustment	-

POSTMARK DATES	AUDIT PAYMENTS	REFUND PAYMENTS

PIAADD / PIAUPD

REPORT PERIOD	TAX ADJUSTMENTS	REPORT PERIOD	TAX ADJUSTMENTS	REPORT PERIOD	TAX ADJUSTMENTS	REPORT PERIOD	TAX ADJUSTMENTS
0401	241.03						
0402	352.04						
0403	755.04						
0404	481.82						
0405	131.67						
Sub total	-	Sub total	-	Sub Total	-	Sub total	
		(key [PF1])		GRAND TOTAL	1,961.60		-

Audit Adjustment Report (Back), Example



Audit Adjustment Report (Back), Example

Form 00-477 (Back)(Rev. 5-89/3)

TAX CODES COVERED BY THIS FORM

Fuels Taxes	- 06	Minerals Taxes	- 10	Motor Vehicle	- 14	Gross Receipts	- 23
	07		11		15		24
	08		19	Mfg. Housing	- 46	Interest Earned	- 48
Hotel Tax	- 12		20	Tobacco Prods.	- 18	Cigarette	- 31
IMC	- 45		21				
			22				

PENALTY AND INTEREST WAIVER
(If "Waiver Granted," then complete the following.)

	Tax Code	Taxpayer number	Ending Period
PIWAVR	1 9	1 7 4 1 2 3 4 5 6 7 8	0 4 0 5

"Enter"

Original P & I Waiver ..... Y Fraud Penalty ..... N Y - YES N - NO

Audit penalty & interest waiver code A P NW - No waiver AP - Audit penalty AI - Audit interest AA - Audit penalty & interest

Periods NOT Included

Return penalty waiver code------- N W NW - No waiver RP - Return penalty

Periods included

Return interest waiver code------- N W NW - No waiver RI - Return interest

Periods included

Random interest waiver code ------ N W NW - No waiver RW - Random waiver

Penalty amount ---------- $ -

Interest amount ---------- $ -

Interest restart date (Optional) ---------- m m d d y y

Tax Adjustment Summary, Example

Tax Adjustment Summary, Example

HOUSTON, TEXAS
TAX ADJUSTMENT SUMMARY

PAGE 1 0F 1
TP#17412345678

REPORT PERIOD	ADDITIONAL TAXABLE GROSS RECEIPTS FROM EXAM 100	TAX RATE	TAX DUE
0401	$9,960.00	2.42%	$241.03
0402	14,547.00	2.42%	352.04
0403	31,200.00	2.42%	755.04
0404	19,910.00	2.42%	481.82
0405	5,441.00	2.42%	131.67
TOTALS	$81,058.00		$1,961.60

Exam 100, Example

Exam 100, Example

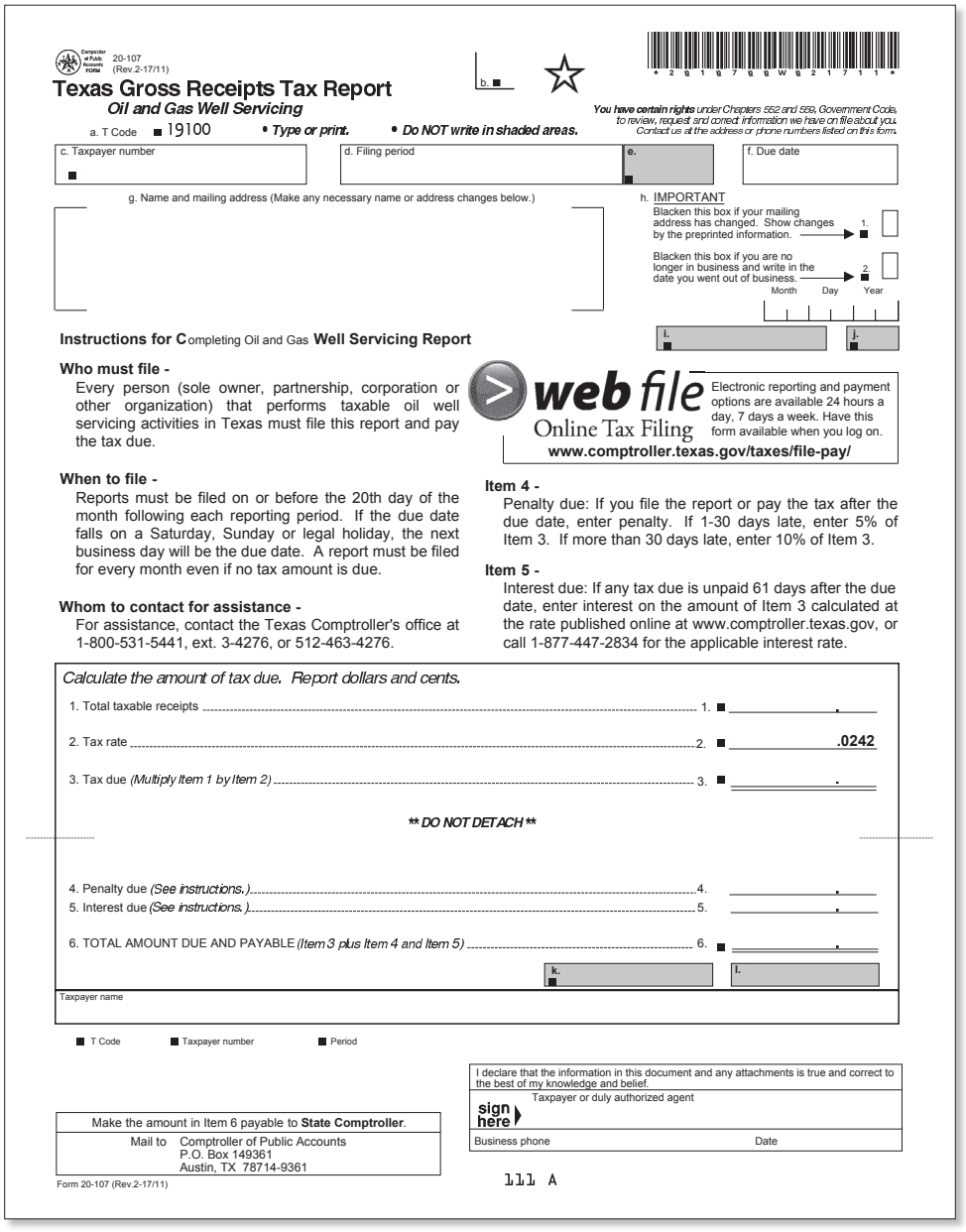
ABC WELL SERVICING, INC.
HOUSTON, TEXAS
ADDITIONAL TAXABLE GROSS RECEIPTS

EXAM 100
Page 1 of 1
TP#17412345678

CUSTOMER	INVOICE DATE	NUMBER	JOB TYPE	DESCRIPTION	AMOUNT
Ozer Drilling Co.	1/13/2004	613	Frac	Mixer Charge	$5,000.00
Fred's Well Co., Inc.	1/16/2004	621	Cement	Service Charge	3,585.00
Oilwell Company	1/21/2004	793	Acidizing	Service Engineer	1,375.00
				TOTAL 0401	$9,960.00
Zippy Production	2/5/2004	912	Frac	Blender Charge	$2,200.00
First Oil Company	2/13/2004	1036	Surveying	Temperature Log	8,800.00
Super Oil & Gas	2/21/2004	1141	Logging	Gamma Ray	3,547.00
				TOTAL 0402	$14,547.00
Oilwell Company	3/5/2004	1287	Logging	Depth Charge	$5,850.00
Second Oil Company	3/21/2004	1327	Acidizing	Pump Charge	25,350.00
				TOTAL 0403	$31,200.00
Super Oil & Gas	4/6/2004	1418	Frac & Acid	Blender Charge	$16,385.00
Zippy Production	4/14/2004	1678	Logging	Gamma Ray	2,025.00
Our Drilling Co.	4/23/2004	1819	Testing	Drill Stem Test	1,500.00
				TOTAL 0404	$19,910.00
Our Drilling Co.	5/6/2004	2101	Testing	Bottom Hole Pressure	$800.00
The Oil Company	5/16/2004	2345	Logging	Gamma Ray	3,146.00
First Oil Company	5/21/2004	2415	Logging	Depth Charge	1,495.00
				TOTAL 0405	$5,441.00

Chapter 6
References and Legal Opinions

- Texas Gross Receipts Tax Report--Oil and Gas Well Servicing - Example (PDF)
- Due Dates and Statute Expiration Chart
- Legal Opinion



20-107 (Rev.2-17/11)

Texas Gross Receipts Tax Report

Oil and Gas Well Servicing

a. T Code 19100 • *Type or print.* • *Do NOT write in shaded areas.*

You have certain rights under Chapters 552 and 559, Government Code, to review, request and correct information we have on file about you. Contact us at the address or phone numbers listed on this form.

c. Taxpayer number | d. Filing period | e. | f. Due date

g. Name and mailing address (Make any necessary name or address changes below.)

h. IMPORTANT
Blacken this box if your mailing address has changed. Show changes by the preprinted information. 1.
Blacken this box if you are no longer in business and write in the date you went out of business. 2.
Month Day Year

i. | j.

Instructions for Completing Oil and Gas **Well Servicing Report**

Who must file -
Every person (sole owner, partnership, corporation or other organization) that performs taxable oil well servicing activities in Texas must file this report and pay the tax due.

When to file -
Reports must be filed on or before the 20th day of the month following each reporting period. If the due date falls on a Saturday, Sunday or legal holiday, the next business day will be the due date. A report must be filed for every month even if no tax amount is due.

Whom to contact for assistance -
For assistance, contact the Texas Comptroller's office at 1-800-531-5441, ext. 3-4276, or 512-463-4276.

web file Online Tax Filing
Electronic reporting and payment options are available 24 hours a day, 7 days a week. Have this form available when you log on.
www.comptroller.texas.gov/taxes/file-pay/

Item 4 -
Penalty due: If you file the report or pay the tax after the due date, enter penalty. If 1-30 days late, enter 5% of Item 3. If more than 30 days late, enter 10% of Item 3.

Item 5 -
Interest due: If any tax due is unpaid 61 days after the due date, enter interest on the amount of Item 3 calculated at the rate published online at www.comptroller.texas.gov, or call 1-877-447-2834 for the applicable interest rate.

Calculate the amount of tax due. Report dollars and cents.

1. Total taxable receipts ..... 1.
2. Tax rate ..... 2. .0242
3. Tax due *(Multiply Item 1 by Item 2)* ..... 3.

** DO NOT DETACH **

4. Penalty due *(See instructions.)* ..... 4.
5. Interest due *(See instructions.)* ..... 5.
6. TOTAL AMOUNT DUE AND PAYABLE *(Item 3 plus Item 4 and Item 5)* ..... 6.

k. | l.

Taxpayer name

T Code | Taxpayer number | Period

I declare that the information in this document and any attachments is true and correct to the best of my knowledge and belief.
Taxpayer or duly authorized agent
sign here
Business phone | Date

Make the amount in Item 6 payable to **State Comptroller**.
Mail to Comptroller of Public Accounts
P.O. Box 149361
Austin, TX 78714-9361

Form 20-107 (Rev.2-17/11)

lll A

Due Dates and Statute Expiration Chart

REPORT PERIOD	DUE DATE	PENALTY BEGINS 5%	ADD'L 5%	INTEREST STARTS	STATUTE EXPIRATION DATE
0006	07/20/2000	07/21/2000	08/22/2000	09/19/2000	07/20/2004
0007	08/21/2000	08/22/2000	09/21/2000	10/21/2000	08/21/2004
0008	09/20/2000	09/21/2000	10/21/2000	11/21/2000	09/20/2004
0009	10/20/2000	10/21/2000	11/21/2000	12/20/2000	10/20/2004
0010	11/20/2000	11/21/2000	12/21/2000	01/20/2001	11/20/2004
0011	12/20/2000	12/21/2000	01/20/2001	02/21/2001	12/20/2004
0012	01/22/2001	01/23/2001	02/22/2001	03/24/2001	01/22/2005
0101	02/20/2001	02/21/2001	03/23/2001	04/24/2001	02/20/2005
0102	03/20/2001	03/21/2001	04/20/2001	05/22/2001	03/20/2005
0103	04/20/2001	04/21/2001	05/22/2001	06/20/2001	04/20/2005
0104	05/21/2001	05/22/2001	06/21/2001	07/21/2001	05/21/2005
0105	06/20/2001	06/21/2001	07/21/2001	08/21/2001	06/20/2005
0106	07/20/2001	07/21/2001	08/21/2001	09/19/2001	07/20/2005
0107	08/20/2001	08/21/2001	09/20/2001	10/20/2001	08/20/2005
0108	09/20/2001	09/21/2001	10/23/2001	11/20/2001	09/20/2005
0109	10/22/2001	10/23/2001	11/22/2001	12/22/2001	10/22/2005
0110	11/20/2001	11/21/2001	12/21/2001	01/23/2002	11/20/2005
0111	12/20/2001	12/21/2001	01/23/2002	02/20/2002	12/20/2005
0112	01/22/2002	01/23/2002	02/22/2002	03/26/2002	01/22/2006
0201	02/20/2002	02/21/2002	03/23/2002	04/23/2002	02/20/2006
0202	03/20/2002	03/21/2002	04/20/2002	05/21/2002	03/20/2006
0203	04/22/2002	04/23/2002	05/23/2002	06/22/2002	04/22/2006
0204	05/20/2002	05/21/2002	06/20/2002	07/20/2002	05/20/2006
0205	06/20/2002	06/21/2002	07/23/2002	08/20/2002	06/20/2006
0206	07/22/2002	07/23/2002	08/22/2002	09/21/2002	07/22/2006
0207	08/20/2002	08/21/2002	09/20/2002	10/22/2002	08/20/2006
0208	09/20/2002	09/21/2002	10/22/2002	11/20/2002	09/20/2006
0209	10/21/2002	10/22/2002	11/21/2002	12/21/2002	10/21/2006
0210	11/20/2002	11/21/2002	12/21/2002	01/22/2003	11/20/2006
0211	12/20/2002	12/21/2002	01/22/2003	02/19/2003	12/20/2006
0212	01/21/2003	01/22/2003	02/21/2003	03/25/2003	01/21/2007
0301	02/20/2003	02/21/2003	03/25/2003	04/22/2003	02/20/2007
0302	03/20/2003	03/21/2003	04/22/2003	05/20/2003	03/20/2007
0303	04/21/2003	04/22/2003	05/22/2003	06/21/2003	04/21/2007
0304	05/20/2003	05/21/2003	06/20/2003	07/22/2003	05/20/2007
0305	06/20/2003	06/21/2003	07/22/2003	08/20/2003	06/20/2007
0306	07/21/2003	07/22/2003	08/21/2003	09/20/2003	07/21/2007
0307	08/20/2003	08/21/2003	09/20/2003	10/21/2003	08/20/2007
0308	09/22/2003	09/23/2003	10/23/2003	11/22/2003	09/22/2007
0309	10/20/2003	10/21/2003	11/20/2003	12/20/2003	10/20/2007
0310	11/20/2003	11/21/2003	12/23/2003	01/21/2004	11/20/2007
0311	12/22/2003	12/23/2003	01/22/2004	02/21/2004	12/22/2007
0312	01/20/2004	01/21//2004	02/20/2004	03/23/2004	01/20/2008
0401	02/20/2004	02/21/2004	03/23/2004	04/21/2004	02/20/2008
0402	03/22/2004	03/23/2004	04/22/2004	05/22/2004	03/22/2008
0403	04/20/2004	04/21/2004	05/21/2004	06/22/2004	04/20/2008
0404	05/20/2004	05/21/2004	06/22/2004	07/20/2004	05/20/2008
0405	06/21/2004	06/22/2004	07/22/2004	082/21/2004	06/21/2008
0406	07/20/2004	07/21/2004	08/20/2004	09/21/2004	07/20/2008
0407	08/20/2004	08/21/2004	09/21/2004	10/20/2004	08/20/2008
0408	09/20/2004	09/21/2004	10/21/2004	11/20/2004	09/20/2008
0409	10/20/2004	10/21/2004	11/20/2004	12/21/2004	10/20/2008
0410	11/22/2004	11/23/2004	12/23/2004	01/22/2005	11/22/2008

REPORT PERIOD	DUE DATE	PENALTY BEGINS 5%	ADD'L 5%	INTEREST STARTS	STATUTE EXPIRATION DATE
0411	12/20/2004	12/21/2004	01/20/2005	02/19/2005	12/20/2008
0412	01/20/2005	01/21/2005	02/23/2005	03/22/2005	01/20/2009
0501	02/22/2005	02/23/2005	03/25/2005	04/26/2005	02/22/2009
0502	03/21/2005	03/22/2005	04/21/2005	05/21/2005	03/21/2009
0503	04/20/2005	04/21/2005	05/21/2005	06/21/2005	04/20/2009
0504	05/20/2005	05/21/2005	06/21/2005	07/20/2005	05/20/2009
0505	06/20/2005	06/21/2005	07/21/2005	08/20/2005	06/20/2009
0506	07/20/2005	07/21/2005	08/20/2005	09/20/2005	07/20/2009
0507	08/22/2005	08/23/2005	09/22/2005	10/22/2005	08/22/2009
0508	09/20/2005	09/21/2005	10/21/2005	11/22/2005	09/20/2009
0509	10/20/2005	10/21/2005	11/22/2005	12/20/2005	10/20/2009
0510	11/21/2005	11/22/2005	12/22/2005	01/21/2006	11/21/2009
0511	12/20/2005	12/21/2005	01/20/2006	02/22/2006	12/20/2009
0512	01/20/2006	01/21/2006	02/22/2006	03/22/2006	01/20/2010
0601	02/21/2006	02/22/2006	03/24/2006	04/25/2006	02/21/2010
0602	03/20/2006	03/21/2006	04/20/2006	05/20/2006	03/20/2010
0603	04/20/2006	04/21/2006	05/23/2006	06/20/2006	04/20/2010
0604	05/22/2006	05/23/2006	06/22/2006	07/22/2006	05/22/2010
0605	06/20/2006	06/21/2006	07/21/2006	08/22/2006	06/20/2010
0606	07/20/2006	07/21/2006	08/22/2006	09/19/2006	07/20/2010
0607	08/21/2006	08/22/2006	09/21/2006	10/21/2006	08/21/2010
0608	09/20/2006	09/21/2006	10/21/2006	11/21/2006	09/20/2010
0609	10/20/2006	10/21/2006	11/21/2006	12/20/2006	10/20/2010
0610	11/20/2006	11/21/2006	12/21/2006	01/20/2007	11/20/2010
0611	12/20/2006	12/21/2006	01/20/2007	02/21/2007	12/20/2010
0612	01/22/2007	01/23/2007	02/22/2007	03/24/2007	01/22/2011
0701	02/20/2007	02/21/2007	03/23/2007	04/24/2007	02/20/2011
0702	03/20/2007	03/21/2007	04/20/2007	05/22/2007	03/20/2011
0703	04/20/2007	04/21/2007	05/22/2007	06/20/2007	04/20/2011
0704	05/21/2007	05/22/2007	06/21/2007	07/21/2007	05/21/2011
0705	06/20/2007	06/21/2007	07/21/2007	08/21/2007	06/20/2011
0706	07/20/2007	07/21/2007	08/21/2007	09/19/2007	07/20/2011
0707	08/20/2007	08/21/2007	09/20/2007	10/20/2007	08/20/2011
0708	09/20/2007	09/21/2007	10/23/2007	11/20/2007	09/20/2011
0709	10/22/2007	10/23/2007	11/22/2007	12/22/2007	10/22/2011
0710	11/20/2007	11/21/2007	12/21/2007	01/23/2008	11/20/2011
0711	12/20/2007	12/21/2007	01/23/2008	02/20/2008	12/20/2011
0712	01/22/2008	01/23/2008	02/22/2008	03/25/2008	01/22/2012
0801	02/20/2008	02/21/2008	03/22/2008	04/22/2008	02/20/2012
0802	03/20/2008	03/21/2008	04/22/2008	05/20/2008	03/20/2012
0803	04/21/2008	04/22/2008	05/22/2008	06/21/2008	04/21/2012
0804	05/20/2008	05/21/2008	06/20/2008	07/22/2008	05/20/2012
0805	06/20/2008	06/21/2008	07/22/2008	08/20/2008	06/20/2012
0806	07/21/2008	07/22/2008	08/21/2008	09/20/2008	07/21/2012
0807	08/20/2008	08/21/2008	09/20/2008	10/21/2008	08/20/2012
0808	09/22/2008	09/23/2008	10/23/2008	11/22/2008	09/22/2012
0809	10/20/2008	10/21/2008	11/20/2008	12/20/2008	10/20/2012
0810	11/20/2008	11/21/2008	12/23/2008	01/21/2009	11/20/2012
0811	12/22/2008	12/23/2008	01/22/2009	02/21/2009	12/22/2012
0812	01/20/2009	01/21/2009	02/20/2009	03/24/2009	01/20/2013

NOTE: Dates obtained from the "DUEDAY" inquiry on CICS.

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Glossary of Terms

Abandon
: To temporarily or permanently cease production from a well or to cease further drilling operations.

Accelerator
: A chemical which will reduce the setting time of cement, when added. See Cement Additive

Acetic Acid
: A colorless acid used to acidize oil wells. Less corrosive than other commonly used acids in well treatment. See Acidizing.

Acid Fracturing
: Opening cracks in hard limestone formations through the use of water and acid under high pressure or a combination of oil and acid under pressure. See Fracturing and Matrix Acidizing.

Acidizing
: Injecting an acid under pressure into an oil-bearing formation to enlarge the pore spaces and passages in order to increase production. See Acetic Acid, Acid Stimulation, Formic Acid, Hydrochloric Acid, Matrix Acidizing, Wellbore Soak, and Well Stimulation.

Acid Stimulation
: The stimulation of a well through the use of acid. See Acidizing.

Acoustic Survey
: A well logging or well surveying method using sonic impulses to estimate the porosity of the rock and the amount of fluid in a formation. Also referred to as sonic logging. See Sonic Logging and Well Logging.

Aeration
: The introduction of air or gas into a liquid.

Air Hoist
: A hoist operated by compressed air – a pneumatic hoist. Air hoists are often mounted on the rig floor and may be used to lift joints of pipe and other heavy objects.

American Association of Oilwell Drilling Contractors (AAODC)
: Now known as International Association of Drilling Contractors (IADC).

American Petroleum Institute (API)
: A trade association and standards organization that represents the interests of the oil and gas industry. It offers publications regarding standards, recommended practices, and other industry related information.

Artificial Lift
: Any method used to raise oil to the surface after a well ceases to flow.

Association of Energy Service Companies (AESC)
: A trade association that represents the interests of members of the energy service segment of the oil and gas industry. It offers publications regarding recommended industry practices and training materials.

Anchor
: A device to fasten or secure equipment. An example is a drill-stem test tool anchor

Anchor Packer
: A packer which sits on a pipe which rests on the bottom. An example is a tail pipe.

Annular Pressure
: Pressure within an annular space.

Annulus
: The space surrounding a pipe in a wellbore, the outer wall of which may be the wall of the borehole or casing. Sometimes referred to as annular space.

Back-In Unit
: A portable, self-propelled servicing or workover rig which must be backed into the wellhead because the driver's cab is mounted on the end opposite the mast support. See Carrier Rig.

Bailer
: A long cylindrical container, with a valve at the lower end, which is used to remove water, sand, oil, and mud from a well.

Ball-and-Seat Valve
: A device used to restrict fluid flow to one direction.

Ball-Out
: To plug open perforations by using ball sealers.

Barefoot Completion
: An open-hole completion without casing. See Wellbore.

Barite
: Barium sulfate – a mineral frequently used to increase the weight or density of drilling mud. See Mud.

Barrel
: A measure of volume for petroleum products in the United States. One barrel is the equivalent of 42 U.S. gallons or 0.15899 cubic meters (9,792 cubic inches).

Basket
: A device placed in the drill or work string that catches debris when a drillable object is being drilled downhole.

Beam Pumping Unit
: A machine designed specifically for sucker rod pumping. An engine or motor (prime mover) is mounted on the unit to power a rotating crank. The crank moves a walking beam up and down to produce reciprocating motion. This reciprocating motion operates the pump.

Bit
: The cutting or boring element used in drilling wells.

Bleed
: To drain off liquid or gas, slowly, through a valve called a bleeder. To bleed down, or bleed off, means to release pressure slowly from a well or from pressurized equipment.

Blowout
: An uncontrolled flow of gas, oil, or other well fluids from the well.

Blowout Preventer (BOP)
: One or more valves installed at the wellhead to prevent the escape of pressure in the annulus or in an open hole during drilling or completion operations.

Borehole
: The hole made by drilling a well. Also referred as Wellbore.

Bottomhole
: The lowest or deepest part of a well.

Bottomhole Assembly
: The portion of the drilling assembly below the drill pipe.

Bottomhole Packer
: A packer at the bottom of a casing string used to exclude water, etc. See Packer.

Bottomhole Plug
: A cement plug at the bottom of the hole - used to shut depleted, water-producing, or unproductive zone.

Bottomhole Pump
: Any pump located at or near the bottom of the well used to lift well fluids. See Sucker Rod Pumping and Hydraulic Pumping.

Bottom Plug
: A cement wiper plug that precedes cement slurry down the casing. The plug wipes drilling mud off the walls of the casing and prevents it from contaminating the cement. See Cementing, Wiper Plug.

Brine
: Water that has a quantity of salt, especially sodium chloride, dissolved in it.

Bullet Perforator
: A tubular device which fires projectiles (bullets) through the casing string to make holes through which the well fluids may enter. See Perforating.

Bulk Tank
: On a drilling rig, a large metal bin that usually holds a large amount of a certain mud additive, such as bentonite, that is used in large quantities in the makeup of the drilling fluid.

Calcium Chloride
: A chemical which absorbs moisture and which is used in cements as a drying agent.

Caliper Log
: A record which indicates the diameter of the wellbore or pipe in order to indicate enlargement of the wellbore due to caving or washout, internal corrosion, or pitting of the pipes.

Carrier Rig
: A specially designed, self-propelled workover or drilling rig that is driven directly to the well site. See Back-in Unit, Drive-in Unit, and Production Rig.

Cased Hole
: A wellbore in which the casing has been run and which has been cemented.

Casing
: Steel pipe lowered into the wellbore as drilling is completed and which is used to prevent the caving of the walls.

Casing Cementing
: Filling the annulus between the casing and borehole wall with cement in order to support the casing and to prevent fluid migration between zones.

Casing Centralizer
: A device secured around the casing at regular intervals to center it in the hole.

Casing Cutter
: A heavy cylindrical body, fitted with a set of knives, used to cut and free a section of casing in a well.

Casing Gun
: A perforating gun run into the casing string.

Casinghead
: A heavy, flanged steel fitting connected to the first string of casing. It provides a housing for slips and packing assemblies, allows suspension of intermediate and production strings of casing, and supplies the means for the annulus to be sealed off.

Casing Point
: The depth in a well at which casing is set.

Cathead
: A spool-shaped attachment on the end of the catshaft, around which rope for hoisting and moving heavy equipment on or near the rig floor is wound.

Catline Boom and Hoist Line
: A hoisting or pulling line powered by the cathead and used to life heavy equipment on the rig.

Catwalk
: The elevated work area adjacent to the v-door and ramp on a drilling rig where pipe is laid to be lifted to the derrick floor by the catline or by an air hoist.

Celler
: A pit in the ground to provide additional height between the rig floor and well head to accommodate the installation of blowout preventers, ratholes, mouseholes, etc. It may also collect drainage water and other fluids for subsequent disposal.

Cement
: A powder consisting of alumina, silica, lime, and other substances that hardens when mixed with water. Extensively used in the oil industry to bond casing to the walls of the wellbore.

Cement Additive
: Materials added to cement to change its properties. Some examples are chemical accelerators, chemical retarders, and weight-reduction materials. See Accelerator and Retarder.

Cement Bond
: The adherence of casing to cement and cement to formation.

Cement Casing
: To fill the annulus between the casing and wall of the hole with cement to support the casing and prevent fluid migration between permeable zones.

Cementing
: Applying cement to various points in a well inside or outside the casing. See Squeeze Cementing.

Cementing Pump
: A high-pressure pump used to force cement down the casing and into the annular space between the casing and the wall of the borehole.

Cementing Time
: The total elapsed time needed to complete a cementing operation.

Cement Plug
: A portion of cement placed at some point in the wellbore to seal it.

Centrifugal Pump
: A pump with an impeller or rotor, an impeller shaft, and a casing, which discharges fluid by centrifugal force.

Chain Tongs
: A hand tool used to tighten or loosen pipe, consisting of a handle and chain that resembles the chain on a bicycle.

Chemical Cutoff
: A method of severing pipe in a well by applying high pressure jets of a very corrosive substance against the wall of the pipe.

Chemical Cutter
: A fishing tool that uses high-pressure jets of chemicals to sever casing, tubing, or drill pipe stuck in the hole.

Chemical Treatment
: A chemical-treating process – acidizing, paraffin removal, etc.

Chlorine Survey
: A type of radioactivity logging survey used to measure the chlorine content of the formation. A formation with low chlorine content and low density probably contains oil or gas while a formation with high chlorine content probably contains salt water only.

Choke
: A device with an orifice installed in a line to restrict the flow of fluids.

Christmas Tree
: The control valves, pressure gauges, and chokes assembled at the top of a well to control the flow of oil and/or gas after the well has been drilled and completed.

Circulation
: The movement of drilling fluid out of the mud pits, down the drill stem, up the annulus, and back to the mud pits.

Circulation Valve
: An accessory employed above a packer, to permit annulus-to-tubing circulation or vice-versa.

Cleanout
: Removal of sand, scale, and other deposits from a well in order to increase production.

Cleanout Tools
: Tools or instruments, such as a fishing tool, swab, bailer, etc. used to clean out an oilwell.

Collar
: A coupling device used to join two lengths of pipe, such as casing or tubing.

Collar Locator
: A logging device used to determine accurately the depth of a well. The log measures and records the depth of each casing collar or coupling in a well.

Compressor
: A device that raises the pressure of a compressible fluid such as air or gas. Compressors create a pressure differential to move or compress a vapor or gas.

Conductivity
: The ability to transmit or convey (as heat or electricity).

Conductor Casing
: Generally, the first string of casing in a well.

Conductor Hole
: The hole where the crew start the top of the well.

Conductor Pipe
: The largest diameter casing and the topmost length of casing.

Cone
: A conical-shaped metal device into which cutting teeth are formed or mounted on a roller cone bit.

Connection
: A section of pipe or fitting used to join pipe to pipe or to a vessel.

Core
: A cylindrical sample taken from a formation for geological analysis.

Core Analysis
: Laboratory of a core sample that may determine porosity, permeability, lithology, fluid content, angle of dip, geological age, and probable productivity of the formation.

Core Barrel
: A tubular device, usually from 10 to 60 feet long, run in place of a bit and used to cut a core sample.

Core Sample
: A small portion of a formation obtained by using a core barrel and core bit in an existing wellbore.

Coring
: The process of cutting a vertical, cylindrical sample of the formations encountered as a well is drilled.

Coring Bit
: A bit that does not drill out the center portion of the hole, but allows this center portion (the core) to pass through the round opening in the center of the bit and into the core barrel.

Corrosion
: Chemical or electrochemical process, such as rust, whereby metal is destroyed through reaction with its environment.

Corrosion Inhibitor
: A chemical substance that minimizes or prevents corrosion in metal equipment.

Coupling
: In piping, a metal collar with internal threads used to join two sections of threaded pipe.

Crankshaft
: A rotating shaft to which connecting rods are attached. It changes up and down (reciprocating) motion to circular (rotary) motion.

Crooked Hole
: A wellbore that has been drilled in a direction other than vertical.

Crown Block and Water Table
: An assembly of sheaves or pulleys mounted on beams at the top of the derrick. The drilling line is run over the sheaves down to the hoisting drum.

Crude Oil
: Unrefined liquid petroleum.

Cutout
: An area of deck grating removed to clear an obstruction or to permit pipes, ducts, columns and the like to pass through the grating.

Cuttings
: The fragments of rock dislodged by the bit and brought to the surface in the drilling mud. Washed and dried cuttings samples are analyzed by geologists to obtain information about the formations drilled.

Daily Drilling Report
: A record made each day of the operations on a working drilling rig and traditionally phoned, faxed, e-mailed, or radioed in to the office of the drilling company.

Deadline
: The drilling line from the crown block sheave to the anchor. So called because it does not move.

Degasser
: The equipment used to remove unwanted gas from a liquid, especially from drilling fluid.

Derrick
: A large load-bearing structure, usually of bolted construction. In drilling, the standard derrick has four legs standing at the corners of the substructure and reaching to the crown block.

Desander
: A centrifugal device for removing sand from drilling fluid to prevent abrasion of the pumps.

Desilter
: A centrifugal device for removing very fine particles, or silt, from drilling fluid.

Diamond Bit
: A drill bit that has small industrial diamonds embedded in its cutting surface.

Dies
: A tool used to shape, form, or finish other tools or pieces of metal.

Dipmeter Survey
: An oilwell-surveying method that determines the direction and angle of formation dip in relation to the borehole. It records data that permit computation of both the amount and direction dip relative to the axis of the hole and thus provides information about the geologic structure of the formation.

Directional Hole
: A wellbore intentionally drilled at an angle from the vertical.

Displacement Fluid
: In well cementing, the fluid, usually drilling mud or salt water, that is pumped into the well after the cement is pumped into it to force the cement out of the casing into the annulus.

Dissolved Gas
: Natural gas that is in solution with crude oil in the reservoir.

Doghouse
: A small enclosure on the rig floor used as an office and/or as a storehouse for small objects.

Downhole
: Pertaining to the wellbore.

Downhole Motor
: A drilling tool made up in the drill string directly above the bit. It causes the bit to turn while the drill string remains fixed.

Drawworks
: The hoisting mechanism on a drilling rig. It is essentially a large winch that spools off or takes in the drilling line and thus lowers or raises the drill stem and bit.

Drill Bit
: The cutting or boring element used in drilling oil and gas wells.

Drill Collars
: A heavy, thick-walled tube used between the drill pipe and the bit in the drill stem. Used to stiffen the drilling assembly and put weight on the bit so that the bit can drill.

Drilling Fluid
: Circulating fluid, one function of which is to lift cuttings out of the wellbore and to the surface. It also serves to cool the bit and to counteract downhole formation pressure.

Drilling Mud
: A specially compounded liquid circulated through the wellbore during rotary drilling operations.

Drill Pipe
: The heavy seamless tubing used to rotate the bit and circulate the drilling fluid.

Drill Stem
: All members in the assembly used for rotary drilling from the swivel to the bit, including the Kelly, the drill pipe and tool joints, the drill collars, the stabilizers, and various specialty items.

Drill-Stem Test (D.S.T.)
: A type of formation testing to measure potential productivity of the formation before the casing is set. See Formation Testing.

Drilling Line
: A wire rope hoisting line, reeved on sheaves of the crown block and traveling block. The primary purpose is to hoist or lower drill pipe or casing from or into a well.

Drill String
: The column, or string, of drill pipe with attached tool joints that transmits fluid and rotational power from the Kelly to the drill collars and the bit.

Drive-in Unit
: A self-propelled workover rig which is driven straight to the wellhead. See Carrier Rig.

Dry Hole
: Any well that does not produce oil or gas in commercial quantities.

Dual Completion
: A single well that produces from two separate formations at the same time.

Electric Submersible Pumping
: A form of artificial lift that utilizes an electric submersible multistage centrifugal pump. Electric power is conducted to the pump by a cable attached to the tubing.

Electric Survey
: Abbreviated to ES. See Electric Well Log.

Electric Well Log
: A recording of electrical characteristics (such as resistivity and conductivity) of the formation in order to measure the amount, location, and nature of the fluids. See Electric Survey and Well Log

Elevators
: On rotary rigs and top drive rigs, hinged steel devices with manual operating handles that crew members latch onto a tool joint.

External Cutter
: A fishing tool containing metal-cutting knives that is lowered into the hole and over the outside length of pipe in order to cut it.

Fastline
: The end of the drilling line that is affixed to the drum or reel of the drawworks, so called because it travels with greater velocity than any other portion of the line.

Fingerboard
: A rack that supports the stands of pipe being stacked in the derrick or mast.

Fire Flooding
: A thermal recovery method in which the oil in the reservoir is ignited. The heat vaporizes lighter hydrocarbons and water pushes the warmed oil toward a producing well.

Fish
: An object accidentally left in the wellbore during workover or drilling. Examples are a piece of scrap metal or part of the drill stem – must be recovered before work can proceed. See Fishing.

Fishing
: Recovering an object accidentally left in a well during drilling or workover. See Fish.

Fitting
: A small, often standardized part, such as a coupling, valve, or gauge, installed in a larger apparatus.

Float Collar
: A special coupling device inserted one or two joints above the bottom of the casing string that contains a check valve to permit fluid to pass downward but not upward through the casing. The float collar prevents drilling mud from entering the casing.

Flood
: To drive oil from a reservoir into a well by injecting water under pressure into the reservoir formation.

Flowing Well
: A well that produces oil or gas by its own reservoir pressure rather than by using artificial means, such as by pumps.

Flow Line
: The surface pipe through which oil or gas travels from a well to processing equipment or to storage.

Flow Rate
: The speed, or velocity, of fluid or gas flow through a pipe or vessel.

Fluid Injection
: Injection of gases or liquids into a reservoir to force oil toward and into producing wells.

Fluid Loss
: The unwanted migration of the liquid part of the drilling mud or cement slurry into a formation, often minimized or prevented by the blending of additives with the mud or cement.

Formation Fluid
: Fluid, such as gas, oil, or water, that exists in a subsurface formation.

Formation Gas
: Gas initially produced from an underground reservoir.

Formation Pressure
: The force exerted by fluids or gas in a formation, recorded in the hole at the level of the formation with the well shut in.

Formation Testing
: Testing of the formation to measure the potential productivity of the well before the casing is set. Also commonly referred to as the drill-stem test. See Drill-stem Test.

Formic Acid
: A chemical used in acidizing oil wells which is less corrosive than hydrofluoric acid or hydrochloric acid. Usually used on high-temperature wells. See Acidizing.

Frac Fluid
: A fluid used in the fracturing process.

Fracturing
: Sometimes referred to as "frac". A method of well stimulation. High hydraulic pressure is used to pump a fluid (hydrochloric acid, water, kerosene, etc.) into the formation to create fissures or cracks. Propping agents such as sand grains, walnut shells, glass beads, etc. are carried in the fluid and lodge in the cracks. When the fluid is removed, the propping agents keep the fissures open, thus leaving channels through which oil can flow. See Acid Fracturing, Frac Job, Hydraulic Fracturing, Nitro Shooting, Propping Agent, Shooting, and Well Stimulation.

Fracture
: A crack or device in a formation, either natural or induced.

Fracture Acidizing
: A procedure by which acid is forced into a formation under pressure high enough to cause the formation to crack. The acid acts on certain kinds of formations, usually carbonates, to increase the permeability of the formation. See Acid Fracturing.

Fracture Pressure
: The pressure at which a formation will break down, or fracture.

Fracturing Fluid
: A fluid, such as water, oil, or acid, used in hydraulic fracturing. The fluid carries propping agents that hold open the formation cracks after hydraulic pressure dissipates.

Free-Point Indicator
: A device run on wireline into the wellbore and inside the fishing string and fish to locate the area where a fish is stuck.

Friction
: Resistance to movement created when two surfaces are in contact. When friction is present, movement between the surfaces produces heat.

Gamma-Ray Log
: A type of well logging device utilizing gamma rays. See Radioactivity Well Logging.

Gas Anchor
: A tubular, perforated device attached to the bottom of a suckerrod pump that helps to prevent gas lock. The device works on the principle that gas, being lighter than oil, rises. As well fluids enter the anchor, gas breaks out of the fluid and exits from the anchor through perforations near the top. Remaining fluids enter the pump through a mosquito bill (a tube within the anchor) which has an opening near the bottom. In this way, all or most of the gas escapes before the fluids enter the pump.

Gas Drive
: The use of the energy that arises from the expansion of compressed gas in a reservoir to move crude oil to a wellbore. Also called Depletion Drive. See Dissolve-Gas Drive, Gas-Cap Drive, and Reservoir Drive Mechanism.

Gas Injection
: The injection of gas into a reservoir to maintain formation pressure by gas drive and to reduce the rate of decline of the original reservoir drive. One type of gas injection uses gas that does not mix (is not miscible) with the oil. Examples of these gases include natural gas, nitrogen, and flue gas. Another type of gas injection uses gas that does mix (is miscible) with the oil. The gas may be naturally miscible under high pressure. Examples of miscible gases include propane, methane enriched with other light hydrocarbons, methane under high pressure, and carbon dioxide under pressure. Frequently, water is also injected in alternating steps with the gas.

Gas Injection Well
: A Well into which gas is injected for the purpose of maintaining or supplementing pressure in an oil reservoir.

Gas Lift
: The process of raising or lifting fluid from a well by injecting gas down the well through tubing or through the tubing-casing annulus. Injected gas aerates the fluid to make it exert less pressure than the formation does. The resulting higher formation pressure forces the fluid out the wellbore.

Gas-Lift Mandrel
: A device installed in the tubing string of a gas-lift well onto which or into which a gas-lift valve is fitted.

Gas-Lift Valve
: A device installed on a gas-lift mandrel, which in turn is put on the tubing string of a gas-lift well. Tubing and casing pressures cause the valve to open and close, thus allowing gas to be injected into the fluid in the tubing to cause the fluid to rise to the surface.

Gas-Lift Well
: A well in which reservoir fluids are artificially lifted by the injection of gas.

Gas Lock
: A condition sometimes encountered in a pumping well when dissolved gas, released from solution during the upstroke of the plunger, appears as free gas between the valves. If the gas pressure is sufficient, the standing valve is locked shut, and fluid cannot enter the tubing.

Gas Well
: A well that primarily produces gas.

Geologist
: A scientist who gathers and interprets data pertaining to the formations of the earth's crust.

Go in the Hole
: To lower the drill stem, the tubing, the casing, or the sucker rods into the wellbore.

Gone to Water
: Pertaining to a well in which production of oil has decreased and production of water has increased.

Gooseneck
: The curved connection between the rotary hose and the swivel.

Gravel
: Sand or glass beads of uniform size and roundness used in gravel packing.

Gravel Packing
: A method of well completion in which a slotted or perforated liner, often wire-wrapped, is placed in the well and surrounded by grave. The gravel excludes sand from the wellbore but allows continued production.

Guide Shoe
: A short, heavy, cylindrical section of steel filled with concrete and rounded at the bottom, which is placed at the end of the casing string. It prevents the casing from snagging on irregularities in the borehole as it is lowered.

Gun Perforating
: Perforating the casing with a device which is lowered into the well and which fires steel projectiles through the casing in order to create holes through which the fluids pass to the wellbore. See Perforating.

Guy Line Anchor
: A buried weight or anchor to which a guy line is attached.

Guy Wire
: A rope or cable used to steady a mast or pole.

Hoist
: An arrangement of pulleys and wire rope used for lifting heavy objects.

Hoisting Components
: Drawworks, drilling line, and traveling and crown blocks.

Hoisting Drum
: The large, flanged spool in the drawworks on which the hoisting cable is wound.

Hoisting Line
: A wire rope used in hoisting operations.

Hoisting System
: The system on the rig that performs all the lifting on the rig, primarily the lifting and lowering of drill pipe out of and into the hole.

Hook
: A large, hook-shaped device from which the elevator bails or the swivel is suspended.

Horsepower
: A unit of measure of work done by a machine.

Horizontal Drilling
: Deviation of the borehole from vertical so that the borehole penetrates a productive formation in a manner parallel to the formation.

Hydraulic
: Of or relating to water or other liquid in motion. Operated, moved, or effected by water or liquid.

Hydraulic Fluid
: A liquid of low viscosity (such as light oil) that is used in systems actuated by liquid – such a s the brake system in an automobile.

Hydraulic Force
: Force resulting from pressure on water or other hydraulic fluid.

Hydraulic Fracturing
: Pumping a specially blended liquid into a well and into a formation under high pressure in order to cause the formation to crack and allow fluids to flow into the wellbore. See Fracturing.

Hydraulic Pumping
: A method of pumping oil from wells by using a downhole pump without sucker rods.

Hydrocarbons
: Organic compounds of hydrogen and carbon whose densities, boiling points, and freezing points increase as their molecular weights increase.

Hydrochloric Acid
: A chemical commonly used in acidizing. See Acidizing.

Hydrofluoric – Hydrochloric Acid
: A mixture of chemicals used in the removal of mud from the well. See Mud Acid.

Hydrogen Sulfide Cracking
: A type of corrosion that occurs when metals are exposed to hydrogen sulfide gas.

Hydrostatic Pressure
: The force exerted by a body of fluid at rest – it increases directly with density and the depth of the fluid. Is expressed as pounds per square inch.

Impeller
: A set of mounted blades used to impart motion to a fluid, air, or gas.

Impermeable
: Preventing the passage of fluid.

Impression Block
: A block with lead or another relatively soft material on its bottom. It is run into a well and set down on an object that has been lost in the well. The block is retrieved, and the impression is examined. The impression is a mirror image of the top of the fish, and it indicates the fish's position in the hole. From this information, the correct fishing tool may be selected.

Induction Log
: An electric well log in which the conductivity of the formation rather than the resistivity is measured. This log aids in the determination of oil and water zones.

Inflatable Packer
: A packer with an element that inflates by means of gas or liquid pumped from the surface through a line. It is deflated by means of slots that can be opened to allow the gas or liquid to flow out. They are used when a temporary packer is needed in a hole.

Injection Gas
: A high-pressure gas injected into a formation to maintain or restore reservoir pressure.

Injection Log
: A survey used to determine the injection profile, that is, to assign specific volumes or percentages to each of the formations taking fluid in an injection well. The injection log is also used to check for casing or packer leaks, proper cement jobs, and fluid migration between zones.

Injection Water
: Water that is introduced into a reservoir to help drive hydrocarbons to a producing well.

Injection Well
: A well through which fluids are injected into an underground stratum to increase reservoir pressure and to displace oil. Also called Input Well.

Injector Head
: A control head for injecting coiled tubing into a well that seals off the tubing and makes a pressure-tight connection.

Intake Valve
: The mechanism on an engine through which air and sometimes fuel are admitted to the cylinder. On a mud pump, it is the valve that opens to allow mud to be drawn in the pump by the pistons moving in the liners.

Intermediate Casing String
: The string of casing set in a well after the surface casing but before production casing is set to keep the hole from caving and to seal off formations.

Internal Cutter
: A fishing tool containing metal-cutting knives that is lowered into the inside of a length of pipe stuck in the hole in order to cut the pipe.

International Association of Drilling Contractors (IADC)
: Formerly the American Association of Oilwell Drilling Contractors. A trade association that represents the interests of members of the drilling segment of the oil and gas industry. It offers publications regarding recommended industry practices and training materials.

Jar
: A percussion tool operated manually or hydraulically to deliver a heavy upward or downward blow to fish stuck in the borehole.

Jar Accelerator
: A hydraulic tool used in conjunction with a jar and made up on the fishing string above the jar to increase the power of the jarring force.

Jerk Line
: A wire rope, one end of which is connected to the end of the tongs and the other end of which is attached to the cathead.

Jet
: A hydraulic device operated by a centrifugal pump used to clean the mud pits, or tanks, and to mix mud components.

Jet Cutoff
: A procedure for severing pipe stuck in a well by detonating special shaped-charge explosives similar to those used in jet perforating. The explosive is lowered into the pipe to the desired depth and detonated. The force of the explosion makes cuts around the pipe, and the severed portion of the pipe is retrieved.

Jet Gun
: The device used in jet perforating which carries the shaped charges. See Jet Perforating, Perforating, and Shaped Charge.

Jet Perforating
: Perforating the casing with a device using shaped charges of high explosives in order to burn a hole in the casing, allowing fluids to flow into the wellbore. See Perforating, Gun Perforating, and Bullet Perforator.

Joint of Pipe
: Length of drill pipe or casing.

Junk
: Metal debris lost in the wellbore – bits, wrenches, or other small objects which must be fished out before further work can continue. See Junk Basket.

Junk Basket
: A fishing tool used in a well to remove junk. See Junk.

Junk Mill
: A mill used to grind up junk in the hole. See Mill.

Junk Retriever
: A special tool made up on the bottom of the drill stem to pick up junk from the bottom of the hole.

Kelly
: The heavy square or hexagonal steel member suspended from the swivel through the rotary table and connected to the topmost joint of drill pipe to turn the drill stem as the rotary table turns.

Kelly Driver
: A device that fits inside the head and inside of which the Kelly fits. The Kelly driver rotates with the Kelly.

Kelly Spinner
: A pneumatically operated device mounted on top of the Kelly that, when actuated, causes the Kelly to turn or spin.

Kick
: An entry of water, gas, oil, or other formation fluid into the wellbore during drilling. If prompt action is not taken to control the kick, a blowout may occur.

Kick Fluids
: Oil, gas, water, or any combination that enters the borehole from a permeable formation.

Kick Off
: To bring a well into production. In workover operations, to swab a well to restore it to production.

Kickoff Point (KOP)
: The depth in a vertical hole at which a deviated or slant hole is started – used in directional drilling.

Kill
: In drilling, to control a kick by taking suitable preventive measures. In production, to stop a well from producing oil and gas so that reconditioning of the well can proceed.

Land Rig
: Any drilling rig that is located on dry land.

Lay Down Pipe
: To pull drill pipe or tubing from the hole and place it in a horizontal position on a pipe rack.

Lead Tongs
: The pipe tongs suspended in the derrick or mast and operated by a chain or a wire rope connected to the makeup cathead or the breakout cathead.

Limited-Entry Technique
: A type of fracturing method where fracturing fluid is injected through only a limited number of perforations in the casing rather than all the perforations at once.

Liner
: A relatively short length of pipe with holes or slots that is placed opposite a producing formation. Usually, such liners are wrapped with specially shaped wire that is designed to prevent the entry of loose sand into the well as it is produced. They are also often used with a gravel pack.

Liner Hanger
: A slip device that attaches the liner to the casing.

Log
: A record of the well characteristics through the use of measurement equipment – driller's log, mud log, electrical well log, or radioactivity log. See Mud Logging, Sonic Logging, and Well Logging.

Long String
: The last string of casing set in a well.

Lost Pipe
: Drill pipe, drill collars, tubing, or casing (fish) that has become separated in the hole from the part of the pipe reaching the surface, necessitating its removal before normal operations can proceed.

Lubricator
: A specially fabricated length of casing or tubing usually placed temporarily above a valve on top of the casinghead or tubing head. It is used to run swabbing or perforating tools into a producing well, and it provides a method for sealing off pressure.

Make a Connection
: To attach a joint or stand of drill pipe onto the drill stem suspended in the wellbore to permit deepening the wellbore by the length of the pipe.

Make Up
: To assemble and join parts to form a complete unit.

Make Up a Joint
: To screw a length of pipe into another length of pipe.

Makeup Tongs
: Tongs used for screwing one length of pipe into another form making up a joint.

Male Connection
: A pipe, coupling, or tool that has threads on the outside so that it can be joined to a female connection.

Mandrel
: A cylindrical bar, spindle, or shaft around which other parts are arranged or attached or that fits inside a cylinder or tube.

Manifold
: An accessory system of piping to a main piping system – serves to divide a flow into several parts, to combine several flows into one, or to reroute a flow to any one of several possible destinations.

Mast
: A portable derrick that is capable of being raised as a unit.

Master Valve
: A large valve located on the Christmas tree used to control the flow of oil and gas from a well.

Matrix Acidizing
: Acidizing whereby the acid is restricted to the natural porosity of the formation as opposed to acidizing into induced fractures. See Acid Fracturing and Acidizing.

Micro Log
: A type of electrical survey method using electrodes on the wall of the borehole.

Mill
: A downhole tool with rough, sharp, extremely hard cutting surfaces for removing metal, packers, cement, sand, or scale by grinding or cutting.

Mixing Tank
: Any tank or vessel used to mix components of a substance – as in the mixing of additives with drilling mud.

Mousehole
: Shallow bores under the rig floor, usually lined with pipe, in which joints of drill pipe are temporarily suspended for later connection to the drill string.

Mousehole Connection
: The procedure of adding a length of drill pipe or tubing to the active string.

Mud Acid
: A mixture of chemicals used to remove mud from the well – hydrochloric acid, hydrofluoric acid, and surfactants are used. See Hydrofluoric – Hydrochloric Acid.

Mud Cake
: The sheath of mud solids that forms on the wall of the hole when liquid from mud filters into the formation.

Mud Cleaner
: A cone-shaped device designed to remove very fine solid particles from the drilling mud.

Mud-Gas Separator
: A device that removes gas from the mud coming out of a well when a kick is being circulated out.

Mud Logging
: A method of testing the drilling during the drilling process to determine the amount of natural gas that has escaped from the formation.

Mud Pump
: A large, high-pressure reciprocating pump used to circulate the mud on a drilling rig.

Mud Return Line
: A trough or pipe that is placed between the surface connections at the wellbore and the shale shaker.

Mud Tank
: One of a series of open tanks, usually made of steel plate, through which the drilling mud is cycled to remove sand and fine sediments.

Mud Weight
: A measure of the density of a drilling fluid expressed as pounds per gallon, pounds per cubic foot, or kilograms per cubic meter.

Multiple Completion
: An arrangement for producing a well in which one wellbore penetrates two or more petroleum-bearing formations.

Natural Gas
: A highly compressible, highly expansible mixture of hydrocarbons with a low specific gravity and occurring naturally in a gaseous form.

Neutron Log
: Part of the radioactivity well logging process – used to determine formation porosity. See Radioactivity Well Logging.

Nipple
: A tubular pipe fitting threaded on both ends used for making connection between pipe joints and other tools.

Nitro Shooting
: A well stimulation process using nitroglycerine. See Formation Fracturing.

Normal Circulation
: The smooth, uninterrupted circulation of drilling fluid down the drill stem, out the bit, up the annular space between the pipe and the hole, and back to the surface.

Nozzle
: A passageway through jet bits that causes the drilling fluid to be ejected from the bit at high velocity.

Nuclear Tracer
: A gas, liquid, or solid material that emits gamma rays.

Oil
: A simple or complex liquid mixture of hydrocarbons that can be refined to yield gasoline, kerosene, diesel fuel, and various other products.

Oilfield
: The surface area overlying an oil reservoir or reservoirs. The term usually includes not only the surface area, but also the reservoir, the wells, and the production equipment.

Oil String
: The final string of casing set in a well after the productive capacity of the formation has been determined to be sufficient.

Oilwell
: A well from which oil is obtained.

Open Formation
: A petroleum-bearing rock with good porosity and permeability.

Open Hole
: Any wellbore in which casing has not been set.

O-Ring
: A circular seal common in the oil field.

Packer
: A downhole device used to seal the annular space between two strings of pipe and the wall of the borehole.

Packer Fluid
: A liquid, usually salt water, oil, or mud, used in a well when a packer is between tubing and the casing. The fluid must be heavy enough to shut off the pressure of the formation being produced.

Packer Squeeze Method
: A squeeze cementing method in which a packer is set to form a seal between the working string (the pipe down which cement is pumped) and the casing. Another packer or a cement plug is set below the point to be squeeze-cemented. By setting packers, the squeeze point is isolated from the rest of the well.

Packing
: A material used in a cylinder on rotating shafts of an engine or pump in the stuffing box of a valve or between flange joints to maintain a leak-proof seal.

Pack Off
: To place a packer in the wellbore and activate it so that it forms a seal between the tubing and the casing.

Paraffin
: Petroleum wax which accumulates on the wall of tubing and well equipment which needs to be removed periodically in order to prevent restriction of the flow.

Paraffin Scraper
: A tube with guides around it to keep it centered in the hole, and a cylindrical piece with blades attached. Spaces between the blades allow drilling fluid to pass through and carry away the scrapings.

Perforated Completion
: A well completion method in which the producing zone or zones are cased through, cemented, and perforated to allow fluid flow through the wellbore.

Perforated Liner
: A liner that has had holes shot in it by a perforating gun.

Perforated Pipe
: Sections of pipe, such as casing, liner, and tail pipe, in which holes or slots have been cut before it is set.

Perforating
: Piercing the casing wall to provide holes through which the formation fluids can flow. This service is accomplished with the use of a gun perforator or a jet perforator. See Gun Perforating, Jet Perforating, Perforating Gun, and Shaped Charge.

Perforating Gun
: A device for perforating the casing, which carries the shaped charges or bullets. See Gun Perforating, jet Gun, Jet Perforating, and Perforating.

Perforation
: A hole made in the casing, cement, and formation through which formation fluids enter a wellbore.

Perforation Depth Control Log (PDC Log)
: A special type of nuclear log that measures the depth of each casing collar.

Permanent Packer
: A nonretrievable type of packer that must be drilled or milled out for removal.

Permeability
: A measure of the ease with which a fluid flows through the connecting pore spaces of a formation or cement.

Petroleum
: A substance occurring naturally in the earth in solid, liquid, or gaseous state and composed mainly of mixtures of chemical compounds of carbon and hydrogen. In some cases, especially in measurement of oil and gas, petroleum refers only to oil, a liquid hydrocarbon, and does not include natural gas or gas liquids such as propane and butane.

Pick Up
: To use the drawworks to lift the bit (or other tool) off bottom by raising the drill stem.

Pilot
: A rodlike or tubelike extension below a downhole tool, such as a mill, that serves to guide the tool into or over another downhole tool or fish.

Pilot Bit
: A bit placed on a special device that serves to guide the device into an already existing hole that is to be opened – made larger in diameter.

Pilot Mill
: A special mill that has a heavy tubular extension below it called a pilot or stinger. The pilot, smaller in diameter than the mill, is designed to go inside drill pipe or tubing that is lost in the hole.

Pipe
: A long, hollow cylinder, usually steel, through which fluids are conducted.

Pipe Racks
: Horizontal supports for tubular goods (pipe).

Pipe Ramp
: An angled ramp for dragging drill pipe, casing, and other materials up to the drilling floor or bringing such equipment down.

Plug
: Any object or device that blocks a hole or passageway.

Plug and Abandon
: To close a well by placing cement plugs in the borehole.

Plunger
: A basic component of the sucker rod pump that serves to draw well fluids into the pump.

Porosity
: The ratio of the volume of empty space to the volume of solid rock in a formation, indicating how much fluid a rock can hold.

Power Generating System
: A diesel, LPG, natural gas, or gasoline engine along with a mechanical transmission or generator for producing power for the drilling rig.

Production
: The phase of the petroleum industry that deals with bringing the well fluids to the surface and preparing the product for delivery. The amount of oil or gas produced in a given period.

Production Packer
: Any packer designed to make a seal between the tubing and the casing during production.

Production Rig
: A portable, self-propelled piece of equipment which may be of two basic types. A well-servicing unit which has a hoist and an engine with a self-erecting mast. A workover rig has, in addition, a substructure with a rotary, pump, pits, and facilities to work a drill string. See Carrier Rig.

Production Test
: A test of the well's producing potential usually done during the initial completion phase.

Propping Agent
: A small granular substance carried in the fracturing fluid and used to keep the fractures open – Examples are sand grains, walnut shells, and glass fragments. See Formation Fracturing.

Pulling Unit
: A type of well servicing equipment used in pulling rods and tubing from the well. See Production Rig.

Pulsed Neutron Logging Device
: A measuring instrument run inside casing to obtain an indication of the presence or absence of hydrocarbons outside the casing, to determine water saturation in a reservoir behind casing, to detect water movement in the reservoir, to estimate porosity, and to estimate water salinity.

Pulsed-Neutron Survey
: A special cased hole logging method that uses radioactivity reaction time to obtain measurements of water saturation, residual oil saturation, and fluid contacts in the formation outside the casing of an oil well.

Pump
: A device that increases the pressure on a fluid or raises it to a higher level.

Pump Rate
: The speed, or velocity, at which a pump is run. In drilling, the pump rate is usually measured in strokes per minute.

Pumping Unit
: The machine that imparts reciprocating motion to a string of sucker rods extending to the positive displacement pump at the bottom of a well.

Radioactivity Well Logging
: A type of well logging method using both gamma-ray curves and neutron curves. Also referred to as nuclear log. This activity indicates the type of rocks and/or fluids in the formation. See Gamma-ray Log, Neutron Log, and Well Logging.

Ram
: The closing and sealing component on a blowout preventer.

Ram Blowout Preventer
: A blowout preventer that uses rams to seal off pressure on a hole that is with or without pipe.

Rate of Penetration (ROP)
: A measure of the speed at which the bit drills into formations, usually expressed in feet or meters per hour or per minute.

Rathole
: A hole in the rig floor, some 30 to 40 feet (9 to 12 meters) deep, which is lined with casing that projects above the floor, into which the Kelly and the swivel are placed when hoisting operations are in progress.

Rathole Rig
: A small, usually truck-mounted rig, the purpose of which is to drill ratholes for regular drilling rigs that will be moved in later. A rathole rig may also drill the top part of the hole before the main rig arrives on location.

Reamer
: A tool used in drilling to smooth the wall of a well, enlarge the hole to the specified size, help stabilize the bit, straighten the wellbore if kinks or doglegs are encountered, and drill directionally.

Reciprocating Motion
: Back-and-forth or up-and-down movement, such as that of a piston cylinder.

Reciprocating Pump
: A pump consisting of a piston that moves back-and-forth or up-and-down in a cylinder. The cylinder is equipped with inlet (suction) and outlet (discharge) valves. On the suction stroke, fluid is drawn into the cylinder, and on the discharge stroke, fluid is forced out of the cylinder.

Recompletion
: After the initial completion of a well, the action and techniques of reentering the well and redoing or repairing the original completion in order to restore the well's productivity.

Reeve (the line)
: To string a wire rope drilling line through the sheaves of the traveling and crown blocks to the hoisting drum.

Refracturing
: Performing fracturing again. See Formation Fracturing.

Reserves
: The unproduced but recoverable oil or gas in a formation that has been proved by production.

Reserve Tank
: A special mud tank that holds mud that is not being actively circulated. A reserve tank usually contains a different type of mud from that which the pump is currently circulating.

Reservoir
: A subsurface, porous, permeable, or naturally fractured rock body in which oil or gas are stored. Most reservoir rocks are limestones, dolomites, sandstones, or a combination of these.

Reservoir Drive Mechanism
: The process in which reservoir fluids are caused to flow out of the reservoir rock and into a wellbore by natural energy.

Reservoir Oil
: Oil in place in the reservoir.

Reservoir Rock
: A permeable rock that may contain oil or gas in appreciable quantity and through which petroleum may migrate.

Resistivity
: The electrical resistance offered to the passage of current. The opposite of conductivity.

Resistivity Well Logging
: The recording of the resistance of formation water to natural or induced electric current. This is a very useful tool in formation evaluation.

Retarder
: A chemical to delay the setting time of cement. See Cement Additive.

Retrievable Packer
: A packer that can be pulled out of the well to be repaired or replaced.

Reverse Circulation
: The course of drilling fluid downward through the annulus and upward through the drill stem, in contrast to normal circulation in which the course is downward through the drill stem and upward through the annulus. This method is frequently used in workover operations.

Rework
: To restore production from an existing formation when it has fallen off substantially or ceased altogether.

Rig
: The derrick, draw work, and other surface equipment of a workover unit.

Rig Down
: To dismantle a drilling rig and auxiliary equipment following the completion of drilling operations. Also called tear down.

Rig Floor
: The area immediately above the substructure of the derrick on which the rotary table and so forth rest.

Rig Up
: To prepare the drilling rig for making a hole – to install tools and machinery before drilling is started.

Rod Blowout Preventer
: A ram device used to close the annular space around the polished or sucker rod in a pumping well.

Rod Hanger
: A device used to hang sucker rods on the mast or in the derrick.

Rod String
: The entire length of sucker rods, which usually consist of several single rods screwed together. The rod string serves as a mechanical link from the beam pumping unit on the surface to the sucker rod pump near the bottom of the well.

Roller Chain
: A type of chain that is used to transmit power by fitting over sprockets attached to shafts, causing rotation of one shaft by the rotation of another.

Rotary
: The machine used to impart rotational power to the drill stem while permitting vertical movement of the pipe for rotary drilling.

Rotary Drilling
: A drilling method in which a hole is drilled by a rotating bit to which a downward force is applied. The bit is fastened to and rotated by the drill stem, which also provides a passageway through which the drilling fluid is circulated.

Rotary Hose
: The hose on a rotary drilling rig that conducts the drilling fluid from the mud pump and standpipe to the swivel and the Kelly.

Rotary Shoe
: A length of pipe whose bottom edge is serrated or dressed with a hard cutting material that is run into the wellbore around the outside of stuck casing, pipe, or tubing in order to mill away the obstruction.

Rotary Speed
: The speed, measured in revolutions per minute, at which the rotary table is operated.

Rotary Table
: The principal component of a rotary, or rotary machine, used to turn the drill stem and support the drilling assembly.

Round Trip
: The procedure of pulling out and subsequently running back into the hole a string of drill pipe or tubing. Also called tripping.

Run Casing/Run Pipe
: To lower a string of casing into the hole.

Run In
: To go into the hole with tubing, drill pipe, and so forth.

Safety Clamp
: A clamp placed tightly around a drill collar that is suspended in the rotary table by drill collar slips.

Safety Joint
: An accessory to a fishing tool, placed above it. If the tool cannot be disengaged from the fish, the safety joint permits easy disengagement of the string of pipe above the safety joint.

Salinity Log
: A special nuclear well log that produces an estimate of the relative amounts of oil, gas, or salt water in a formation.

Sand
: An abrasive material composed of small quartz grains formed from the disintegration of pre-existing rocks.

Sand Consolidation
: Any one of several methods by which the loose, unconsolidated grains of a producing formation are made to adhere to prevent a well from producing sand but permit it to produce oil and gas.

Sand Control
: Any method by which large amounts of sand in a sandy formation are prevented from entering the wellbore.

Sandfrac
: A method of fracturing subsurface rock formations by injecting fluid and sand under pressure to increase permeability.

Sandline
: A wireline used on drilling rigs and well-servicing rigs to operate a swab or bailer, retrieve cores, or to run logging devices.

Sandstone
: A sedimentary rock composed of individual mineral grains of rock fragments between 0.06 and 2 millimeters (0.002 and 0.079 inches) in diameter and cemented together by silica, calcite, iron oxide, etc.

Scale
: A mineral deposit that precipitates out of water and adheres to the inside of pipes, heaters, and other equipment.

Schlumberger
: Pronounced “Slumberjay” – a pioneer company in electric well logging named for the French scientist who developed the method.

Scraper
: Any device that is used to remove deposits (such as scale or paraffin) from tubing, casing, rods, flow lines, or pipelines.

Scratcher
: A device that is fastened to the outside of casing to remove mud cake from the wall of a hole in order to condition the hole for cementing.

Secondary Recovery
: The use of water-flooding or gas injection to maintain formation pressure during primary production and to reduce the rate of decline of the original reservoir drive.

Service Well
: A nonproducing well used for injecting liquid or gas into the reservoir for enhanced recovery.

Set Casing/Set Pipe
: To run and cement casing at a certain depth in the wellbore.

Shale
: A fine-grained sedimentary rock composed mostly of consolidated clay or mud. Shale is the most frequently occurring sedimentary rock.

Shale Shaker
: A vibrating screen used to remove cuttings from the circulating fluid in rotary drilling operations.

Shaped Charge
: A type of perforating device used in a jet gun to perforate the casing. See Jet Gun, Jet Perforating, and Perforating Gun.

Shear Ram
: The component in a blowout preventer that cuts, or shears, through drill pipe and forms a seal against well pressure.

Sheave
: A grooved pulley. A support wheel over which tape, wire, or cable rides.

Shooting
: Exploding nitroglycerine or other explosives in a formation in order to increase the flow oil. See Formation Fracturing, Nitro Shooting, and Well Stimulation.

Shoulder
: The flat portion machined on the base of the bit shank that meets the shoulder of the drill collar and serves to form a pressure-tight seal between the bit and drill collar.

Shut In
: To close the valves on a well so that it stops producing

Sonic Logging
: A type of well logging method done in an uncased hole – may be run simultaneously with a potential test or a gamma-ray log. See Log and Well Logging.

Squeeze Cementing
: Sealing specific points in a well through the use of cement and pressure. See Workover.

Stimulation
: A process to obtain a higher producing rate in a well. Examples are acidizing, fracturing, and shooting. See Well Stimulation.

Sucker Rod
: Special steel rods threaded on each end and screwed together to reach from the beam pumping unit to the sucker-rod pump at the bottom of a well.

Swab
: A device used in swabbing. See Swabbing.

Swabbing
: A temporary operation to bring well fluids to the surface when a well does not flow. This operation can determine whether or not the well can be made to flow or if artificial life is necessary.

Swage
: A hook used to straighten damaged or collapsed casing in a well.

Tally
: To measure and record the total length of pipe, casing, or tubing that is to be run in a well.

Taper Tap
: A tap with a gradually decreasing diameter from the top. It is used to retrieve hollow fish, such as a drill collar, and is the male counterpart of a die collar.

Temperature Log
: A survey run in cased holes to locate the top of the cement in the annulus. Since cement generates a considerable amount of heat when setting, a temperature increase will be found at the level where cement is found behind the casing.

Temperature Survey
: An operation used to determine temperatures at various depths in the wellbore. It is also used to determine the height of cement behind the casing and to locate the source of water influx into the wellbore.

Thermal Recovery
: A type of improved recovery in which heat is introduced into a reservoir to lower the viscosity of heavy oils and to facilitate their flow into producing wells.

Tongs
: The large wrenches used for turning when making up or breaking out drill pipe, casing, tubing, or other pipe.

Torque
: The turning force that is applied to a shaft or other rotary mechanism to cause it to rotate or tend to do so. Torque is measured in foot-pounds, joules, or Newton-meters.

Total Depth
: The maximum depth reached in a well.

Tracer
: A substance added to reservoir fluids to permit the movements of the fluid to be followed or traced.

Tracer Log
: A survey that uses a radioactive tracer such as a gas, liquid, or solid having a high gamma ray emission. When the material is injected into any portion of the wellbore, the point of placement or movement can be recorded by a gamma ray instrument. The tracer log is used to determine channeling or the travel of squeezed cement behind a section of perforated casing.

Trailer Rig
: A rig mounted on a wheeled and towed trailer.

Traveling Block
: An arrangement of pulleys, or sheaves, through which drilling cable is reeved, which moves up or down in the derrick or mast.

Trip
: To insert or remove the drill stem into or out of the hole.

Truck-Mounted Rig
: A well-servicing and workover rig that is mounted on a truck chassis.

Tubing
: The smaller pipe within the casing which serves as the conduit for the passage of oil and gas to the wellhead.

Tubing Coupling
: A special connector used to connect lengths of tubing.

Tubing Head
: A flanged fitting that supports the tubing string, seals off pressure between the casing and the outside of the tubing, and provides a connection that supports the Christmas tree.

Tubing Job
: The act of pulling out and running tubing into a wellbore.

Tubing Pump
: A sucker rod pump in which the barrel is attached to the tubing.

Tubular Goods
: Any kind of pipe. Oilfield tubular goods include tubing, casing, drill pipe, drill collars, and line pipe.

Unit Operator
: The oil company in charge of development and production in an oilfield in which several companies have joined to produce the field.

Unloading a Well
: Removing fluid from the tubing in a well, often by means of a swab, to lower the bottomhole pressure in the wellbore at the perforations, and to induce the well to flow.

Valve
: A device used to control the rate of flow in a line to open or shut off a line completely or to serve as an automatic or semiautomatic safety device. Those used extensively include the check valve, gate valve, globe valve, needle valve, plug valve, and pressure relief valve.

V-Belt
: A belt with a trapezoidal cross section, made to run in sheaves or pulleys, with grooves of corresponding shape.

V-Door
: An opening at floor level in a side of a derrick or mast. The V-door is opposite the drawworks and is used as an entry to bring in drill pipe, casing, and other tools from the pipe rack.

Waiting on Cement
: Standing time while waiting for cement in a well to harden. Abbreviated to W.O.C.

Walking Beam
: The horizontal steel member of a beam pumping unit that has rocking or reciprocating motion.

Wash Over
: To release pipe that is stuck in the hole by running washover pipe.

Washover Pipe
: An accessory used in fishing operations to go over the outside of tubing or drill pipe stuck in the hole because of cuttings, mud, etc. that have collected in the annulus. The washover pipe cleans the annular space and permits recovery of the pipe.

Washover String
: The assembly of tools run into the hole during fishing to perform a washover. A typical washover string consists of a washover back-off connector, several joints of washover pipe, and a rotary shoe.

Water Drive
: The reservoir drive mechanism in which oil is produced by the expansion of the underlying water and rock, which forces the oil into the wellbore.

Water Pump
: On an engine, a device, powered by the engine, that moves coolant (water) through openings in the engine block, through the radiator or heat exchanger, and back into the block.

Water Tank
: Tank used to store water that is used for mud-mixing, cementing, and rig cleaning.

Water Well
: A well drilled to obtain a fresh water supply in order to support drilling and production operations or to obtain a water supply to be used in connection with an enhanced recovery program.

Weight on Bit (WOB)
: The amount of downward force placed on the bit.

Well
: The hole made by the drilling bit, which can be open (uncased) or cased. Also called borehole, hole, or wellbore.

Wellbore
: The borehole or hole drilled for the well. It may be opened (uncased) or cased (with casing inserted). Also called a borehole or hole.

Wellbore Soak
: A type of acidizing method whereby acid is poured into the borehole and allowed to soak into the formation. This is a very slow process. Also called wellbore cleanup.

Well Completion
: The completion of bringing a well to productive status.

Well Fluid
: The fluid, usually a combination of gas, oil, water, and suspended sediment, that comes out of a reservoir. Also call well stream.

Wellhead
: Equipment at the surface of a wellbore, usually consisting of the casing head, tubing head, and Christmas tree.

Well Logging
: Recording information about the characteristics of the formation. Some examples are electric well logging, mud logging, radioactivity well logging, and sonic logging. See Acoustic Survey, Electric Well Logging, Gamma-ray Log, Log, Microlog, Mud Logging, Neutron Log, Radioactivity Well Logging, and Sonic Logging.

Well Puller
: A member of a well servicing company crew.

Well Servicing
: Performing maintenance work on an oil or gas well in order to improve or maintain the producing rate from a formation. Involves repairs to the pump, tubing, sucker rods, etc.

Well-Servicing Rig
: A portable rig, truck-mounted, trailer-mounted, or a carrier rig, consisting of a hoist and engine with a self-erecting mast.

Well Stimulation
: An operation to increase the producing rate of a well or to force the well to begin producing when drilled. Examples are acidizing, fracturing, and shooting. See Acidizing, Formation Fracturing, Shooting, and Stimulation.

Wildcat
: A well drilled in an area where no oil or gas production exists.

Wireline
: A slender, rod-like or threadlike piece of metal usually small in diameter, that is used for lowering special tools into the well.

Wireline Operations
: The lowering of mechanical tools, such as valves and fishing tools, into the well for various purposes.

Workover
: A remedial operation to try to increase production from a well. Examples are deepening, plugging, and squeeze cementing. See recompletion.

Workover Fluid
: A special drilling mud used to keep a well under control while it is being worked over.

Workover Rig
: A portable rig used for working over a well.

Work String
: In drilling, the string of drill pipe or tubing suspended in a well to which is attached a special tool or device that is used to carry out a certain task, such as squeeze cementing or fishing.