

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 1989 through 1998 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.

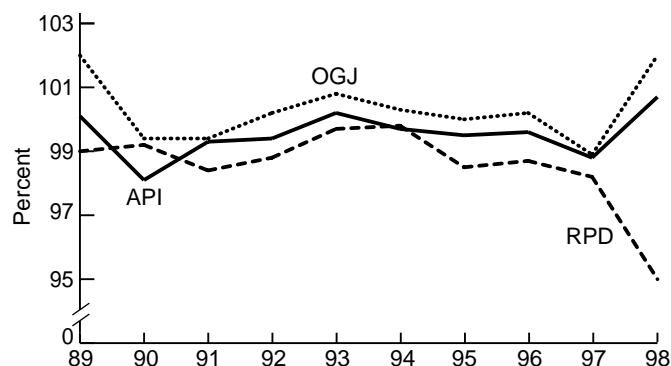
Crude Oil Production

Crude oil production statistics (including those for lease condensate) from the American Petroleum Institute (API), the *Oil and Gas Journal (OGJ)*, and EIA's Reserves and Production Division (RPD) 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 1989 through 1998, API crude

Figure FE1. A Comparison of Crude Oil Production, 1989-1998 (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, 1989-1998

| Year | PSA | API | | OGJ | | RPD | |
|------|-----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|
| | Million Barrels | Million Barrels | Percent of PSA | Million Barrels | Percent of PSA | Million Barrels | Percent of PSA |
| 1998 | 2,282 | 2,298 | 100.7 | 2,327 | 102.0 | 2,169 | 95.0 |
| 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 |

Sources: PSA: *Petroleum Supply Annual*, 1989 through 1998, Table 2. API: American Petroleum Institute, *Monthly Statistical Report*, 1989 through 1998. OGJ: *Oil and Gas Journal*, 1989 through 1998. RPD: *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves Annual Report*, Crude Oil, 1989 through 1998, Table 6; Lease Condensate, 1989, Table 15; 1990 through 1998, Table 16.

oil production statistics averaged within 0.66 percent of the *PSA* volumes. From 1997 to 1998, the API data difference decreased from 1.2 percent below *PSA* numbers to 0.7 percent above *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 1997, OGJ statistics were 1.1 percent below *PSA* statistics, but, in 1998, OGJ difference rose to 2.0 percent above. For the 10-year period 1989 through 1998, the average absolute difference was 0.78 percent.

The RPD 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 1998, data were received from a sample survey of 3,344 oil and gas well operators. The RPD's national production estimates for the 1998 data were 4.4 percent lower than comparable *PSA* volumes versus 1.8 percent lower than 1997 *PSA* volumes. However, over the 10-year period 1989 through 1998, the RPD and *PSA* statistics have remained in relatively close agreement, with an average absolute difference of only 1.5 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.

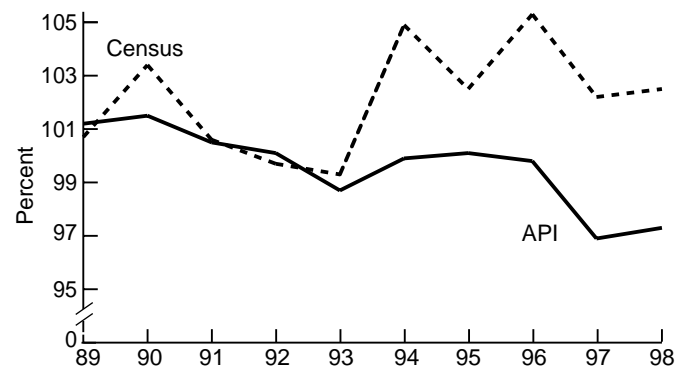
Crude Oil Imports

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 185 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," located on page xxxvi). In 1997, there was a 3.1 percent the difference between API and *PSA* statistics; however, in 1998, the difference had decreased to 2.7 percent. Over the 10-year period 1989 through 1997, the average absolute difference was 1.1 percent. For the second consecutive year, annual crude oil imports rose above the 3 billion barrel mark for the *PSA* data.

Figure FE2. A Comparison of Crude Oil Imports, 1989-1998 (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), 1989-1998

| Year | PSA | API ^a | | Census ^b | |
|------|-----------------|------------------|----------------|---------------------|----------------|
| | Million Barrels | Million Barrels | Percent of PSA | Million Barrels | Percent of PSA |
| 1998 | 3,178 | 3,092 | 97.3 | 3,258 | 102.5 |
| 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 |

^aAPI statistics include *PSA* statistics for crude oil imported for the Strategic Petroleum Reserve.

^bCensus statistics are adjusted to reflect the geographic coverage and reporting period of the *PSA*.

Sources: *PSA*: *Petroleum Supply Annual*, 1989 through 1998, Table 2. API: American Petroleum Institute, *Monthly Statistical Report*, 1989 through 1998. Census: Bureau of the Census, FT-246, *Annual U.S. Imports for Consumption and General Imports*, 1989 through 1998.

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 xxxvi). 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 1998, the adjusted Census data were 2.5 percent higher than the PSA annual volumes. The difference represents only a 0.3 percent increase over 1997 data, although the reason for the decrease is not readily apparent.

Product Supplied

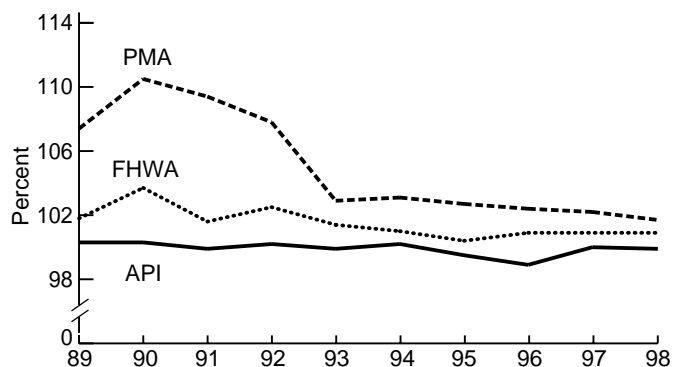
Product supplied, as reported in the PSA, is used to measure the volume of petroleum products available for domestic consumption. These data are generated for each petroleum product by adding field production, refinery production, and imports minus (-) stock change, refinery inputs, and exports. Product 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 published in the *Petroleum Marketing Annual* (PMA) and are available electronically after 1994. The respondent universe consists of refiners and gas plant operators, importers, and resellers or retailers. Approximately 202 firms made up the EIA-782C survey frame. In 1998, the PMA volume of motor gasoline was 1.7 percent above the PSA volume, a 0.5 percent decrease from 1997. 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. For the 10-year period 1989 through 1998, the average difference between PSA and PMA data was 5.0 percent.

Figure FE3. A Comparison of Motor Gas Supplied, 1989-1998 (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, 1989-1998

| Year | PSA | | PMA | | API | | FHWA | |
|------|-----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|--|
| | Million Barrels | Million Barrels | Percent of PSA | Million Barrels | Percent of PSA | Million Barrels | Percent of PSA | |
| 1998 | 3,012 | 3,064 | 101.7 | 3,008 | 99.9 | 3,039 | 100.9 | |
| 1997 | 2,926 | 2,991 | 102.2 | 2,927 | 100.0 | 2,952 | 100.9 | |
| 1996 | 2,888 | 2,958 | 102.4 | 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 | |

Sources: PSA: *Petroleum Supply Annual*, 1989 through 1998, Table 2. PMA: *Petroleum Marketing Annual*, 1989 through 1993, Table 47; 1994 through 1998, Table 48. API: American Petroleum Institute, *Monthly Statistical Report*, 1989 through 1998. FHWA: Federal Highway Administration, *Highway Statistics*, 1989 through 1998, 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 1989 through 1998, 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, since 1996, the difference between FHWA and *PSA* statistics has remained at 0.9 percent. For the 10-year period 1989 through 1998, 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;" (FOKS) 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 generally have been comparable to *PSA* statistics, having averaged within 1.7 percent of each other for the last ten years.

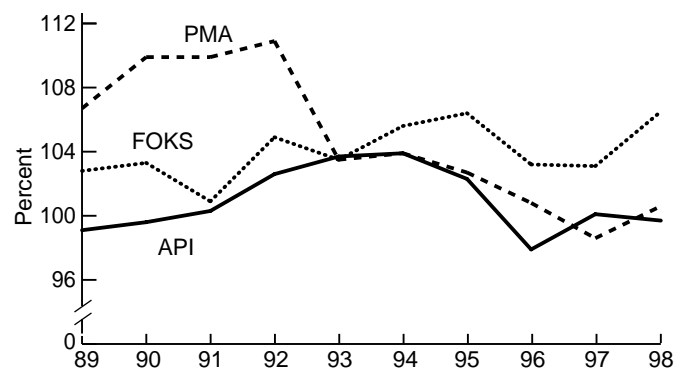
Table FE4. A Comparison of Data Series for Distillate Fuel Oil (including Kerosene) Supplied, 1989-1998

| Year | PSA | | PMA | | FOKS | | API ^a | |
|------|-----------------|----------------|-----------------|----------------|-----------------|----------------|------------------|----------------|
| | Million Barrels | Percent of PSA | Million Barrels | Percent of PSA | Million Barrels | Percent of PSA | Million Barrels | Percent of PSA |
| 1998 | 1,263 | 100.6 | 1,270 | 100.6 | 1,345 | 106.5 | 1,259 | 99.7 |
| 1997 | 1,278 | 98.6 | 1,260 | 98.6 | 1,318 | 103.1 | 1,279 | 100.1 |
| 1996 | 1,254 | 100.8 | 1,264 | 100.8 | 1,294 | 103.2 | 1,228 | 97.9 |
| 1995 | 1,170 | 102.7 | 1,202 | 102.7 | 1,245 | 106.4 | 1,197 | 102.3 |
| 1994 | 1,154 | 103.9 | 1,199 | 103.9 | 1,219 | 105.6 | 1,199 | 103.9 |
| 1993 | 1,128 | 103.5 | 1,167 | 103.5 | 1,168 | 103.5 | 1,170 | 103.7 |
| 1992 | 1,090 | 110.9 | 1,209 | 110.9 | 1,140 | 104.9 | 1,118 | 102.6 |
| 1991 | 1,083 | 109.9 | 1,190 | 109.9 | 1,093 | 100.9 | 1,086 | 100.3 |
| 1990 | 1,118 | 109.9 | 1,229 | 109.9 | 1,155 | 103.3 | 1,114 | 99.6 |
| 1989 | 1,183 | 106.7 | 1,262 | 106.7 | 1,216 | 102.8 | 1,172 | 99.1 |

^aAPI statistics include *PSA* statistics for kerosene for 1989 through 1998.

Sources: *PSA*: *Petroleum Supply Annual*, 1989 through 1998, Table 2. *PMA*: *Petroleum Marketing Annual*, 1989 through 1993, Table 49; 1994 through 1998, Table 50. *Fuel Oil and Kerosene Sales Report*, 1989 through 1998. API: American Petroleum Institute, *Monthly Statistical Report*, 1989 through 1998.

Figure FE4. A Comparison of Distillate Supplied, 1989-1998 (As a Percent of PSA)



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

The Fuel Oil And Kerosene Sales Report provides data on end-use sales of distillate fuel oil and kerosene. For the 10-year period 1989 through 1998, the average difference between *PSA* and FOKS data was 4.0 percent.

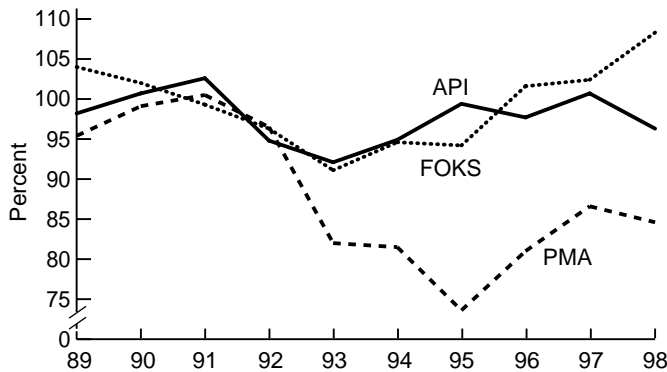
Until recently, the *PMA* statistics for prime suppliers' sales of distillate fuel oil and kerosene sold into States for consumption had been consistently higher than the *PSA* statistics. However, following a 1.4 percent decrease, between *PMA* and *PSA* data in 1997, there was only a 0.6 percent increase in 1998. For the last 10 years, the average absolute difference between *PSA* and *PMA* data was 5.0 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 FE5. A Comparison of Data Series for Residual Fuel Oil Supplied for Domestic Use, 1989-1998

| Year | PSA | PMA | | FOKS | | API | |
|------|-----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|
| | Million Barrels | Million Barrels | Percent of PSA | Million Barrels | Percent of PSA | Million Barrels | Percent of PSA |
| 1998 | 324 | 274 | 84.6 | 351 | 108.3 | 312 | 96.3 |
| 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 |

Sources: PSA: *Petroleum Supply Annual*, 1989 through 1998, Table 2. PMA: *Petroleum Marketing Annual*, 1989 through 1993, Table 48; 1994 through 1998, Table 49. *Fuel Oil and Kerosene Sales Report*, 1989 through 1998. API: American Petroleum Institute, *Monthly Statistical Report*, 1989 through 1998.

Figure FE5. A Comparison of Residual Supplied, 1989-1998 (As a Percent of PSA)



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

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, 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 increased from 4.5 percent in 1992 to 26.4 percent in 1995. Since then, the difference has narrowed to 15.4 percent in 1998. For the 10-year period 1989 through 1998, the average absolute difference between *PSA* and *PMA* data was 12.0 percent. The Fuel Oil And Kerosene Sales Report provides data on end-use sales of residual fuel oil. For the 10-year period 1989 through 1998, the difference between *PSA* and FOKS data averaged 4.3 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 3.1 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.

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 1998, none in 1997, none in 1996, none in 1995, 4.5 million barrels in 1994, 5.4 million barrels in 1993, 3.6 million barrels in 1992, none in 1991, 9.8 million barrels in 1990, and 20.3 million barrels in 1989. 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 (28 million barrels in 1998, 24 million barrels in 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 and 31 million barrels in 1989) 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.