
Standard Definitions for Petroleum Statistics

FIFTH EDITION

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Finance, Accounting and Statistics Department

**FIFTH EDITION
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PREFACE

This report contains key definitions of terms used in API surveys and reports such as the Weekly Statistical Bulletin. Definitions for new products such as RFG and low and high sulfur distillate fuel have been incorporated. In addition, a new section containing environmental terms such as chemical releases, oil spills and refinery residuals has been added to the report.

The definitions in this report were designed to provide a consistent basis for the reporting and interpretation of petroleum industry statistics. They are not intended to meet definitional require-

ments for disciplines such as taxation, engineering and law.

To provide a broader understanding of some of the refinery aspects, the "Layman's Guide to a U.S. Refinery" is included. This guide provides a general understanding of some of the terms used in refining operations.

This report was developed in 1966 by an ad hoc task group consisting of representatives of federal and state agencies and trade associations, and was reviewed and updated by the API's Committee on Supply and Consumption Statistics in 1995.

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PART I. RESERVES¹ AND PRODUCTION DEFINITIONS

CASINGHEAD GAS. Casinghead gas (or oil well gas) is associated and dissolved gas produced along with crude oil from oil completions. (See line x, Appendix A.)

CRUDE OIL. Crude oil is technically defined as a mixture of hydrocarbons that exists in the liquid phase in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities. For statistical purposes, volumes reported as crude oil include:

1. Liquids technically defined as crude oil;
2. Small amounts of hydrocarbons that exist in the gaseous phase in natural underground reservoirs, but are liquid at atmospheric pressure after being recovered from oil well (casinghead) gas in lease separators;² and
3. Small amounts of nonhydrocarbons produced with the oil.

Statistical data pertaining to crude oil production and reserves are reported as liquid equivalents at the surface (excluding basic sediment and

¹ Developed by the Society of Petroleum Engineers (SPE) and adopted by the SPE in 1987. These definitions were not in force when the American Petroleum Institute (API) did its reserves studies. These studies were discontinued with the December 31, 1975 report.

² From a technical standpoint, liquids recovered in lease separators from oil well gas are termed "condensate"; however, since they are commingled with the crude oil stream, it is not practical to measure and report their volumes separately.

All natural gas liquids measured separately from crude oil—those liquefied in lease separators, field facilities and natural gas processing plants—are combined and reported as a total figure by the American Gas Association (AGA).

water) measured in terms of stock tank barrels of 42 U.S. gallons at atmospheric pressure, and corrected to 60°F.

CRUDE OIL—PRODUCTION. Crude oil production is the volume of liquids statistically defined as crude oil, which is produced from oil reservoirs during given periods of time. The amount of such production for a given period is generally established by measurement of volumes delivered from lease storage tanks (i.e., the point of custody transfer) to pipelines, trucks, or other media for transport to refineries or terminals with adjustments for (1) net differences between opening and closing lease inventories, and (2) basic sediment and water (BS&W). In Appendix A, crude oil production is represented as line w.

FIELD. A field is an area consisting of a single reservoir or multiple reservoirs all grouped on, or related to, the same individual geological structural feature and/or stratigraphic condition. There may be two or more reservoirs in a field which are separated vertically by intervening impervious strata, or laterally by local geologic barriers, or by both.

A new field is a new area of oil or gas production with accumulation being controlled by a separate geological structural feature and/or stratigraphic condition to the extent that the new discovery is not considered a new pool, or an extension of a pool, in a preexisting field.

FIELD FACILITY. A field facility is an installation designed for one or more specific and limited functions. Such facilities usually process natural gas produced from more than one lease for the purpose of recovering condensate from the stream of natural gas; however, some field facilities are designed to recover propane, butanes, natural gasoline, etc., and to control the quality of natural gas to be marketed.

Field facilities include: compressors, dehydration units, field extraction units, scrubbers, drip points,

conventional single or multiple stage separation units, LTX low temperature separators, and other types of separation and recovery equipment.

GAS WELL GAS. Gas well gas is natural gas produced from gas completions. Such gas may be either non-associated or associated gas. (See line y, Appendix A.)

GEOGRAPHIC BOUNDARIES.³ Data pertaining to reserves are reported for each state. Additional geographic detail is reported for the land areas of California, Louisiana, New Mexico, and Texas. (See Maps, Appendix B.)

Reserves for offshore areas are not reported separately but are included in the totals for adjacent land areas. Offshore proved reserves of crude oil for Louisiana and Texas are combined and reported as a single total.

Official production totals, as reported for each state, include offshore production. State totals are subclassified and reported as (1) offshore production, and (2) onshore production. Additional geographic detail is reported for the land areas of California, Louisiana, New Mexico, and Texas. (See Maps, Appendix B.)

LEASE SEPARATOR. A lease separator is a facility located at the surface for the purpose of (1) separating casinghead gas from produced crude oil and water at the temperature and pressure conditions of the separator; and (2) separating gas from that portion of associated gas and non-associated gas which liquefies at temperature and pressure conditions of the separator.

NATURAL GAS. A mixture of hydrocarbon compounds and small quantities of various nonhydrocarbons existing in the gaseous phase or

in solution with crude oil in natural underground reservoirs at reservoir conditions. Natural gas may be subclassified as follows:

Associated Gas - Free natural gas, commonly known as gas-cap gas, which overlies and is in contact with crude oil in the reservoir.⁴

Dissolved Gas - Natural gas which is in solution with crude oil in the reservoir at reservoir conditions.

Non-associated Gas - Free natural gas not in contact with crude oil in the reservoir.

Dissolved gas and associated gas may be produced concurrently from the same well bore. In such situations, it is not feasible to measure the production of dissolved gas and associated gas separately; therefore, production is reported under the heading of associated-dissolved or casinghead gas. Reserves estimated for associated and dissolved gas are also reported as totals for associated-dissolved gas combined.

For statistical purposes, all natural gas volumes are reported in cubic feet on a pressure base of 14.73 psia, at 60°F.

NATURAL GAS LIQUIDS (NGL). Natural gas liquids (NGL) are those portions of reservoir gas which are liquefied at the surface in lease separators, field facilities, or gas processing plants. Natural gas liquids include but are not limited to: ethane, propane, butanes, pentanes, natural gasoline, and condensate.

NATURAL GAS LIQUIDS—PRODUCTION.

The elements of natural gas liquids affecting the definition of natural gas production are identified on pages 4 through 6. For statistical purposes,

³ It should be noted that the inland boundaries for California and Louisiana used by the API and AGA reserves committees conform to state practices, but differ from the boundaries used by the U.S. Bureau of the Census and AAPG (American Association of Petroleum Geologists)-API for certain reporting. The feasibility of eliminating these discrepancies is being investigated.

⁴ Where reservoir conditions are such that the production of associated gas does not substantially affect the recovery of crude oil in the reservoir, such gas may be reclassified as non-associated gas by a regulatory agency. In this event, reserves and production are reported in accordance with the classification used by the regulatory agency.

natural gas liquids production is reported as follows:

1. **Lease Condensate** which is a natural gas liquid recovered from gas well gas (associated and non-associated) in lease separators or field facilities. (See line *m*, Appendix A.) Lease condensate consists primarily of pentanes and heavier hydrocarbons. Volumes are reported in terms of barrels of 42 U.S. gallons, at atmospheric pressure, and corrected to 60°F.
2. **Natural Gas Plant Products** which are natural gas liquids recovered from natural gas in natural gas processing plants and, in some situations, from field facilities (see line *k* and *l*, Appendix A). Natural gas plant products are reported in barrels of 42 U.S. gallons, corrected to 60°F, and subclassified according to standards of the Gas Processors Association (GPA) or the American Society for Testing Materials (ASTM) as follows:
 - a. **Ethane**—A normally gaseous paraffinic compound (C_2H_6).
 - b. **Propane**—A normally gaseous paraffinic compound (C_3H_8); includes all products covered by GPA specifications for commercial and HD-5 propane.
 - c. **Butane**—Normally gaseous paraffinic compounds (C_4H_{10}); includes all products covered by GPA specifications for commercial butane.
 - (1) **Isobutane**—A saturated branch-chain hydrocarbon (C_4H_{10}) which contains 80% or more isobutane.
 - (2) **Normal Butane**—A saturated straight-chain hydrocarbon (C_4H_{10}) which contains 80% or more normal butane.
 - d. **Pentanes Plus**—A mixture of hydrocarbons, mostly pentanes and heavier, extracted from natural gas. Includes natural gasoline, isopentane and plant condensate.
 - (1) **Natural Gasoline**—A mixture of hydrocarbons, mostly pentanes and heavier, extracted from natural gas, which meet vapor pressure, end point, and other specifications for natural gasoline set by the GPA.
 - (2) **Isopentane**—A saturated branch-chain hydrocarbon (C_5H_{12}), obtained by fractionation of natural gasoline or isomerization of normal pentane.
 - (3) **Plant Condensate**—One of the natural gas plant products, mostly pentanes and heavier, recovered and separated as liquids at gas inlet separators or scrubbers in processing plants or field facilities. Plant condensate is not suitable for blending with natural gasoline or refinery gasoline.
 - e. **Other Natural Gas Plant Products** meeting refined product standards (i.e., gasoline, kerosine, distillate, etc.).

NATURAL GAS PROCESSING PLANT. A facility designed (1) to achieve the recovery of natural gas liquids from the stream of natural gas which may or may not have been processed through lease separators and field facilities, and (2) to control the quality of the natural gas to be marketed. Cycling plants are classified natural gas processing plants.

NATURAL GAS—PRODUCTION. Statistics pertaining to natural gas production represent volumes of gas produced from natural oil and gas reservoirs during given periods of time with adjustments (where applicable) to reflect (1) the volume of gas returned to natural reservoirs, and (2) the reduction of volume resulting from the removal of natural gas liquids and

nonhydrocarbon gases. The volume of natural gas withdrawn from underground storage facilities is not included in natural gas production statistics.

The flow of natural gas from oil and gas reservoirs is illustrated in Appendix A. Various elements may be identified as follows:

x = gross production of associated-dissolved (casinghead) gas from oil completions in oil reservoirs;

y_1 = gross production of associated (gas-cap) gas from gas completions in gas caps of oil reservoirs;

y_2 = gross production of non-associated gas from gas completions in non-associated gas reservoirs;

y = total gross production of natural gas from gas completions; i.e., $y = y_1 + y_2$;

a_1 = volume of gas from oil wells which is vented or flared on leases;

a_2 = volume of vented or flared gas at field facilities;⁵

a_3 = volume of vented or flared gas at gas processing plants;⁵

a = total volume of vented or flared gas; i.e., $a = a_1 + a_2 + a_3$;

b_1 = volume of associated (casinghead) gas used for lease fuel;

b_2 = volume of natural gas used for fuel in field facilities;⁵

b_3 = volume of natural gas used for fuel in gas processing plants;⁵

b_4 = volume of non-associated gas used for lease fuel;

b = total volume of natural gas used for fuel on leases and in field facilities and gas processing plants; i.e., $b = b_1 + b_2 + b_3 + b_4$;

c_1 = volume of associated-dissolved gas produced from oil completions in oil reservoirs and gas completions in gas caps of oil reservoirs, processed through field facilities, and used for gas lift, gas injection, and cycling operations;

c_2 = volume of non-associated gas which is produced from gas completions in non-associated gas reservoirs, processed through field facilities, and used for gas lift, gas injection and cycling operations;

c = total volume of associated-dissolved gas and non-associated gas produced from oil completions and gas completions, processed through field facilities, and used for gas lift, gas injection, and cycling operations; i.e., $c = c_1 + c_2$;

d_1 = volume of associated-dissolved gas produced from oil completions and gas completions, processed through gas processing plants, and used as gas lift, gas injection, and cycling operations;

d_2 = volume of non-associated gas produced from gas completions, processed through gas processing plants, and used for gas lift, gas injection, and cycling operations; and

d = total volume of natural gas produced from oil completions and gas completions, processed through gas processing plants, and used for gas lift, gas injection, and cycling operations; i.e., $d = d_1 + d_2$.

⁵ Quantities of gas represent by a_2 , a_3 , b_2 and b_3 represent mixtures of dissolved gas, associated gas, and non-associated gas which cannot be measured separately. Therefore, it is not possible to directly relate quantities of such gas to individual reservoirs.

The flow of natural gas liquids (see definition on page 2), extracted from natural gas, is shown in

Appendix A. Elements affecting the definition of natural gas production may be identified as follows:

k_1 = natural gas liquids extracted in gas processing plants from associated-dissolved gas produced from oil completions in oil reservoirs, and associated gas produced from gas completions in gas caps of oil reservoirs;

k_2 = natural gas liquids extracted in gas processing plants from non-associated gas produced from gas completions in non-associated gas reservoirs;

k = total volume of natural gas liquids extracted from associated-dissolved gas and non-associated gas in gas producing plants; i.e., $k = k_1 + k_2$;

l_1 = natural gas liquids, excluding lease condensate, extracted in field facilities from associated-dissolved gas produced from oil completions in oil reservoirs, and gas completions in gas caps of oil reservoirs;

l_2 = natural gas liquids, excluding lease condensate, extracted in field facilities from non-associated gas produced from gas completions in non-associated gas reservoirs;

l = total volume of natural gas liquids, excluding lease condensate, extracted from natural gas in field facilities; i.e., $l = l_1 + l_2$;

m_1 = lease condensate recovered in lease separators from associated gas produced from gas completions in gas caps of oil reservoirs;

m_2 = lease condensate recovered in lease separators from non-associated gas produced from gas completions in non-associated gas reservoirs;

m_3 = lease condensate recovered in field facilities from associated gas;

m_4 = lease condensate recovered in field facilities from non-associated gas; and

m = total lease condensate recovered in lease separators and field facilities from associated and non-associated natural gas produced from gas completions; i.e.,
 $m = m_1 + m_2 + m_3 + m_4$.

Other terms involved in the definitions of natural gas production but not shown in Appendix A, are as follows:

K_1 = gaseous equivalent of natural gas liquids recovered from associated-dissolved gas in gas processing plants;

K_2 = gaseous equivalent of natural gas liquids recovered from non-associated gas in gas processing plants;

K = total gaseous equivalent of natural gas liquids recovered from associated-dissolved gas and non-associated gas in gas processing plants; i.e., $K = K_1 + K_2$;

L_1 = gaseous equivalent of natural gas liquids, excluding lease condensate, recovered from associated-dissolved gas in field facilities;

L_2 = gaseous equivalent of natural gas liquids, excluding lease condensate, recovered from non-associated gas in field facilities;

L = total gaseous equivalent of natural gas liquids, excluding lease condensate, recovered from associated-dissolved gas and non-associated gas in field facilities; i.e., $L = L_1 + L_2$;

M_1 = gaseous equivalent of lease condensate recovered from associated gas in lease separators;

M_2 = gaseous equivalent of lease condensate recovered from non-associated gas in lease separators;

M_3 = gaseous equivalent of lease condensate recovered from associated gas in field facilities;

M_4 = gaseous equivalent of lease condensate recovered from non-associated gas in field facilities;

M = total gaseous equivalent of lease condensate recovered from associated and non-associated gas in lease separators and field facilities; i.e., $M = M_1 + M_2 + M_3 + M_4$;

λ_1 = reduction in gaseous volume resulting from the removal of nonhydrocarbons from associated-dissolved gas;

λ_2 = reduction in gaseous volume resulting from the removal of nonhydrocarbons from non-associated gas; and

λ = total reduction in gaseous volume resulting from the removal of nonhydrocarbons from associated-dissolved and non-associated gas; i.e., $\lambda = \lambda_1 + \lambda_2$.

Using the notation set forth above, statistical definitions of natural gas production are as follows:

I. *Total Gross Prod.* = $x + y$

II. *Total Net Prod.* = $(x + y) - (c + d + K + L + M + \lambda)$

III. *Associated-Dissolved Prod. (Net)* = $(x + y) - (c_1 + d_1 + K_1 + L_1 + M_1 + M_3 + \lambda_1)$

IV. *Non-Associated Prod. (Net)* = $y_2 - (c_2 + d_2 + K + L_2 + M_2 + M_4 + \lambda_2)$

Official data pertaining to natural gas production are based on operator reports to state regulatory agencies. Such reports permit the qualification

of total gross and total net natural gas production (equations I and II) for the United States. These reports do not provide for the identification of elements required for the quantification of elements required for the quantification of equations III and IV. However, estimates of the quantities y_1 , y_2 , c_1 , c_2 , d_1 , d_2 , K_1 , K_2 , L_1 , L_2 , M_1 , M_2 , M_3 , M_4 , λ_1 , and λ_2 are developed by the American Gas Association Committee on Natural Gas Reserves for use in preparing various estimates of reserves and ultimate recovery.

MARKETED PRODUCTION. The total volume of natural gas production reported as marketed production is defined by the following equation:

$$V. \text{Marketed Prod.} = (x + y) - (a + c + d + \lambda)$$

OFFSHORE. The term "offshore" is defined as that geographic area which lies seaward of the coastline. In general, the term "coastline" means the line of ordinary low water along that portion of the coast which is in direct contact with the open sea or the line marking seaward limit of inland water. If a state agency uses a different basis for identifying onshore and offshore areas, the state classification is used.

For purposes of statistical reporting, Cook Inlet (Alaska) is arbitrarily classified as "offshore."

OIL WELL GAS. (See Casinghead Gas).

POOL. In general, the term "pool" is synonymous with the term "reservoir"; however, in certain situations, a pool may consist of more than one reservoir.

RESERVES. Reserves are estimated volumes of crude oil, condensate, natural gas, natural gas liquids, and associated substances anticipated to be commercially recoverable from known accumulations from a given date, under existing economic conditions, by established operating practices, and under current government regulations. Reserve estimates are based on interpretation of geologic and/or engineering data available at the time of the estimate.

Reserve estimates generally will be revised as reservoirs are produced, as additional geologic and/or engineering data become available, or as economic conditions change.

Reserves do not include volumes of crude oil, condensate, natural gas, or natural gas liquids being held in inventory. If required for financial reporting or other special purposes, reserves may be reduced for on-site usage and/or processing losses.

The ownership status of reserves may change due to the expiration of a production license or contract; when relevant to reserve assignment such changes should be identified for each reserve classification.

Reserves may be attributed to either natural reservoir energy, or improved recovery methods. Improved recovery includes all methods for supplementing natural reservoir energy to increase ultimate recovery from a reservoir. Such methods include (1) pressure maintenance, (2) cycling, (3) waterflooding, (4) thermal methods, (5) chemical flooding, and (6) the use of miscible and immiscible displacement fluids.

All reserve estimates involve some degree of uncertainty, depending chiefly on the amount and reliability of geologic and engineering data available at the time of the estimate and the interpretation of these data. The relative degree of uncertainty may be conveyed by placing reserves in one of two classifications, either proved or unproved. Unproved reserves are less certain to be recovered than proved reserves and may be subclassified as probable or possible to denote progressively increasing uncertainty.

RESERVES—PROVED. Proved reserves can be estimated with reasonable certainty to be recoverable under current economic conditions. Current economic conditions include prices and costs prevailing at the time of the estimate. Proved reserves may be developed or undeveloped.

In general, reserves are considered proved if commercial producibility of the reservoir is supported by actual production or formation tests. The term proved refers to the estimated volume of reserves and not just to the productivity of the well or reservoir. In certain instances, proved reserves may be assigned on the basis of electrical and other type logs and/or core analysis that indicate subject reservoir is hydrocarbon bearing and is analogous to reservoirs in the same area that are producing, or have demonstrated the ability to produce on a formation test.

The area of a reservoir considered proved includes (1) the area delineated by drilling and defined by fluid contacts, if any, and (2) the undrilled areas that can be reasonably judged as commercially productive on the basis of available geological and engineering data. In the absence of data on fluid contacts, the lowest known structural occurrence of hydrocarbons controls the proved limit unless otherwise indicated by definitive engineering or performance data.

Proved reserves must have facilities to process and transport those reserves to market that are operational at the time of the estimate, or there is a commitment or reasonable expectation to install such facilities in the future.

In general, proved undeveloped reserves are assigned to undrilled locations that satisfy the following conditions: (1) the locations are direct offsets to wells that have indicated commercial production in the objective formation, (2) it is reasonably certain that the locations are within the known proved productive limits of the objective formation, (3) the locations conform to existing well spacing regulations, if any, and (4) it is reasonably certain that the locations will be developed. Reserves for other undrilled locations are classified as proved undeveloped only in those cases where interpretations of data from wells indicate that the objective formation is laterally continuous and contains commercially recoverable hydrocarbons at locations beyond direct offsets.

Reserves that can be produced through the application of established improved recovery methods are included in the proved classification when (1) successful testing by a pilot project or favorable production or pressure response of an installed program in that reservoir, or one in the immediate area with similar rock and fluid properties, provides support for the engineering analysis on which the project or program is based and (2) it is reasonably certain the project will proceed.

Reserves to be recovered by improved recovery methods that have yet to be established through repeated commercially successful applications are included in the proved classification only (1) after a favorable production response from subject reservoir from either (a) a representative pilot or (b) an installed program, where the response provides support for the engineering analysis on which the project is based, and (2) it is reasonably certain the project will proceed.

RESERVES—UNPROVED. Unproved reserves are based on geologic and/or engineering data similar to that used in estimates of proved reserves; but technical, contractual, economic, or regulatory uncertainties preclude such reserves being classified as proved. They may be estimated assuming future economic conditions different from those prevailing at the time of the estimate.

Estimates of unproved reserves may be made for internal planning or special evaluations, but are not routinely compiled.

Unproved reserves are not to be added to proved reserves because of different levels of uncertainty.

Unproved reserves may be divided into two subclassifications: probable and possible.

Probable Reserves—Probable reserves are less certain than proved reserves and can be estimated with a degree of certainty sufficient

to indicate they are more likely to be recovered than not.

In general, probable reserves may include (1) reserves anticipated to be proved by normal stepout drilling where subsurface control is inadequate to classify these reserves as proved, (2) reserves in formations that appear to be productive based on log characteristics, but that lack core data or definitive tests and which are not analogous to producing or proved reservoirs in the area, (3) incremental reserves attributable to infill drilling that otherwise could be classified as proved, but closer statutory spacing had not been approved at the time of the estimate, (4) reserves attributable to an improved recovery method which has been established by repeated commercially successful applications when a project or pilot is planned but not in operation, and rock, fluid, and reservoir characteristics appear favorable for commercial application, (5) reserves in an area of a formation that has been proved productive in other areas of the field but subject area appears to be separated from the proved area by faulting and the geologic interpretation indicates subject area is structurally higher than the proved area, (6) reserves attributable to a successful work over, treatment, retreatment, change of equipment, or other mechanical procedure, where such procedure has not been proved successful in wells exhibiting similar behavior in analogous reservoirs, and (7) incremental reserves in a proved producing reservoir where an alternate interpretation of performance or volumetric data indicates significantly more reserves than can be classified as proved.

Possible Reserves—Possible reserves are less certain than probable reserves and can be estimated with a low degree of certainty, insufficient to indicate whether they are more likely to be recovered than not.

In general, possible reserves may include (1) reserves suggested by structural and/or stratigraphic extrapolation beyond areas classified as probable, based on geologic and/or geophysical interpretation, (2) reserves in formations that appear to be hydrocarbon bearing based on logs or cores but that may not be productive at commercial rates, (3) incremental reserves attributable to infill drilling that are subject to technical uncertainty, (4) reserves attributable to an improved recovery method when a project or pilot is planned but not in operation, and rock, fluid, and reservoir characteristics are such that a reasonable doubt exists that the project will be commercial, and (5) reserves in an area of a formation that has been proved productive in other areas of the field but subject area appears to be separated from the proved area by faulting and geologic interpretation indicates subject area is structurally lower than the proved area.

RESERVES—STATUS CATEGORIES. Reserves-status categories define the development and producing status of wells and/or reservoirs.

Developed—Developed reserves are expected to be recovered from existing wells (including reserves behind pipe). Improved recovery reserves are considered developed only after the necessary equipment has been installed, or when the costs to do so are relatively minor. Developed reserves may be sub-categorized as producing or nonproducing.

Producing—Producing reserves are expected to be recovered from completion intervals open at the time of the estimate and producing. Improved recovery reserves are considered to be producing only after an improved recovery project is in operation.

Nonproducing—Nonproducing reserves include shut-in and behind-pipe reserves. Shut-in reserves are expected to be recovered from completion intervals open at the time of the estimate, but which had not

started producing, or were shut in for market conditions or pipeline connection, or were not capable of production for mechanical reasons, and the time when sales will start is uncertain.

Behind-pipe reserves are expected to be recovered from zones behind casing in existing wells, which will require additional completion work or a future recompletion prior to the start of production.

Undeveloped—Undeveloped reserves are expected to be recovered: (1) from new wells on undrilled acreage, (2) from deepening existing wells to a different reservoir, or (3) where a relatively large expenditure is required to (a) recomplete an existing well or (b) install production or transportation facilities for primary or improved recovery projects.

RESERVOIR. A reservoir is a porous and permeable under-ground formation containing an individual and separate natural accumulation of producible hydrocarbons (oil and/or gas) which is confined by impermeable rock or water barriers and is characterized by a single natural pressure system.

In most situations, reservoirs are classified as oil reservoirs or as gas reservoirs by a regulatory agency. In the absence of a regulatory authority, the classification is based on the natural occurrence of the hydrocarbons in the reservoir as determined by the operator.

RESIDUE GAS. Residue gas is natural gas from which gas plant products (natural gas liquids), and in some cases non-hydrocarbons, have been extracted in gas processing plants.

ZONE. In the context of this report, the term "zone" as applied to reservoirs, is used to describe an interval which has one or more distinguishing characteristics, such as lithology, porosity, saturation, etc.

PART II. WELLS AND DRILLING DEFINITIONS

BYPASSED FOOTAGE. Bypassed footage is the footage in that section of hole which is abandoned as the result of remedial sidetrack drilling operations.

COMPLETION. The term "completion" refers to the installation of permanent equipment for the production of oil or gas. If a well is equipped to produce only oil or gas from one zone or reservoir, the definition of a "well" (classified as an oil well or gas well) and the definition of a "completion" are identical. However, if a well is equipped to produce oil and/or gas separately from more than one reservoir, a "well" is not synonymous with a "completion."

COMPLETION DATE. The date of completion of an oil well or a gas well is the date on which the installation of permanent equipment has been completed (for the production of oil or gas) as reported to the appropriate regulatory agency.

The date of completion of a dry hole is the date of abandonment as reported to the appropriate agency.

The date of completion of a service well is the date on which the well is equipped to perform the service for which it was intended.

DEEPER-POOL TEST. A deeper-pool test is an exploratory hole located within the productive area of a pool, or pools, already partly or wholly developed. It is drilled below the deepest productive pool in order to explore for deeper unknown prospects.

DEEPEST TOTAL DEPTH. The deepest total depth of a given well is the distance from a surface reference point (usually the Kelly bushing) to the point of deepest penetration

measured along the well bore. If a well is drilled from a platform or barge over water and the reference point is above water, the depth of the water is included in the total length of the well bore.

DEPTH OF DEEPEST PRODUCTION. The depth of deepest production is the length of the well bore measured (in feet) from the surface reference point to the bottom of the open hole or the deepest perforation in the casing of a producing well.

DEVELOPMENT WELL. In general, a development well is a well drilled within the proved area of an oil or gas reservoir to the depth of a stratigraphic horizon known to be productive. If the well is completed for production, it is classified as an oil or gas development well. If the well is not completed for production, it is classified as a dry development hole.¹

DIRECTIONAL (DEVIATED) WELL. A directional (deviated) well is a well purposely deviated from the vertical using controlled angles to reach an objective location other than one directly below the surface location. A directional well may be the original hole or a directional "sidetrack" hole that deviates from the original bore at some point below the surface.²

¹Wells drilled within the proved area of an oil or gas reservoir, but drilled to depths of less than or more than the depths of stratigraphic horizons known to be productive, are classified as dry exploratory holes if they are not completed for the production of oil or gas.

Wells drilled within the proved area of an oil or gas reservoir, but drilled to depths less than or more than the depths of stratigraphic horizons known to be productive, are classified as successful exploratory wells if they are completed for the production of oil or gas in a new reservoir.

²The new footage associated with directional "sidetrack" holes should not be confused with footage resulting from remedial SIDETRACK DRILLING.

If there is a common bore from which two or more wells are drilled, the first complete bore from the surface to the original objective is classified and reported as a well drilled. Each of the deviations from the common bore is reported as a separate well.

DRY HOLE. A dry hole is an exploratory or development well found to be incapable of producing either oil or gas in sufficient quantities to justify completion as an oil or gas well.

EXPLORATORY WELL. An exploratory well is a well drilled (1) to find and produce oil or gas in an unproved area; (2) to find a new reservoir in a field previously found to be productive of oil or gas in another reservoir; or (3) to extend the limits of a known oil or gas reservoir. Exploratory wells include the following:

1. New-field wildcats
2. New-pool wildcats
3. Deeper-pool tests
4. Shallower-pool tests
5. Outpost (extension) tests

FOOTAGE DRILLED. Total footage for wells in various categories, as reported for any specified period, includes (1) the deepest total depth (length of well bores) of all wells drilled from the surface, (2) the total of all bypassed footage drilled in connection with reported wells, and (3) all new footage drilled for directional "sidetrack" wells.⁴ In the case of old wells drilled deeper, the reported footage is that which was drilled below the total depth of the old well.

GAS WELL. A gas well is a well completed for production of natural gas from one or more gas zones or reservoirs. Such wells contain no completions for the production of crude oil.

⁴Footage reported for directional "sidetrack" wells does not include footage in the common bore which is reported as footage for the original well.

GEOGRAPHIC BOUNDARIES. Well and drilling statistics are reported for each state and adjacent offshore areas. Additional geographic detail is reported for four states and the Northern Gulf of Mexico.⁴ (See Maps in Appendix B):

Map I - A

California-Total

- (a) North
- (b) East Central
- (c) Central Coastal
- (d) South
- (e) Offshore

Map II - A

Louisiana-Total

- (a) North
- (b) South
- (c) Offshore

Map III

New Mexico-Total

- (a) East
- (b) West

Map IV

Texas-Total

- (a) Railroad Commission District 1
- (b) Railroad Commission District 2
- (c) Railroad Commission District 3
- (d) Railroad Commission District 4
- (e) Railroad Commission District 5
- (f) Railroad Commission District 6
- (g) Railroad Commission District 7B
- (h) Railroad Commission District 7C
- (i) Railroad Commission District 8
- (j) Railroad Commission District 8A
- (k) Railroad Commission District 9
- (l) Railroad Commission District 10
- (m) Offshore

⁴The Northern Gulf of Mexico is a new area designated by the Bureau of Land Management for federally controlled Outer Continental Shelf (OCS) waters not previously mapped or leased. The area covers Gulf of Mexico OCS waters off the states of Texas, Louisiana, Mississippi, Alabama, and Florida.

Map V
Northern Gulf of Mexico

HORIZONTAL WELL. A well drilled which takes a path through the reservoir approximately 90 degrees to vertical and which generally follows a constant structural or stratigraphic interval.

MULTIPLE COMPLETION WELL. A multiple completion well is a well equipped to produce oil and/or gas separately from more than one reservoir. Such wells contain multiple strings of tubing or other equipment which permit production from the various completions to be measured and accounted for separately.

For statistical purpose, a multiple completion well is reported as one well and classified as either an oil well or a gas well. If one of the several completions in a given well is an oil completion, the well is classified as an oil well. If all of the completions of a given well are gas completions, the well is classified as a gas well.

NEW-FIELD WILDCAT. A new-field wildcat is a well located on a structural feature or other type of trap which has not previously produced oil or gas. In regions where local geological conditions have little or no control over accumulations, these wells are generally at least two miles from the nearest productive area. Distance, however, is not the determining factor. Of greater importance is the degree of risk assumed by the operator, and the intention to test a structure or stratigraphic condition not previously proved productive.

NEW-POOL WILDCAT. A new-pool wildcat is a well located to explore for a new pool on a structural feature or other type of trap already producing oil or gas, but outside the known limits of the presently producing area. In some regions where local geological conditions exert an almost negligible control, exploratory holes of this type may be called "near wildcats." Such

wells will usually be less than two miles from the nearest productive area.

OFFSHORE WELL. An offshore well is one which is bottomed at, or produces from, a point which lies seaward of the coastline. In general, the term "coastline" means the line of ordinary low water along that portion of the coast which is in direct contact with the open sea or the line marking the seaward limit of inland water. If a state agency uses a different basis for classifying onshore and offshore wells, the state classification is used.

For purposes of statistical reporting, Cook Inlet (Alaska) is classified as "offshore."

OIL WELL. An oil well is a well completed for the production of crude oil from at least one oil zone or reservoir.

OLD WELL DRILLED DEEPER. An old well drilled deeper is a previously drilled hole which is reentered and deepened by additional drilling. Such wells are reported as (1) oil or gas wells if completed for the production of oil or gas, or (2) dry holes if sufficient quantities of oil or gas are not found to justify completion at the greater depth.

OLD WELL WORKED OVER. An old well worked over is a previously drilled hole which is reentered for purpose of improving or establishing production of oil or gas, but no additional footage is drilled. Such wells are not included in drilling statistics reported by the API.

OPERATOR. An operator is an individual, partnership, or corporation that has legal authority to drill a well and operate a lease if production is found. The operator may actually drill the well or arrange for drilling to be done by a drilling contractor.

OUTPOST (EXTENSION) TEST. An outpost is a well located and drilled with the expectation of

extending for a considerable distance the productive area of a partly developed pool. It is usually two or more locations distant from the nearest productive site.

PLUGGED-BACK FOOTAGE. Under certain conditions, drilling operations may be continued to a greater depth than at which a potentially productive formation is found. If production is not established at the greater depth, the well may be completed in the shallower formation. Except in special situations, the length of the well bore from the deepest depth at which the well is completed to the maximum depth drilled is defined as "plugged-back footage."

Plugged-back footage is included in total footage drilled, but is not reported separately by the API.

REDRILL FOOTAGE. Occasionally a hole is lost or junked and a second hole may be drilled from the surface in close proximity to the first. Footage drilled for the second hole is defined as "redrill footage." Under these circumstances, the first hole is reported as a dry hole (exploratory or developmental) and the total footage is reported as dry hole footage. The second hole is reported as an oil well, gas well, or dry hole according to the result. The redrill footage is included in the appropriate classification of total footage, but is not reported as a separate classification by the API.

SERVICE WELL. A service well is a well drilled or completed for the purpose of supporting production in an existing field. Wells of this class are drilled for the following purposes:

1. Gas injection (natural gas, propane, butane, or flue-gas)
2. Water injection
3. Steam injection
4. Air injection
5. Salt water disposal
6. Water supply for injection
7. Observation
8. Injection for in-situ combustion

SHALLOWER-POOL TEST. A shallower-pool test is an exploratory well drilled in search of a new productive reservoir, unknown but possibly suspected from data secured from other wells, and shallower than known productive pools. The test is located within the productive area of a pool or pools, previously developed.

SIDETRACK DRILLING. Sidetrack drilling is a remedial operation which results in the creation of a new section of well bore for the purpose of (1) detouring around junk, (2) redrilling lost hole, or (3) straightening key seats and crooked holes.

STRATIGRAPHIC TEST. A stratigraphic test is a drilling effort, geologically directed, to obtain information pertaining to a specific geological condition that might lead toward the discovery of an accumulation of hydrocarbons. Such wells are customarily drilled without the intention of being completed for hydrocarbon production. This classification also includes tests identified as core tests and all types of expendable holes related to hydrocarbon exploration.

WATER WELL. A water well is a well drilled to (1) obtain a water supply to support drilling or plant operations, or (2) obtain a water supply to be used in connection with an improved recovery program.

Water wells of the first type are not reported. Water wells drilled in connection with an improved recovery program are reported as service wells.

WELL. A well is a hole drilled in the earth for the purpose of (1) finding or producing crude oil or natural gas; or (2) providing services related to the production of crude oil or natural gas.

Wells are classified as (1) oil wells; (2) gas wells; (3) dry holes; (4) stratigraphic tests; or (5) service wells.