

# Comparisons of Independent Petroleum Supply Statistics

by Robert G. Harper, III

## Introduction

The Petroleum Division (PD) of the Energy Information Administration (EIA) collects and publishes information on petroleum supply and disposition in the United States. The information is collected through a series of surveys that make up the Petroleum Supply Reporting System (PSRS). The PSRS data are published in the *Weekly Petroleum Status Report (WPSR)*, *Petroleum Supply Monthly (PSM)*, and the *Petroleum Supply Annual (PSA)*.

This article compares final petroleum data published in the *PSA* with similar petroleum data obtained from other sources. Data comparisons are presented for 1988 through 1997 for the following series: crude oil production, crude oil imports, motor gasoline supplied, distillate fuel oil supplied, and residual fuel oil supplied. Graphs were added in order to better portray the data similarities and data differences.

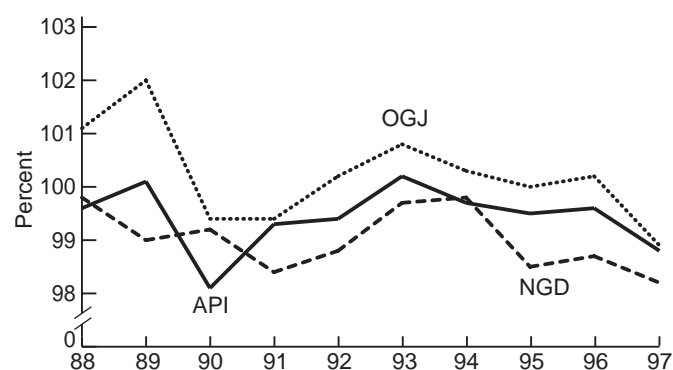
## Crude Oil Production

Crude oil production statistics (including those for lease condensate) from the American Petroleum Institute (API), the *Oil and Gas Journal (OGJ)*, and EIA's Natural Gas Division (NGD) are compared with statistics from the *Petroleum Supply Annual (PSA)* (Table FE1/Figure FE1). Data on crude oil production

published in the *PSA* are based on data collected by State government agencies as well as the Minerals Management Service (MMS) of the U.S. Department of the Interior, which collects data on crude oil produced on Federally-owned offshore leases.

Production estimates from API are also based on data provided by State government agencies. From 1988 through 1997, API crude

**Figure FE1. A Comparison of Crude Oil Production, 1988-1997 (As a Percent of PSA)**



Source: Energy Information Administration, *Petroleum Supply Annual*, Table FE1.

**Table FE1. A Comparison of Data Series for Crude Oil Production, 1988-1997**

Year	PSA	API		OGJ		NGD	
	Million Barrels	Million Barrels	Percent of PSA	Million Barrels	Percent of PSA	Million Barrels	Percent of PSA
1997	2,355	2,326	98.8	2,330	98.9	2,312	98.2
1996	2,366	2,356	99.6	2,370	100.2	2,335	98.7
1995	2,394	2,382	99.5	2,393	100.0	2,358	98.5
1994	2,431	2,424	99.7	2,438	100.3	2,425	99.8
1993	2,499	2,504	100.2	2,520	100.8	2,492	99.7
1992	2,625	2,608	99.4	2,630	100.2	2,593	98.8
1991	2,707	2,687	99.3	2,692	99.4	2,665	98.4
1990	2,685	2,634	98.1	2,668	99.4	2,663	99.2
1989	2,779	2,781	100.1	2,834	102.0	2,751	99.0
1988	2,979	2,967	99.6	3,013	101.1	2,973	99.8

Sources: PSA: *Petroleum Supply Annual*, 1988 through 1997, Table 2. API: American Petroleum Institute, *Monthly Statistical Report*, 1988 through 1997. OGJ: *Oil and Gas Journal*, 1988 through 1997. NGD: *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves Annual Report*, Crude Oil, 1988 through 1997, Table 6; Lease Condensate, 1988 through 1989, Table 15; 1990 through 1997, Table 16.

oil production statistics averaged within 0.63 percent of the *PSA* volumes. From 1996 to 1997, the API data difference increased from 0.4 percent below *PSA* numbers to 1.2 percent below *PSA* statistics.

Crude oil production estimates developed by the *Oil and Gas Journal* (OGJ) are based on data obtained from State conservation agencies and on historical State production levels. In 1996, OGJ statistics were 0.2 percent above *PSA* statistics, but, in 1997, OGJ difference increased to 1.1 percent below. For the 10-year period 1988 through 1997, the average absolute difference was 0.69 percent.

The NGD publishes the *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves Annual Report*. These crude oil production estimates are based on data from Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves." In 1997, data were received from a sample of 3,480 survey oil and gas well operators. The NGD's national production estimates for the 1997 data were 1.8 percent lower than comparable *PSA* volumes versus 1.3 percent lower than 1996 *PSA* volumes. However, over the 10-year period 1988 through 1997, the NGD and *PSA* statistics have remained in relatively close agreement, with an average absolute difference of only 0.99 percent.

The comparison of these data series does not show any major discrepancies between the four independent sources. However, minor differences could be due to revisions and late reporting by State agencies, the Minerals Management Service, and also by oil and gas well operators, which do not provide data or resubmissions.

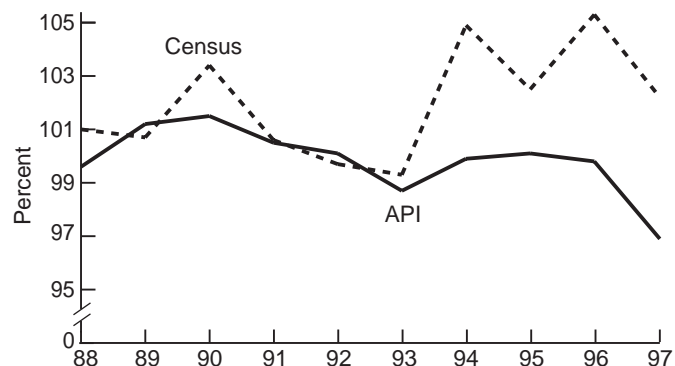
## Crude Oil Imports

Data on crude oil imports are collected on survey Form EIA-814, "Monthly Imports Report." Survey respondents to the form include all companies that import crude oil or petroleum products into the United States, Puerto Rico, the Virgin Islands, and other

U.S. possessions. However, for comparison purposes, statistics on imports into Puerto Rico, the Virgin Islands, and other U.S. possessions are excluded from this analysis. Approximately 208 respondents report on the Form EIA-814. The *PSA* statistics are compared with API and the U.S. Bureau of the Census (Census) statistics on crude oil imports (Table FE2/Figure FE2).

Since the API data on crude oil imports does not include crude oil imported by the Strategic Petroleum Reserve (SPR), data from the *PSA* on volumes of crude oil imported for the SPR were added to API data for comparison purposes. (See "Information on Data Source Differences and Adjustments.") In 1996, there was a 0.2 percent the difference between API and *PSA* statistics; however, in 1997, the absolute difference had increased to 3.1 percent. Over the 10-year period 1988 through 1997, the average absolute difference was only 0.85 percent. Annual crude oil imports rose above the 3 billion barrel mark for the first time in the 1997 *PSA* data.

**Figure FE2. A Comparison of Crude Oil Imports, 1988-1997 (As a Percent of PSA)**



Source: Energy Information Administration, *Petroleum Supply Annual*, Table FE2.

**Table FE2. A Comparison of Data Series for Crude Oil Imports into United States (Excluding U.S. Possessions), 1988-1997**

Year	PSA	API <sup>a</sup>		Census <sup>b</sup>	
	Million Barrels	Million Barrels	Percent of PSA	Million Barrels	Percent of PSA
1997	3,002	2,909	96.9	3,069	102.2
1996	2,748	2,743	99.8	2,894	105.3
1995	2,639	2,642	100.1	2,705	102.5
1994	2,578	2,576	99.9	2,704	104.9
1993	2,477	2,445	98.7	2,459	99.3
1992	2,226	2,229	100.1	2,220	99.7
1991	2,111	2,122	100.5	2,124	100.6
1990	2,151	2,184	101.5	2,224	103.4
1989	2,133	2,158	101.2	2,147	100.7
1988	1,869	1,861	99.6	1,888	101.0

<sup>a</sup>API statistics include PSA statistics for crude oil imported for the Strategic Petroleum Reserve.

<sup>b</sup>Census statistics are adjusted to reflect the geographic coverage and reporting period of the PSA.

Sources: PSA: *Petroleum Supply Annual*, 1988 through 1997, Table 2. API: American Petroleum Institute, *Monthly Statistical Report*, 1988 through 1997. Census: Bureau of the Census, FT-246, *Annual U.S. Imports for Consumption and General Imports*, 1988 through 1997.

The Bureau of the Census obtains data on crude oil imports from the U.S. Customs Service. (See “Information on Data Source Differences and Adjustments,” located on page xix). In order to import crude oil or petroleum products into the United States, either U.S. Customs Form CF-7501, “Entry Summary,” or U.S. Customs Form CF-7505, “Warehouse Withdrawal for Consumption,” must be filed. Those forms are processed, tabulated, and published in Census Bureau report FT-246, *Annual U.S. Imports for Consumption and General Imports*. Data on imports into Puerto Rico and other U.S. possessions are excluded from Census data. The Census data are adjusted for comparison purposes because their geographic coverage differs from that for the *PSA* data. In 1997, the adjusted Census data were 2.2 percent higher than the *PSA* annual volumes. The difference represents a 3.1 percent decrease over 1996 data, although the reason for the decrease is not readily apparent.

## Product Supplied

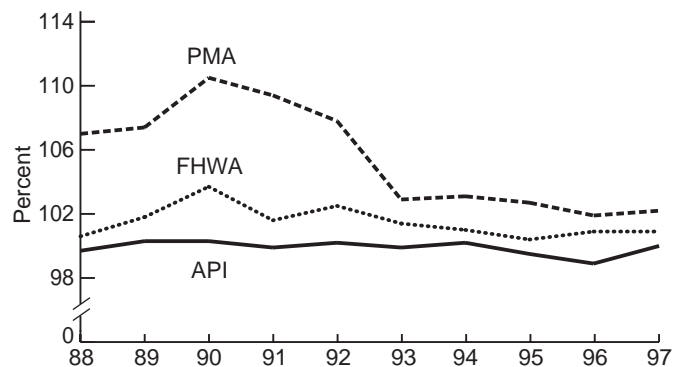
Product supplied, as reported in the *PSA*, is used to measure the volume of petroleum products available for domestic consumption. These data are generated for each petroleum product by adding field production, refinery production, and imports minus (-) stock change, refinery inputs, and exports. Product supplied measures the disappearance of products from primary sources, i.e., from refineries, natural gas processing plants, blending plants, pipelines, and bulk terminals.

## Motor Gasoline Supplied

*PSA* statistics on motor gasoline supplied are compared with data from the EIA’s Petroleum Division’s marketing surveys, the American Petroleum Institute (API), and the Federal Highway Administration (FHWA) (Table FE3/Figure FE3). PD Form EIA-782C, “Monthly Report of Prime Supplier Sales Volumes of Petroleum Products for Local Consumption,” is used to monitor

prime suppliers’ sales to local distributors, local retailers, or end users. These data are available electronically after 1994. The respondent universe consists of refiners and gas plant operators, importers, and resellers or retailers. Approximately 214 firms made up the EIA-782C survey frame. In 1997, the *PMA* volume of motor gasoline was 2.2 percent above the *PSA* volume, a 0.3 percent increase from 1996. Downstream blending is one major reason that *PMA* volumes for motor gasoline may be higher than *PSA* volumes. Blending of fuel ethanol and methyl tertiary butyl ether with unfinished gasoline often occurs downstream from refineries and, until 1993, may have been counted in the EIA-782C data, but omitted from the *PSA* data. Prior to 1993, double counting on the EIA-782C survey may have also contributed to the discrepancy between survey results. Since then, improved operating procedures have sharply reduced this problem.

**Figure FE3. A Comparison of Motor Gas Supplied, 1988-1997 (As a Percent of PSA)**



Source: Energy Information Administration, *Petroleum Supply Annual*, Table FE3.

**Table FE3. A Comparison of Data Series for Motor Gasoline Supplied for Domestic Use, 1988-1997**

Year	PSA		PMA		API		FHWA	
	Million Barrels	Million Barrels	Percent of PSA	Million Barrels	Percent of PSA	Million Barrels	Percent of PSA	
1997	2,926	2,991	102.2	2,927	100.0	2,952	100.9	
1996	2,888	2,942	101.9	2,856	98.9	2,913	100.9	
1995	2,843	2,919	102.7	2,829	99.5	2,854	100.4	
1994	2,774	2,861	103.1	2,780	100.2	2,801	101.0	
1993	2,729	2,807	102.9	2,725	99.9	2,768	101.4	
1992	2,660	2,867	107.8	2,666	100.2	2,726	102.5	
1991	2,623	2,870	109.4	2,621	99.9	2,665	101.6	
1990	2,641	2,919	110.5	2,650	100.3	2,739	103.7	
1989	2,675	2,873	107.4	2,683	100.3	2,722	101.8	
1988	2,685	2,874	107.0	2,678	99.7	2,702	100.6	

Sources: PSA: *Petroleum Supply Annual*, 1988 through 1997, Table 2. PMA: *Petroleum Marketing Annual*, 1988, Table 45; 1989 through 1993, Table 47; 1994 through 1997, Table 48. API: American Petroleum Institute, Monthly Statistical Report, 1988 through 1997. FHWA: Federal Highway Administration, Highway Statistics, 1988 through 1997, Tables MF-24 and MF-21.

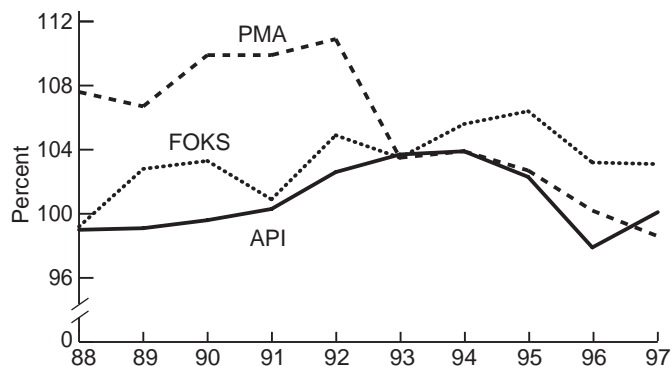
API statistics on motor gasoline delivered from primary storage are published in their *Monthly Statistical Report*. The API statistics are similar in concept to EIA's *product supplied*. The data represent *production plus imports* for motor gasoline (adjusted for net stock change) minus *exports*. Those statistics are based on an historical analysis of the industry and information provided on a voluntary basis by importers of record (licensed importers) and by operators of refineries, bulk terminals, and pipelines. For the 10-year period 1988 through 1997, API and *PSA* statistics averaged within 0.3 percent of each other.

Data from the FHWA on total gasoline usage are based on volumes of gasoline reported to State motor fuel tax agencies by wholesale distributors. The FHWA's publication "*Highway Statistics*" includes data on both highway and non-highway use of gasoline. To adjust for comparison purposes, aviation gasoline use is subtracted from the FHWA data by the EIA. FHWA statistics are consistently higher than the *PSA* statistics. However, in both 1996 and 1997, the difference between FHWA and *PSA* statistics was only 0.9 percent. For the 10-year period 1988 through 1997, the average difference between *PSA* and FHWA data was 1.5 percent.

## Distillate Fuel Oil Supplied

Statistics for distillate fuel oil (including kerosene) supplied from the *PSA* are compared with EIA's PMA data on distillate fuel oil sales collected from survey Form EIA-782C, "Monthly Report of Prime Supplier Sales Volumes of Petroleum Products for Local Consumption; Form EIA-821 "Annual Fuel Oil and Kerosene Sales Report;" and API data on distillate fuel oil delivered from primary storage (Table FE4/Figure FE4). Data on kerosene were discontinued in API's *Monthly Statistical Report*. To adjust for this, kerosene volumes from the *PSA* were added to API data for comparison purposes. API statistics on distillate fuel oil supplied

**Figure FE4. A Comparison of Distillate Supplied, 1988-1997 (As a Percent of PSA)**



Source: Energy Information Administration, *Petroleum Supply Annual*, Table FE4.

generally have been comparable to *PSA* statistics, having averaged within 1.7 percent of each other for the last ten years.

Until recently, the PMA statistics for prime suppliers' sales of distillate fuel oil and kerosene sold into States for consumption had been higher than the *PSA* statistics. However, in 1997, there was a 1.4 percent decrease between PMA and *PSA* data. For the last 10 years, the average absolute difference between *PSA* and PMA data was 5.7 percent. Double reporting on the EIA-782C survey is one reason that PMA sales are higher than *PSA* product supplied for distillate fuel oil prior to 1993. Another reason is the fungible nature of petroleum products. For example, if a product produced according to kerosene-type jet fuel specifications is sold as No. 1 distillate or kerosene, then the EIA-782C total distillate volumes would be greater than those of the *PSA*.

**Table FE4. A Comparison of Data Series for Distillate Fuel Oil (including Kerosene) Supplied, 1988-1997**

Year	PSA		PMA		FOKS		API <sup>a</sup>	
	Million Barrels	Million Barrels	Percent of PSA	Million Barrels	Percent of PSA	Million Barrels	Percent of PSA	
1997	1,278	1,260	98.6	1,318	103.1	1,279	100.1	
1996	1,254	1,257	100.2	1,294	103.2	1,228	97.9	
1995	1,170	1,202	102.7	1,245	106.4	1,197	102.3	
1994	1,154	1,199	103.9	1,219	105.6	1,199	103.9	
1993	1,128	1,167	103.5	1,168	103.5	1,170	103.7	
1992	1,090	1,209	110.9	1,140	104.9	1,118	102.6	
1991	1,083	1,190	109.9	1,093	100.9	1,086	100.3	
1990	1,118	1,229	109.9	1,155	103.3	1,114	99.6	
1989	1,183	1,262	106.7	1,216	102.8	1,172	99.1	
1988	1,178	1,268	107.6	1,168	99.2	1,166	99.0	

<sup>a</sup>API statistics include *PSA* statistics for kerosene for 1988 through 1997.

Sources: *PSA*: *Petroleum Supply Annual*, 1988 through 1997, Table 2. *PMA*: *Petroleum Marketing Annual*, 1988, Table 47; 1989 through 1993, Table 49; 1994 through 1997, Table 50. *Fuel Oil and Kerosene Sales Report*, 1988 through 1997. *API*: American Petroleum Institute, *Monthly Statistical Report*, 1988 through 1997.

**Table FE5. A Comparison of Data Series for Residual Fuel Oil Supplied for Domestic Use, 1988-1997**

Year	PSA	PMA		FOKS		API	
	Million Barrels	Million Barrels	Percent of PSA	Million Barrels	Percent of PSA	Million Barrels	Percent of PSA
1997	291	252	86.6	298	102.4	293	100.7
1996	311	252	81.0	316	101.6	304	97.7
1995	311	229	73.6	293	94.2	308	99.4
1994	373	304	81.5	353	94.6	354	94.9
1993	394	323	82.0	359	91.1	363	92.1
1992	401	387	96.5	386	96.3	380	94.8
1991	423	425	100.5	420	99.3	434	102.6
1990	449	445	99.1	458	102.0	452	100.7
1989	500	477	95.4	520	104.0	491	98.2
1988	504	475	94.2	517	102.6	490	97.2

Sources: PSA: *Petroleum Supply Annual*, 1988 through 1997, Table 2. PMA: *Petroleum Marketing Annual*, 1988, Table 46; 1989 through 1993, Table 48; 1994 through 1997, Table 49. *Fuel Oil and Kerosene Sales Report*, 1988 through 1997. API: American Petroleum Institute, Monthly Statistical Report, 1988 through 1997.

## Residual Fuel Oil Supplied

Product supplied data from the *PSA* for residual fuel oil are compared with *PMA* data on prime suppliers' sales of residual fuel oil, Form-821 Annual Fuel Oil and Kerosene Sales, and *API* data on residual fuel oil delivered (Table FE5/Figure FE5). The *PMA*

statistics for residual fuel oil are historically lower than the *PSA* statistics. A primary reason for the difference between *PMA* and *PSA* data may be because both PD Form EIA-782C, is a sales survey, with volumes based on transfer of ownership (equity basis), while *PSA* Form EIA-810 is a supply survey, with volumes reported on the basis of the amount of petroleum in custody,

## Information on Data Source Differences and Adjustments

**American Petroleum Institute:** In this article, *API*'s annual statistics are totals of initial monthly values. The initial monthly estimate published by *API* is derived from *API* sources. However, later *API* publications reflect revisions which make use of *EIA* data. *PSA* statistics on crude oil include imports for the Strategic Petroleum Reserve (*SPR*) while *API* statistics do not. Therefore, the following figures for *SPR* were added to the *API* figures: none in 1997, none in 1996, none in 1995, 4.5 millions barrels in 1994, 5.4 million barrels in 1993, 3.6 million barrels in 1992, none in 1991, 9.8 million barrels in 1990, 20.3 million barrels in 1989, and 18.8 million barrels in 1988. The *API* publishes monthly estimates of motor gasoline, distillate fuel oil and residual fuel oil delivered from primary storage in thousand barrels per day. However, the *API* discontinued publishing kerosene data in 1982. *PSA* values for kerosene supplied (24 million barrels 1997, 23 million barrels in 1996, 20 million barrels in 1995, 18 million barrels in 1994. 18 million barrels in 1993, 15 million barrels in 1992, 17 million barrels in 1991, 16 million barrels in 1990, 31 million barrels in 1989, and 35 million barrels in 1988) were added to *API* distillate totals.

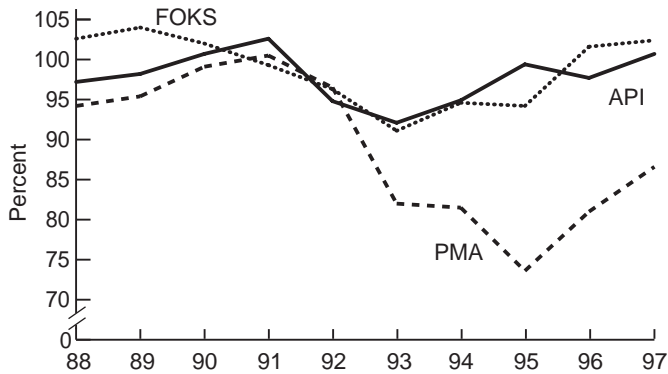
**Oil and Gas Journal:** The *Oil and Gas Journal* publishes weekly averages of crude oil production in thousand barrels per day. Those averages are used to produce monthly totals as follows: the average for each week is used as a daily production estimate for each of the days the week covers. For each month, the production estimates for days covered by the month are summed. The totals are converted from thousand to million barrels for this article.

**Federal Highway Administration:** Data on both highway and non-highway use of gasoline, excluding aviation gasoline, are from the *Highway Statistics* publication and are based on volumes of total gasoline usage.

**U.S. Bureau of the Census:** Since 1986, Census data have been available through the FT-246, *Annual U.S. Imports for Consumption and General Imports*. Imports into Puerto Rico and the Virgin Islands are included in the Census data but not in the *PSA* data. The Census excludes data on imports into the United States from Puerto Rico and the Virgin Islands.

**Petroleum Division:** *EIA*'s Petroleum Division data are from the Form EIA-782C, "Monthly Report of Prime Supplier Sales Volumes of Petroleum Products for Local Consumption." The prime supplier produces imports or transports product across State boundaries and local marketing areas and sells the product to local distributors, local retailers, or end users. The report on *Fuel Oil and Kerosene Sales* provides information and State-level data on end-use sales of distillate fuel oil, kerosene, and residual fuel oil.

**Figure FE5. A Comparison of Residual Supplied, 1988-1997 (As a Percent of PSA)**



Source: Energy Information Administration, *Petroleum Supply Annual*, Table FE5.

regardless of ownership (custody basis). Residual fuel oil imported by electric utilities for their own use may not be reported on Form EIA-782C because a transfer of ownership (sale) did not occur in the United States. The difference between *PSA* and *PMA* statistics had steadily declined from 5.8 percent in 1988 until 1991, when *PMA* statistics, were only 0.5 percent greater than *PSA*

statistics. However, in 1995, there was an 26.4 percent difference between *PMA* and *PSA* statistics, a difference which has since decreased to 19.0 in 1996, and 13.4 in 1997, respectively. For the 10-year period 1988 through 1997, the average absolute difference between *PSA* and *PMA* data was 11.1 percent. The *API* volumes of residual fuel oil supplied were close to *PSA* volumes over the same 10-year period, while the average absolute difference between *PSA* and *API* data is 3.0 percent.

## Conclusion

For comparison purposes, it must be recognized that differences probably will always exist given the various data collection processes employed by the respective organizations. The makeup of the sampling frames, the inclusion or exclusion of data from related survey forms, and how survey data are compiled or aggregated, are just three of the many reasons why the data from one survey may differ from those of another. Although *PSA* statistics were in relative proximity to other sources of petroleum data, the primary focus is to keep the data differences in perspective and within as narrow a range as possible. Future efforts will involve analysis of the differences as they relate to relevant issues, problems, or situations and how the data collection process may impact or be impacted by them.