**Attachment 1 to CBE's 27 September 2011 Comments to Air Resources Board**

## Part 1. Narrative



## Part 2. Data tables.

## Narrative description of the data

Annual average data for refinery groups. Weighted annual average refinery crude feed volume, density and sulfur content, process capacity, fuels, yield, capacity utilization, energy, and emissions data for California (2004–2009) and U.S. Petroleum Administration districts (PADDs) 1, 2, 3 and 5 are shown in Table 2-1. PADD 4 data were excluded based on observed anomalies that could not be resolved due in part to incomplete crude feed data reporting. These U.S. data were taken from recently published work that describes the U.S. data and PADD 4 anomaly in detail *(1)*.

The California Energy Commission (CEC) *(5)* reported annual average California crude feed volume data. California refinery crude feed quality data are discussed below. Refinery process capacities shown were volumes that could be processed during 24 hours after making allowances for types and grades of inputs and products, environmental constraints and scheduled downtime, from *Oil & Gas Journal (6)*.

Fuels consumed by California refineries shown in Table 2-1 for 2006–2009 were provided by the CEC *(7),* and those shown for 2004–2005 were provided by Air Resources Board (ARB) staff *(8)*. Errors in the 2006–2007 fuels data were discovered, investigated, and corrected by CEC staff during the data gathering effort for this project *(7)*. Table 2-1 includes the fuels data corrected and revised by CEC staff with one exception: For the "other products" fuel category, which accounts generally for only ~1% of refinery energy and emissions, CEC staff suspected an as-yet unresolved error in the 2006–2009 data reported *(7)*. Those suspect data were replaced for these years (2006–2009) in Table 2-1 with the 1999–2005 average of "other" fuels reported for California.

Although impacts of all U.S. refinery hydrogen demand required estimation *(1),* for California refineries the CEC data included energy consumed by refinery-owned hydrogen production *(7)*. The method used for U.S. refinery hydrogen was applied only to California refinery hydrogen purchased from third-party plants, and broken out as hydrogen purchased by California refineries ("$H_2$ purch.") or "third-party $H_2$ prod." in Table 2-1. This application of 90% capacity utilization, energy and emission factors for modern-design natural gas fed steam reforming *(1)* was conservative for California refineries given the evidence that they are generally hydrogen-limited *(9)* and the known use of naphtha steam reforming by some of them *(6)*. Independent emissions reports by third-party plants *(2)* supplying hydrogen to California refineries showed good agreement within 2–3%. Calculations for this third-party refinery hydrogen supply data check are shown in Table 2-2. Note that although these emissions are clearly related to steam reforming's great hydrocarbon fuel and feedstock consumption and high operating temperatures (~1500 ºF) *(9)*, most of the $CO_2$ emitted by this process forms in its shift reaction rather than as a direct product of combustion.

Products yield was calculated as defined by the U.S. Energy Information Administration (EIA) from California refinery input and output data reported by the CEC *(10, 11)*. Reporting inconsistencies for kerosene subcategories in 2009 that were identified during project data gathering were confirmed and corrected by CEC staff *(11)*. The kerosene and kerosene jet fuel yields for 2009 in Table 2-1 reflect those corrections. Utilization of operable refinery capacity for California was calculated as defined by EIA from the feed

volume *(5)* and atmospheric distillation capacity *(6)* data in Table 2-1. Annual average refinery capacity utilization 2004–2009 ranged 83–95%. Process-level capacity utilization was not otherwise reported, indicating a processing data limitation.

California refinery energy consumption and $CO_2$ emissions were calculated from fuels consumed and the same fuel-specific energy and emission factors used for the U.S. *(1)* except for the emission factor for electricity purchased from the grid. The U.S grid factor (187.78 kg/GJ) was replaced by the California factor (97.22 kg/GJ) to reflect the greater share of hydropower in the California grid purchases by these refiners. Emission factors applied to combustion of fuels, including both of these grid factors, were developed, documented and used by EIA for international reporting of U.S. emissions *(1, 12, 13)*.

Table 2-1 shows emissions by fuel energy (kg/GJ) and crude volume processed (kg/$m^3$). These emissions for California refineries (354–401 kg/$m^3$, 2004–2009), span previously reported S.F. Bay Area emissions (360 kg/$m^3$, 2008), which exceed reported average U.S. refinery emissions (277–315 kg/$m^3$, various years) for reasons that could be explained primarily by differences in crude feed quality *(1)*. These fuels-based emissions, however, may also exceed the average from California refineries' total from Mandatory GHG Reporting Rule (MRR) reports (351–354 kg/$m^3$ with purchased $H_2$, 2008–2009) *(2)*. It was not possible to account for that apparent discrepancy because data and calculation details for the MRR-reported emissions are kept secret from the public by ARB policy. The more transparently supported fuels consumption-based emissions estimates were used in quantitative analysis of average California refinery emissions for these reasons.

Average California refinery crude feed density and sulfur content was not previously reported *(1)*. EIA reported these data for U.S. PADDs and some other states but not for California *(14)*. California Petroleum Industry Information Act forms M13, M18 and A04 do not require these data to be reported. The ARB responded to a formal request by confirming that its staff could find no records related to these data *(15)*. These data were reported for the foreign crude streams processed at each facility monthly *(14)*. They were also reported for the Trans-Alaska pipeline stream from the Alaskan North Slope *(16),* but not for the average California-produced crude stream refined.

Because California-produced crude was not refined in appreciable amounts outside California *(17–20),* the quality of the California-produced stream refined statewide could be estimated based on that of total California production. The density and sulfur content of California crude feeds shown in Table 2-1 was calculated from these annual estimates for California-produced crude and the other crude streams refined in California by the standard weighted averaging method that is summarized in Table 2-3.

Public databases reported density and sulfur content data for most of the oil streams produced in California *(16, 21–24)*. Annual production volumes *(25)* were matched to the average of these reported density and sulfur data by field, and where data were reported, by area, formation, pool or zone. The matched data are shown in Table 2-4. Some 480–550 areas, pools, formations or zones produced crude among California oil fields annually 2004–2009; more than 99% of that total volume was matched to density measurements and 94–96% was matched to sulfur, 2004–2009. In light of the knowledge that the specific geologic conditions containing an oil deposit constrain its quality, this

measured coverage and large number of component streams (Table 2-4) provide support for the California-produced crude quality estimates shown in Table 2-3. However, the quality of crude produced from the same formation, zone and even well can vary to some extent over time, and individual refineries run crude of non-average quality. Reporting domestic refinery inputs in the way foreign inputs are reported would provide substantially better quality data for future analysis, especially facility-level analysis.

California facility-level data. Process capacities were reported in barrels per calendar day for each major fuels refinery and some of the smaller plants targeting other products in California, by *Oil & Gas Journal (6)*. These data are presented in Table 2-5. Capacity data were found to be aggregated among facilities in three cases. Two of these paired facilities were located near each other in Wilmington and Carson. In those cases the aggregated data are reported in Table 2-5.

In the third case, facilities reporting aggregated capacities were too distant (~250 miles) for integration of process energy flows, such as shared hydrogen and steam. In addition, these facilities had reported capacities separately to EIA *(14)* and had reported emissions separately to ARB *(2)*. Capacities of these two facilities, the ConocoPhillips Rodeo and Santa Maria refineries, were disaggregated by process-level comparisons between the *Oil & Gas Journal (6)* and EIA-reported data *(14)* to obtain capacities for each refinery in barrels/calendar day. The EIA data were not substituted directly because EIA reported capacities for most processes in barrels per stream day, which in general would provide less accurate indications of actual operation. Historic effluent discharge permits files for the Rodeo refinery provided a check on, and compared to, the disaggregated results.

Facilities were ranked by crude capacity (atmospheric crude distillation capacity) in Table 2-5 to facilitate visual inspection of the data. The larger facilities from the top through most of the vertical span of the table are California's fuel refiners: smaller facilities at the bottom of the table largely target different products or intermediates. Hydrotreating of gas oil, residua and oils to be fed into catalytic cracking units is tabulated separately from product hydrotreating to reflect a distinction among refinery processes perhaps first articulated by *Speight (29)*. The first six processes shown in the table[1] are the primary processes acting on crude and its denser gas oil and residual oil components; product hydrotreating and the following half-dozen processes act on the unfinished products from those primary or "crude stream" processes *(29, 1)*. Primary processing capacity was concentrated among the large fuels refineries in California.

Emission intensities of individual California fuels refineries were estimated by adding excluded emissions associated with hydrogen to refinery emissions reported under California's Mandatory GHG Emissions Reporting Rule (MRR), and comparing mass emitted against the facility's atmospheric distillation capacity (Table 2-5). This was necessary because facility-level fuel consumption, crude feed volume, and products yield data were not reported, and MRR reporting excluded much of the emissions from making hydrogen used by refineries from refinery emission reports.

[1] Atmospheric distillation, vacuum distillation, coking and thermal cracking, catalytic cracking, hydrocracking, and hydrotreating of gas oil, residua and catalytic cracking unit feeds.

Refiners did not report emissions from hydrogen production they relied upon through purchase agreements with nearby third-party producers under MRR; those emissions were reported separately by the third-party hydrogen plants *(2)*. Refiners did, however, report the third party hydrogen capacity asset they had secured to *Oil & Gas Journal (6)*. Those reported capacities compare reasonably well to emissions from the third-party plants reported in 2008 and 2009 under the MRR (Table 2-2). During this period the facilities reporting third-party hydrogen supply and their third-party suppliers were co-located: in the northeastern S.F. Bay Area; and in a stretch of the Los Angeles Area from El Segundo to Wilmington in *(2, 6)*. Third-party hydrogen emissions were assigned to refiners in proportion to their reported reliance on that hydrogen in each region. The calculation is shown with estimated facility emission intensity results in Table 2-6.

Average California refinery capacity utilization rates and MRR-reported emissions approaching but less than 100% of reported capacity and fuels emissions implied both the potential for underestimation of facility-level emissions intensities for some refineries, and constraints on the magnitude of that error for the facility data set as a whole. Table 2-6 results were accepted, conditioned on this uncertainty, to account for facility-level variability that could otherwise be obscured by focus on statewide averages alone, and because better facility estimates were unavailable due to limitations in reported data.

Crude feed quality data reported at the facility level were sparse at best. Although EIA reported the density and sulfur content of all foreign-sourced crude refined by each facility *(14),* these data were not reported for domestically produced crude inputs to facilities. Foreign crude volumes refined *(14)* remained significantly smaller than atmospheric distillation capacities (Table 2-5) for the major California fuels refineries 2004–2009, indicating that these facilities processed Californian and/or Alaskan crude as a significant or substantial portion of their feeds. Nonreporting of crude feed quality was thus a major limitation in the data. This lack of domestic crude feed quality reporting at refineries contrasted with the public reporting of density and sulfur measurements for nearly all of the crude streams refined in California (tables 2-3, 2-4) *before* the oil passed through the refinery gate.

Site-specific supply logistics allowed crude streams of known quality to be traced to S.F. Bay Area refineries by volume. Bay Area refineries received crude from well reported foreign sources *(14),* adequately documented Alaska North Slope (ANS) crude blends *(16)* delivered by ship from the TAPs pipeline terminus, and via a pipeline carrying a blend of the crude oils produced in California's San Joaquin Valley *(1, 5, 19, 20, 26)*. Recently published work apportioned those crude supply streams among facilities to derive crude feed density and sulfur estimates that supported an emission prediction which compared well to that independently reported for 2008 by Bay Area refineries *(1)*. This project built on that previous work.

San Joaquin Valley (SJV) crude supply data gathered for 2008 (Table 2-4) matched density and sulfur content measurements to 99.9% and 98.8%, respectively, of the total crude volume produced by 489 production streams in the SJV. These data were used to update the weighted average density and sulfur content of the SJV pipeline stream. The same ANS data used for the California average, which was from in the TAPs pipeline terminus at Valdez *(16),* was applied to the Bay Area ANS stream as well. Weighted

averages of the SJV, ANS and foreign streams were taken to estimate Bay Area refineries' crude feed quality. The calculations are shown in Table 2-7.

A crude feed mixing analysis was performed by the same method used to assess the adequacy of crude feed quality data in recently published work *(1)*. Gravity (density) and sulfur content are among the most widely used indicators for crude value, and are used to price crudes, largely because they are general predictors for other characteristics of oil that affect its processing for fuels production. Density and sulfur correlate roughly with distillation yield and with asphaltic, nitrogen, nickel and vanadium among well-mixed blends of crude oils from various locations and geologies *(1, 28, 29)*. California crude feeds 2004–2009 were found to be roughly as well mixed as those shown to be adequately mixed to support predictions of processing, energy, and emission effects among U.S. PADDs 1, 2, 3 and 5 *(1)* (Table 2-8). This supported the adequacy of the California crude feed density and sulfur data for purposes of the analysis targeted here.

Refinery capacity utilization, light liquids/other products ratios and fuel mix emission intensities were not available at the regional and facility levels because crude volume processed, products yield, and fuels consumption by refineries were not reported at the regional and facility levels, for California refineries. Previous work addressed this data limitation, as it applies to predictions based on available data, by assigning the most representative available average reported among U.S. PADDs, as in the Bay Area emissions prediction referenced above *(1)*. The California average data gathered by the project allowed this proxy to be refined to some extent by applying the 2008 California average data to the S.F. Bay Area region. Facility-level analysis for Bay Area refineries conservatively assumed the full variability observed among all regions and years.

Data adequacy overview. For California refineries as a group, the quality of data that could be found from verifiable public reports was adequate but poorly accessible. The errors found and addressed as disclosed above were judged to reflect the intensity of data validation effort rather than a departure from the typical—and perhaps inevitable—error rate for data sets of this kind. At the facility level, however, data quality was poor: Feed volume, fuels usage, products yield and emissions verification data as well as crude feed density and sulfur content for most refineries were not reported. The need for attention to refinery crude feed quality reporting and documentation beyond this project, perhaps obvious from the foregoing, appears urgent. This assessment applies to publicly reported data for the parameters identified above: confidential, proprietary, or otherwise secret data are not publicly verifiable and were not used.

Validation that the data adequately describe refinery emissions performance across regions accounted for the limited quantity of California data that could be gathered and the potential for nonlinear relationships among causal drivers of emissions. PADD 5 data were excluded for years when California data were included in the comparison mode of regression analyses because California is part of PADD 5. An attempt to balance observation counts among regions by subsampling the data led to a relatively small analysis sample (N = 24). Results from that too-small sample were discarded and were not used in the analysis. Instead, California (2004–2009) and PADD 5 (1999–2003) data were resampled to balance data counts among regions without excluding any PADDs 1–3

data (1999–2008) from the sample analyzed (N = 52). Analysis was by nonparametric regression to account for nonlinear relationships among causal factors. Refinery emission intensity, energy intensity, crude feed density and sulfur, fuel mix emission intensity, light liquids/other products ratio, primary processing capacity, and capacity utilization were analyzed in the comparison mode of the model. Residuals from these analyses appeared normal (Shapiro-Wilk; Anderson-Darling; Lilliefors; Jarque-Bera tests, $\alpha$ 0.05). Results supported consistent relationships among causal factors across regions. Crude quality and products could explain 97% of variability in energy intensity and 96% of variability in emissions, and observed and predicted values differed by ≤ 4% for California refineries and ≤ 9% for all refining regions in all cases. Crude quality alone could explain 92% of variability in emissions, and observed and predicted values differed by ≤ 6% for California and ≤ 11% for all regions in all cases. Data inputs and results are shown in Table 2-9.

Emission measurement warrants explicit attention. Briefly: Applying emission factors developed from measurements taken elsewhere to a new, unmeasured source requires many assumptions. Direct sampling and analysis of samples taken at the points of emission—in cases where it was done well—has demonstrated that errors related to those assumptions render the "emission factor" approach inaccurate or unreliable for pollutants that vary dramatically with combustion conditions. Best practices for assessing such emissions apply emission factors to known activity rates, such as the types and amounts of fuels burned, only where direct sampling measurements are not available or suspect. Direct measurement of emissions is the best practice and should be required and reported.

The assumption of constant combustion conditions is prone to relatively smaller errors, however, when applied to combustion products that dominate the emission stream and vary proportionately little with typical combustion variability, such as $CO_2$. Importantly, $CO_2$ predominates among greenhouse gases in refinery emissions, accounting for more than 98% of emitted $CO_2e$ in 100-year horizon assessments *(1, 2)*. Thus, the application of appropriate emission factors to accurate fuels data is relatively, and perhaps uniquely, accurate and reliable for the pollutant of main interest in the present analysis. This is fortunate, since comprehensive direct measurements of refinery emissions have not yet been required or reported.

## Part 2. Data.

**Table 2-1. Oil refining data, California (2004–2009); U.S. PADDs 1, 2, 3 and 5 (1999–2008)**

| | | Refinery crude inputs | | | | Refinery process capacity | | |
|---|---|---|---|---|---|---|---|---|
| California refineries | | Feed volume ($m^3/d \times 10^3$) | Density ($kg/m^3$) | Sulfur ($kg/m^3$) | Source countries | Atm. dist. ($m^3/d \times 10^3$) | Vacuum dist. ($m^3/d \times 10^3$) | Coking & therm. ($m^3/d \times 10^3$) |
| Calif. | 2004 | 285.239 | 899.23 | 11.46 | 20 | 306.623 | 177.001 | 77.331 |
| Calif. | 2005 | 293.702 | 900.56 | 11.82 | 24 | 309.167 | 177.621 | 77.729 |
| Calif. | 2006 | 285.519 | 899.56 | 11.73 | 22 | 312.028 | 181.548 | 77.967 |
| Calif. | 2007 | 278.419 | 899.84 | 11.89 | 26 | 315.288 | 183.535 | 79.573 |
| Calif. | 2008 | 285.636 | 902.00 | 12.85 | 23 | 313.972 | 185.093 | 78.452 |
| Calif. | 2009 | 263.568 | 901.38 | 11.70 | 21 | 318.010 | 189.099 | 78.611 |
| Energy factor | | -- | -- | -- | -- | -- | -- | -- |
| $CO_2$ emission factor (kg/GJ) | | -- | -- | -- | -- | -- | -- | -- |

| | | Refinery crude inputs | | | | Refinery process capacity | | |
|---|---|---|---|---|---|---|---|---|
| U.S. refineries PADD | Year | Feed volume ($m^3/d \times 10^3$) | Density ($kg/m^3$) | Sulfur ($kg/m^3$) | Source countries | Atm. dist. ($m^3/d \times 10^3$) | Vacuum dist. ($m^3/d \times 10^3$) | Coking & therm. ($m^3/d \times 10^3$) |
| 1 | 1999 | 244.363 | 858.20 | 8.24 | 24 | 243.648 | 98.020 | 14.198 |
| 1 | 2000 | 247.543 | 860.18 | 8.00 | 23 | 245.922 | 97.213 | 14.404 |
| 1 | 2001 | 235.460 | 866.34 | 7.71 | 19 | 249.578 | 96.577 | 14.086 |
| 1 | 2002 | 242.456 | 865.71 | 7.45 | 20 | 252.217 | 97.424 | 14.420 |
| 1 | 2003 | 251.836 | 863.44 | 7.43 | 21 | 250.750 | 99.745 | 14.484 |
| 1 | 2004 | 249.610 | 865.44 | 7.79 | 21 | 250.246 | 99.741 | 14.484 |
| 1 | 2005 | 254.221 | 863.38 | 7.17 | 22 | 252.631 | 101.497 | 14.484 |
| 1 | 2006 | 236.255 | 864.12 | 7.17 | 21 | 252.631 | 101.490 | 14.484 |
| 1 | 2007 | 234.188 | 864.33 | 7.26 | 24 | 252.631 | 101.490 | 14.484 |
| 1 | 2008 | 221.151 | 863.65 | 7.08 | 24 | 252.631 | 101.490 | 14.484 |
| 2 | 1999 | 536.264 | 858.25 | 10.64 | 15 | 570.946 | 232.722 | 58.801 |
| 2 | 2000 | 542.147 | 860.03 | 11.35 | 16 | 569.841 | 236.251 | 60.978 |
| 2 | 2001 | 526.089 | 861.33 | 11.37 | 15 | 564.271 | 229.892 | 61.312 |
| 2 | 2002 | 511.621 | 861.02 | 11.28 | 20 | 557.754 | 225.920 | 56.983 |
| 2 | 2003 | 512.575 | 862.80 | 11.65 | 16 | 555.868 | 226.693 | 56.122 |
| 2 | 2004 | 524.817 | 865.65 | 11.86 | 20 | 555.281 | 229.605 | 58.178 |
| 2 | 2005 | 526.884 | 865.65 | 11.95 | 23 | 564.648 | 236.887 | 59.623 |
| 2 | 2006 | 526.089 | 865.44 | 11.60 | 20 | 565.065 | 238.954 | 59.480 |
| 2 | 2007 | 514.801 | 864.07 | 11.84 | 17 | 578.730 | 231.688 | 60.315 |
| 2 | 2008 | 515.755 | 862.59 | 11.73 | 16 | 579.803 | 234.657 | 59.226 |
| 3 | 1999 | 1,116.890 | 869.00 | 12.86 | 33 | 1,234.340 | 575.734 | 154.933 |
| 3 | 2000 | 1,130.240 | 870.29 | 12.97 | 31 | 1,234.360 | 591.069 | 164.981 |
| 3 | 2001 | 1,156.000 | 874.43 | 14.34 | 28 | 1,236.250 | 581.572 | 173.182 |
| 3 | 2002 | 1,127.860 | 876.70 | 14.47 | 33 | 1,258.170 | 574.493 | 187.174 |
| 3 | 2003 | 1,160.130 | 874.48 | 14.43 | 30 | 1,268.770 | 584.170 | 193.899 |
| 3 | 2004 | 1,191.450 | 877.79 | 14.40 | 33 | 1,280.320 | 604.415 | 200.467 |
| 3 | 2005 | 1,145.350 | 878.01 | 14.40 | 36 | 1,323.230 | 596.821 | 198.973 |
| 3 | 2006 | 1,172.530 | 875.67 | 14.36 | 41 | 1,333.830 | 598.501 | 201.898 |
| 3 | 2007 | 1,176.820 | 876.98 | 14.47 | 37 | 1,341.890 | 610.544 | 209.377 |
| 3 | 2008 | 1,118.790 | 878.66 | 14.94 | 36 | 1,337.700 | 614.105 | 210.458 |
| 5 | 1999 | 419.726 | 894.61 | 11.09 | 24 | 494.843 | 231.722 | 95.944 |
| 5 | 2000 | 430.856 | 895.85 | 10.84 | 23 | 498.357 | 231.523 | 97.144 |
| 5 | 2001 | 442.621 | 893.76 | 10.99 | 26 | 495.424 | 236.920 | 97.574 |
| 5 | 2002 | 447.867 | 889.99 | 10.86 | 27 | 484.218 | 234.193 | 98.337 |
| 5 | 2003 | 456.612 | 889.10 | 10.94 | 29 | 489.237 | 235.966 | 96.712 |
| 5 | 2004 | 454.863 | 888.87 | 11.20 | 28 | 487.232 | 234.784 | 96.950 |
| 5 | 2005 | 460.904 | 888.99 | 11.38 | 27 | 491.044 | 235.377 | 97.348 |
| 5 | 2006 | 456.930 | 887.65 | 10.92 | 30 | 494.415 | 239.304 | 97.586 |
| 5 | 2007 | 443.734 | 885.54 | 11.07 | 30 | 496.090 | 240.310 | 100.035 |
| 5 | 2008 | 447.390 | 890.16 | 12.11 | 30 | 497.296 | 244.113 | 97.928 |
| Energy factor | | -- | -- | -- | -- | -- | -- | -- |
| $CO_2$ emission factor (kg/GJ) | | -- | -- | -- | -- | -- | -- | -- |

*Data sources given in part 1 narrative description of data*

**Table 2-1. Oil refining data, Calif. (2004–2009); PADDs 1, 2, 3 and 5 (1999–2008) *continued***

| California refineries | | Refinery process capacity, *continued* Cat. cracking ($m^3/d \times 10^3$) | Hydrocracking ($m^3/d \times 10^3$) | 1º hydrotreating ($m^3/d \times 10^3$)[a] | 2º hydrotreating ($m^3/d \times 10^3$)[a] | Reforming ($m^3/d \times 10^3$) | Alkylation ($m^3/d \times 10^3$) |
|---|---|---|---|---|---|---|---|
| Calif. | 2004 | 103.437 | 68.436 | 80.384 | 187.621 | 63.706 | 25.470 |
| Calif. | 2005 | 103.437 | 69.644 | 80.416 | 186.762 | 63.865 | 25.883 |
| Calif. | 2006 | 105.663 | 76.020 | 78.190 | 198.146 | 68.380 | 27.950 |
| Calif. | 2007 | 108.488 | 77.729 | 81.608 | 192.001 | 69.207 | 27.950 |
| Calif. | 2008 | 106.866 | 77.729 | 80.098 | 193.848 | 68.635 | 27.704 |
| Calif. | 2009 | 104.951 | 80.233 | 80.098 | 193.419 | 68.635 | 27.918 |
| Energy factor | | -- | -- | -- | -- | -- | -- |
| $CO_2$ emission fa | | -- | -- | -- | -- | -- | -- |

| U.S. refineries PADD | Year | Refinery process capacity, *continued* Cat. cracking ($m^3/d \times 10^3$) | Hydrocracking ($m^3/d \times 10^3$) | 1º hydrotreating ($m^3/d \times 10^3$)[a] | 2º hydrotreating ($m^3/d \times 10^3$)[a] | Reforming ($m^3/d \times 10^3$) | Alkylation ($m^3/d \times 10^3$) |
|---|---|---|---|---|---|---|---|
| 1 | 1999 | 104.757 | 6.662 | 13.196 | 128.255 | 45.667 | 12.821 |
| 1 | 2000 | 107.984 | 6.662 | 13.196 | 124.595 | 44.675 | 13.457 |
| 1 | 2001 | 99.240 | 6.805 | 7.154 | 130.303 | 44.834 | 12.813 |
| 1 | 2002 | 98.989 | 6.024 | 21.311 | 122.137 | 45.276 | 12.923 |
| 1 | 2003 | 98.273 | 6.024 | 14.729 | 137.793 | 45.483 | 12.899 |
| 1 | 2004 | 98.270 | 6.026 | 14.770 | 135.131 | 46.488 | 12.900 |
| 1 | 2005 | 99.701 | 6.026 | 14.770 | 132.269 | 46.806 | 13.355 |
| 1 | 2006 | 99.701 | 6.153 | 7.043 | 139.933 | 46.806 | 13.347 |
| 1 | 2007 | 99.701 | 6.153 | 7.043 | 140.569 | 46.806 | 13.347 |
| 1 | 2008 | 99.701 | 6.153 | 7.043 | 140.569 | 46.806 | 13.347 |
| 2 | 1999 | 193.249 | 25.327 | 71.258 | 299.120 | 135.335 | 39.270 |
| 2 | 2000 | 191.890 | 25.327 | 60.988 | 315.480 | 137.696 | 39.588 |
| 2 | 2001 | 188.217 | 23.864 | 54.008 | 329.612 | 134.351 | 39.397 |
| 2 | 2002 | 186.884 | 24.341 | 71.767 | 314.399 | 133.572 | 38.922 |
| 2 | 2003 | 184.753 | 24.103 | 73.551 | 348.438 | 133.391 | 38.347 |
| 2 | 2004 | 182.678 | 21.908 | 82.141 | 351.570 | 132.471 | 38.067 |
| 2 | 2005 | 185.546 | 27.982 | 83.301 | 380.895 | 133.677 | 39.844 |
| 2 | 2006 | 185.375 | 30.653 | 79.374 | 390.126 | 133.474 | 39.908 |
| 2 | 2007 | 180.097 | 37.012 | 79.295 | 385.279 | 134.603 | 39.113 |
| 2 | 2008 | 186.759 | 36.519 | 84.398 | 368.902 | 129.722 | 38.707 |
| 3 | 1999 | 431.654 | 112.650 | 186.378 | 640.377 | 273.083 | 86.019 |
| 3 | 2000 | 434.341 | 115.131 | 191.902 | 658.996 | 277.296 | 85.988 |
| 3 | 2001 | 449.640 | 118.422 | 159.000 | 704.826 | 268.398 | 85.139 |
| 3 | 2002 | 460.097 | 121.379 | 185.875 | 704.153 | 272.336 | 98.062 |
| 3 | 2003 | 458.206 | 113.588 | 213.565 | 763.848 | 270.876 | 89.818 |
| 3 | 2004 | 461.255 | 118.684 | 222.562 | 823.819 | 275.175 | 105.136 |
| 3 | 2005 | 464.750 | 114.391 | 221.912 | 874.860 | 268.593 | 91.440 |
| 3 | 2006 | 466.316 | 114.471 | 223.013 | 906.027 | 268.569 | 92.526 |
| 3 | 2007 | 467.278 | 120.589 | 247.174 | 910.060 | 274.583 | 89.071 |
| 3 | 2008 | 473.112 | 118.426 | 229.097 | 940.388 | 270.910 | 91.786 |
| 5 | 1999 | 126.300 | 80.888 | 96.299 | 215.884 | 87.627 | 29.279 |
| 5 | 2000 | 127.174 | 81.190 | 83.468 | 226.261 | 88.486 | 41.806 |
| 5 | 2001 | 126.951 | 81.921 | 86.139 | 226.419 | 89.499 | 29.325 |
| 5 | 2002 | 127.680 | 81.921 | 94.725 | 218.206 | 88.330 | 29.993 |
| 5 | 2003 | 126.037 | 80.432 | 80.527 | 239.567 | 88.473 | 31.138 |
| 5 | 2004 | 127.166 | 81.378 | 81.513 | 247.651 | 88.953 | 31.185 |
| 5 | 2005 | 127.619 | 82.586 | 81.545 | 246.430 | 89.462 | 31.527 |
| 5 | 2006 | 130.258 | 88.961 | 79.319 | 257.416 | 94.001 | 33.594 |
| 5 | 2007 | 133.322 | 92.213 | 82.737 | 260.238 | 96.338 | 33.618 |
| 5 | 2008 | 131.700 | 91.243 | 81.227 | 261.749 | 94.733 | 33.371 |
| Energy factor | | -- | -- | -- | -- | -- | -- |
| $CO_2$ emission fa | | -- | -- | -- | -- | -- | -- |

*Data sources given in part 1 narrative description of data*

(a) Primary processing (1º) of gas oil, residua and cat. cracking feeds or secondary processing (2º) of product streams

**Table 2-1. Oil refining data, Calif. (2004–2009); PADDs 1, 2, 3 and 5 (1999–2008) *continued***

| | | Refinery process capacity, *continued* | | | | | | |
|---|---|---|---|---|---|---|---|---|
| California refineries | | Pol./Dim. ($m^3/d \times 10^3$) | Aromatics ($m^3/d \times 10^3$) | Isomerization ($m^3/d \times 10^3$) | Lubes ($m^3/d \times 10^3$) | Asphalt ($m^3/d \times 10^3$) | Sulfur ($kg/d \times 10^5$) | $H_2$ (total) ($m^3 \times 10^8$) |
| Calif. | 2004 | 1.542 | 0.000 | 24.166 | 2.862 | 6.598 | 37.780 | 131.542 |
| Calif. | 2005 | 1.653 | 0.000 | 24.842 | 2.862 | 6.836 | 38.080 | 132.523 |
| Calif. | 2006 | 1.956 | 0.000 | 26.893 | 3.180 | 6.598 | 41.990 | 142.094 |
| Calif. | 2007 | 1.442 | 0.000 | 25.176 | 3.180 | 6.836 | 39.030 | 145.030 |
| Calif. | 2008 | 1.442 | 0.000 | 24.678 | 3.180 | 6.836 | 42.090 | 145.030 |
| Calif. | 2009 | 1.442 | 0.000 | 24.682 | 3.180 | 9.778 | 44.040 | 145.030 |
| Energy factor | | -- | -- | -- | -- | -- | -- | |
| $CO_2$ emission fa | | -- | -- | -- | -- | -- | -- | |

| | | Refinery process capacity, *continued* | | | | | | |
|---|---|---|---|---|---|---|---|---|
| U.S. refineries PADD | Year | Pol./Dim. ($m^3/d \times 10^3$) | Aromatics ($m^3/d \times 10^3$) | Isomerization ($m^3/d \times 10^3$) | Lubes ($m^3/d \times 10^3$) | Asphalt ($m^3/d \times 10^3$) | Sulfur ($kg/d \times 10^5$) | $H_2$ (total) ($m^3 \times 10^8$) |
| 1 | 1999 | 2.836 | 8.611 | 4.473 | 3.685 | 10.334 | 9.210 | 11.783 |
| 1 | 2000 | 2.836 | 8.515 | 4.309 | 3.005 | 4.611 | 9.210 | 14.056 |
| 1 | 2001 | 2.121 | 8.515 | 5.262 | 3.005 | 4.611 | 8.560 | 11.576 |
| 1 | 2002 | 2.121 | 8.515 | 6.105 | 2.989 | 4.452 | 12.650 | 10.232 |
| 1 | 2003 | 2.121 | 8.515 | 8.685 | 2.989 | 4.452 | 13.010 | 15.090 |
| 1 | 2004 | 2.121 | 8.515 | 8.776 | 3.005 | 4.452 | 13.010 | 15.090 |
| 1 | 2005 | 2.121 | 8.515 | 8.776 | 3.005 | 4.452 | 13.190 | 15.297 |
| 1 | 2006 | 2.121 | 8.515 | 8.780 | 3.005 | 4.452 | 13.190 | 17.364 |
| 1 | 2007 | 2.121 | 8.515 | 8.780 | 3.005 | 4.452 | 12.850 | 13.333 |
| 1 | 2008 | 2.121 | 8.515 | 8.780 | 3.005 | 4.452 | 12.850 | 13.333 |
| 2 | 1999 | 2.083 | 9.242 | 27.958 | 2.639 | 34.930 | 44.360 | 44.237 |
| 2 | 2000 | 2.083 | 9.235 | 27.640 | 2.639 | 37.632 | 44.020 | 44.030 |
| 2 | 2001 | 2.083 | 9.235 | 27.568 | 2.639 | 36.170 | 44.250 | 47.751 |
| 2 | 2002 | 1.361 | 8.876 | 26.983 | 2.766 | 36.678 | 46.720 | 43.926 |
| 2 | 2003 | 1.359 | 8.876 | 28.634 | 2.766 | 37.267 | 48.180 | 40.619 |
| 2 | 2004 | 1.289 | 8.765 | 29.001 | 2.766 | 37.052 | 46.310 | 41.032 |
| 2 | 2005 | 1.278 | 8.383 | 29.079 | 2.687 | 38.141 | 51.400 | 49.611 |
| 2 | 2006 | 1.278 | 9.194 | 29.397 | 2.687 | 38.968 | 52.430 | 77.000 |
| 2 | 2007 | 1.278 | 6.571 | 29.444 | 2.687 | 31.511 | 46.000 | 77.931 |
| 2 | 2008 | 1.304 | 6.571 | 27.839 | 1.351 | 36.082 | 52.000 | 78.551 |
| 3 | 1999 | 3.100 | 40.811 | 45.229 | 17.862 | 19.304 | 140.920 | 146.456 |
| 3 | 2000 | 2.973 | 42.024 | 43.472 | 18.013 | 19.667 | 152.970 | 148.833 |
| 3 | 2001 | 2.973 | 42.604 | 42.911 | 17.719 | 18.481 | 152.660 | 155.655 |
| 3 | 2002 | 3.530 | 43.096 | 45.510 | 17.449 | 19.044 | 165.160 | 160.512 |
| 3 | 2003 | 3.545 | 40.724 | 45.720 | 17.926 | 25.692 | 171.340 | 160.512 |
| 3 | 2004 | 3.784 | 43.857 | 44.720 | 19.818 | 24.087 | 193.950 | 174.362 |
| 3 | 2005 | 3.466 | 43.538 | 43.450 | 23.435 | 19.365 | 191.350 | 172.398 |
| 3 | 2006 | 3.450 | 42.393 | 43.116 | 23.514 | 19.137 | 193.930 | 162.269 |
| 3 | 2007 | 6.458 | 50.263 | 39.229 | 22.818 | 19.375 | 190.130 | 160.822 |
| 3 | 2008 | 6.458 | 57.865 | 42.845 | 22.815 | 19.375 | 192.430 | 164.233 |
| 5 | 1999 | 2.242 | 0.397 | 20.970 | 4.372 | 11.908 | 41.520 | 126.301 |
| 5 | 2000 | 2.337 | 0.397 | 21.416 | 4.372 | 12.147 | 41.520 | 151.934 |
| 5 | 2001 | 2.337 | 0.445 | 21.416 | 4.372 | 10.779 | 41.520 | 149.247 |
| 5 | 2002 | 2.337 | 0.445 | 21.468 | 3.418 | 7.425 | 42.300 | 151.004 |
| 5 | 2003 | 2.353 | 0.445 | 27.165 | 3.418 | 9.794 | 43.310 | 148.523 |
| 5 | 2004 | 2.385 | 0.401 | 26.592 | 2.862 | 9.201 | 42.860 | 147.903 |
| 5 | 2005 | 2.496 | 0.358 | 27.274 | 2.862 | 9.396 | 45.200 | 149.557 |
| 5 | 2006 | 2.798 | 0.215 | 29.373 | 3.180 | 9.158 | 49.110 | 159.169 |
| 5 | 2007 | 2.285 | 0.193 | 32.584 | 3.180 | 9.396 | 45.390 | 162.786 |
| 5 | 2008 | 2.285 | 0.193 | 31.705 | 3.180 | 9.396 | 50.110 | 162.786 |
| Energy factor | | -- | -- | -- | -- | -- | -- | 16.4 $MJ/m^3$ |
| $CO_2$ emission fa | | -- | -- | -- | -- | -- | -- | 52.70 |

*Data sources given in part 1 narrative description of data*

**Table 2-1. Oil refining data, Calif. (2004–2009); PADDs 1, 2, 3 and 5 (1999–2008) *continued***

| | | Fuels consumed in refineries | | | | | | |
|---|---|---|---|---|---|---|---|---|
| California refineries | | $H_2$ (purch.) ($m^3 \times 10^8$) | Crude oil ($m^3 \times 10^4$) | LPG ($m^3 \times 10^4$) | Distillate ($m^3 \times 10^4$) | Res. fuel oil ($m^3 \times 10^4$) | Fuel gas (bl) ($m^3 \times 10^4$) | Pet. coke ($m^3 \times 10^4$) |
| Calif. | 2004 | 14.418 | 0.000 | 25.803 | 0.000 | 0.000 | 629.035 | 185.480 |
| Calif. | 2005 | 14.470 | 0.000 | 27.129 | 0.000 | 0.000 | 648.594 | 197.475 |
| Calif. | 2006 | 14.056 | 0.000 | 16.132 | 1.244 | 0.000 | 633.147 | 251.324 |
| Calif. | 2007 | 29.146 | 0.000 | 15.421 | 1.001 | 0.000 | 622.581 | 241.058 |
| Calif. | 2008 | 29.146 | 0.000 | 15.982 | 1.939 | 0.000 | 601.661 | 227.776 |
| Calif. | 2009 | 29.146 | 0.000 | 14.781 | 2.507 | 0.000 | 556.490 | 210.530 |
| Energy factor | | 16.4 MJ/$m^3$ | 38.49 GJ/$m^3$ | 25.62 GJ/$m^3$ | 38.66 GJ/$m^3$ | 41.72 GJ/$m^3$ | 39.82 GJ/$m^3$ | 39.98 GJ/$m^3$ |
| $CO_2$ emission fa | | 52.70 | 78.53 | 65.76 | 77.18 | 83.14 | 67.73 | 107.74 |

| | | Fuels consumed in refineries | | | | | | |
|---|---|---|---|---|---|---|---|---|
| U.S. refineries | | $H_2$ (purch.) | Crude oil | LPG | Distillate | Res. fuel oil | Fuel gas (bl) | Pet. coke |
| PADD | Year | ($m^3 \times 10^8$) | ($m^3 \times 10^4$) | ($m^3 \times 10^4$) | ($m^3 \times 10^4$) | ($m^3 \times 10^4$) | ($m^3 \times 10^4$) | ($m^3 \times 10^4$) |
| 1 | 1999 | | 0.000 | 2.766 | 2.035 | 37.012 | 323.87 | 205.380 |
| 1 | 2000 | | 0.000 | 5.008 | 4.166 | 38.904 | 319.90 | 190.928 |
| 1 | 2001 | | 0.000 | 5.819 | 8.967 | 44.675 | 323.22 | 189.751 |
| 1 | 2002 | | 0.000 | 4.483 | 7.631 | 29.190 | 339.87 | 188.050 |
| 1 | 2003 | | 0.000 | 7.854 | 9.921 | 28.014 | 353.29 | 196.492 |
| 1 | 2004 | | 0.000 | 7.870 | 7.409 | 18.013 | 354.19 | 203.774 |
| 1 | 2005 | | 0.000 | 11.479 | 5.819 | 18.220 | 354.81 | 203.695 |
| 1 | 2006 | | 0.000 | 5.231 | 0.366 | 14.627 | 337.56 | 175.411 |
| 1 | 2007 | | 0.000 | 2.941 | 0.350 | 13.132 | 363.92 | 190.356 |
| 1 | 2008 | | 0.000 | 0.827 | 0.461 | 6.344 | 339.09 | 193.933 |
| 2 | 1999 | | 0.000 | 27.123 | 0.986 | 43.531 | 766.67 | 296.972 |
| 2 | 2000 | | 0.000 | 14.484 | 0.763 | 34.166 | 773.41 | 293.348 |
| 2 | 2001 | | 0.000 | 13.975 | 1.288 | 38.888 | 766.97 | 276.431 |
| 2 | 2002 | | 0.000 | 16.439 | 1.081 | 29.747 | 732.93 | 276.892 |
| 2 | 2003 | | 0.000 | 25.804 | 0.588 | 9.380 | 729.70 | 273.569 |
| 2 | 2004 | | 0.000 | 17.155 | 0.588 | 3.100 | 792.49 | 253.394 |
| 2 | 2005 | | 0.000 | 12.385 | 0.795 | 2.592 | 798.32 | 275.716 |
| 2 | 2006 | | 0.000 | 9.015 | 0.715 | 3.275 | 788.34 | 262.361 |
| 2 | 2007 | | 0.000 | 13.387 | 0.747 | 3.005 | 785.86 | 249.626 |
| 2 | 2008 | | 0.000 | 12.783 | 0.700 | 3.084 | 777.16 | 238.560 |
| 3 | 1999 | | 0.159 | 12.560 | 1.892 | 0.191 | 1,812.63 | 662.230 |
| 3 | 2000 | | 0.000 | 13.085 | 2.798 | 0.032 | 1,841.63 | 674.535 |
| 3 | 2001 | | 0.000 | 11.018 | 2.178 | 0.000 | 1,775.65 | 668.224 |
| 3 | 2002 | | 0.000 | 13.450 | 1.336 | 0.000 | 1,811.93 | 668.907 |
| 3 | 2003 | | 0.000 | 17.489 | 0.700 | 0.000 | 1,949.71 | 679.718 |
| 3 | 2004 | | 0.000 | 5.898 | 1.304 | 0.000 | 1,908.64 | 695.951 |
| 3 | 2005 | | 0.000 | 5.708 | 1.367 | 0.064 | 1,777.45 | 656.602 |
| 3 | 2006 | | 0.000 | 4.404 | 1.765 | 0.016 | 1,988.07 | 724.807 |
| 3 | 2007 | | 0.000 | 3.307 | 1.828 | 0.048 | 1,922.63 | 679.639 |
| 3 | 2008 | | 0.000 | 8.204 | 1.701 | 0.048 | 1,819.56 | 625.981 |
| 5 | 1999 | | 0.000 | 18.649 | 4.086 | 9.015 | 728.04 | 211.739 |
| 5 | 2000 | | 0.000 | 34.151 | 3.736 | 11.081 | 742.82 | 223.139 |
| 5 | 2001 | | 0.000 | 47.251 | 4.436 | 13.609 | 770.31 | 228.274 |
| 5 | 2002 | | 0.000 | 19.587 | 3.307 | 14.341 | 706.94 | 226.398 |
| 5 | 2003 | | 0.000 | 34.484 | 3.911 | 11.558 | 743.54 | 238.227 |
| 5 | 2004 | | 0.000 | 24.627 | 3.657 | 11.495 | 739.64 | 244.411 |
| 5 | 2005 | | 0.000 | 36.424 | 4.022 | 11.558 | 726.57 | 244.379 |
| 5 | 2006 | | 0.000 | 23.339 | 4.054 | 12.242 | 715.43 | 231.327 |
| 5 | 2007 | | 0.000 | 22.497 | 3.752 | 11.813 | 724.24 | 230.865 |
| 5 | 2008 | | 0.000 | 23.991 | 4.642 | 11.845 | 689.74 | 196.508 |
| Energy factor | | | 38.49 GJ/$m^3$ | 25.62 GJ/$m^3$ | 38.66 GJ/$m^3$ | 41.72 GJ/$m^3$ | 39.82 GJ/$m^3$ | 39.98 GJ/$m^3$ |
| $CO_2$ emission factor (kg/GJ) | | | 78.53 | 65.76 | 77.18 | 83.14 | 67.73 | 107.74 |

*Data sources given in part 1 narrative description of data*

**Table 2-1. Oil refining data, Calif. (2004–2009); PADDs 1, 2, 3 and 5 (1999–2008) *continued***

| | | Fuels consumed in refineries *continued* | | | | | Refinery products yield | |
|---|---|---|---|---|---|---|---|---|
| California refineries | | Other products (petajoules) | Natural gas ($m^3 \times 10^7$) | Coal (Gg) | Electricity purchased (TWh) | Steam purchased (Tg) | LPG (%) | Fin. motor gasoline (%) |
| Calif. | 2004 | 5.112 | 366.244 | 0.000 | 2.972 | 5.268 | 2.2 | 53.4 |
| Calif. | 2005 | 6.461 | 375.964 | 0.000 | 3.107 | 5.674 | 2.0 | 53.3 |
| Calif. | 2006 | 5.583 | 372.101 | 0.000 | 3.257 | 5.766 | 1.7 | 53.9 |
| Calif. | 2007 | 5.583 | 390.180 | 0.000 | 3.113 | 5.728 | 1.7 | 53.7 |
| Calif. | 2008 | 5.583 | 404.019 | 0.000 | 3.304 | 5.559 | 1.7 | 50.6 |
| Calif. | 2009 | 5.583 | 414.216 | 0.000 | 3.059 | 5.846 | 1.6 | 53.5 |
| Energy factor | | Million GJ | 38.27 MJ/$m^3$ | 25.80 MJ/kg | 3.60 MJ/kWh | 2.18 MJ/kg | -- | -- |
| $CO_2$ emission fa | | 73.20 | 55.98 | 99.58 | 97.22 | 91.63 | -- | -- |

| | | Fuels consumed in refineries *continued* | | | | | Refinery products yield | |
|---|---|---|---|---|---|---|---|---|
| U.S. refineries PADD | Year | Other products ($m^3 \times 10^4$) | Natural gas ($m^3 \times 10^7$) | Coal (Gg) | Electricity purchased (TWh) | Steam purchased (Tg) | LPG (%) | Fin. motor gasoline (%) |
| 1 | 1999 | 6.964 | 115.01 | 28.123 | 3.180 | 1.599 | 2.5 | 46.6 |
| 1 | 2000 | 6.105 | 125.53 | 27.216 | 3.084 | 1.897 | 2.8 | 45.2 |
| 1 | 2001 | 5.406 | 99.15 | 29.030 | 3.450 | 1.797 | 2.9 | 45.8 |
| 1 | 2002 | 5.851 | 110.86 | 28.123 | 3.282 | 1.865 | 3.0 | 46.7 |
| 1 | 2003 | 7.059 | 80.32 | 29.030 | 3.415 | 1.674 | 3.0 | 46.4 |
| 1 | 2004 | 2.242 | 91.77 | 26.308 | 3.410 | 2.352 | 2.6 | 46.5 |
| 1 | 2005 | 2.242 | 100.82 | 29.937 | 3.520 | 2.228 | 2.4 | 46.6 |
| 1 | 2006 | 0.859 | 102.58 | 28.123 | 3.576 | 2.593 | 2.6 | 45.8 |
| 1 | 2007 | 0.334 | 81.29 | 29.030 | 3.984 | 2.624 | 3.2 | 45.5 |
| 1 | 2008 | 0.461 | 78.92 | 28.123 | 4.192 | 2.361 | 3.3 | 44.6 |
| 2 | 1999 | 22.560 | 263.17 | 0.000 | 8.956 | 1.262 | 3.7 | 51.1 |
| 2 | 2000 | 19.047 | 300.38 | 1.814 | 8.949 | 0.890 | 3.7 | 50.4 |
| 2 | 2001 | 20.382 | 265.10 | 6.350 | 8.728 | 2.060 | 3.6 | 51.1 |
| 2 | 2002 | 19.555 | 272.35 | 0.000 | 8.933 | 2.368 | 3.5 | 52.0 |
| 2 | 2003 | 16.392 | 267.27 | 8.165 | 8.885 | 2.577 | 3.3 | 51.5 |
| 2 | 2004 | 27.855 | 292.54 | 7.258 | 9.486 | 2.863 | 3.3 | 51.6 |
| 2 | 2005 | 26.805 | 301.52 | 7.258 | 9.875 | 2.283 | 3.1 | 50.4 |
| 2 | 2006 | 31.177 | 324.85 | 2.722 | 10.488 | 3.310 | 4.0 | 49.4 |
| 2 | 2007 | 6.280 | 339.94 | 6.350 | 10.555 | 4.871 | 3.9 | 49.8 |
| 2 | 2008 | 0.286 | 393.30 | 10.886 | 10.804 | 5.000 | 3.5 | 48.5 |
| 3 | 1999 | 31.177 | 1,476.83 | 0.000 | 13.762 | 8.968 | 6.1 | 44.8 |
| 3 | 2000 | 34.405 | 1,475.41 | 0.000 | 14.501 | 11.455 | 6.0 | 44.7 |
| 3 | 2001 | 30.923 | 1,383.25 | 0.000 | 15.868 | 13.142 | 5.6 | 44.3 |
| 3 | 2002 | 21.479 | 1,298.76 | 0.000 | 16.145 | 14.670 | 5.8 | 45.4 |
| 3 | 2003 | 29.874 | 1,217.06 | 0.000 | 15.682 | 14.456 | 5.5 | 44.8 |
| 3 | 2004 | 22.544 | 1,118.96 | 0.000 | 17.044 | 14.827 | 5.3 | 44.6 |
| 3 | 2005 | 20.668 | 1,121.29 | 0.000 | 16.620 | 15.757 | 4.7 | 43.8 |
| 3 | 2006 | 31.336 | 1,120.29 | 0.000 | 18.612 | 17.690 | 4.8 | 43.5 |
| 3 | 2007 | 24.007 | 1,027.91 | 0.000 | 20.433 | 28.790 | 5.0 | 43.2 |
| 3 | 2008 | 26.996 | 1,078.93 | 0.000 | 20.675 | 28.919 | 5.1 | 41.6 |
| 5 | 1999 | 25.851 | 347.54 | 0.000 | 5.389 | 8.469 | 2.6 | 44.7 |
| 5 | 2000 | 26.185 | 382.68 | 0.000 | 4.809 | 8.268 | 3.1 | 45.7 |
| 5 | 2001 | 22.576 | 348.67 | 0.000 | 4.695 | 7.881 | 2.7 | 45.5 |
| 5 | 2002 | 22.672 | 387.33 | 0.000 | 4.780 | 7.589 | 2.7 | 47.3 |
| 5 | 2003 | 25.740 | 374.77 | 0.000 | 4.520 | 8.595 | 2.9 | 47.2 |
| 5 | 2004 | 31.305 | 353.35 | 0.000 | 4.871 | 8.732 | 2.6 | 47.3 |
| 5 | 2005 | 27.028 | 349.06 | 0.000 | 4.978 | 8.145 | 2.5 | 47.3 |
| 5 | 2006 | 34.961 | 357.33 | 0.000 | 4.973 | 8.164 | 2.8 | 47.7 |
| 5 | 2007 | 27.282 | 378.63 | 0.000 | 5.113 | 8.091 | 2.8 | 46.6 |
| 5 | 2008 | 32.227 | 396.29 | 0.000 | 5.125 | 8.064 | 2.8 | 45.6 |
| Energy factor | | 38.66 GJ/$m^3$ | 38.27 MJ/$m^3$ | 25.80 MJ/kg | 3.60 MJ/kWh | 2.18 MJ/kg | -- | -- |
| $CO_2$ emission fa | | 73.20 | 55.98 | 99.58 | 187.78 | 91.63 | -- | -- |

*Data sources given in part 1 narrative description of data*

**Table 2-1. Oil refining data, Calif. (2004–2009); PADDs 1, 2, 3 and 5 (1999–2008) *continued***

| California refineries | | Refinery products yield *continued* Aviation gasoline (%) | Kerosene jet fuel (%) | Kerosene (%) | Distillate fuel oil (%) | Residual fuel oil (%) | Naphtha for chem FS (%) | Oth. oils for chem FS (%) |
|---|---|---|---|---|---|---|---|---|
| Calif. | 2004 | 0.2 | 13.7 | 0.0 | 17.3 | 3.7 | 0.0 | 0.5 |
| Calif. | 2005 | 0.1 | 13.6 | 0.0 | 18.8 | 3.4 | 0.0 | 0.5 |
| Calif. | 2006 | 0.1 | 13.3 | 0.0 | 18.7 | 3.4 | 0.0 | 0.5 |
| Calif. | 2007 | 0.1 | 12.9 | 0.0 | 19.2 | 3.9 | 0.0 | 0.3 |
| Calif. | 2008 | 0.1 | 15.7 | 0.0 | 20.6 | 3.2 | 0.0 | 0.1 |
| Calif. | 2009 | 0.0 | 14.3 | 0.0 | 18.7 | 3.1 | 0.0 | 0.4 |
| Energy factor | | -- | -- | -- | -- | -- | -- | -- |
| $CO_2$ emission fa | | -- | -- | -- | -- | -- | -- | -- |

| U.S. refineries PADD | Year | Refinery products yield *continued* Aviation gasoline (%) | Kerosene jet fuel (%) | Kerosene (%) | Distillate fuel oil (%) | Residual fuel oil (%) | Naphtha for chem FS (%) | Oth. oils for chem FS (%) |
|---|---|---|---|---|---|---|---|---|
| 1 | 1999 | 0.2 | 7.0 | 0.8 | 26.3 | 6.5 | 0.8 | 0.0 |
| 1 | 2000 | 0.2 | 6.3 | 0.8 | 27.9 | 6.8 | 0.8 | 0.0 |
| 1 | 2001 | 0.2 | 5.3 | 0.8 | 29.1 | 6.6 | 0.8 | 0.0 |
| 1 | 2002 | 0.3 | 5.3 | 0.8 | 28.1 | 5.7 | 0.9 | 0.0 |
| 1 | 2003 | 0.2 | 5.2 | 0.8 | 27.2 | 7.8 | 0.8 | 0.0 |
| 1 | 2004 | 0.4 | 6.1 | 0.7 | 26.6 | 6.9 | 0.8 | 0.0 |
| 1 | 2005 | 0.3 | 5.7 | 0.7 | 28.8 | 6.2 | 0.8 | 0.0 |
| 1 | 2006 | 0.0 | 5.1 | 0.4 | 29.2 | 7.1 | 1.1 | 0.0 |
| 1 | 2007 | 0.1 | 5.0 | 0.5 | 29.4 | 7.2 | 1.1 | 0.0 |
| 1 | 2008 | 0.0 | 5.7 | 0.6 | 29.6 | 7.1 | 1.1 | 0.0 |
| 2 | 1999 | 0.1 | 6.6 | 0.5 | 24.8 | 1.6 | 0.6 | 0.7 |
| 2 | 2000 | 0.1 | 6.9 | 0.4 | 25.7 | 1.8 | 0.5 | 0.4 |
| 2 | 2001 | 0.1 | 6.6 | 0.4 | 26.0 | 2.0 | 0.6 | 0.0 |
| 2 | 2002 | 0.1 | 6.7 | 0.3 | 25.4 | 1.8 | 0.6 | 0.0 |
| 2 | 2003 | 0.1 | 6.2 | 0.3 | 26.0 | 1.7 | 0.5 | 0.0 |
| 2 | 2004 | 0.1 | 6.4 | 0.3 | 25.7 | 1.8 | 0.8 | 0.3 |
| 2 | 2005 | 0.1 | 6.5 | 0.3 | 27.1 | 1.6 | 0.8 | 0.3 |
| 2 | 2006 | 0.1 | 6.2 | 0.3 | 27.3 | 1.7 | 0.9 | 0.2 |
| 2 | 2007 | 0.1 | 6.1 | 0.1 | 28.2 | 1.7 | 0.9 | 0.2 |
| 2 | 2008 | 0.1 | 6.3 | 0.0 | 30.0 | 1.6 | 0.8 | 0.2 |
| 3 | 1999 | 0.2 | 11.1 | 0.4 | 21.1 | 4.3 | 2.1 | 2.5 |
| 3 | 2000 | 0.1 | 11.1 | 0.4 | 21.9 | 4.6 | 2.2 | 2.3 |
| 3 | 2001 | 0.1 | 10.5 | 0.6 | 22.8 | 4.8 | 1.7 | 2.1 |
| 3 | 2002 | 0.1 | 10.3 | 0.4 | 22.3 | 3.7 | 2.7 | 1.9 |
| 3 | 2003 | 0.1 | 9.9 | 0.4 | 23.0 | 4.1 | 2.6 | 2.3 |
| 3 | 2004 | 0.1 | 10.0 | 0.5 | 23.5 | 3.9 | 2.8 | 2.4 |
| 3 | 2005 | 0.1 | 10.2 | 0.6 | 24.5 | 3.9 | 2.3 | 2.1 |
| 3 | 2006 | 0.2 | 9.7 | 0.4 | 25.2 | 3.8 | 1.9 | 2.4 |
| 3 | 2007 | 0.1 | 9.4 | 0.3 | 26.0 | 4.1 | 1.9 | 2.4 |
| 3 | 2008 | 0.1 | 9.6 | 0.0 | 28.4 | 4.0 | 1.5 | 2.3 |
| 5 | 1999 | 0.1 | 15.8 | 0.2 | 18.3 | 8.5 | 0.2 | 0.3 |
| 5 | 2000 | 0.1 | 16.2 | 0.2 | 18.5 | 6.8 | 0.1 | 0.3 |
| 5 | 2001 | 0.1 | 16.0 | 0.1 | 19.2 | 6.9 | 0.1 | 0.3 |
| 5 | 2002 | 0.1 | 16.0 | 0.1 | 19.0 | 6.2 | 0.1 | 0.3 |
| 5 | 2003 | 0.1 | 16.0 | 0.0 | 19.5 | 5.8 | 0.1 | 0.3 |
| 5 | 2004 | 0.1 | 16.2 | 0.0 | 19.5 | 6.1 | 0.0 | 0.3 |
| 5 | 2005 | 0.1 | 16.2 | 0.0 | 20.4 | 5.8 | 0.0 | 0.4 |
| 5 | 2006 | 0.1 | 15.3 | 0.0 | 20.3 | 5.8 | 0.0 | 0.4 |
| 5 | 2007 | 0.1 | 15.6 | 0.0 | 20.8 | 6.3 | 0.0 | 0.3 |
| 5 | 2008 | 0.1 | 17.5 | 0.0 | 21.6 | 5.5 | 0.0 | 0.1 |
| Energy factor | | -- | -- | -- | -- | -- | -- | -- |
| $CO_2$ emission fa | | -- | -- | -- | -- | -- | -- | -- |

*Data sources given in part 1 narrative description of data*

**Table 2-1. Oil refining data, Calif. (2004–2009); PADDs 1, 2, 3 and 5 (1999–2008) *continued***

| California refineries | | Refinery products yield *continued* Special naphtha (%) | Lubricants (%) | Waxes (%) | Petroleum coke (%) | Asphalt & road oil (%) | Fuel gas (%) | Miscellaneous products (%) | Utilization of operable ref. capacity (%) |
|---|---|---|---|---|---|---|---|---|---|
| Calif. | 2004 | 0.0 | 1.0 | 0.0 | 7.4 | 2.1 | 6.1 | 0.4 | 93.0 |
| Calif. | 2005 | 0.0 | 1.0 | 0.0 | 7.7 | 1.8 | 5.7 | 0.4 | 95.0 |
| Calif. | 2006 | 0.0 | 1.0 | 0.0 | 7.4 | 2.0 | 5.7 | 0.6 | 91.5 |
| Calif. | 2007 | 0.0 | 0.9 | 0.0 | 7.1 | 2.2 | 5.8 | 0.6 | 88.3 |
| Calif. | 2008 | 0.0 | 1.1 | 0.0 | 7.4 | 1.5 | 5.5 | 0.8 | 91.0 |
| Calif. | 2009 | 0.0 | 1.1 | 0.0 | 7.6 | 1.5 | 5.3 | 0.8 | 82.9 |
| Energy factor | | -- | -- | -- | -- | -- | -- | -- | -- |
| $CO_2$ emission fa | | -- | -- | -- | -- | -- | -- | -- | -- |

| U.S. refineries PADD | Year | Refinery products yield *continued* Special naphtha (%) | Lubricants (%) | Waxes (%) | Petroleum coke (%) | Asphalt & road oil (%) | Fuel gas (%) | Miscellaneous products (%) | Utilization of operable ref. capacity (%) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1999 | 0.1 | 1.0 | 0.0 | 3.1 | 5.4 | 3.7 | 0.1 | 90.9 |
| 1 | 2000 | 0.1 | 0.9 | 0.1 | 3.0 | 6.1 | 3.5 | 0.1 | 91.7 |
| 1 | 2001 | 0.1 | 0.9 | 0.0 | 3.3 | 6.0 | 3.8 | 0.1 | 87.2 |
| 1 | 2002 | 0.1 | 1.0 | 0.0 | 3.1 | 6.0 | 3.9 | 0.1 | 88.9 |
| 1 | 2003 | 0.1 | 1.0 | 0.0 | 2.9 | 5.7 | 3.8 | 0.1 | 92.7 |
| 1 | 2004 | 0.1 | 1.1 | 0.0 | 3.1 | 6.2 | 3.9 | 0.1 | 90.4 |
| 1 | 2005 | 0.1 | 1.0 | 0.0 | 2.9 | 5.7 | 3.8 | 0.1 | 93.1 |
| 1 | 2006 | 0.1 | 1.1 | 0.0 | 3.0 | 5.6 | 3.6 | 0.2 | 86.7 |
| 1 | 2007 | 0.0 | 1.0 | 0.0 | 3.2 | 5.0 | 3.9 | 0.2 | 85.6 |
| 1 | 2008 | 0.0 | 1.1 | 0.1 | 3.3 | 5.1 | 3.8 | 0.2 | 80.8 |
| 2 | 1999 | 0.7 | 0.6 | 0.1 | 4.2 | 5.6 | 3.9 | 0.3 | 93.3 |
| 2 | 2000 | 0.7 | 0.5 | 0.1 | 4.3 | 5.5 | 3.9 | 0.3 | 94.2 |
| 2 | 2001 | 0.6 | 0.4 | 0.1 | 4.3 | 5.1 | 4.0 | 0.3 | 93.9 |
| 2 | 2002 | 0.5 | 0.5 | 0.1 | 4.1 | 5.3 | 4.0 | 0.4 | 90.0 |
| 2 | 2003 | 0.6 | 0.5 | 0.1 | 4.2 | 5.6 | 4.1 | 0.4 | 91.6 |
| 2 | 2004 | 0.1 | 0.4 | 0.1 | 4.3 | 5.7 | 4.1 | 0.4 | 93.6 |
| 2 | 2005 | 0.2 | 0.4 | 0.1 | 4.5 | 5.7 | 4.1 | 0.5 | 92.9 |
| 2 | 2006 | 0.2 | 0.5 | 0.1 | 4.4 | 6.1 | 4.1 | 0.5 | 92.4 |
| 2 | 2007 | 0.1 | 0.4 | 0.1 | 4.3 | 5.3 | 4.2 | 0.4 | 90.1 |
| 2 | 2008 | 0.1 | 0.4 | 0.1 | 4.3 | 5.3 | 4.0 | 0.4 | 88.4 |
| 3 | 1999 | 0.8 | 1.7 | 0.2 | 4.8 | 1.7 | 4.1 | 0.4 | 94.7 |
| 3 | 2000 | 0.4 | 1.7 | 0.2 | 4.8 | 1.8 | 4.1 | 0.4 | 93.9 |
| 3 | 2001 | 0.4 | 1.6 | 0.1 | 5.3 | 1.6 | 4.1 | 0.5 | 94.8 |
| 3 | 2002 | 0.4 | 1.6 | 0.1 | 5.7 | 1.6 | 4.2 | 0.5 | 91.5 |
| 3 | 2003 | 0.4 | 1.5 | 0.1 | 5.7 | 1.6 | 4.4 | 0.5 | 93.6 |
| 3 | 2004 | 0.5 | 1.6 | 0.1 | 5.9 | 1.5 | 4.3 | 0.4 | 94.1 |
| 3 | 2005 | 0.4 | 1.6 | 0.1 | 6.0 | 1.6 | 4.3 | 0.4 | 88.3 |
| 3 | 2006 | 0.4 | 1.7 | 0.1 | 6.2 | 1.5 | 4.6 | 0.5 | 88.7 |
| 3 | 2007 | 0.5 | 1.7 | 0.1 | 6.0 | 1.3 | 4.3 | 0.5 | 88.7 |
| 3 | 2008 | 0.5 | 1.7 | 0.1 | 6.0 | 1.1 | 4.4 | 0.6 | 83.6 |
| 5 | 1999 | 0.1 | 1.0 | 0.0 | 6.1 | 2.4 | 5.8 | 0.2 | 87.1 |
| 5 | 2000 | 0.1 | 0.9 | -0.1 | 6.3 | 2.4 | 5.6 | 0.3 | 87.5 |
| 5 | 2001 | 0.1 | 1.0 | 0.0 | 6.0 | 2.1 | 5.8 | 0.3 | 89.1 |
| 5 | 2002 | 0.1 | 0.8 | 0.0 | 6.0 | 2.1 | 5.5 | 0.3 | 90.0 |
| 5 | 2003 | 0.1 | 0.8 | 0.0 | 6.2 | 1.9 | 5.6 | 0.3 | 91.3 |
| 5 | 2004 | 0.0 | 0.7 | 0.0 | 6.1 | 1.9 | 5.4 | 0.3 | 90.4 |
| 5 | 2005 | 0.0 | 0.7 | 0.0 | 6.2 | 1.7 | 5.1 | 0.3 | 91.7 |
| 5 | 2006 | 0.1 | 0.7 | 0.0 | 6.0 | 1.8 | 5.2 | 0.4 | 90.5 |
| 5 | 2007 | 0.0 | 0.6 | 0.0 | 5.8 | 1.8 | 5.4 | 0.4 | 87.6 |
| 5 | 2008 | 0.0 | 0.8 | 0.0 | 6.1 | 1.4 | 5.1 | 0.5 | 88.1 |
| Energy factor | | -- | -- | -- | -- | -- | -- | -- | -- |
| $CO_2$ emission fa | | -- | -- | -- | -- | -- | -- | -- | -- |

*Data sources given in part 1 narrative description of data*

**Table 2-1. Oil refining data, Calif. (2004–2009); PADDs 1, 2, 3 and 5 (1999–2008) *continued***

| California refineries | | Energy consumed/vol. crude feed ($GJ/m^3$) and $CO_2$ emitted/vol. crude feed ($kg/m^3$) for refinery fuels | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 3rd-party $H_2$ prod. | | Crude oil consmd. | | LPG consumed | | Distillate consmd. | | Res. Fuel Oil cons. | |
| | | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) |
| Calif. | 2004 | 0.204 | 10.77 | 0.000 | 0.00 | 0.063 | 4.18 | 0.000 | 0.00 | 0.000 | 0.00 |
| Calif. | 2005 | 0.199 | 10.50 | 0.000 | 0.00 | 0.065 | 4.26 | 0.000 | 0.00 | 0.000 | 0.00 |
| Calif. | 2006 | 0.199 | 10.49 | 0.000 | 0.00 | 0.040 | 2.61 | 0.005 | 0.36 | 0.000 | 0.00 |
| Calif. | 2007 | 0.423 | 22.31 | 0.000 | 0.00 | 0.039 | 2.56 | 0.004 | 0.29 | 0.000 | 0.00 |
| Calif. | 2008 | 0.413 | 21.75 | 0.000 | 0.00 | 0.039 | 2.58 | 0.007 | 0.55 | 0.000 | 0.00 |
| Calif. | 2009 | 0.447 | 23.57 | 0.000 | 0.00 | 0.039 | 2.59 | 0.010 | 0.78 | 0.000 | 0.00 |
| Energy factor | | 16.4 $MJ/m^3$ | | 38.49 $GJ/m^3$ | | 25.62 $GJ/m^3$ | | 38.66 $GJ/m^3$ | | 41.72 $GJ/m^3$ | |
| $CO_2$ emission fa | | -- | 52.70 | -- | 78.53 | -- | 65.76 | -- | 77.18 | -- | 83.14 |

| U.S. refineries | | Energy consumed/vol. crude feed ($GJ/m^3$) and $CO_2$ emitted/vol. crude feed ($kg/m^3$) for refinery fuels | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Hydrogen prod. | | Crude oil consmd. | | LPG consumed | | Distillate consmd. | | Res. Fuel Oil cons. | |
| PADD | Year | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) |
| 1 | 1999 | 0.195 | 10.28 | 0.000 | 0.00 | 0.008 | 0.52 | 0.009 | 0.68 | 0.173 | 14.39 |
| 1 | 2000 | 0.230 | 12.10 | 0.000 | 0.00 | 0.014 | 0.93 | 0.018 | 1.38 | 0.180 | 14.94 |
| 1 | 2001 | 0.199 | 10.48 | 0.000 | 0.00 | 0.017 | 1.14 | 0.040 | 3.11 | 0.217 | 18.03 |
| 1 | 2002 | 0.171 | 8.99 | 0.000 | 0.00 | 0.013 | 0.85 | 0.033 | 2.57 | 0.138 | 11.44 |
| 1 | 2003 | 0.242 | 12.77 | 0.000 | 0.00 | 0.022 | 1.44 | 0.042 | 3.22 | 0.127 | 10.57 |
| 1 | 2004 | 0.245 | 12.88 | 0.000 | 0.00 | 0.022 | 1.46 | 0.031 | 2.43 | 0.083 | 6.86 |
| 1 | 2005 | 0.243 | 12.82 | 0.000 | 0.00 | 0.032 | 2.08 | 0.024 | 1.87 | 0.082 | 6.81 |
| 1 | 2006 | 0.297 | 15.66 | 0.000 | 0.00 | 0.016 | 1.02 | 0.002 | 0.13 | 0.071 | 5.88 |
| 1 | 2007 | 0.230 | 12.13 | 0.000 | 0.00 | 0.009 | 0.58 | 0.002 | 0.12 | 0.064 | 5.33 |
| 1 | 2008 | 0.244 | 12.85 | 0.000 | 0.00 | 0.003 | 0.17 | 0.002 | 0.17 | 0.033 | 2.73 |
| 2 | 1999 | 0.334 | 17.58 | 0.000 | 0.00 | 0.036 | 2.33 | 0.002 | 0.15 | 0.093 | 7.71 |
| 2 | 2000 | 0.328 | 17.31 | 0.000 | 0.00 | 0.019 | 1.23 | 0.002 | 0.12 | 0.072 | 5.99 |
| 2 | 2001 | 0.367 | 19.34 | 0.000 | 0.00 | 0.019 | 1.23 | 0.003 | 0.20 | 0.085 | 7.02 |
| 2 | 2002 | 0.347 | 18.30 | 0.000 | 0.00 | 0.023 | 1.48 | 0.002 | 0.17 | 0.067 | 5.53 |
| 2 | 2003 | 0.321 | 16.89 | 0.000 | 0.00 | 0.035 | 2.32 | 0.001 | 0.09 | 0.021 | 1.74 |
| 2 | 2004 | 0.316 | 16.66 | 0.000 | 0.00 | 0.023 | 1.51 | 0.001 | 0.09 | 0.007 | 0.56 |
| 2 | 2005 | 0.381 | 20.07 | 0.000 | 0.00 | 0.017 | 1.09 | 0.002 | 0.12 | 0.006 | 0.47 |
| 2 | 2006 | 0.592 | 31.19 | 0.000 | 0.00 | 0.012 | 0.79 | 0.001 | 0.11 | 0.007 | 0.59 |
| 2 | 2007 | 0.612 | 32.26 | 0.000 | 0.00 | 0.018 | 1.20 | 0.002 | 0.12 | 0.007 | 0.55 |
| 2 | 2008 | 0.616 | 32.46 | 0.000 | 0.00 | 0.017 | 1.14 | 0.001 | 0.11 | 0.007 | 0.57 |
| 3 | 1999 | 0.530 | 27.94 | 0.000 | 0.01 | 0.008 | 0.52 | 0.002 | 0.14 | 0.000 | 0.02 |
| 3 | 2000 | 0.533 | 28.06 | 0.000 | 0.00 | 0.008 | 0.53 | 0.003 | 0.20 | 0.000 | 0.00 |
| 3 | 2001 | 0.545 | 28.70 | 0.000 | 0.00 | 0.007 | 0.44 | 0.002 | 0.15 | 0.000 | 0.00 |
| 3 | 2002 | 0.576 | 30.33 | 0.000 | 0.00 | 0.008 | 0.55 | 0.001 | 0.10 | 0.000 | 0.00 |
| 3 | 2003 | 0.560 | 29.49 | 0.000 | 0.00 | 0.011 | 0.70 | 0.001 | 0.05 | 0.000 | 0.00 |
| 3 | 2004 | 0.592 | 31.19 | 0.000 | 0.00 | 0.004 | 0.23 | 0.001 | 0.09 | 0.000 | 0.00 |
| 3 | 2005 | 0.609 | 32.08 | 0.000 | 0.00 | 0.004 | 0.23 | 0.001 | 0.10 | 0.000 | 0.01 |
| 3 | 2006 | 0.560 | 29.49 | 0.000 | 0.00 | 0.003 | 0.17 | 0.002 | 0.12 | 0.000 | 0.00 |
| 3 | 2007 | 0.553 | 29.12 | 0.000 | 0.00 | 0.002 | 0.13 | 0.002 | 0.13 | 0.000 | 0.00 |
| 3 | 2008 | 0.594 | 31.28 | 0.000 | 0.00 | 0.005 | 0.34 | 0.002 | 0.12 | 0.000 | 0.00 |
| 5 | 1999 | 1.217 | 64.13 | 0.000 | 0.00 | 0.031 | 2.05 | 0.010 | 0.80 | 0.025 | 2.04 |
| 5 | 2000 | 1.426 | 75.15 | 0.000 | 0.00 | 0.056 | 3.66 | 0.009 | 0.71 | 0.029 | 2.44 |
| 5 | 2001 | 1.364 | 71.86 | 0.000 | 0.00 | 0.075 | 4.93 | 0.011 | 0.82 | 0.035 | 2.92 |
| 5 | 2002 | 1.363 | 71.85 | 0.000 | 0.00 | 0.031 | 2.02 | 0.008 | 0.60 | 0.037 | 3.04 |
| 5 | 2003 | 1.315 | 69.32 | 0.000 | 0.00 | 0.053 | 3.49 | 0.009 | 0.70 | 0.029 | 2.41 |
| 5 | 2004 | 1.315 | 69.29 | 0.000 | 0.00 | 0.038 | 2.50 | 0.009 | 0.66 | 0.029 | 2.40 |
| 5 | 2005 | 1.312 | 69.15 | 0.000 | 0.00 | 0.056 | 3.65 | 0.009 | 0.71 | 0.029 | 2.38 |
| 5 | 2006 | 1.409 | 74.24 | 0.000 | 0.00 | 0.036 | 2.36 | 0.009 | 0.73 | 0.031 | 2.55 |
| 5 | 2007 | 1.484 | 78.18 | 0.000 | 0.00 | 0.036 | 2.34 | 0.009 | 0.69 | 0.030 | 2.53 |
| 5 | 2008 | 1.471 | 77.54 | 0.000 | 0.00 | 0.038 | 2.48 | 0.011 | 0.85 | 0.030 | 2.52 |
| Energy factor | | 16.4 $MJ/m^3$ | | 38.49 $GJ/m^3$ | | 25.62 $GJ/m^3$ | | 38.66 $GJ/m^3$ | | 41.72 $GJ/m^3$ | |
| $CO_2$ emission fa | | -- | 52.70 | -- | 78.53 | -- | 65.76 | -- | 77.18 | -- | 83.14 |

*Data sources given in part 1 narrative description of data*

**Table 2-1. Oil refining data, Calif. (2004–2009); PADDs 1, 2, 3 and 5 (1999–2008) *continued***

| | | Energy consumed ($GJ/m^3$) and $CO_2$ emitted/vol. crude feed ($kg/m^3$) for refinery fuels *continued* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| California | | Fuel Gas (bl) | | Petroleum coke | | Other products | | Natural Gas | | Coal consumed | |
| refineries | | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) |
| Calif. | 2004 | 2.406 | 162.95 | 0.712 | 76.74 | 0.049 | 3.59 | 1.346 | 75.36 | 0.000 | 0.00 |
| Calif. | 2005 | 2.409 | 163.18 | 0.736 | 79.35 | 0.060 | 4.41 | 1.342 | 75.13 | 0.000 | 0.00 |
| Calif. | 2006 | 2.419 | 163.85 | 0.964 | 103.88 | 0.054 | 3.92 | 1.366 | 76.49 | 0.000 | 0.00 |
| Calif. | 2007 | 2.440 | 165.23 | 0.948 | 102.18 | 0.055 | 4.02 | 1.469 | 82.26 | 0.000 | 0.00 |
| Calif. | 2008 | 2.298 | 155.64 | 0.873 | 94.11 | 0.054 | 3.92 | 1.483 | 83.02 | 0.000 | 0.00 |
| Calif. | 2009 | 2.303 | 156.01 | 0.875 | 94.26 | 0.058 | 4.25 | 1.648 | 92.24 | 0.000 | 0.00 |
| Energy factor | | 39.82 $GJ/m^3$ | | 39.98 $GJ/m^3$ | | 38.66 $GJ/m^3$ | | 38.27 $MJ/m^3$ | | 25.80 MJ/kg | |
| $CO_2$ emission fa | | -- | 67.73 | -- | 107.74 | -- | 73.20 | -- | 55.98 | -- | 99.58 |

| | | Energy consumed ($GJ/m^3$) and $CO_2$ emitted/vol. crude feed ($kg/m^3$) for refinery fuels *continued* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| U.S. refineries | | Fuel Gas (bl) | | Petroleum coke | | Other products | | Natural Gas | | Coal consumed | |
| PADD | Year | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) |
| 1 | 1999 | 1.446 | 97.93 | 0.921 | 99.19 | 0.030 | 2.21 | 0.494 | 27.63 | 0.008 | 0.81 |
| 1 | 2000 | 1.410 | 95.49 | 0.845 | 91.02 | 0.026 | 1.91 | 0.532 | 29.76 | 0.008 | 0.77 |
| 1 | 2001 | 1.498 | 101.43 | 0.883 | 95.10 | 0.024 | 1.78 | 0.442 | 24.72 | 0.009 | 0.87 |
| 1 | 2002 | 1.529 | 103.58 | 0.850 | 91.53 | 0.026 | 1.87 | 0.479 | 26.84 | 0.008 | 0.82 |
| 1 | 2003 | 1.530 | 103.66 | 0.855 | 92.08 | 0.030 | 2.17 | 0.334 | 18.72 | 0.008 | 0.81 |
| 1 | 2004 | 1.548 | 104.85 | 0.894 | 96.34 | 0.010 | 0.70 | 0.386 | 21.58 | 0.008 | 0.74 |
| 1 | 2005 | 1.523 | 103.13 | 0.878 | 94.56 | 0.009 | 0.68 | 0.416 | 23.28 | 0.008 | 0.83 |
| 1 | 2006 | 1.559 | 105.58 | 0.813 | 87.62 | 0.004 | 0.28 | 0.455 | 25.48 | 0.008 | 0.84 |
| 1 | 2007 | 1.695 | 114.82 | 0.890 | 95.92 | 0.002 | 0.11 | 0.364 | 20.37 | 0.009 | 0.87 |
| 1 | 2008 | 1.673 | 113.30 | 0.961 | 103.49 | 0.002 | 0.16 | 0.374 | 20.95 | 0.009 | 0.90 |
| 2 | 1999 | 1.560 | 105.64 | 0.607 | 65.35 | 0.045 | 3.26 | 0.515 | 28.80 | 0.000 | 0.00 |
| 2 | 2000 | 1.556 | 105.41 | 0.593 | 63.85 | 0.037 | 2.72 | 0.581 | 32.52 | 0.000 | 0.02 |
| 2 | 2001 | 1.591 | 107.72 | 0.576 | 62.01 | 0.041 | 3.00 | 0.528 | 29.58 | 0.001 | 0.09 |
| 2 | 2002 | 1.563 | 105.85 | 0.593 | 63.87 | 0.041 | 2.96 | 0.558 | 31.24 | 0.000 | 0.00 |
| 2 | 2003 | 1.553 | 105.19 | 0.585 | 62.99 | 0.034 | 2.48 | 0.547 | 30.60 | 0.001 | 0.11 |
| 2 | 2004 | 1.647 | 111.58 | 0.529 | 56.98 | 0.056 | 4.12 | 0.584 | 32.72 | 0.001 | 0.10 |
| 2 | 2005 | 1.653 | 111.96 | 0.573 | 61.76 | 0.054 | 3.94 | 0.600 | 33.59 | 0.001 | 0.10 |
| 2 | 2006 | 1.635 | 110.72 | 0.546 | 58.85 | 0.063 | 4.59 | 0.647 | 36.24 | 0.000 | 0.04 |
| 2 | 2007 | 1.665 | 112.80 | 0.531 | 57.22 | 0.013 | 0.95 | 0.692 | 38.76 | 0.001 | 0.09 |
| 2 | 2008 | 1.644 | 111.34 | 0.507 | 54.59 | 0.001 | 0.04 | 0.800 | 44.76 | 0.002 | 0.15 |
| 3 | 1999 | 1.771 | 119.92 | 0.650 | 69.97 | 0.030 | 2.16 | 1.386 | 77.61 | 0.000 | 0.00 |
| 3 | 2000 | 1.778 | 120.40 | 0.654 | 70.43 | 0.032 | 2.36 | 1.369 | 76.62 | 0.000 | 0.00 |
| 3 | 2001 | 1.676 | 113.50 | 0.633 | 68.22 | 0.028 | 2.07 | 1.255 | 70.23 | 0.000 | 0.00 |
| 3 | 2002 | 1.753 | 118.71 | 0.650 | 69.99 | 0.020 | 1.48 | 1.207 | 67.59 | 0.000 | 0.00 |
| 3 | 2003 | 1.834 | 124.18 | 0.642 | 69.14 | 0.027 | 2.00 | 1.100 | 61.57 | 0.000 | 0.00 |
| 3 | 2004 | 1.748 | 118.37 | 0.640 | 68.93 | 0.020 | 1.47 | 0.985 | 55.12 | 0.000 | 0.00 |
| 3 | 2005 | 1.693 | 114.67 | 0.628 | 67.65 | 0.019 | 1.40 | 1.027 | 57.46 | 0.000 | 0.00 |
| 3 | 2006 | 1.850 | 125.28 | 0.677 | 72.95 | 0.028 | 2.07 | 1.002 | 56.08 | 0.000 | 0.00 |
| 3 | 2007 | 1.782 | 120.72 | 0.633 | 68.15 | 0.022 | 1.58 | 0.916 | 51.27 | 0.000 | 0.00 |
| 3 | 2008 | 1.774 | 120.17 | 0.613 | 66.03 | 0.026 | 1.87 | 1.011 | 56.60 | 0.000 | 0.00 |
| 5 | 1999 | 1.892 | 128.17 | 0.553 | 59.53 | 0.065 | 4.78 | 0.868 | 48.60 | 0.000 | 0.00 |
| 5 | 2000 | 1.881 | 127.39 | 0.567 | 61.12 | 0.064 | 4.71 | 0.931 | 52.13 | 0.000 | 0.00 |
| 5 | 2001 | 1.899 | 128.60 | 0.565 | 60.86 | 0.054 | 3.95 | 0.826 | 46.24 | 0.000 | 0.00 |
| 5 | 2002 | 1.722 | 116.63 | 0.554 | 59.66 | 0.054 | 3.92 | 0.907 | 50.76 | 0.000 | 0.00 |
| 5 | 2003 | 1.777 | 120.32 | 0.572 | 61.57 | 0.060 | 4.37 | 0.861 | 48.17 | 0.000 | 0.00 |
| 5 | 2004 | 1.774 | 120.15 | 0.589 | 63.41 | 0.073 | 5.34 | 0.815 | 45.60 | 0.000 | 0.00 |
| 5 | 2005 | 1.720 | 116.48 | 0.581 | 62.57 | 0.062 | 4.55 | 0.794 | 44.45 | 0.000 | 0.00 |
| 5 | 2006 | 1.708 | 115.69 | 0.555 | 59.75 | 0.081 | 5.93 | 0.820 | 45.90 | 0.000 | 0.00 |
| 5 | 2007 | 1.781 | 120.60 | 0.570 | 61.40 | 0.065 | 4.77 | 0.895 | 50.08 | 0.000 | 0.00 |
| 5 | 2008 | 1.682 | 113.92 | 0.481 | 51.83 | 0.076 | 5.58 | 0.929 | 51.99 | 0.000 | 0.00 |
| Energy factor | | 39.82 $GJ/m^3$ | | 39.98 $GJ/m^3$ | | 38.66 $GJ/m^3$ | | 38.27 $MJ/m^3$ | | 25.80 MJ/kg | |
| $CO_2$ emission fa | | -- | 67.73 | -- | 107.74 | -- | 73.20 | -- | 55.98 | -- | 99.58 |

*Data sources given in part 1 narrative*

**Table 2-1. Oil refining data, Calif. (2004–2009); PADDs 1, 2, 3 and 5 (1999–2008) *continued***

| California refineries | | Energy consumed & $CO_2$ emitted/vol. crude feed for refinery fuels *continued* Electricity purchased ($GJ/m^3$) | Electricity purchased ($kg/m^3$) | Steam purchased ($GJ/m^3$) | Steam purchased ($kg/m^3$) | Refinery energy intensity *(EI)* ($GJ/m^3$) | Fuel mix emit intensity ($CO_2$) (kg/GJ) | Refinery emission intensity ($CO_2$) ($kg/m^3$) |
|---|---|---|---|---|---|---|---|---|
| Calif. | 2004 | 0.103 | 9.99 | 0.110 | 10.11 | 4.994 | 70.82 | 353.7 |
| Calif. | 2005 | 0.104 | 10.14 | 0.115 | 10.57 | 5.032 | 71.06 | 357.5 |
| Calif. | 2006 | 0.113 | 10.94 | 0.121 | 11.05 | 5.280 | 72.65 | 383.6 |
| Calif. | 2007 | 0.110 | 10.72 | 0.123 | 11.26 | 5.611 | 71.43 | 400.8 |
| Calif. | 2008 | 0.114 | 11.09 | 0.116 | 10.65 | 5.397 | 71.02 | 383.3 |
| Calif. | 2009 | 0.114 | 11.13 | 0.132 | 12.14 | 5.628 | 70.54 | 397.0 |
| Energy factor | | 3.60 MJ/kWh | | 2.18 MJ/kg | | -- | -- | -- |
| $CO_2$ emission fa | | -- | 97.22 | -- | 91.63 | -- | -- | -- |

| U.S. refineries | | Energy & $CO_2$/vol. crude for fuels *continued* Electricity purchased | | Steam purchased | | Refinery energy intensity *(EI)* | Fuel mix emit intensity ($CO_2$) | Refinery emission intensity ($CO_2$) |
|---|---|---|---|---|---|---|---|---|
| PADD | Year | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | ($kg/m^3$) | ($GJ/m^3$) | (kg/GJ) | ($kg/m^3$) |
| 1 | 1999 | 0.128 | 24.10 | 0.039 | 3.58 | 3.451 | 81.53 | 281.3 |
| 1 | 2000 | 0.123 | 23.07 | 0.046 | 4.19 | 3.430 | 80.34 | 275.6 |
| 1 | 2001 | 0.145 | 27.14 | 0.046 | 4.18 | 3.518 | 81.85 | 288.0 |
| 1 | 2002 | 0.134 | 25.07 | 0.046 | 4.21 | 3.426 | 81.08 | 277.8 |
| 1 | 2003 | 0.134 | 25.11 | 0.040 | 3.64 | 3.364 | 81.51 | 274.2 |
| 1 | 2004 | 0.135 | 25.30 | 0.056 | 5.16 | 3.416 | 81.46 | 278.3 |
| 1 | 2005 | 0.137 | 25.64 | 0.052 | 4.80 | 3.404 | 81.23 | 276.5 |
| 1 | 2006 | 0.149 | 28.03 | 0.066 | 6.01 | 3.440 | 80.40 | 276.5 |
| 1 | 2007 | 0.168 | 31.51 | 0.067 | 6.13 | 3.499 | 82.28 | 287.9 |
| 1 | 2008 | 0.187 | 35.11 | 0.064 | 5.84 | 3.551 | 83.26 | 295.7 |
| 2 | 1999 | 0.165 | 30.93 | 0.014 | 1.29 | 3.368 | 78.11 | 263.1 |
| 2 | 2000 | 0.163 | 30.57 | 0.010 | 0.90 | 3.361 | 77.56 | 260.6 |
| 2 | 2001 | 0.164 | 30.73 | 0.023 | 2.14 | 3.396 | 77.46 | 263.1 |
| 2 | 2002 | 0.172 | 32.34 | 0.028 | 2.53 | 3.393 | 77.90 | 264.3 |
| 2 | 2003 | 0.171 | 32.10 | 0.030 | 2.75 | 3.298 | 78.00 | 257.3 |
| 2 | 2004 | 0.178 | 33.48 | 0.033 | 2.99 | 3.376 | 77.25 | 260.8 |
| 2 | 2005 | 0.185 | 34.71 | 0.026 | 2.37 | 3.496 | 77.27 | 270.2 |
| 2 | 2006 | 0.197 | 36.92 | 0.038 | 3.44 | 3.738 | 75.84 | 283.5 |
| 2 | 2007 | 0.202 | 37.97 | 0.057 | 5.18 | 3.800 | 75.55 | 287.1 |
| 2 | 2008 | 0.207 | 38.80 | 0.058 | 5.31 | 3.858 | 74.97 | 289.3 |
| 3 | 1999 | 0.122 | 22.82 | 0.048 | 4.39 | 4.546 | 71.61 | 325.5 |
| 3 | 2000 | 0.127 | 23.76 | 0.061 | 5.55 | 4.563 | 71.87 | 327.9 |
| 3 | 2001 | 0.135 | 25.42 | 0.068 | 6.22 | 4.348 | 72.43 | 315.0 |
| 3 | 2002 | 0.141 | 26.51 | 0.078 | 7.12 | 4.434 | 72.71 | 322.4 |
| 3 | 2003 | 0.133 | 25.04 | 0.074 | 6.82 | 4.381 | 72.81 | 319.0 |
| 3 | 2004 | 0.141 | 26.49 | 0.074 | 6.81 | 4.204 | 73.43 | 308.7 |
| 3 | 2005 | 0.143 | 26.88 | 0.082 | 7.53 | 4.205 | 73.24 | 308.0 |
| 3 | 2006 | 0.157 | 29.40 | 0.090 | 8.26 | 4.367 | 74.15 | 323.8 |
| 3 | 2007 | 0.171 | 32.16 | 0.146 | 13.39 | 4.226 | 74.93 | 316.7 |
| 3 | 2008 | 0.182 | 34.23 | 0.154 | 14.15 | 4.361 | 74.48 | 324.8 |
| 5 | 1999 | 0.127 | 23.78 | 0.121 | 11.04 | 4.908 | 70.27 | 344.9 |
| 5 | 2000 | 0.110 | 20.67 | 0.115 | 10.50 | 5.189 | 69.09 | 358.5 |
| 5 | 2001 | 0.105 | 19.65 | 0.106 | 9.74 | 5.039 | 69.38 | 349.6 |
| 5 | 2002 | 0.105 | 19.77 | 0.101 | 9.27 | 4.881 | 69.15 | 337.5 |
| 5 | 2003 | 0.098 | 18.33 | 0.112 | 10.30 | 4.885 | 69.40 | 339.0 |
| 5 | 2004 | 0.106 | 19.83 | 0.115 | 10.51 | 4.861 | 69.89 | 339.7 |
| 5 | 2005 | 0.107 | 20.00 | 0.106 | 9.67 | 4.774 | 69.88 | 333.6 |
| 5 | 2006 | 0.107 | 20.16 | 0.107 | 9.78 | 4.862 | 69.32 | 337.1 |
| 5 | 2007 | 0.114 | 21.34 | 0.109 | 9.98 | 5.091 | 69.12 | 351.9 |
| 5 | 2008 | 0.113 | 21.22 | 0.108 | 9.86 | 4.939 | 68.39 | 337.8 |
| Energy factor | | 3.60 MJ/kWh | | 2.18 MJ/kg | | -- | -- | -- |
| $CO_2$ emission fa | | -- | 187.78 | -- | 91.63 | -- | -- | -- |

*Data sources given in part 1 narrative description of data*

**Table 2-2. Third-party refinery hydrogen supply data evaluation**

*Data are totals for California refineries*

| | 2008 | 2009 |
|---|---|---|
| Hydrogen production capacity data[a] | | |
| Third-party capacity serving refineries ($m^3 \bullet 10^8$) | 29.15 | 29.15 |
| Production at typical (90%) capacity utilization | | |
| Third-party at 90% of capacity ($m^3 \bullet 10^8$) | 26.23 | 26.23 |
| Estimated energy to make hydrogen at 90% capacity[b] | | |
| Third-party at 90% capacity (GJ) | 43,019,496 | 43,019,496 |
| Estimated $CO_2$ emissions from $H_2$ at 90% capacity[c] | | |
| Emissions at 90% third-party capacity (tonnes) | 2,267,127 | 2,267,127 |
| Emissions reported (Mandatory GHG Reporting)[d] | | |
| Third-party emissions (tonnes) | 2,224,778 | 2,193,684 |
| Difference from third-party estimate (%) | -2% | -3% |
| Energy calculated from reported emission (GJ) | 42,215,901 | 41,625,882 |
| Difference from third-party estimate (%) | -2% | -3% |

[a] From *Oil & Gas Journal* Worldwide Refining surveys *(6).*

[b] Energy based on 16.4 $MJ/m^3$ energy factor for natural gas-fed steam reforming *(1).*

[c] Emissions based on a 52.7 kg/GJ factor for natural gas-fed steam reforming *(1).*

[d] Facilityy-reported Mandatory GHG Reporting Rule emissions *(2).*

**Table 2-3. Density and sulfur content of average California crude feeds, summary of calculation**

| Year | Feed source | Feed volume ($m^3$/year)[a] | Specific gravity | Sulfur (% wt.) | Feed mass (tonnes) | Feed sulfur (tonnes) | Feed *d* (kg/$m^3$) | Feed *S* (kg/$m^3$) |
|---|---|---|---|---|---|---|---|---|
| 2009 | California[b] | 38,007,186 | 0.9274 | 1.12 | 35,249,004 | 394,436 | 927.430 | 10.378 |
| 2009 | Alaska (TAPS)[c] | 14,491,215 | 0.8714 | 1.11 | 12,627,065 | 140,160 | 871.360 | 9.672 |
| 2009 | Foreign imports[d] | 43,703,065 | 0.8887 | 1.52 | 38,838,914 | 590,740 | 888.700 | 13.517 |
| **2009** | **Refinery input** | 96,202,420 | -- | -- | 86,714,984 | 1,125,337 | **901.380** | **11.698** |
| 2008 | California[b] | 39,745,712 | 0.9273 | 1.16 | 36,855,722 | 427,895 | 927.288 | 10.766 |
| 2008 | Alaska (TAPS)[c] | 13,985,477 | 0.8714 | 1.11 | 12,186,385 | 135,269 | 871.360 | 9.672 |
| 2008 | Foreign imports[d] | 50,526,005 | 0.8906 | 1.73 | 44,997,449 | 776,206 | 890.58 | 15.36 |
| **2008** | **Refinery input** | 104,257,194 | -- | -- | 94,039,556 | 1,339,370 | **902.00** | **12.85** |
| 2007 | California[b] | 39,976,562 | 0.9269 | 1.10 | 37,055,075 | 407,606 | 926.92 | 10.20 |
| 2007 | Alaska (TAPS)[c] | 16,041,819 | 0.8714 | 1.11 | 13,978,199 | 155,158 | 871.36 | 9.67 |
| 2007 | Foreign imports[d] | 45,604,553 | 0.8861 | 1.60 | 40,411,563 | 645,777 | 886.13 | 14.16 |
| **2007** | **Refinery input** | 101,622,933 | -- | -- | 91,444,836 | 1,208,541 | **899.84** | **11.89** |
| 2006 | California[b] | 40,461,950 | 0.9270 | 1.10 | 37,506,204 | 410,693 | 926.95 | 10.15 |
| 2006 | Alaska (TAPS)[c] | 16,802,414 | 0.8714 | 1.11 | 14,640,951 | 162,515 | 871.36 | 9.67 |
| 2006 | Foreign imports[d] | 46,949,904 | 0.8860 | 1.56 | 41,599,493 | 648,952 | 886.04 | 13.82 |
| **2006** | **Refinery input** | 104,214,267 | -- | -- | 93,746,648 | 1,222,160 | **899.56** | **11.73** |
| 2005 | California[b] | 42,298,889 | 0.9277 | 1.10 | 39,240,679 | 431,255 | 927.70 | 10.20 |
| 2005 | Alaska (TAPS)[c] | 21,607,328 | 0.8714 | 1.11 | 18,827,761 | 208,988 | 871.36 | 9.67 |
| 2005 | Foreign imports[d] | 43,295,104 | 0.8886 | 1.63 | 38,472,895 | 626,723 | 888.62 | 14.48 |
| **2005** | **Refinery input** | 107,201,321 | -- | -- | 96,541,336 | 1,266,967 | **900.56** | **11.82** |
| 2004 | California[b] | 43,625,479 | 0.9279 | 1.18 | 40,481,871 | 476,472 | 927.94 | 10.92 |
| 2004 | Alaska (TAPS)[c] | 22,570,950 | 0.8714 | 1.11 | 19,667,423 | 218,308 | 871.36 | 9.67 |
| 2004 | Foreign imports[d] | 37,915,927 | 0.8828 | 1.49 | 33,471,422 | 498,055 | 882.78 | 13.14 |
| **2004** | **Refinery input** | 104,112,356 | -- | -- | 93,620,716 | 1,192,835 | **899.23** | **11.46** |

[a] Feed volumes from California Energy Commission *(5)*.

[b] Weighted average density and sulfur content of California-produced crude from data in Table 2-4.

[c] Density and sulfur content, Alaska North Slope blend, TAPS terminus at Valdez, 2002 *(16)*.

[d] Weighted average density and sulfur content of all foreign crude imports processed in California *(14)*.

## Table 2-4. California-producted crude data by field, area, and pool, formation or zone

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Aliso Canyon | Field | Field total | | | 23.084 | 23.396 | 21.997 | 20.707 | 21.005 | 23.987 |
| Aliso Canyon | Field | Not matched to pool/*OQ* | 0.917 *b* | 0.80 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Aliso Canyon | | Aliso | 0.969 *c* | 0.94 *c* | 1.512 | 1.297 | 1.036 | 0.307 | 0.690 | 0.481 |
| Aliso Canyon | | Aliso, West | 0.993 *c* | 0.80 *b* | 0.604 | 0.490 | 0.454 | 0.378 | 0.201 | 0.166 |
| Aliso Canyon | | Porter-Del Aliso A-36 | 0.913 *c* | 0.80 *b* | 5.749 | 5.060 | 4.881 | 5.433 | 8.133 | 8.474 |
| Aliso Canyon | | Porter, West | 0.911 *c* | 0.80 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.010 | 0.028 |
| Aliso Canyon | | Mission-Adrian | 0.882 *c* | 0.80 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Aliso Canyon | | Monterey | 0.917 *b* | 0.80 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.018 |
| Aliso Canyon | | Sesnon-Frew A/ | 0.840 *c* | 0.80 *b* | 15.219 | 16.550 | 15.626 | 14.589 | 11.970 | 14.820 |
| Aliso Canyon | | Faulted Sesnon | 0.922 *c* | 0.80 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ant Hill | Field | Field total | | | 12.225 | 12.145 | 15.664 | 17.945 | 12.714 | 9.251 |
| Ant Hill | Field | Not matched to pool/*OQ* | 0.898 *b* | 0.48 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ant Hill | | Olcese | 0.968 *b* | 0.68 *b* | 12.225 | 12.145 | 15.664 | 17.945 | 12.714 | 9.251 |
| Ant Hill | | Jewett | 0.828 *b* | 0.28 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Antelope Hills | Field | Field total | | | 37.514 | 31.996 | 27.777 | 25.870 | 26.880 | 24.872 |
| Antelope Hills | Field | Not matched to pool/*OQ* | 0.946 *c* | 0.69 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Antelope Hills | Hopkins Area | Phacoides | 0.871 *c* | 0.69 *c* | 0.363 | 0.339 | 0.251 | 0.222 | 0.254 | 0.210 |
| Antelope Hills | Hopkins Area | Eocene | 0.953 *c* | 0.69 *c* | 0.560 | 0.560 | 0.486 | 0.469 | 0.543 | 0.382 |
| Antelope Hills | Williams Area | No breakdown by pool | 0.957 *c* | 0.69 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.006 | 1.967 |
| Antelope Hills | Williams Area | Gas Zone | 0.946 *c* | 0.69 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Antelope Hills | Williams Area | Upper | 0.986 *c* | 0.69 *c* | 1.311 | 2.208 | 0.951 | 0.695 | 1.550 | 0.676 |
| Antelope Hills | Williams Area | East Block-Button Bed | 0.953 *c* | 0.69 *c* | 12.877 | 7.884 | 6.092 | 0.695 | 5.371 | 4.259 |
| Antelope Hills | Williams Area | East Block-Agua | 0.947 *c* | 0.69 *c* | 4.322 | 2.483 | 3.335 | 6.243 | 4.232 | 4.220 |
| Antelope Hills | Williams Area | W. Blk-Button Bed & Agua | 0.947 *c* | 0.69 *c* | 6.421 | 5.543 | 4.724 | 3.582 | 6.344 | 5.548 |
| Antelope Hills | Williams Area | Point of Rocks | 0.953 *c* | 0.69 *c* | 11.659 | 12.979 | 11.938 | 8.977 | 8.580 | 7.627 |
| Antelope Hills | Nepple Area Gas | All | 0.946 *c* | 0.69 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 3.602 |
| Antelope Hills, North | Field | Field total | | | 12.912 | 13.516 | 13.064 | 12.349 | 22.827 | 35.157 |
| Antelope Hills, North | Field | Not matched to pool/*OQ* | 0.953 *d* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 | 0.386 |
| Antelope Hills, North | | Miocene-Eocene | 0.974 *c* | | 12.912 | 13.516 | 13.064 | 11.733 | 11.885 | 14.800 |
| Antelope Hills, North | | Point of Rocks | 0.959 *c* | | 0.000 | 0.000 | 0.000 | 0.616 | 10.937 | 23.572 |
| Arroyo Grande | Field | Field total | | | 97.925 | 92.775 | 92.838 | 87.130 | 75.491 | 71.809 |
| Arroyo Grande | Field | Not matched to pool/*OQ* | 0.969 *c* | 1.30 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Arroyo Grande | Oak Park Area | Martin-Elberta | 0.966 *c* | 1.30 *b* | 0.069 | 0.003 | 0.016 | 0.000 | 0.000 | 0.394 |
| Arroyo Grande | Tiber Area | Dollie | 0.973 *c* | 1.30 *b* | 97.856 | 92.772 | 92.822 | 87.130 | 75.491 | 71.415 |
| Asphalto | Field | Field total | | | 21.839 | 21.726 | 19.621 | 31.842 | 41.838 | 38.404 |
| Asphalto | Field | Not matched to pool/*OQ* | 0.845 *c* | 0.42 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Asphalto | | Etchegoin | 0.973 *c* | 0.42 *b* | 0.000 | 0.000 | 0.000 | 1.120 | 0.866 | 0.703 |
| Asphalto | | Olig | 0.789 *c* | 0.42 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Asphalto | | Antelope Shale | 0.846 *c* | 0.42 *b* | 2.978 | 2.804 | 0.363 | 1.349 | 3.153 | 4.903 |
| Asphalto | | Stevens | 0.849 *b* | 0.42 *b* | 17.510 | 17.959 | 18.539 | 28.593 | 37.315 | 31.671 |
| Asphalto | | 1st Carneros | 0.805 *c* | 0.42 *b* | 1.352 | 0.962 | 0.719 | 0.780 | 0.504 | 1.019 |
| Asphalto | | Carneros | 0.805 *c* | 0.42 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bandini | Field | Field total | | | 2.647 | 3.271 | 3.476 | 3.432 | 3.123 | 1.571 |
| Bandini | Field | Not matched to pool/*OQ* | 0.841 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bandini | | Pliocene | 0.837 *c* | | 2.647 | 3.271 | 3.476 | 3.432 | 3.123 | 1.571 |
| Bandini | | Miocene | 0.845 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Barham Ranch | Field | Field total | | | 17.622 | 16.373 | 18.360 | 15.201 | 14.908 | 13.026 |
| Barham Ranch | Field | Not matched to pool/*OQ* | 0.918 *c* | 1.30 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Barham Ranch | La Laguna | Monterey | 0.868 *c* | 1.30 *c* | 17.065 | 15.520 | 14.194 | 11.915 | 11.872 | 9.833 |
| Barham Ranch | Old Area | | 0.968 *c* | 1.30 *c* | 0.558 | 0.853 | 4.166 | 3.285 | 3.037 | 3.193 |
| Barsdale | Field | Field total | | | 14.820 | 11.247 | 8.792 | 9.916 | 8.542 | 7.176 |
| Barsdale | Field | Not matched to pool/*OQ* | 0.881 *c* | 0.83 *b* | 14.820 | 11.247 | 8.792 | 9.916 | 6.032 | 5.237 |
| Barsdale | | Deep | 0.857 *c* | 0.83 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 2.510 | 1.939 |
| Beer Nose | Field | Field total | | | 0.949 | 0.937 | 0.905 | 0.569 | 0.306 | 0.433 |
| Beer Nose | Field | Not matched to pool/*OQ* | 0.871 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Beer Nose | | Bloemer | 0.871 *c* | | 0.949 | 0.937 | 0.905 | 0.569 | 0.306 | 0.433 |
| Belgian Anticline | Field | Field total | | | 11.077 | 8.739 | 9.653 | 9.303 | 8.523 | 8.563 |
| Belgian Anticline | Field | Not matched to pool/*OQ* | 0.850 *b* | 0.41 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Belgian Anticline | Main Area | No breakdown by pool | 0.838 *c* | 0.41 *b* | 9.176 | 7.123 | 7.185 | 8.166 | 7.535 | 6.893 |
| Belgian Anticline | Main Area | Oceanic | 0.850 *b* | 0.59 *b* | 0.000 | 0.000 | 0.000 | 0.206 | 0.000 | 0.000 |
| Belgian Anticline | Main Area | Point of Rocks | 0.800 *c* | 0.41 *c* | 0.385 | 0.449 | 0.589 | 0.931 | 0.247 | 0.328 |
| Belgian Anticline | Northwest Area | No breakdown by pool | 0.885 *c* | 0.59 *b* | 1.516 | 1.167 | 1.880 | 0.931 | 0.741 | 1.342 |
| Belgian Anticline | Northwest Area | Miocene | 0.860 *c* | 0.59 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Belgian Anticline | Northwest Area | Eocene | 0.846 *c* | 0.59 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bellevue | Field | Field total | | | 6.161 | 5.617 | 5.639 | 6.320 | 5.521 | 5.073 |
| Bellevue | Field | Not matched to pool/*OQ* | 0.850 *c* | 0.36 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bellevue | Main Area | Stevens | 0.855 *c* | 0.36 *b* | 5.333 | 4.890 | 4.804 | 5.515 | 4.782 | 4.341 |
| Bellevue | South Area | Stevens | 0.845 *c* | 0.36 *b* | 0.828 | 0.727 | 0.835 | 0.805 | 0.738 | 0.731 |
| Bellevue, West | Field | Field total | | | 4.724 | 3.766 | 4.310 | 3.823 | 4.897 | 4.620 |
| Bellevue, West | Field | Not matched to pool/*OQ* | 0.868 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bellevue, West | | Stevens | 0.868 *c* | | 4.724 | 3.766 | 4.310 | 3.823 | 4.897 | 4.620 |
| Belmont Offshore | Field | Field total | | | 51.407 | 66.657 | 108.201 | 12.418 | 114.889 | 106.080 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | | Sulfur % wt. | | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Belmont Offshore | Field | Not matched to pool/*OQ* | 0.883 | *b* | 0.90 | *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Belmont Offshore | Old Area | Upper | 0.926 | *c* | 0.90 | *b* | 0.000 | 22.183 | 53.991 | 57.897 | 59.375 | 56.347 |
| Belmont Offshore | Old Area | Intermediate | 0.899 | *c* | 0.90 | *b* | 0.000 | 0.000 | 0.000 | 4.088 | 11.400 | 6.554 |
| Belmont Offshore | Old Area | Lower | 0.899 | *c* | 0.90 | *c* | 5.408 | 5.008 | 15.576 | 25.943 | 18.030 | 26.106 |
| Belmont Offshore | Old Area | 237 | 0.883 | *b* | 0.90 | *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Belmont Offshore | Old Area | Schist | 0.883 | *b* | 0.90 | *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Belmont Offshore | Surfside Area | | 0.897 | *c* | 0.14 | *c* | 45.999 | 39.465 | 38.634 | 36.734 | 26.084 | 17.073 |
| Belridge, North | Field | Field total | | | | | 609.344 | 591.421 | 540.598 | 525.997 | 563.581 | 519.432 |
| Belridge, North | Field | Not matched to pool/*OQ* | 0.854 | *b,c* | 0.66 | *b,c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Belridge, North | | Tulare | 0.972 | *b* | 1.14 | *b* | 29.653 | 21.937 | 150.161 | 18.346 | 23.115 | 19.580 |
| Belridge, North | | Diatomite | 0.890 | *c* | 1.14 | *b* | 559.721 | 548.835 | 502.891 | 492.418 | 525.835 | 486.952 |
| Belridge, North | | Temblor | 0.825 | *c* | 0.69 | *c* | 2.260 | 1.186 | 2.557 | 2.211 | 2.373 | 1.781 |
| Belridge, North | | R Sand | 0.771 | *c* | 0.17 | *c* | 1.055 | 1.179 | 5.091 | 3.607 | 2.522 | 2.311 |
| Belridge, North | | Belridge 64 | 0.828 | *c* | 0.17 | *c* | 16.655 | 18.284 | 15.037 | 9.414 | 9.735 | 8.809 |
| Belridge, North | | Y Sand | 0.835 | *c* | 0.65 | *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Belridge, South | Field | Field total | | | | | 6,301.301 | 5,907.403 | 5,645.857 | 5,360.766 | 5,159.343 | 4,652.846 |
| Belridge, South | Field | Not matched to pool/*OQ* | 0.906 | *b,c* | 0.70 | *b,c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.644 | 0.671 |
| Belridge, South | | Tulare | 0.966 | *b* | 0.23 | *b* | 2,504.036 | 2,288.377 | 2,155.501 | 2,139.089 | 2,009.493 | 1,785.617 |
| Belridge, South | | Diatomite | 0.890 | *c* | 0.86 | *b* | 3,768.569 | 3,593.228 | 3,466.721 | 3,197.425 | 3,129.365 | 2,849.268 |
| Belridge, South | | Diatomite-Antelope Shale | 0.886 | *c* | 0.86 | *b* | 2.074 | 2.567 | 3.163 | 7.187 | 6.114 | 6.784 |
| Belridge, South | | Antelope Shale | 0.882 | *c* | 0.86 | *b* | 26.622 | 23.231 | 20.472 | 17.065 | 13.728 | 10.664 |
| Beta Offshore | Field | Field total | | | | | 135.378 | 144.755 | 132.025 | 144.490 | 173.583 | 231.143 |
| Beta Offshore | Field | Not matched to pool/*OQ* | 0.959 | *d* | 3.80 | *c* | 135.378 | 144.755 | 132.025 | 144.490 | 173.583 | 231.143 |
| Beverly Hills | Field | Field total | | | | | 175.960 | 178.745 | 173.359 | 153.548 | 140.515 | 137.987 |
| Beverly Hills | Field | Not matched to pool/*OQ* | 0.869 | *c* | 2.41 | *b,c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Beverly Hills | East Area | Pliocene | 0.850 | *c* | 2.30 | *c* | 11.382 | 13.489 | 11.618 | 10.314 | 10.037 | 9.221 |
| Beverly Hills | East Area | Miocene | 0.855 | *c* | 2.45 | *b* | 131.046 | 3.572 | 125.216 | 109.708 | 99.962 | 98.761 |
| Beverly Hills | West Area | Pliocene | 0.944 | *c* | 2.45 | *b* | 0.522 | 0.290 | 0.338 | 0.750 | 0.675 | 0.726 |
| Beverly Hills | West Area | Miocene | 0.827 | *c* | 2.45 | *b* | 33.010 | 34.205 | 36.188 | 32.775 | 29.841 | 29.280 |
| Big Mountain | Field | Field total | | | | | 5.287 | 3.486 | 4.818 | 5.460 | 5.778 | 5.622 |
| Big Mountain | Field | Not matched to pool/*OQ* | 0.901 | *c* | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Big Mountain | | Sespe | 0.932 | *c* | | | 5.287 | 3.486 | 4.818 | 5.460 | 5.778 | 5.622 |
| Big Mountain | | Eocene | 0.876 | *c* | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bitterwater | Field | Field total | | | | | 0.364 | 0.346 | 0.356 | 0.339 | 0.311 | 0.297 |
| Bitterwater | Field | Not matched to pool/*OQ* | 0.896 | *c* | | | 0.364 | 0.346 | 0.356 | 0.339 | 0.311 | 0.297 |
| Blackwells Corner | Field | Field total | | | | | 1.423 | 1.162 | 1.290 | 3.022 | 2.016 | 1.661 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Blackwells Corner | Field | Not matched to pool/*OQ* | 0.973 *b* | | 1.423 | 1.162 | 1.290 | 3.022 | 2.016 | 1.661 |
| Bowerbank | Field | Field total | | | 0.893 | 0.033 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bowerbank | Field | Not matched to pool/*OQ* | 0.865 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bowerbank | | Gas Zone | 0.865 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bowerbank | | Stevens | 0.865 *c* | | 0.893 | 0.033 | 0.000 | 0.000 | 0.000 | 0.000 |
| Brea-Olinda | Field | Field total | | | 200.487 | 196.035 | 196.141 | 187.882 | 179.099 | 190.006 |
| Brea-Olinda | Field | Not matched to pool/*OQ* | 0.917 *c* | 1.43 *b* | 200.487 | 196.035 | 196.141 | 187.882 | 179.099 | 190.006 |
| Brentwood | Field | Field total | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Brentwood | Field | Not matched to pool/*OQ* | 0.823 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Brentwood | Main Area | Prewett | 0.830 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Brentwood | Main Area | First Massive | 0.820 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Brentwood | Main Area | First Massive Block IA | 0.820 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Brentwood | Main Area | First Massive Block III | 0.820 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Brentwood | Main Area | Second Massive | 0.830 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Brentwood | Main Area | Third Massive | 0.830 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Brentwood | West Area | First Massive | 0.797 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Brentwood | West Area | Second Massive | 0.835 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Brentwood | West Area | Third Massive | 0.830 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Buena Vista | Field | Field total | | | 122.660 | 114.225 | 113.420 | 118.835 | 153.799 | 169.786 |
| Buena Vista | Field | Not matched to pool/*OQ* | 0.886 *b,c* | 0.56 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Buena Vista | Buena Vista Front | | 0.917 *c* | 0.59 *b* | 12.847 | 10.922 | 10.969 | 9.058 | 9.846 | 8.646 |
| Buena Vista | Buena Vista Hills | No breakdown by pool | 0.894 *b* | 0.59 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.015 | 1.762 |
| Buena Vista | Buena Vista Hills | Gas Zone | 0.873 *b* | 0.59 *b* | 0.256 | 0.323 | 0.126 | 0.066 | 0.069 | 0.184 |
| Buena Vista | Buena Vista Hills | Gas Zone-Upper | 0.873 *b* | 0.59 *b* | 0.738 | 0.721 | 0.585 | 0.416 | 0.264 | 0.226 |
| Buena Vista | Buena Vista Hills | Upper Undifferentiated | 0.893 *c* | 0.59 *b* | 59.805 | 54.252 | 53.708 | 59.124 | 71.357 | 88.160 |
| Buena Vista | Buena Vista Hills | Sub-Scalez & Mulinia | 0.893 *c* | 0.59 *b* | 0.426 | 0.497 | 0.302 | 0.605 | 0.286 | 0.481 |
| Buena Vista | Buena Vista Hills | 27B Undifferentiated | 0.888 *c* | 0.59 *b* | 1.049 | 1.415 | 1.577 | 1.467 | 2.702 | 4.156 |
| Buena Vista | Buena Vista Hills | Reef Ridge | 0.876 *c* | 0.50 *b* | 0.655 | 0.474 | 0.662 | 1.360 | 1.748 | 1.253 |
| Buena Vista | Buena Vista Hills | Antelope Shale-E. Dome | 0.877 *c* | 0.50 *b* | 8.047 | 7.995 | 10.666 | 12.381 | 16.400 | 16.619 |
| Buena Vista | Buena Vista Hills | Antelope Shale-W. Dome | 0.877 *c* | 0.50 *b* | 7.874 | 7.625 | 6.993 | 7.121 | 9.801 | 12.946 |
| Buena Vista | Buena Vista Hills | 555 Stevens | 0.882 *c* | 0.50 *b* | 30.962 | 30.000 | 27.832 | 27.236 | 41.311 | 35.353 |
| Bunker Gas | Field | Field total | | | 0.978 | 0.089 | 0.060 | 0.150 | 0.093 | 0.073 |
| Bunker Gas | Field | Not matched to pool/*OQ* | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Bunker Gas | | No breakdown by pool | | | 0.978 | 0.089 | 0.060 | 0.150 | 0.093 | 0.073 |
| Bunker Gas | | Oil Zone | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Burrel | Field | Field total | | | 0.162 | 0.164 | 0.168 | 0.086 | 0.155 | 0.140 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Burrel | Field | Not matched to pool/*OQ* | 0.876 *c* | 0.90 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Burrel | | Miocene | 0.876 *c* | 0.90 *c* | 0.162 | 0.164 | 0.168 | 0.086 | 0.155 | 0.140 |
| Cabrillo | Field | Field total | | | 0.000 | 0.000 | 1.613 | 4.450 | 7.997 | 7.714 |
| Cabrillo | Field | Not matched to pool/*OQ* | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cabrillo | | Topanga | | | 0.000 | 0.000 | 1.613 | 4.450 | 7.997 | 7.714 |
| Cal Canal Gas | Field | Field total | | | 3.554 | 3.198 | 3.899 | 3.803 | 3.576 | 3.933 |
| Cal Canal Gas | Field | Not matched to pool/*OQ* | 0.820 *c* | 0.16 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cal Canal Gas | | Etchegoin | 0.820 *c* | 0.16 *c* | 0.028 | 0.023 | 0.000 | 0.000 | 0.000 | 0.008 |
| Cal Canal Gas | | Stevens | 0.820 *c* | 0.16 *c* | 3.526 | 3.175 | 3.899 | 3.803 | 3.576 | 3.925 |
| Calders Corner | Field | Field total | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Calders Corner | Field | Not matched to pool/*OQ* | 0.850 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Calders Corner | | Stevens | 0.850 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Camden | Field | Field total | | | 0.181 | 0.216 | 0.197 | 0.179 | 0.196 | 0.215 |
| Camden | Field | Not matched to pool/*OQ* | 0.860 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Camden | | Miocene | 0.860 *c* | | 0.181 | 0.216 | 0.197 | 0.179 | 0.196 | 0.215 |
| Canada Larga | Field | Field total | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.047 | 0.356 |
| Canada Larga | Field | Not matched to pool/*OQ* | 0.904 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.356 |
| Canal | Field | Field total | | | 5.283 | 4.238 | 3.664 | 4.367 | 4.166 | 5.189 |
| Canal | Field | Not matched to pool/*OQ* | 0.845 *c* | 0.50 *b,c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Canal | Main Area | Gas Zone | 0.845 *c* | 0.50 *b,c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.045 |
| Canal | Main Area | Upper Stevens | 0.850 *c* | 0.41 *c* | 0.555 | 0.395 | 0.425 | 0.411 | 0.354 | 0.299 |
| Canal | Main Area | Middle Stevens | 0.850 *c* | 0.41 *b* | 1.938 | 1.458 | 1.708 | 1.643 | 1.415 | 1.197 |
| Canal | Main Area | Lower Stevens | 0.850 *c* | 0.70 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.060 | 0.523 |
| Canal | Pioneer Canal | Upper Stevens | 0.833 *c* | 0.26 *b* | 1.141 | 0.869 | 0.442 | 0.626 | 0.608 | 0.740 |
| Canal | Pioneer Canal | Lower Stevens | 0.844 *c* | 0.70 *b* | 1.641 | 1.517 | 1.088 | 1.687 | 1.728 | 2.430 |
| Canfield Ranch | Field | Field total | | | 41.285 | 38.025 | 28.738 | 24.287 | 19.103 | 18.590 |
| Canfield Ranch | Field | Not matched to pool/*OQ* | 0.877 *b,c* | 0.37 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Canfield Ranch | Gosford East | Stevens | 0.855 *b* | 0.37 *b* | 35.342 | 32.939 | 24.698 | 20.720 | 16.583 | 16.483 |
| Canfield Ranch | Gosford East | Larimer Equiv. | 0.877 *b,c* | 0.37 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Canfield Ranch | Gosford South | Stevens | 0.868 *c* | 0.37 *c* | 5.696 | 4.713 | 3.697 | 3.238 | 2.180 | 1.791 |
| Canfield Ranch | Gosford West | Stevens | 0.930 *c* | 0.37 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Canfield Ranch | Old Area | Etchegoin | 0.877 *b,c* | 0.37 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Canfield Ranch | Old Area | Stevens | 0.887 *c* | 0.37 *c* | 0.247 | 0.374 | 0.343 | 0.329 | 0.340 | 0.316 |
| Canfield Ranch | Old River Area | Stevens | 0.845 *c* | 0.37 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Careaga Canyon | Field | Field total | | | 0.273 | 0.303 | 0.139 | 2.943 | 1.872 | 1.811 |
| Careaga Canyon | Field | Not matched to pool/*OQ* | 0.853 *c* | 0.34 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Careaga Canyon | Old Area | Monterey | 0.855 *c* | 0.20 *c* | 0.273 | 0.303 | 0.139 | 0.065 | 0.000 | 0.000 |
| Careaga Canyon | San Antonio Crk. | Monterey | 0.850 *c* | 0.47 *c* | 0.000 | 0.000 | 0.000 | 2.878 | 1.872 | 1.811 |
| Carneros Creek | Field | Field total | | | 5.693 | 5.261 | 6.588 | 7.321 | 8.155 | 5.688 |
| Carneros Creek | Field | Not matched to pool/*OQ* | 0.913 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Carneros Creek | | Button Bed | 0.979 *c* | | 0.607 | 0.677 | 0.733 | 0.744 | 0.770 | 0.773 |
| Carneros Creek | | Carneros | 0.916 *c* | | 0.096 | 0.086 | 0.073 | 0.069 | 0.057 | 0.045 |
| Carneros Creek | | Phacoides | 0.871 *c* | | 0.472 | 0.407 | 0.251 | 0.243 | 0.368 | 0.216 |
| Carneros Creek | | Point of Rocks | 0.885 *c* | | 4.517 | 4.091 | 5.530 | 6.265 | 6.960 | 4.671 |
| Carpinteria Offshore | Field | Field total | | | 82.509 | 80.415 | 82.592 | 83.660 | 78.051 | 73.980 |
| Carpinteria Offshore | Field | Not matched to pool/*OQ* | 0.895 *c* | 1.88 *e* | 82.509 | 80.415 | 82.592 | 83.660 | 78.051 | 73.980 |
| Cascade | Field | Field total | | | 67.505 | 64.173 | 51.856 | 43.285 | 33.814 | 30.889 |
| Cascade | Field | Not matched to pool/*OQ* | 0.910 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cascade | | No breakdown by pool | 0.885 *c* | | 1.846 | 1.446 | 2.124 | 3.479 | 2.732 | 3.197 |
| Cascade | | Deep | 0.885 *c* | | 65.659 | 62.727 | 49.731 | 39.806 | 31.082 | 27.692 |
| Casmalia | Field | Field total | | | 24.997 | 21.850 | 22.615 | 21.323 | 27.163 | 29.030 |
| Casmalia | Field | Not matched to pool/*OQ* | 0.959 *c* | 2.80 *b* | 24.997 | 21.850 | 22.615 | 21.323 | 27.163 | 29.030 |
| Castaic Hills | Field | Field total | | | 1.207 | 2.096 | 2.517 | 2.875 | 2.829 | 2.861 |
| Castaic Hills | Field | Not matched to pool/*OQ* | 0.937 *c* | 0.51 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Castaic Hills | | Golden | 1.007 *c* | 0.51 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Castaic Hills | | Sterling | 0.863 *c* | 0.51 *b* | 0.976 | 1.846 | 2.369 | 2.658 | 2.541 | 2.595 |
| Castaic Hills | | Sterling East | 0.863 *c* | 0.51 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Castaic Hills | | Rynne-Fisher | 0.860 *c* | 0.51 *b* | 0.232 | 0.250 | 0.148 | 0.218 | 0.288 | 0.266 |
| Castaic Hills | | Upper Radovich | 1.014 *c* | 0.51 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Castaic Hills | | Lower Radovich | 1.014 *c* | 0.51 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cat Canyon | Field | Field total | | | 61.406 | 54.220 | 56.314 | 57.354 | 36.675 | 45.823 |
| Cat Canyon | Field | Not matched to pool/*OQ* | 0.988 *b,c* | 4.74 *b,c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cat Canyon | Central Area | Sisquoc | 0.985 *b* | 4.96 *b* | 0.581 | 0.110 | 0.688 | 1.015 | 0.782 | 0.502 |
| Cat Canyon | East Area | | 1.001 *c* | 5.05 *c* | 0.560 | 0.159 | 0.064 | 0.000 | 0.000 | 0.000 |
| Cat Canyon | Gato Ridge Area | | 0.986 *c* | 5.87 *c* | 12.842 | 11.677 | 12.117 | 12.200 | 11.564 | 11.054 |
| Cat Canyon | Olivera Canyon | Monterey | 0.960 *b* | 4.10 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cat Canyon | Sisquoc Area | | 1.006 *c* | 4.50 *c* | 27.110 | 27.415 | 23.985 | 23.848 | 12.142 | 19.625 |
| Cat Canyon | Tinaquaic Area | Monterey | 1.022 *c* | 4.96 *b* | 0.000 | 0.000 | 0.304 | 3.158 | 3.155 | 2.823 |
| Cat Canyon | West Area | No breakdown by pool | 0.953 *c* | 3.74 *c* | 20.313 | 14.859 | 19.157 | 17.132 | 9.031 | 11.819 |
| Cat Canyon | West Area | S6-S6A-Gas Zone | 0.988 *b,c* | 4.74 *b,c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Chaffee Canyon | Field | Field total | | | 0.406 | 0.328 | 0.366 | 0.374 | 0.288 | 0.282 |
| Chaffee Canyon | Field | Not matched to pool/*OQ* | 0.845 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chaffee Canyon | | Pliocene-Gas Zone | 0.845 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Chaffee Canyon | | Eocene | 0.845 *c* | | 0.406 | 0.328 | 0.366 | 0.374 | 0.288 | 0.282 |
| Cheviot Hills | Field | Field total | | | 12.047 | 11.644 | 9.944 | 9.194 | 9.096 | 8.489 |
| Cheviot Hills | Field | Not matched to pool/*OQ* | 0.869 *b* | 0.70 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 9.096 | 0.000 |
| Cheviot Hills | | Pliocene | 0.889 *b* | 0.87 *b* | 11.000 | 10.553 | 9.069 | 8.209 | 7.745 | 7.212 |
| Cheviot Hills | | Miocene | 0.849 *b* | 0.53 *b* | 1.047 | 1.091 | 0.875 | 0.985 | 1.351 | 1.277 |
| Chico-Martinez | Field | Field total | | | 1.393 | 1.534 | 0.598 | 0.882 | 0.719 | 0.476 |
| Chico-Martinez | Field | Not matched to pool/*OQ* | 0.948 *c* | | 1.393 | 1.534 | 0.598 | 0.882 | 0.719 | 0.476 |
| Chino-Soquel | Field | Field total | | | 0.120 | 0.116 | 0.296 | 0.313 | 0.216 | 0.100 |
| Chino-Soquel | Field | Not matched to pool/*OQ* | 0.928 *c* | | 0.120 | 0.116 | 0.296 | 0.313 | 0.216 | 0.100 |
| Cienaga Canyon | Field | Field total | | | 0.835 | 0.715 | 1.167 | 1.526 | 3.093 | 1.809 |
| Cienaga Canyon | Field | Not matched to pool/*OQ* | 0.934 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cienaga Canyon | | Temblor | 0.934 *c* | | 0.835 | 0.715 | 1.167 | 1.526 | 3.093 | 1.809 |
| Coalinga | Field | Field total | | | 953.461 | 936.150 | 913.298 | 893.683 | 913.671 | 934.137 |
| Coalinga | Field | Not matched to pool/*OQ* | 0.887 *c* | 0.37 *b,c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Coalinga | | Temblor | 0.931 *c* | 0.64 *c* | 953.461 | 936.150 | 913.298 | 893.683 | 913.671 | 934.137 |
| Coalinga | | Cretacious | 0.843 *c* | 0.10 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Coalinga East Ext. | Field | Field total | | | 6.825 | 6.010 | 2.788 | 4.748 | 4.772 | 3.550 |
| Coalinga East Ext. | Field | Not matched to pool/*OQ* | 0.865 *b,c* | 0.26 *b,c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Coalinga East Ext. | Coalinga Nose | Vaqueros | 0.845 *c* | 0.22 *c* | 1.823 | 1.528 | 1.747 | 1.213 | 0.877 | 0.373 |
| Coalinga East Ext. | Coalinga Nose | Gatchell | 0.868 *b* | 0.25 *b* | 5.002 | 4.482 | 1.041 | 3.536 | 3.895 | 3.177 |
| Coalinga East Ext. | Northeast Area | Gatchell | 0.883 *b* | 0.31 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Coles Levee North | Field | Field total | | | 25.506 | 25.106 | 23.549 | 23.388 | 26.236 | 24.788 |
| Coles Levee North | Field | Not matched to pool/*OQ* | 0.805 *b,c* | 0.49 *b,c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Coles Levee North | | Gas Zone | 0.805 *b,c* | 0.49 *b,c* | 0.006 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Coles Levee North | | Stevens Undifferentiated | 0.859 *b* | 0.58 *b* | 25.500 | 25.106 | 23.549 | 23.388 | 26.236 | 24.788 |
| Coles Levee North | | Miocene-Eocene | 0.751 *c* | 0.39 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 3.482 |
| Coles Levee South | Field | Field total | | | 14.511 | 15.111 | 15.375 | 15.098 | 14.667 | 10.912 |
| Coles Levee South | Field | Not matched to pool/*OQ* | 0.834 *b,c* | 0.38 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Coles Levee South | | Gas Zone | 0.834 *b,c* | 0.38 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Coles Levee South | | Stevens | 0.840 *b* | 0.38 *b* | 14.511 | 15.111 | 15.375 | 15.098 | 14.667 | 14.393 |
| Coles Levee South | | Nozu | 0.829 *c* | 0.38 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Comanche Point | Field | Field total | | | 0.551 | 0.586 | 0.723 | 0.576 | 0.976 | 0.868 |
| Comanche Point | Field | Not matched to pool/*OQ* | 0.954 *c* | 1.16 *c* | 0.551 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Comanche Point | | No breakdown by pool | 0.966 *c* | 1.16 *c* | 0.000 | 0.586 | 0.723 | 0.576 | 0.324 | 0.336 |
| Comanche Point | | Santa Margarita | 0.966 *c* | 1.16 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.652 | 0.532 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Coyote East | Field | Field total | | | 44.041 | 40.007 | 37.966 | 35.872 | 35.938 | 36.258 |
| Coyote East | Field | Not matched to pool/*OQ* | 0.930 *c* | 1.16 *c* | 44.041 | 40.007 | 37.966 | 35.872 | 35.938 | 36.258 |
| Cuyama South | Field | Field total | | | 44.548 | 44.524 | 42.754 | 42.188 | 40.259 | 36.443 |
| Cuyama South | Field | Not matched to pool/*OQ* | 0.863 *b* | 0.42 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cuyama South | Main Area | No breakdown by pool | 0.863 *b* | 0.42 *b* | 41.633 | 41.361 | 38.291 | 38.915 | 38.512 | 32.150 |
| Cuyama South | Main Area | 52-1-Gas Zone | 0.863 *b* | 0.42 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cuyama South | Southeast Area | Santa Margarita-Gas Zone | 0.863 *b* | 0.42 *b* | 0.000 | 0.024 | 0.784 | 0.630 | 0.359 | 0.267 |
| Cuyama South | Southeast Area | Santa Margarita | 0.863 *b* | 0.42 *b* | 2.915 | 3.140 | 3.679 | 2.643 | 1.387 | 1.023 |
| Cuyama South | Southeast Area | Cox | 0.863 *b* | 0.42 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cuyama South | East Area | L. Miocene | 0.863 *b* | 0.42 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cymric | Field | Field total | | | 3,007.267 | 2,835.179 | 2,934.520 | 2,923.618 | 2,861.509 | 2,787.928 |
| Cymric | Field | Not matched to pool/*OQ* | 0.907 *c* | 0.68 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cymric | Cymric Flank Area | Cameros | 0.842 *c* | 0.44 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.220 |
| Cymric | Cymric Flank Area | Phacoides | 0.860 *c* | 0.68 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cymric | Salt Creek Main | Etchegoin | 0.979 *c* | 1.16 *b* | 0.276 | 0.336 | 0.339 | 0.345 | 0.557 | 0.522 |
| Cymric | Salt Creek Main | Cameros West | 0.943 *b* | 0.69 *b* | 1.922 | 1.876 | 1.461 | 0.805 | 0.854 | 0.999 |
| Cymric | Salt Creek Main | Cameros Unit | 0.937 *c* | 0.69 *b* | 11.588 | 10.496 | 8.999 | 8.658 | 6.181 | 7.259 |
| Cymric | Salt Creek Main | Phacoides | 0.922 *c* | 0.44 *b* | 2.160 | 2.109 | 1.996 | 2.293 | 2.320 | 1.488 |
| Cymric | Salt Creek West | Phacoides | 0.922 *c* | 0.44 *b* | 0.000 | 0.123 | 0.260 | 0.145 | 0.181 | 0.170 |
| Cymric | Sheep Springs | Tulare | 0.990 *c* | 1.16 *b* | 0.364 | 0.344 | 0.299 | 0.177 | 0.187 | 0.221 |
| Cymric | Sheep Springs | Etchegoin | 0.959 *c* | 0.86 *b* | 3.510 | 3.376 | 3.709 | 3.490 | 3.832 | 4.454 |
| Cymric | Sheep Springs | Monterey | 0.925 *c* | 0.69 *b* | 0.000 | 0.000 | 0.028 | 0.085 | 0.267 | 0.000 |
| Cymric | Sheep Springs | Cameros | 0.916 *c* | 0.44 *b* | 2.269 | 1.749 | 1.424 | 4.160 | 6.845 | 7.221 |
| Cymric | Sheep Springs | Phacoides | 0.860 *c* | 0.44 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cymric | Sheep Springs | Oceanic | 0.820 *c* | 0.23 *b* | 0.014 | 0.012 | 0.010 | 0.010 | 0.008 | 0.011 |
| Cymric | Welport Area | No breakdown by pool | 0.907 *c* | 0.68 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cymric | Welport Area | Tulare-Antelope | 0.979 *c* | 1.16 *b* | 145.560 | 279.075 | 287.711 | 253.195 | 295.886 | 295.336 |
| Cymric | Welport Area | Tulare | 0.979 *c* | 1.16 *b* | 1,251.681 | 1,146.959 | 1,175.553 | 1,045.810 | 963.330 | 892.743 |
| Cymric | Welport Area | Etchegoin | 0.887 *c* | 0.86 *b* | 1,302.987 | 1,147.315 | 1,209.081 | 1,347.150 | 1,329.735 | 1,365.377 |
| Cymric | Welport Area | San Joaquin | 0.985 *c* | 1.38 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cymric | Welport Area | Reef Ridge-Antelope | 0.960 *c* | 0.86 *b* | 270.520 | 226.043 | 228.528 | 248.238 | 240.793 | 203.307 |
| Cymric | Welport Area | McDonald-Devilwater | 0.891 *c* | 0.86 *b* | 0.016 | 4.855 | 2.637 | 1.481 | 1.879 | 1.195 |
| Cymric | Welport Area | Cameros | 0.866 *c* | 0.44 *b* | 2.170 | 0.715 | 0.638 | 1.246 | 3.196 | 4.153 |
| Cymric | Welport Area | Agua | 0.871 *c* | 0.44 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cymric | Welport Area | Phacoides | 0.860 *c* | 0.44 *b* | 0.161 | 0.211 | 2.117 | 2.321 | 1.264 | 0.640 |
| Cymric | Welport Area | Oceanic | 0.821 *c* | 0.23 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.622 | 0.902 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Cymric | Welport Area | Point of Rocks | 0.788 *c* | 0.23 *b* | 12.068 | 9.586 | 9.729 | 4.010 | 3.573 | 1.709 |
| Deer Creek | Field | Field total | | | 6.307 | 6.694 | 7.017 | 7.071 | 8.049 | 8.978 |
| Deer Creek | Field | Not matched to pool/*OQ* | 0.921 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Deer Creek | | Santa Margarita | 0.855 *c* | | 6.307 | 6.694 | 7.017 | 7.071 | 8.049 | 8.978 |
| Deer Creek North | Field | Field total | | | 0.000 | 0.072 | 0.172 | 0.159 | 0.139 | 0.019 |
| Deer Creek North | Field | Not matched to pool/*OQ* | 0.986 *c* | | 0.000 | 0.072 | 0.172 | 0.159 | 0.000 | 0.019 |
| Del Valle | Field | Field total | | | 10.605 | 8.325 | 9.465 | 9.356 | 9.690 | 10.434 |
| Del Valle | Field | Not matched to pool/*OQ* | 0.887 *c* | 1.15 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Del Valle | Kinler Area | | 0.934 *c* | 1.15 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Del Valle | Main Area | | 0.853 *c* | 1.15 *b* | 6.646 | 4.949 | 6.204 | 6.145 | 6.368 | 7.063 |
| Del Valle | South Area | | 0.875 *c* | 1.14 *b* | 3.959 | 3.377 | 3.260 | 3.211 | 3.322 | 3.333 |
| Denverton Crk. Gas | Field | Field total | | | 0.189 | 0.158 | 0.096 | 0.052 | 0.032 | 0.009 |
| Denverton Crk. Gas | Field | Not matched to pool/*OQ* | | | 0.189 | 0.158 | 0.096 | 0.052 | 0.032 | 0.009 |
| Devils Den | Field | Field total | | | 3.040 | 3.629 | 4.116 | 3.761 | 3.266 | 3.087 |
| Devils Den | Field | Not matched to pool/*OQ* | 0.917 *b,c* | 0.41 *b,c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Devils Den | Alferitz Area | No breakdown by pool | 0.931 *b* | 0.37 *b* | 2.140 | 2.890 | 3.444 | 3.068 | 2.734 | 2.559 |
| Devils Den | Alferitz Area | Eocene Gas Zone | 0.887 *c* | 0.57 *b* | 0.207 | 0.194 | 0.172 | 0.152 | 0.103 | 0.132 |
| Devils Den | Bates Area | | 0.904 *c* | 0.14 *c* | 0.055 | 0.081 | 0.095 | 0.140 | 0.112 | 0.111 |
| Devils Den | Old Area | | 0.945 *c* | 0.57 *b* | 0.639 | 0.464 | 0.405 | 0.401 | 0.317 | 0.285 |
| Dominguez | Field | Field total | | | 1.421 | 1.337 | 1.317 | 1.286 | 1.227 | 1.179 |
| Dominguez | Field | Not matched to pool/*OQ* | 0.871 *c* | 0.76 *b* | 1.421 | 1.337 | 1.317 | 1.286 | 1.227 | 1.179 |
| Dos Cuadras OCS | Field | Field total | | | 245.909 | 227.487 | 247.484 | 215.117 | 220.371 | 210.282 |
| Dos Cuadras OCS | Field | Not matched to pool/*OQ* | 0.881 *c* | 1.11 *b* | 245.909 | 227.487 | 247.484 | 215.117 | 220.371 | 210.282 |
| Dunnigan Hills Gas | Field | Field total | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| Dunnigan Hills Gas | Field | Not matched to pool/*OQ* | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Dunnigan Hills Gas | Main Area | | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| Dunnigan Hills Gas | Southeast Area | Winters | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Dutch Slough Gas | Field | Field total | | | 0.097 | 0.357 | 0.587 | 0.408 | 0.174 | 0.066 |
| Dutch Slough Gas | Field | Not matched to pool/*OQ* | | | 0.097 | 0.357 | 0.587 | 0.408 | 0.000 | 0.066 |
| Edison | Field | Field total | | | 105.532 | 102.366 | 107.857 | 106.296 | 107.886 | 107.254 |
| Edison | Field | Not matched to pool/*OQ* | 0.914 *c* | 0.34 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Edison | Edison Groves | | 0.970 *c* | 0.70 *c* | 3.346 | 3.463 | 4.555 | 3.059 | 3.614 | 6.797 |
| Edison | Jeppi Area | | 0.851 *c* | 0.42 *b* | 1.246 | 1.713 | 1.593 | 1.774 | 1.907 | 1.934 |
| Edison | Main Area | | 0.933 *c* | 0.56 *c* | 59.822 | 57.194 | 58.143 | 58.630 | 58.082 | 53.381 |
| Edison | Portals-Fairfax | | 0.953 *c* | 0.20 *c* | 4.989 | 4.612 | 5.309 | 5.352 | 5.502 | 9.735 |
| Edison | Race Track Hill | | 0.905 *c* | 0.22 *c* | 27.452 | 27.834 | 30.109 | 29.621 | 31.108 | 26.896 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Edison | West Area | No breakdown by pool | 0.901 *c* | 0.20 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Edison | West Area | Santa Margarita | 0.966 *c* | 0.20 *c* | 0.069 | 0.043 | 0.035 | 0.152 | 0.179 | 0.169 |
| Edison | West Area | Chanac-Jewett | 0.920 *c* | 0.20 *c* | 7.766 | 6.898 | 7.516 | 7.033 | 6.879 | 6.286 |
| Edison | West Area | Pyramid Hill-Vedder | 0.816 *c* | 0.20 *c* | 0.843 | 0.608 | 0.596 | 0.673 | 0.615 | 0.398 |
| Edison, Northeast | Field | Field total | | | 0.138 | 0.236 | 0.551 | 0.000 | 0.000 | 0.000 |
| Edison, Northeast | Field | Not matched to pool/*OQ* | 0.979 *c* | 0.20 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Edison, Northeast | | Chanac | 0.979 *c* | 0.20 *c* | 0.138 | 0.236 | 0.551 | 0.000 | 0.000 | 0.000 |
| El Segundo | Field | Field total | | | 2.525 | 2.585 | 2.394 | 2.392 | 3.931 | 4.146 |
| El Segundo | Field | Not matched to pool/*OQ* | 0.949 *b* | 4.33 *b* | 2.525 | 2.585 | 2.394 | 2.392 | 3.931 | 4.146 |
| Elk Hills | Field | Field total | | | 2,952.868 | 2,867.320 | 2,732.544 | 2,602.608 | 2,371.953 | 2,005.087 |
| Elk Hills | Field | Not matched to pool/*OQ* | 0.882 *c* | 0.64 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 177.090 |
| Elk Hills | | No breakdown by pool | 0.882 *c* | 0.64 *b* | 0.000 | 0.217 | 0.742 | 0.790 | 1.085 | 1.190 |
| Elk Hills | | Tulare | 1.000 *c* | 1.02 *b* | 6.677 | 6.074 | 7.999 | 8.305 | 6.875 | 4.004 |
| Elk Hills | | Gas Zone | 0.924 *b* | 0.82 *b* | 0.000 | 0.000 | 0.648 | 0.834 | 0.436 | 8.212 |
| Elk Hills | | 4th Mya | 0.947 *c* | 0.82 *b* | 9.931 | 9.940 | 7.909 | 8.230 | 9.450 | 5.128 |
| Elk Hills | | Upper Undifferentiated | 0.905 *c* | 0.75 *b* | 1,637.570 | 1,601.698 | 1,554.117 | 1,542.450 | 1,337.456 | 1,190.117 |
| Elk Hills | | Upper Sub-Scalez | 0.859 *c* | 0.83 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Elk Hills | | Reef Ridge | 0.882 *c* | 0.64 *b* | 0.109 | 0.228 | 0.007 | 0.000 | 0.000 | 14.471 |
| Elk Hills | | Stevens | 0.845 *c* | 0.49 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Elk Hills | | Stevens 29R | 0.845 *c* | 0.49 *b* | 226.734 | 227.119 | 226.399 | 205.279 | 199.585 | 178.097 |
| Elk Hills | | Stevens Northwest | 0.904 *c* | 0.49 *b* | 153.316 | 142.235 | 134.023 | 120.068 | 118.314 | 124.094 |
| Elk Hills | | Stevens 31S | 0.845 *c* | 0.49 *b* | 915.403 | 877.087 | 797.902 | 711.270 | 674.112 | 597.304 |
| Elk Hills | | Cameros | 0.780 *c* | 0.63 *b* | 2.807 | 2.432 | 2.587 | 5.234 | 24.640 | 74.029 |
| Elk Hills | | Agua | 0.840 *c* | | 0.322 | 0.290 | 0.210 | 0.148 | 0.000 | 0.000 |
| Elwood S. Offshore | Field | Field total | | | 188.467 | 165.575 | 176.621 | 179.733 | 147.853 | 146.535 |
| Elwood S. Offshore | Field | Not matched to pool/*OQ* | 0.870 *c* | 1.10 *b,c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Elwood S. Offshore | Coal Oil Point | | 0.870 *c* | 1.10 *b,c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Elwood S. Offshore | Main Area | Sisquoc | 0.880 *c* | 2.02 *c* | 0.276 | 0.130 | 0.214 | 0.280 | 0.155 | 0.144 |
| Elwood S. Offshore | Main Area | Monterey | 0.880 *c* | 2.02 *c* | 188.191 | 162.407 | 174.816 | 177.367 | 145.882 | 142.611 |
| Elwood S. Offshore | Main Area | Rincon | 0.860 *c* | 0.17 *b* | 0.000 | 0.248 | 1.465 | 2.087 | 1.816 | 3.779 |
| Elwood S. Offshore | Main Area | Sespe | 0.860 *c* | 0.20 *c* | 0.000 | 2.790 | 0.126 | 0.000 | 0.000 | 0.000 |
| English Colony | Field | Field total | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| English Colony | Field | Not matched to pool/*OQ* | 0.855 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| English Colony | | Stevens | 0.855 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Esperanza | Field | Field total | | | 1.468 | 0.880 | 1.493 | 1.559 | 1.363 | 1.415 |
| Esperanza | Field | Not matched to pool/*OQ* | 0.893 *c* | | 1.468 | 0.880 | 1.493 | 1.559 | 1.363 | 1.415 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Eureka Canyon | Field | Field total | | | 0.602 | 0.796 | 0.867 | 0.578 | 0.538 | 0.493 |
| Eureka Canyon | Field | Not matched to pool/*OQ* | 0.899 *c* | | 0.602 | 0.796 | 0.867 | 0.578 | 0.538 | 0.493 |
| Fillmore | Field | Field total | | | 0.091 | 0.113 | 0.049 | 0.024 | 0.000 | 0.000 |
| Fillmore | Field | Not matched to pool/*OQ* | 0.865 *c* | 0.05 *c* | 0.091 | 0.113 | 0.049 | 0.024 | 0.000 | 0.000 |
| Fruitvale | Field | Field total | | | 66.923 | 70.502 | 74.849 | 78.749 | 76.198 | 71.804 |
| Fruitvale | Field | Not matched to pool/*OQ* | 0.939 *b* | 0.86 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fruitvale | Calloway Area | | 0.939 *b* | 0.86 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fruitvale | Greenacres Area | Billington | 0.939 *b* | 0.86 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fruitvale | Greenacres Area | Plank | 0.939 *b* | 0.86 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fruitvale | Main Area | | 0.939 *b* | 0.86 *b* | 66.923 | 70.502 | 74.849 | 78.749 | 76.198 | 71.804 |
| Grand Island Gas | Field | Field total | | | 0.008 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Grand Island Gas | Field | Not matched to pool/*OQ* | | | 0.008 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Greeley | Field | Field total | | | 19.841 | 18.241 | 17.146 | 16.888 | 26.587 | 20.542 |
| Greeley | Field | Not matched to pool/*OQ* | 0.839 *b* | 0.29 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Greeley | | Stevens Undifferentiated | 0.841 *b* | 0.28 *b* | 2.081 | 1.890 | 1.800 | 2.287 | 8.787 | 4.514 |
| Greeley | | Upper Stevens | 0.841 *b* | 0.28 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Greeley | | Olœse 12-21 | 0.839 *b* | 0.31 *b* | 4.692 | 3.435 | 3.542 | 3.103 | 3.520 | 3.253 |
| Greeley | | Rio Bravo-Vedder | 0.837 *b* | 0.29 *b* | 13.068 | 12.916 | 11.645 | 11.497 | 14.281 | 12.775 |
| Guijarral Hills | Field | Field total | | | 0.994 | 0.689 | 0.330 | 0.235 | 0.108 | 0.066 |
| Guijarral Hills | Field | Not matched to pool/*OQ* | 0.834 *b* | 0.61 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Guijarral Hills | Main Area | Smith | 0.847 *c* | 0.63 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Guijarral Hills | Main Area | Smith & Allison | 0.844 *c* | 0.63 *b* | 0.994 | 0.689 | 0.330 | 0.235 | 0.108 | 0.066 |
| Guijarral Hills | Main Area | Allison | 0.840 *c* | 0.63 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Guijarral Hills | Main Area | Leda | 0.850 *c* | 0.63 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Guijarral Hills | Main Area | Leda North | 0.841 *b* | 0.63 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Guijarral Hills | Main Area | Dessel | 0.893 *c* | 0.59 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Guijarral Hills | Main Area | Gatchell | 0.877 *c* | 0.31 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Guijarral Hills | Northwest Area | Leda | 0.842 *c* | 0.63 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Guijarral Hills | Polvadero Area | Sanger | 0.874 *c* | 0.63 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Guijarral Hills | Polvadero Area | Bourdieu | 0.877 *c* | 0.59 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Guijarral Hills | West Area | Leda | 0.842 *c* | 0.63 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Half Moon Bay | Field | Field total | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.020 | 0.070 |
| Half Moon Bay | Field | Not matched to pool/*OQ* | 0.874 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.020 | 0.070 |
| Hasley Canyon | Field | Field total | | | 6.199 | 8.127 | 12.387 | 13.083 | 11.413 | 8.979 |
| Hasley Canyon | Field | Not matched to pool/*OQ* | 0.963 *c* | 5.49 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Hasley Canyon | | Val Verde | 0.963 *c* | 5.49 *b* | 6.199 | 8.127 | 12.387 | 13.083 | 11.413 | 8.979 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Helm | Field | Field total | | | 8.340 | 5.849 | 8.923 | 12.379 | 15.920 | 16.010 |
| Helm | Field | Not matched to pool/*OQ* | 0.827 *b,c* | 0.27 *b,c* | 0.000 | 0.000 | 0.155 | 0.000 | 0.000 | 0.000 |
| Helm | Main Area | Miocene | 0.837 *b* | 0.26 *b* | 3.864 | 3.646 | 6.828 | 6.101 | 11.291 | 11.273 |
| Helm | Main Area | Eocene & Cretaceous | 0.808 *c* | 0.30 *c* | 2.565 | 1.771 | 1.794 | 6.170 | 4.540 | 4.663 |
| Helm | Southeast Area | Miocene | 0.837 *b* | 0.26 *b* | 1.911 | 0.432 | 0.146 | 0.108 | 0.089 | 0.078 |
| Holser | Field | Field total | | | 4.055 | 2.816 | 3.275 | 3.407 | 3.071 | 2.755 |
| Holser | Field | Not matched to pool/*OQ* | 0.923 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Holser | | Conglomerate | 0.953 *c* | | 0.065 | 0.042 | 0.053 | 0.052 | 0.046 | 0.040 |
| Holser | | Holser-Nuevo | 0.893 *c* | | 3.990 | 2.773 | 3.219 | 3.354 | 3.025 | 2.715 |
| Hondo Offshore | Field | Field total | | | 1,223.927 | 973.919 | 894.604 | 899.656 | 873.872 | 753.598 |
| Hondo Offshore | Field | Not matched to pool/*OQ* | 0.929 *e* | 4.29 *e* | 1,223.927 | 973.919 | 894.604 | 899.656 | 873.872 | 753.598 |
| Honor Rancho | Field | Field total | | | 10.736 | 11.837 | 11.332 | 14.287 | 13.931 | 12.957 |
| Honor Rancho | Field | Not matched to pool/*OQ* | 0.842 *c* | 0.40 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Honor Rancho | Main Area | Gabriel | 0.840 *c* | 0.40 *b* | 0.107 | 0.063 | 0.129 | 0.229 | 0.248 | 0.257 |
| Honor Rancho | Main Area | Rancho | 0.850 *c* | 0.40 *b* | 0.000 | 0.000 | 0.000 | 1.047 | 1.146 | 0.525 |
| Honor Rancho | Main Area | Wayside | 0.850 *c* | 0.40 *b* | 2.516 | 2.193 | 1.424 | 2.592 | 1.980 | 1.583 |
| Honor Rancho | Southeast Area | Wayside 13 | 0.830 *c* | 0.40 *b* | 8.113 | 9.582 | 9.779 | 10.418 | 10.558 | 10.592 |
| Hopper Canyon | Field | Field total | | | 1.863 | 0.364 | 1.134 | 1.184 | 1.321 | 1.163 |
| Hopper Canyon | Field | Not matched to pool/*OQ* | 0.942 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Hopper Canyon | Main Area | | 0.911 *c* | | 1.863 | 0.364 | 1.134 | 1.184 | 1.321 | 1.163 |
| Hopper Canyon | North Area | | 0.973 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Howard Townsite | Field | Field total | | | 1.590 | 1.463 | 1.032 | 0.921 | 1.402 | 1.104 |
| Howard Townsite | Field | Not matched to pool/*OQ* | 0.835 *c* | 0.28 *c* | 1.590 | 1.463 | 1.032 | 0.921 | 1.402 | 1.104 |
| Hueneme Offshore | Field | Field total | | | 17.943 | 23.187 | 23.089 | 21.055 | 19.300 | 17.322 |
| Hueneme Offshore | Field | Not matched to pool/*OQ* | 0.968 *c* | 3.73 *e* | 17.943 | 23.187 | 23.089 | 21.055 | 19.300 | 17.322 |
| Huntington Beach | Field | Field total | | | 426.468 | 393.104 | 354.270 | 325.566 | 308.982 | 292.617 |
| Huntington Beach | Field | Not matched to pool/*OQ* | 0.929 *b* | 1.60 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Huntington Beach | Offshore | | 0.929 *b* | 1.60 *b* | 337.116 | 309.991 | 276.390 | 251.715 | 237.291 | 219.935 |
| Huntington Beach | Onshore | | 0.929 *b* | 1.60 *b* | 89.352 | 83.113 | 77.880 | 73.851 | 71.691 | 69.945 |
| Hyperion | Field | Field total | | | 1.446 | 1.681 | 1.582 | 1.627 | 1.657 | 1.560 |
| Hyperion | Field | Not matched to pool/*OQ* | 0.956 *c* | | 1.446 | 1.681 | 1.582 | 1.627 | 1.657 | 1.560 |
| Inglewood | Field | Field total | | | 450.216 | 458.258 | 528.095 | 492.660 | 493.945 | 447.759 |
| Inglewood | Field | Not matched to pool/*OQ* | 0.929 *b* | 2.24 *b* | 450.216 | 458.258 | 528.095 | 492.660 | 493.945 | 447.759 |
| Jacalitos | Field | Field total | | | 9.944 | 11.819 | 15.437 | 21.410 | 26.355 | 20.136 |
| Jacalitos | Field | Not matched to pool/*OQ* | 0.832 *b* | 0.34 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Jacalitos | | Temblor | 0.832 *b* | 0.34 *b* | 9.944 | 11.819 | 15.437 | 21.410 | 26.355 | 20.136 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Jasmin | Field | Field total | | | 2.820 | 3.213 | 4.120 | 6.647 | 13.511 | 16.997 |
| Jasmin | Field | Not matched to pool/*OQ* | 0.973 *b* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Jasmin | | Pyramid Hill | 0.973 *b* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Jasmin | | Cantleberry | 0.973 *b* | | 2.820 | 3.213 | 4.120 | 6.647 | 13.511 | 16.997 |
| Kern Bluff | Field | Field total | | | 1.654 | 1.593 | 1.456 | 1.411 | 1.281 | 1.353 |
| Kern Bluff | Field | Not matched to pool/*OQ* | 0.973 *c* | 0.63 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Kern Bluff | | Miocene | 0.973 *c* | 0.63 *c* | 1.654 | 1.593 | 1.456 | 1.411 | 1.281 | 1.353 |
| Kern Bluff | | Transition-Santa Margarita | 0.973 *c* | 0.63 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Kern Bluff | | Vedder | 0.973 *c* | 0.63 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Kern Front | Field | Field total | | | 260.566 | 240.570 | 253.748 | 270.374 | 341.787 | 395.301 |
| Kern Front | Field | Not matched to pool/*OQ* | 0.968 *b* | 0.89 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Kern Front | | No breakdown by pool | 0.968 *b* | 0.89 *b* | 260.566 | 231.601 | 229.949 | 229.821 | 239.416 | 223.144 |
| Kern Front | | Etchegoin | 0.973 *c* | 0.94 *b* | 0.000 | 8.969 | 23.799 | 40.553 | 102.370 | 172.158 |
| Kern River | Field | Field total | | | 5,570.723 | 5,253.662 | 4,899.065 | 4,791.678 | 4,682.727 | 4,592.039 |
| Kern River | Field | Not matched to pool/*OQ* | 0.979 *b* | 1.15 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Kern River | | Kern River | 0.983 *b* | 1.16 *b* | 5,570.723 | 5,253.662 | 4,897.798 | 4,790.897 | 4,680.235 | 4,590.668 |
| Kern River | | Jewett | 0.977 *b* | 1.14 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.060 |
| Kern River | | Vedder | 0.823 *c* | 0.05 *c* | 0.000 | 0.000 | 1.267 | 0.781 | 2.492 | 1.311 |
| Kettleman Mid. Dome | Field | Field total | | | 0.094 | 0.182 | 0.493 | 3.775 | 6.632 | 5.812 |
| Kettleman Mid. Dome | Field | Not matched to pool/*OQ* | 0.842 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Kettleman Mid. Dome | | Etchegoin-Jacalitos | 0.976 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Kettleman Mid. Dome | | Temblor | 0.757 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Kettleman Mid. Dome | | Vaqueros | 0.830 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Kettleman Mid. Dome | | Kreyenhagen | 0.847 *c* | | 0.094 | 0.182 | 0.493 | 2.093 | 2.879 | 2.374 |
| Kettleman Mid. Dome | | Eocene-McAdams | 0.797 *c* | | 0.000 | 0.000 | 0.000 | 1.681 | 3.753 | 3.438 |
| Kettleman N. Dome | Field | Field total | | | 13.594 | 17.166 | 20.274 | 11.970 | 0.585 | 5.655 |
| Kettleman N. Dome | Field | Not matched to pool/*OQ* | 0.771 *b* | 0.19 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Kettleman N. Dome | | No breakdown by pool | 0.771 *b* | 0.19 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Kettleman N. Dome | | Temblor | 0.835 *b* | 0.35 *b* | 7.731 | 10.381 | 14.247 | 8.045 | 0.047 | 3.241 |
| Kettleman N. Dome | | Whepley | 0.832 *c* | 0.13 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Kettleman N. Dome | | Vaqueros | 0.843 *c* | 0.28 *c* | 2.084 | 2.491 | 1.980 | 1.146 | 0.501 | 0.697 |
| Kettleman N. Dome | | Kreyenhagen | 0.871 *c* | 0.31 *c* | 3.447 | 3.823 | 3.704 | 2.515 | 0.036 | 1.310 |
| Kettleman N. Dome | | Upper McAdams | 0.826 *c* | 0.31 *c* | 0.014 | 0.229 | 0.048 | 0.022 | 0.000 | 0.000 |
| Kettleman N. Dome | | Lower McAdams | 0.859 *c* | 0.31 *c* | 0.317 | 0.243 | 0.295 | 0.242 | 0.000 | 0.407 |
| La Goleta Gas | Field | Field total | | | 0.041 | 0.035 | 0.000 | 0.041 | 0.109 | 0.015 |
| La Goleta Gas | Field | Not matched to pool/*OQ* | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| La Goleta Gas | | Vaqueros | | | 0.041 | 0.035 | 0.000 | 0.041 | 0.109 | 0.015 |
| La Goleta Gas | | Sespe | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| La Honda | Field | Field total | | | 0.000 | 0.213 | 0.300 | 0.292 | 0.468 | 0.458 |
| La Honda | Field | Not matched to pool/*OQ* | 0.867 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| La Honda | Main Area | | 0.867 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| La Honda | South Area | | 0.913 *c* | | 0.000 | 0.213 | 0.300 | 0.292 | 0.468 | 0.458 |
| Landslide | Field | Field total | | | 15.938 | 14.074 | 12.863 | 9.399 | 6.673 | 5.840 |
| Landslide | Field | Not matched to pool/*OQ* | 0.872 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Landslide | Boulder Creek | Stevens | 0.872 *c* | | 1.450 | 1.418 | 1.320 | 1.250 | 1.373 | 1.529 |
| Landslide | Main Area | Stevens | 0.872 *c* | | 14.488 | 12.656 | 11.543 | 8.149 | 5.301 | 4.311 |
| Las Cienagas | Field | Field total | | | 60.337 | 67.463 | 81.534 | 78.275 | 79.911 | 78.139 |
| Las Cienagas | Field | Not matched to pool/*OQ* | 0.865 *c* | 0.58 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Las Cienagas | Fourth Avenue | | 0.869 *c* | 0.58 *b* | 2.845 | 2.961 | 6.386 | 6.348 | 7.429 | 10.624 |
| Las Cienagas | Good Shepard | | 0.871 *c* | 0.58 *b* | 0.000 | 0.387 | 2.317 | 0.371 | 0.000 | 0.000 |
| Las Cienagas | Jefferson Area | | 0.861 *c* | 0.58 *b* | 18.804 | 24.896 | 32.301 | 34.795 | 33.363 | 29.179 |
| Las Cienagas | Murphy Area | No breakdown by pool | 0.862 *c* | 0.58 *b* | 33.139 | 31.557 | 40.531 | 36.761 | 37.639 | 34.781 |
| Las Cienagas | Murphy Area | A,B,C & PE zones, B Block | 0.870 *c* | 0.58 *b* | 5.550 | 7.662 | 0.000 | 0.000 | 1.480 | 3.554 |
| Las Cienagas | Pacific Electric | | 0.855 *c* | 0.58 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Las Llajas | Field | Field total | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Las Llajas | Field | Not matched to pool/*OQ* | 0.896 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Las Llajas | | Las Llajas | 0.896 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Las Llajas | | Santa Susana | 0.896 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Lawndale | Field | Field total | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Lawndale | Field | Not matched to pool/*OQ* | 0.882 *c* | 1.40 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Lawndale | | Upper | 0.879 *c* | 1.40 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Lawndale | | Schist Conglomerate | 0.887 *c* | 1.40 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Lindsey Slough Gas | Field | Field total | | | 1.479 | 0.561 | 0.761 | 0.943 | 0.908 | 0.754 |
| Lindsey Slough Gas | Field | Not matched to pool/*OQ* | | | 1.479 | 0.561 | 0.761 | 0.943 | 0.908 | 0.754 |
| Livermore | Field | Field total | | | 1.638 | 1.794 | 1.508 | 2.094 | 2.934 | 2.870 |
| Livermore | Field | Not matched to pool/*OQ* | 0.905 *c* | | 1.638 | 1.794 | 1.508 | 2.094 | 2.934 | 2.870 |
| Lompoc | Field | Field total | | | 16.338 | 15.128 | 24.546 | 26.179 | 31.576 | 34.809 |
| Lompoc | Field | Not matched to pool/*OQ* | 0.959 *b* | 3.50 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Lompoc | Main Area | Monterey | 0.932 *c* | 3.50 *b* | 9.961 | 8.524 | 18.262 | 20.572 | 26.510 | 29.763 |
| Lompoc | Northwest Area | Monterey | 0.945 *c* | 1.84 *c* | 6.377 | 6.605 | 6.284 | 5.607 | 5.067 | 5.047 |
| Long Beach | Field | Field total | | | 229.740 | 238.851 | 240.859 | 235.523 | 238.202 | 229.985 |
| Long Beach | Field | Not matched to pool/*OQ* | 0.918 *b* | 1.30 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Long Beach | Northwest Ext. | | 0.959 *c* | 1.86 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Long Beach | Old Area | No breakdown by pool | 0.918 *b* | 1.30 *b* | 0.000 | 0.000 | 0.029 | 0.000 | 0.000 | 0.000 |
| Long Beach | Old Area | Wardlow | 0.865 *c* | 1.30 *b* | 2.632 | 2.500 | 2.186 | 1.700 | 1.789 | 2.304 |
| Long Beach | Old Area | Alamitos | 0.918 *b* | 1.29 *b* | 5.305 | 5.491 | 4.809 | 6.172 | 6.793 | 5.739 |
| Long Beach | Old Area | Brown | 0.911 *c* | 1.06 *b* | 0.382 | 1.378 | 2.481 | 2.429 | 2.089 | 0.748 |
| Long Beach | Old Area | Deep | 0.865 *c* | 1.06 *b* | 0.084 | 0.063 | 0.000 | 0.000 | 0.000 | 0.163 |
| Long Beach | Old Area | Others | 0.912 *b* | 1.30 *b* | 217.170 | 225.130 | 227.091 | 220.565 | 223.199 | 216.636 |
| Long Beach | Recreation Park | | 0.893 *c* | 1.30 *b* | 4.167 | 4.289 | 4.264 | 4.658 | 4.331 | 4.395 |
| Long Beach Airport | Field | Field total | | | 0.175 | 0.380 | 1.310 | 1.917 | 1.808 | 1.750 |
| Long Beach Airport | Field | Not matched to pool/*OQ* | 0.855 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Long Beach Airport | | Deep | 0.855 *c* | | 0.175 | 0.380 | 1.310 | 1.917 | 1.808 | 1.750 |
| Los Alamos | Field | Field total | | | 0.000 | 0.083 | 0.000 | 0.375 | 0.000 | 0.035 |
| Los Alamos | Field | Not matched to pool/*OQ* | 0.845 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Los Alamos | | Monterey | 0.845 *c* | | 0.000 | 0.083 | 0.000 | 0.375 | 0.000 | 0.035 |
| Los Angeles City | Field | Field total | | | 0.397 | 0.304 | 0.255 | 0.235 | 0.205 | 0.202 |
| Los Angeles City | Field | Not matched to pool/*OQ* | 0.960 *c* | | 0.397 | 0.304 | 0.255 | 0.235 | 0.205 | 0.202 |
| Los Angeles Downtn. | Field | Field total | | | 15.111 | 14.233 | 1.945 | 0.924 | 5.319 | 5.167 |
| Los Angeles Downtn. | Field | Not matched to pool/*OQ* | 0.857 *c* | 1.58 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Los Angeles Downtn. | | No breakdown by pool | 0.857 *c* | 1.58 *c* | 15.111 | 14.233 | 1.945 | 0.924 | 5.319 | 5.167 |
| Los Angeles Downtn. | | Hill Gas Sands | 0.857 *c* | 1.58 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Los Angeles East | Field | Field total | | | 8.162 | 7.492 | 9.175 | 6.893 | 6.144 | 3.866 |
| Los Angeles East | Field | Not matched to pool/*OQ* | 0.853 *c* | | 8.162 | 7.492 | 9.175 | 6.893 | 6.144 | 3.866 |
| Los Lobos | Field | Field total | | | 0.000 | 0.000 | 1.299 | 8.663 | 2.693 | 0.000 |
| Los Lobos | Field | Not matched to pool/*OQ* | 0.949 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Los Lobos | | Etchegoin | 0.953 *c* | | 0.000 | 0.000 | 1.299 | 2.376 | 0.305 | 0.000 |
| Los Lobos | | Reef Ridge | 0.904 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Los Lobos | | Monterey | 0.990 *c* | | 0.000 | 0.000 | 0.000 | 6.288 | 2.388 | 0.000 |
| Lost Hills | Field | Field total | | | 1,783.149 | 1,820.338 | 1,883.906 | 1,929.043 | 1,873.020 | 1,839.112 |
| Lost Hills | Field | Not matched to pool/*OQ* | 0.909 *b* | 0.71 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Lost Hills | | No breakdown by pool | 0.909 *b* | 0.71 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.872 |
| Lost Hills | | Tulare | 0.934 *d* | 0.83 *b* | 14.142 | 32.613 | 43.832 | 55.518 | 101.136 | 151.557 |
| Lost Hills | | Tulare-Etchegoin | 0.892 *b* | 0.59 *b* | 1,096.131 | 1,116.993 | 1,070.442 | 1,037.618 | 970.994 | 860.645 |
| Lost Hills | | Etchegoin | 0.858 *b* | 0.33 *b* | 39.465 | 136.192 | 291.041 | 404.895 | 418.818 | 456.193 |
| Lost Hills | | Etchegoin-Cahn | 0.909 *b* | 0.71 *b* | 145.947 | 138.768 | 126.662 | 113.640 | 97.778 | 116.788 |
| Lost Hills | | Cahn | 0.880 *c* | 0.71 *b* | 482.263 | 389.604 | 345.600 | 313.022 | 279.407 | 226.494 |
| Lost Hills | | Devilwater | 0.865 *c* | 0.71 *b* | 3.518 | 3.152 | 2.296 | 4.351 | 4.886 | 22.534 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Lost Hills | | Carneros | 0.865 *c* | 0.71 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.354 |
| Lost Hills | | Antelope/McDonald | 0.909 *b* | 0.71 *b* | 1.683 | 3.015 | 4.032 | 0.000 | 0.000 | 3.789 |
| Lost Hills Northwest | Field | Field total | | | 3.378 | 3.019 | 2.831 | 2.434 | 3.201 | 3.407 |
| Lost Hills Northwest | Field | Not matched to pool/*OQ* | 0.910 *c* | 0.33 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Lost Hills Northwest | | Etchegoin | 0.885 *c* | 0.33 *c* | 2.084 | 1.946 | 1.866 | 1.632 | 2.257 | 2.566 |
| Lost Hills Northwest | | Antelope Shale | 0.934 *c* | 0.33 *c* | 1.293 | 1.073 | 0.965 | 0.803 | 0.942 | 0.841 |
| Lynch Canyon | Field | Field total | | | 0.000 | 4.818 | 10.225 | 17.692 | 20.365 | 23.877 |
| Lynch Canyon | Field | Not matched to pool/*OQ* | 0.993 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Lynch Canyon | | Lanigan | 0.993 *c* | | 0.000 | 4.818 | 10.225 | 17.692 | 20.365 | 23.877 |
| Mahala | Field | Field total | | | 0.444 | 0.340 | 0.416 | 0.287 | 0.246 | 0.105 |
| Mahala | Field | Not matched to pool/*OQ* | 0.908 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mahala | Abacherli Area | | 0.923 *c* | | 0.404 | 0.314 | 0.327 | 0.262 | 0.216 | 0.079 |
| Mahala | Mahala Area | | 0.921 *c* | | 0.040 | 0.026 | 0.021 | 0.025 | 0.029 | 0.025 |
| Mahala | Mahala West Area | | 0.871 *c* | | 0.000 | 0.000 | 0.068 | 0.000 | 0.000 | 0.000 |
| Mahala | Prado Dam Area | | 0.916 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Maine Prairie Gas | Field | Field total | | | 0.006 | 0.065 | 0.004 | 0.002 | 0.002 | 0.004 |
| Maine Prairie Gas | Field | Not matched to pool/*OQ* | | | 0.006 | 0.065 | 0.004 | 0.002 | 0.002 | 0.004 |
| McCool Ranch | Field | Field total | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.618 | 0.194 |
| McCool Ranch | Field | Not matched to pool/*OQ* | 0.988 *c* | 1.20 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| McCool Ranch | | Lombardi | 0.988 *c* | 1.20 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.618 | 0.194 |
| McDonald Anticline | Field | Field total | | | 11.087 | 13.129 | 12.258 | 12.192 | 14.821 | 9.591 |
| McDonald Anticline | Field | Not matched to pool/*OQ* | 0.903 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| McDonald Anticline | Bacon Hills Area | No breakdown by pool | 0.907 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| McDonald Anticline | Bacon Hills Area | Antelope | 0.979 *c* | | 0.048 | 0.163 | 0.141 | 0.000 | 0.373 | 0.207 |
| McDonald Anticline | Bacon Hills Area | Oceanic | 0.835 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| McDonald Anticline | Layman Area | | 0.913 *c* | | 11.040 | 12.965 | 12.118 | 12.192 | 14.448 | 9.384 |
| McKittrick | Field | Field total | | | 404.989 | 406.531 | 445.962 | 434.653 | 395.041 | 356.473 |
| McKittrick | Field | Not matched to pool/*OQ* | 0.957 *b* | 0.96 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| McKittrick | Main Area | Tulare | 0.962 *b* | 0.96 *b* | 2.328 | 3.061 | 16.439 | 42.995 | 40.318 | 42.625 |
| McKittrick | Main Area | Upper | 0.962 *b* | 0.96 *b* | 40.613 | 47.795 | 72.613 | 88.855 | 101.789 | 101.718 |
| McKittrick | Main Area | Olig | 0.973 *c* | 0.96 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 1.108 | 11.094 |
| McKittrick | Main Area | Antelope Shale | 0.986 *c* | 1.18 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| McKittrick | Main Area | Stevens | 0.903 *c* | 1.02 *c* | 3.489 | 6.503 | 4.058 | 20.762 | 13.409 | 12.499 |
| McKittrick | Northeast Area | Upper | 0.949 *c* | 0.96 *b* | 258.285 | 259.160 | 264.895 | 213.143 | 174.632 | 138.170 |
| McKittrick | Northeast Area | Tulare | 0.962 *b* | 0.96 *b* | 5.470 | 9.659 | 16.536 | 14.865 | 13.971 | 15.596 |
| McKittrick | Northeast Area | Antelope Shale | 0.905 *c* | 1.18 *c* | 1.119 | 0.688 | 0.633 | 1.856 | 4.565 | 2.572 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| McKittrick | Northeast Area | Carneros | 0.845 *c* | 1.02 *c* | 2.563 | 2.952 | 3.017 | 4.430 | 3.297 | 7.832 |
| McKittrick | Northeast Area | Phacoides | 0.860 *c* | 1.02 *c* | 31.246 | 28.859 | 27.197 | 21.257 | 23.673 | 22.428 |
| McKittrick | Northeast Area | Phacoides/Oceanic | 0.853 *c* | 1.02 *c* | 3.167 | 2.210 | 2.052 | 1.235 | 1.018 | 0.682 |
| McKittrick | Northeast Area | Oceanic | 0.845 *c* | 1.02 *c* | 21.512 | 14.625 | 8.188 | 3.733 | 4.402 | 4.267 |
| McKittrick | Northeast Area | Point of Rocks | 0.910 *c* | 1.02 *c* | 35.196 | 31.017 | 30.332 | 21.522 | 12.860 | 10.584 |
| Medora Lake Gas | Field | Field total | | | 0.013 | 0.047 | 0.042 | 0.030 | 0.010 | 0.000 |
| Medora Lake Gas | Field | Not matched to pool/*OQ* | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Medora Lake Gas | | Winters | | | 0.013 | 0.047 | 0.042 | 0.030 | 0.010 | 0.000 |
| Merrill Avenue Gas | Field | Field total | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Merrill Avenue Gas | Field | Not matched to pool/*OQ* | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Merrill Avenue Gas | | Blewett | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Midway-Sunset | Field | Field total | | | 7,117.798 | 6,721.020 | 6,300.516 | 6,043.567 | 5,775.550 | 5,398.648 |
| Midway-Sunset | Field | Not matched to pool/*OQ* | 0.945 *b* | 1.00 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Midway-Sunset | County Code 029 | | 0.945 *b* | 1.00 *b* | 2,870.140 | 2,519.130 | 2,215.383 | 2,023.260 | 1,847.419 | 1,680.645 |
| Midway-Sunset | County Code 030 | | 0.945 *b* | 1.00 *b* | 4,244.114 | 4,198.429 | 4,080.051 | 4,014.579 | 3,923.591 | 3,711.220 |
| Midway-Sunset | County Code 079 | | 0.945 *b* | 1.00 *b* | 3.544 | 3.461 | 5.088 | 5.728 | 4.541 | 7.419 |
| Millar Gas | Field | Field total | | | 0.164 | 0.077 | 0.048 | 0.047 | 0.034 | 0.000 |
| Millar Gas | Field | Not matched to pool/*OQ* | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Millar Gas | Main Area | | | | 0.025 | 0.001 | 0.041 | 0.047 | 0.034 | 0.000 |
| Millar Gas | West Area | | | | 0.139 | 0.076 | 0.007 | 0.000 | 0.000 | 0.000 |
| Monroe Swell | Field | Field total | | | 2.282 | 2.670 | 2.233 | 1.204 | 1.381 | 1.148 |
| Monroe Swell | Field | Not matched to pool/*OQ* | 0.930 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Monroe Swell | Northwest Area | | 0.916 *c* | | 1.255 | 1.502 | 1.142 | 0.524 | 0.901 | 0.516 |
| Monroe Swell | Old Area | | 0.944 *c* | | 1.027 | 1.168 | 1.091 | 0.680 | 0.480 | 0.632 |
| Montalvo West | Field | Field total | | | 49.978 | 46.838 | 44.459 | 40.082 | 64.931 | 91.323 |
| Montalvo West | Field | Not matched to pool/*OQ* | 0.923 *c* | 4.10 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Montalvo West | Offshore | Sespe | 0.922 *c* | 4.10 *c* | 3.805 | 3.923 | 3.422 | 4.796 | 3.947 | 3.684 |
| Montalvo West | Offshore | Colonia | 0.959 *d* | 4.10 *d* | 11.691 | 10.088 | 7.505 | 5.678 | 19.146 | 17.569 |
| Montalvo West | Onshore | No breakdown by pool | 0.923 *c* | 4.10 *c* | 34.483 | 32.663 | 33.533 | 29.607 | 30.307 | 30.132 |
| Montalvo West | Onshore | Gas Zone | 0.923 *c* | 4.10 *c* | 0.000 | 0.164 | 0.000 | 0.000 | 0.000 | 0.000 |
| Montalvo West | Onshore | Sespe | 0.887 *c* | 4.10 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 11.531 | 20.995 |
| Montalvo West | Onshore | Colonia | 0.959 *c* | 4.10 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 18.943 |
| Montebello | Field | Field total | | | 138.173 | 128.467 | 122.178 | 112.687 | 110.810 | 117.459 |
| Montebello | Field | Not matched to pool/*OQ* | 0.914 *b* | 0.91 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Montebello | Any Area | | 0.914 *b* | 0.91 *b* | 38.310 | 33.344 | 35.102 | 34.708 | 32.477 | 34.788 |
| Montebello | Main Area | No breakdown by pool | 0.914 *b* | 0.91 *b* | 86.152 | 78.914 | 71.433 | 64.732 | 64.201 | 67.310 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Montebello | Main Area | 1st and 2nd | 0.919 *c* | 1.17 *b* | 5.265 | 4.685 | 3.781 | 3.482 | 1.535 | 1.696 |
| Montebello | West Area | No breakdown by pool | 0.914 *b* | 0.91 *b* | 0.000 | 0.000 | 0.000 | 0.006 | 0.115 | 0.225 |
| Montebello | West Area | 1st | 0.934 *c* | 1.17 *b* | 0.000 | 0.000 | 0.000 | 0.063 | 0.000 | 0.183 |
| Montebello | West Area | Observation Pool | 0.914 *b* | 0.91 *b* | 0.978 | 0.000 | 11.862 | 0.000 | 4.663 | 4.360 |
| Montebello | West Area | 8th | 0.850 *c* | 0.91 *b* | 7.468 | 11.523 | 0.000 | 9.696 | 7.819 | 8.897 |
| Monument Junction | Field | Field total | | | 25.981 | 23.598 | 21.572 | 21.666 | 21.044 | 17.123 |
| Monument Junction | Field | Not matched to pool/*OQ* | 0.898 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.461 |
| Monument Junction | Main Area | San Joaquin | 0.898 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.008 | 0.000 |
| Monument Junction | Main Area | Reef Ridge | 0.898 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Monument Junction | Main Area | Antelope | 0.898 *c* | | 21.957 | 18.486 | 16.890 | 17.690 | 17.837 | 15.997 |
| Monument Junction | Mongoose Area | Antelope | 0.898 *c* | | 4.024 | 5.113 | 4.682 | 3.976 | 3.199 | 2.586 |
| Moorpark West | Field | Field total | | | 0.262 | 0.287 | 0.070 | 0.288 | 0.292 | 0.275 |
| Moorpark West | Field | Not matched to pool/*OQ* | 0.973 *c* | | 0.262 | 0.287 | 0.070 | 0.288 | 0.292 | 0.275 |
| Morales Canyon | Field | Field total | | | 0.546 | 0.395 | 0.490 | 0.176 | 0.597 | 0.372 |
| Morales Canyon | Field | Not matched to pool/*OQ* | 0.850 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Morales Canyon | Clayton Area | Clayton | 0.865 *c* | | 0.546 | 0.395 | 0.490 | 0.093 | 0.234 | 0.284 |
| Morales Canyon | Government 18 | Covernment 18 | 0.835 *c* | | 0.000 | 0.000 | 0.000 | 0.083 | 0.363 | 0.088 |
| Mount Poso | Field | Field total | | | 111.179 | 93.159 | 88.095 | 89.413 | 94.248 | 87.004 |
| Mount Poso | Field | Not matched to pool/*OQ* | 0.965 *c* | 0.67 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mount Poso | Baker-Grover | Vedder | 0.963 *c* | 0.67 *b* | 0.942 | 1.487 | 1.495 | 2.220 | 2.575 | 2.103 |
| Mount Poso | Dominion Area | Pyramid Hill | 0.979 *c* | 0.67 *b* | 0.189 | 0.235 | 0.136 | 0.020 | 0.019 | 0.045 |
| Mount Poso | Dominion Area | Vedder | 0.966 *c* | 0.67 *b* | 14.429 | 13.247 | 14.818 | 14.187 | 14.804 | 15.831 |
| Mount Poso | Dorsey Area | Vedder | 0.963 *c* | 0.68 *c* | 7.924 | 8.496 | 7.828 | 7.963 | 7.970 | 7.455 |
| Mount Poso | Granite Canyon | Vedder | 0.966 *c* | 0.67 *b* | 1.772 | 1.963 | 1.941 | 1.801 | 1.440 | 1.351 |
| Mount Poso | Main Area | No breakdown by pool | 0.964 *c* | 0.65 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mount Poso | Main Area | Pyramid Hill | 0.966 *c* | 0.65 *c* | 0.000 | 1.481 | 2.364 | 3.098 | 8.527 | 15.351 |
| Mount Poso | Main Area | Pyramid Hill-Vedder | 0.964 *c* | 0.65 *c* | 84.263 | 65.555 | 59.050 | 59.512 | 57.794 | 42.276 |
| Mount Poso | Main Area | Vedder | 0.963 *c* | 0.67 *b* | 0.170 | 0.043 | 0.051 | 0.338 | 1.049 | 2.353 |
| Mount Poso | West Area | Vedder | 0.959 *c* | 0.67 *b* | 1.491 | 0.652 | 0.412 | 0.273 | 0.070 | 0.235 |
| Mountain View | Field | Field total | | | 28.850 | 25.917 | 23.018 | 23.724 | 25.010 | 21.928 |
| Mountain View | Field | Not matched to pool/*OQ* | 0.874 *c* | 0.44 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mountain View | Arvin Area | | 0.873 *c* | 0.36 *c* | 1.295 | 1.178 | 1.050 | 1.087 | 1.625 | 1.405 |
| Mountain View | Arvin West Area | Richards | 0.863 *c* | 0.44 *b* | 0.869 | 0.949 | 1.219 | 1.308 | 1.311 | 1.119 |
| Mountain View | Arvin West Area | Chanac-Cattani | 0.871 *c* | 0.51 *c* | 0.240 | 0.192 | 0.099 | 0.152 | 0.288 | 0.191 |
| Mountain View | Arvin West Area | Cattani | 0.876 *c* | 0.44 *b* | 0.994 | 0.976 | 0.955 | 0.972 | 1.024 | 1.015 |
| Mountain View | Arvin West Area | Houchin Main | 0.850 *c* | 0.44 *b* | 0.287 | 0.265 | 0.202 | 0.178 | 0.161 | 0.161 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Mountain View | Arvin West Area | Houchin Northwest & Brite | 0.850 *c* | 0.44 *b* | 4.639 | 4.008 | 3.381 | 3.415 | 3.149 | 2.842 |
| Mountain View | Arvin West Area | Stenderup | 0.887 *c* | 0.44 *b* | 1.694 | 1.748 | 1.495 | 1.581 | 1.736 | 1.560 |
| Mountain View | Arvin West Area | Frick | 0.893 *c* | 0.44 *b* | 1.265 | 1.337 | 1.521 | 1.480 | 1.572 | 1.240 |
| Mountain View | Digiorgio Area | No breakdown by pool | 0.879 *c* | 0.44 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mountain View | Digiorgio Area | Schist | 0.898 *c* | 0.44 *b* | 0.000 | 0.000 | 0.000 | 1.103 | 0.560 | 0.002 |
| Mountain View | Main Area | No breakdown by pool | 0.882 *c* | 0.44 *b* | 17.237 | 14.963 | 12.749 | 11.814 | 13.366 | 12.204 |
| Mountain View | Main Area | Kern River-Chanac | 0.911 *c* | 0.36 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mountain View | Vaccaro Area | Chanac | 0.845 *c* | 0.51 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mountain View | Vaccaro Area | Upper Miocene | 0.858 *c* | 0.44 *b* | 0.329 | 0.301 | 0.348 | 0.634 | 0.219 | 0.188 |
| Newhall | Field | Field total | | | 0.260 | 0.237 | 0.276 | 0.338 | 0.228 | 0.267 |
| Newhall | Field | Not matched to pool/*OQ* | 0.918 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Newhall | De Witt Canyon | Kraft | 0.928 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Newhall | Elsmere Area | | 0.966 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Newhall | Pico Canyon Area | | 0.852 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Newhall | Rice Canyon Area | | 0.888 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Newhall | Townsite Area | | 0.934 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Newhall | Towsley Canyon | | 0.935 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Newhall | Tunnel Area | | 0.954 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Newhall | Whitney Canyon | | 0.920 *c* | | 0.260 | 0.237 | 0.276 | 0.338 | 0.228 | 0.250 |
| Newhall | Wiley Canyon | | 0.888 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.017 |
| Newhall-Potrero | Field | Field total | | | 28.584 | 32.927 | 34.651 | 30.558 | 27.727 | 22.335 |
| Newhall-Potrero | Field | Not matched to pool/*OQ* | 0.864 *b* | 0.60 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.620 |
| Newhall-Potrero | | No breakdown by pool | 0.864 *b* | 0.60 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.142 | 0.084 |
| Newhall-Potrero | | Pico Sands | 0.864 *b* | 0.60 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Newhall-Potrero | | 1-2-3 pool | 0.853 *c* | 0.52 *c* | 12.402 | 16.974 | 13.876 | 10.755 | 10.357 | 9.806 |
| Newhall-Potrero | | 3 pool | 0.850 *c* | 0.52 *c* | 0.866 | 1.846 | 1.253 | 0.793 | 0.669 | 0.618 |
| Newhall-Potrero | | 5th | 0.857 *c* | 0.56 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Newhall-Potrero | | 5th/6th | 0.851 *c* | 0.56 *c* | 10.918 | 9.417 | 12.119 | 11.630 | 11.269 | 9.199 |
| Newhall-Potrero | | 6th | 0.846 *c* | 0.56 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Newhall-Potrero | | 7th | 0.868 *c* | 0.81 *b* | 4.397 | 4.689 | 7.404 | 7.374 | 5.290 | 4.200 |
| Newhall-Potrero | | 9th | 0.864 *b* | 0.60 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Newport West | Field | Field total | | | 17.018 | 15.415 | 15.849 | 17.880 | 18.547 | 16.865 |
| Newport West | Field | Not matched to pool/*OQ* | 0.946 *b* | 2.74 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Newport West | Offshore | Division D-E | 0.940 *c* | 2.74 *b* | 5.328 | 5.457 | 5.280 | 4.782 | 4.968 | 4.642 |
| Newport West | Onshore | Bolsa | 0.947 *c* | 2.74 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Newport West | Onshore | A | 0.916 *c* | 1.99 *b* | 1.369 | 1.297 | 1.472 | 1.552 | 1.402 | 1.257 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Newport West | Onshore | B | 0.947 *c* | 1.99 *b* | 7.836 | 6.568 | 6.055 | 6.129 | 5.444 | 4.887 |
| Newport West | Onshore | C | 0.916 *c* | 2.74 *b* | 2.473 | 2.074 | 3.043 | 5.416 | 6.733 | 6.078 |
| Newport West | Onshore | D | 0.916 *c* | 2.74 *b* | 0.010 | 0.019 | 0.000 | 0.000 | 0.000 | 0.000 |
| Oak Canyon | Field | Field total | | | 6.270 | 6.537 | 6.133 | 5.109 | 5.058 | 5.031 |
| Oak Canyon | Field | Not matched to pool/*OQ* | 0.887 *c* | 0.59 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Oak Canyon | | 1-A | 0.910 *c* | 0.59 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Oak Canyon | | 3-AB | 0.876 *c* | 1.03 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.223 |
| Oak Canyon | | 3-ABCD | 0.893 *c* | 1.03 *c* | 3.237 | 3.417 | 3.066 | 2.510 | 2.607 | 2.363 |
| Oak Canyon | | 3-CD | 0.910 *c* | 1.03 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Oak Canyon | | 4-AB | 0.876 *c* | 0.59 *b* | 0.460 | 0.456 | 0.408 | 0.375 | 0.347 | 0.368 |
| Oak Canyon | | 4-AB & 5-A | 0.873 *c* | 0.59 *b* | 0.575 | 0.580 | 0.589 | 0.386 | 0.141 | 0.000 |
| Oak Canyon | | 6-AB, 7, and 8-AB | 0.871 *c* | 0.59 *b* | 1.998 | 2.084 | 2.070 | 1.838 | 1.963 | 2.077 |
| Oak Park | Field | Field total | | | 4.270 | 2.956 | 3.638 | 3.095 | 2.939 | 2.748 |
| Oak Park | Field | Not matched to pool/*OQ* | 0.922 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Oak Park | | Sespe | 0.922 *c* | | 4.270 | 2.956 | 3.638 | 3.095 | 2.939 | 2.748 |
| Oakridge | Field | Field total | | | 11.779 | 7.903 | 11.611 | 12.425 | 11.560 | 10.260 |
| Oakridge | Field | Not matched to pool/*OQ* | 0.928 *c* | 0.98 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Oakridge | | Miocene | 0.928 *c* | 0.98 *b* | 11.779 | 7.903 | 11.611 | 12.425 | 11.560 | 10.260 |
| Oat Mountain | Field | Field total | | | 6.385 | 5.415 | 9.094 | 11.369 | 12.595 | 19.382 |
| Oat Mountain | Field | Not matched to pool/*OQ* | 0.948 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Oat Mountain | | Pliocene | 0.948 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Oat Mountain | | Sesnon-Eocene | 0.948 *c* | | 6.385 | 5.415 | 9.094 | 11.369 | 12.595 | 19.382 |
| Oil Creek | Field | Field total | | | 0.459 | 0.373 | 0.297 | 0.170 | 0.101 | 0.193 |
| Oil Creek | Field | Not matched to pool/*OQ* | 0.820 *c* | | 0.459 | 0.373 | 0.297 | 0.170 | 0.101 | 0.193 |
| Ojai | Field | Field total | | | 52.527 | 47.341 | 46.451 | 45.786 | 41.782 | 43.316 |
| Ojai | Field | Not matched to pool/*OQ* | 0.921 *c* | 1.63 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ojai | Lion Mountain | Lower Sespe | 0.920 *c* | 1.63 *b* | 0.411 | 0.314 | 0.402 | 0.500 | 0.157 | 0.428 |
| Ojai | Lion Mountain | Eocene | 0.893 *c* | 1.63 *b* | 0.265 | 0.201 | 0.241 | 0.260 | 0.082 | 0.224 |
| Ojai | N. Sulphur Mtn. | Miocene | 0.917 *c* | 1.63 *b* | 10.697 | 9.571 | 8.722 | 7.619 | 8.751 | 10.158 |
| Ojai | Oakview Area | | 0.865 *c* | 1.63 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ojai | Silverthread Area | Pliocene | 0.922 *c* | 1.63 *b* | 0.063 | 0.055 | 0.058 | 0.054 | 0.065 | 0.066 |
| Ojai | Silverthread Area | Miocene | 0.893 *c* | 1.63 *b* | 30.931 | 26.927 | 26.980 | 28.514 | 24.463 | 24.177 |
| Ojai | Sisar Creek Area | Saugus | 0.973 *c* | 1.63 *b* | 1.994 | 1.818 | 1.830 | 1.861 | 1.727 | 1.703 |
| Ojai | Sisar Creek Area | Saugus-Miocene | 0.973 *c* | 1.63 *b* | 0.220 | 0.385 | 0.341 | 0.356 | 0.375 | 0.374 |
| Ojai | Sisar Creek Area | Miocene | 0.973 *c* | 1.63 *b* | 0.638 | 0.435 | 0.433 | 0.461 | 0.415 | 0.728 |
| Ojai | Sulphur Crest | Miocene | 0.892 *c* | 1.63 *b* | 6.693 | 6.878 | 6.530 | 5.306 | 4.896 | 5.095 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Ojai | Sulphur Mountain | Miocene | 0.953 *c* | 1.63 *b* | 0.545 | 0.713 | 0.754 | 0.703 | 0.699 | 0.423 |
| Ojai | Tip Top Area | | 0.916 *c* | 1.63 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ojai | Weldon Canyon | | 0.882 *c* | 1.63 *b* | 0.070 | 0.044 | 0.159 | 0.206 | 0.153 | 0.257 |
| Olive | Field | Field total | | | 3.303 | 3.374 | 3.167 | 3.171 | 3.177 | 3.113 |
| Olive | Field | Not matched to pool/*OQ* | 0.973 *c* | | 3.303 | 3.374 | 3.167 | 3.171 | 3.177 | 3.113 |
| Orcutt | Field | Field total | | | 92.217 | 94.897 | 101.422 | 106.258 | 138.418 | 175.231 |
| Orcutt | Field | Not matched to pool/*OQ* | 0.880 *c* | 2.48 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Orcutt | Careaga Area | Monterey | 0.919 *c* | 2.17 *c* | 0.121 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Orcutt | Careaga Area | Pt Sal | 0.882 *c* | 0.61 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Orcutt | Careaga Area | Lospe | 0.863 *c* | 1.65 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Orcutt | Main Area | No breakdown by pool | 0.880 *c* | 2.48 *b* | 91.354 | 93.450 | 98.890 | 104.716 | 127.504 | 137.253 |
| Orcutt | Main Area | Diatomite | 0.880 *c* | 2.48 *b* | 0.742 | 1.447 | 2.533 | 1.542 | 10.914 | 30.730 |
| Orcutt | Main Area | SX | 0.880 *c* | 2.48 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 20.131 |
| Orcutt | Main Area | Monterey Deep | 0.855 *c* | 2.48 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.517 |
| Oxnard | Field | Field total | | | 16.933 | 14.789 | 12.878 | 11.115 | 24.040 | 19.811 |
| Oxnard | Field | Not matched to pool/*OQ* | 1.010 *c* | 5.77 *b,c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Oxnard | | Pliocene Tar | 1.022 *c* | 6.00 *c* | 15.610 | 14.061 | 11.850 | 9.737 | 22.544 | 18.176 |
| Oxnard | | Miocene Tar | 1.022 *c* | 7.54 *b* | 0.000 | 0.016 | 0.041 | 0.041 | 0.041 | 0.037 |
| Oxnard | | Topanga | 0.910 *c* | 1.72 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Oxnard | | McInnes | 0.910 *c* | 1.72 *b* | 1.324 | 0.712 | 0.986 | 1.337 | 1.454 | 1.597 |
| Oxnard | | Lucas | 0.865 *c* | 1.72 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Oxnard | | Livingston and E-D | 0.857 *c* | 1.72 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Pacoima | Field | Field total | | | 0.000 | 1.488 | 0.830 | 0.307 | 0.000 | 0.000 |
| Pacoima | Field | Not matched to pool/*OQ* | 0.855 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Pacoima | | Modelo Gas Zone | 0.855 *c* | | 0.000 | 0.153 | 0.198 | 0.000 | 0.000 | 0.000 |
| Pacoima | | Modelo | 0.855 *c* | | 0.000 | 1.335 | 0.632 | 0.307 | 0.000 | 0.000 |
| Paloma | Field | Field total | | | 3.811 | 4.448 | 5.421 | 5.148 | 4.695 | 4.312 |
| Paloma | Field | Not matched to pool/*OQ* | 0.806 *b* | 0.26 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Paloma | Main Area | Gas Zone | 0.806 *b* | 0.26 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Paloma | Main Area | Paloma | 0.804 *c* | 0.40 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Paloma | Main Area | Antelope | 0.806 *b* | 0.26 *b* | 0.000 | 0.000 | 0.047 | 0.290 | 0.123 | 0.158 |
| Paloma | Main Area | Lower Stevens | 0.819 *c* | 0.10 *c* | 3.304 | 3.914 | 4.776 | 4.052 | 3.961 | 3.610 |
| Paloma | Symons Area | Symons | 0.792 *c* | 0.10 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Paloma | Symons Area | Paloma | 0.816 *c* | 0.40 *c* | 0.507 | 0.534 | 0.598 | 0.805 | 0.611 | 0.544 |
| Pescado Offshore | Field | Field total | | | 835.129 | 794.985 | 807.051 | 702.007 | 770.829 | 717.512 |
| Pescado Offshore | Field | Not matched to pool/*OQ* | 0.917 *f* | | 835.129 | 794.985 | 807.051 | 702.007 | 770.829 | 717.512 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Pioneer | Field | Field total | | | 0.286 | 0.308 | 0.387 | 0.394 | 0.351 | 0.366 |
| Pioneer | Field | Not matched to pool/*OQ* | 0.825 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Pioneer | | Miocene | 0.825 *c* | | 0.286 | 0.308 | 0.387 | 0.394 | 0.351 | 0.366 |
| Pitas Point Offshore | Field | Field total | | | 0.117 | 0.000 | 0.000 | 0.059 | 0.112 | 0.059 |
| Pitas Point Offshore | Field | Not matched to pool/*OQ* | 0.835 *e* | 0.61 *e* | 0.117 | 0.000 | 0.000 | 0.059 | 0.112 | 0.059 |
| Placerita | Field | Field total | | | 196.527 | 172.576 | 162.715 | 152.629 | 134.848 | 114.907 |
| Placerita | Field | Not matched to pool/*OQ* | 0.927 *b* | 1.30 *b* | 196.527 | 0.000 | 0.000 | 0.000 | 134.848 | 0.000 |
| Placerita | | No breakdown by pool | 0.927 *b* | 1.30 *b* | 0.000 | 172.576 | 162.715 | 152.629 | 0.000 | 18.667 |
| Placerita | | Upper Kraft | 0.986 *c* | 1.30 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Placerita | | Lower Kraft | 0.925 *c* | 1.30 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 96.240 |
| Playa Del Rey | Field | Field total | | | 6.641 | 5.623 | 7.144 | 6.106 | 7.822 | 7.497 |
| Playa Del Rey | Field | Not matched to pool/*OQ* | 0.907 *b* | 2.65 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.363 |
| Playa Del Rey | Del Rey Hills Area | | 0.907 *b* | 3.20 *c* | 0.783 | 0.649 | 1.424 | 1.443 | 1.378 | 0.822 |
| Playa Del Rey | Kidson Area | | 0.876 *c* | 2.65 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Playa Del Rey | Venice Area | | 0.924 *c* | 2.65 *b* | 5.859 | 4.974 | 5.720 | 4.663 | 6.444 | 6.700 |
| Pleasant Valley | Field | Field total | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Pleasant Valley | Field | Not matched to pool/*OQ* | 0.866 *c* | 0.35 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Pleasant Valley | | Temblor | 0.850 *c* | 0.35 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Pleasant Valley | | Kreyenhagen | 0.866 *c* | 0.35 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Pleasant Valley | | Gatchell | 0.882 *c* | 0.35 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Pleito | Field | Field total | | | 36.092 | 32.269 | 30.230 | 29.978 | 43.034 | 39.634 |
| Pleito | Field | Not matched to pool/*OQ* | 0.935 *c* | 1.18 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Pleito | Creek Area | | 0.953 *c* | 1.18 *c* | 2.197 | 2.279 | 2.002 | 1.988 | 11.106 | 14.054 |
| Pleito | Ranch Area | | 0.916 *c* | 1.18 *c* | 33.895 | 29.990 | 28.228 | 27.990 | 31.928 | 25.580 |
| Point Arguello OCS | Field | Field total | | | 576.230 | 453.842 | 414.619 | 426.343 | 388.670 | 366.854 |
| Point Arguello OCS | Field | Not matched to pool/*OQ* | 0.934 *c* | 2.90 *c* | 576.230 | 453.842 | 414.619 | 426.343 | 388.670 | 366.854 |
| Pt. Pedernales OCS | Field | Field total | | | 379.534 | 404.059 | 472.821 | 440.090 | 426.093 | 364.590 |
| Pt. Pedernales OCS | Field | Not matched to pool/*OQ* | 0.960 *c* | 1.40 *e* | 379.534 | 404.059 | 472.821 | 440.090 | 426.093 | 364.590 |
| Poso Creek | Field | Field total | | | 45.343 | 75.121 | 114.511 | 206.274 | 320.456 | 356.434 |
| Poso Creek | Field | Not matched to pool/*OQ* | 0.979 *c* | 0.94 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Poso Creek | Enas Area | | 0.983 *c* | 0.98 *c* | 1.125 | 1.493 | 1.057 | 1.395 | 2.645 | 2.041 |
| Poso Creek | McVan Area | | 0.973 *c* | 0.80 *c* | 12.682 | 34.283 | 62.896 | 131.810 | 207.814 | 210.001 |
| Poso Creek | Premier Area | No breakdown by pool | 0.978 *c* | 0.98 *c* | 31.536 | 39.345 | 50.558 | 73.069 | 109.931 | 140.919 |
| Poso Creek | Premier Area | Etchegoin-Chanac | 0.981 *c* | 0.98 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.066 | 3.429 |
| Pyramid Hills | Field | Field total | | | 10.547 | 11.282 | 10.089 | 10.377 | 10.652 | 9.084 |
| Pyramid Hills | Field | Not matched to pool/*OQ* | 0.903 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Pyramid Hills | Dagany Area | KR | 0.959 *c* | | 3.861 | 3.902 | 3.067 | 3.320 | 3.708 | 3.187 |
| Pyramid Hills | Dagany Area | Canoas | 0.804 *c* | | 0.039 | 0.024 | 0.036 | 0.041 | 0.045 | 0.022 |
| Pyramid Hills | Norris Area | Miocene | 0.986 *c* | | 0.177 | 0.226 | 0.180 | 0.407 | 0.232 | 0.141 |
| Pyramid Hills | Norris Area | Eocene | 0.899 *c* | | 1.320 | 2.000 | 1.661 | 1.609 | 1.408 | 0.681 |
| Pyramid Hills | Orchard Ranch | Canoas | 0.814 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Pyramid Hills | West Area | Gas Zone | 0.903 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Pyramid Hills | West Slope Area | KR | 0.953 *c* | | 5.150 | 5.130 | 5.144 | 5.000 | 5.260 | 5.053 |
| Railroad Gap | Field | Field total | | | 5.975 | 2.892 | 2.173 | 5.545 | 14.498 | 23.035 |
| Railroad Gap | Field | Not matched to pool/*OQ* | 0.867 *c* | 0.86 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Railroad Gap | | No breakdown by pool | 0.867 *c* | 0.86 *b* | 0.000 | 0.000 | 0.000 | 0.038 | 0.839 | 2.729 |
| Railroad Gap | | Gas Zone | 0.867 *c* | 0.86 *b* | 0.136 | 0.104 | 0.069 | 0.707 | 0.466 | 0.638 |
| Railroad Gap | | Amnicola | 0.979 *c* | 1.60 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Railroad Gap | | Olig | 0.816 *c* | 0.67 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Railroad Gap | | Antelope Shale | 0.867 *b* | 2.00 *c* | 2.206 | 1.690 | 1.059 | 3.742 | 6.935 | 6.737 |
| Railroad Gap | | Antelope Shale/Carneros | 0.867 *c* | 0.86 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.503 |
| Railroad Gap | | Valv | 0.866 *c* | 0.64 *c* | 0.000 | 0.136 | 0.124 | 0.080 | 0.176 | 0.331 |
| Railroad Gap | | Carneros | 0.857 *b* | 0.44 *b* | 0.213 | 0.105 | 0.117 | 0.226 | 5.447 | 11.499 |
| Railroad Gap | | Phacoides | 0.810 *c* | 0.22 *b* | 3.421 | 0.857 | 0.804 | 0.751 | 0.635 | 0.597 |
| Raisin City | Field | Field total | | | 22.096 | 21.648 | 29.737 | 33.951 | 29.059 | 29.161 |
| Raisin City | Field | Not matched to pool/*OQ* | 0.906 *b* | 0.43 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Raisin City | | Zilch | 0.897 *c* | 0.70 *c* | 19.856 | 17.398 | 15.523 | 16.320 | 16.136 | 18.098 |
| Raisin City | | Eocene | 0.888 *c* | 0.41 *c* | 2.240 | 4.251 | 14.214 | 17.433 | 12.923 | 11.063 |
| Raisin City | | Moreno | 0.906 *b* | 0.43 *b* | 0.000 | 0.000 | 0.000 | 0.198 | 0.000 | 0.000 |
| Raisin City | | Panoche | 0.906 *b* | 0.43 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ramona | Field | Field total | | | 11.443 | 10.820 | 12.257 | 11.956 | 12.092 | 11.430 |
| Ramona | Field | Not matched to pool/*OQ* | 0.911 *b* | 2.45 *b* | 11.443 | 10.820 | 12.257 | 11.956 | 12.092 | 11.430 |
| Ramona North | Field | Field total | | | 0.028 | 0.000 | 0.000 | 0.020 | 0.055 | 0.104 |
| Ramona North | Field | Not matched to pool/*OQ* | 0.947 *c* | | 0.028 | 0.000 | 0.000 | 0.020 | 0.055 | 0.104 |
| Richfield | Field | Field total | | | 68.862 | 63.458 | 59.648 | 56.549 | 54.999 | 60.205 |
| Richfield | Field | Not matched to pool/*OQ* | 0.946 *c* | 1.56 *c* | 68.862 | 63.458 | 59.648 | 56.549 | 54.999 | 60.205 |
| Rincon | Field | Field total | | | 76.299 | 59.580 | 60.614 | 63.305 | 54.573 | 51.790 |
| Rincon | Field | Not matched to pool/*OQ* | 0.873 *c* | 0.70 *b,c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Rincon | Offshore | | 0.865 *c* | 0.20 *c* | 16.591 | 7.408 | 7.189 | 4.869 | 2.413 | 1.852 |
| Rincon | Onshore | | 0.880 *c* | 1.20 *b* | 59.708 | 52.172 | 53.426 | 58.436 | 52.160 | 46.282 |
| Rio Bravo | Field | Field total | | | 26.751 | 27.674 | 29.116 | 27.838 | 29.858 | 30.102 |
| Rio Bravo | Field | Not matched to pool/*OQ* | 0.849 *c* | 0.29 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rio Bravo | | No breakdown by pool | 0.849 *c* | 0.29 *b* | 0.000 | 0.000 | 0.000 | 0.010 | 0.022 | 2.672 |
| Rio Bravo | | Gas Zone | 0.849 *c* | 0.29 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Rio Bravo | | Round Mountain | 0.849 *c* | 0.29 *b* | 0.000 | 0.129 | 0.174 | 0.177 | 0.194 | 0.183 |
| Rio Bravo | | Olcese | 0.860 *c* | 0.29 *b* | 5.866 | 1.327 | 1.831 | 1.821 | 2.490 | 2.741 |
| Rio Bravo | | Round Mt-Olcese | 0.849 *c* | 0.29 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Rio Bravo | | R. Brvo-Mn Vedder-Osborn | 0.838 *c* | 0.35 *c* | 20.885 | 26.218 | 27.111 | 25.830 | 27.153 | 24.506 |
| Rio Bravo | | Osborn-Helbling | 0.849 *c* | 0.29 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Rio Bravo | | Helbling | 0.850 *c* | 0.29 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Rio Viejo | Field | Field total | | | 15.632 | 15.142 | 14.273 | 13.869 | 13.221 | 12.189 |
| Rio Viejo | Field | Not matched to pool/*OQ* | 0.879 *c* | 0.90 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Rio Viejo | | Stevens | 0.879 *c* | 0.90 *c* | 15.632 | 15.142 | 14.273 | 13.869 | 13.221 | 12.189 |
| Rio Vista Gas | Field | Field total | | | 2.348 | 2.481 | 2.742 | 4.412 | 4.928 | 2.210 |
| Rio Vista Gas | Field | Not matched to pool/*OQ* | | | 2.348 | 2.481 | 2.742 | 4.412 | 4.928 | 2.210 |
| River Island Gas | Field | Field total | | | 0.000 | 0.182 | 0.539 | 0.189 | 0.100 | 0.073 |
| River Island Gas | Field | Not matched to pool/*OQ* | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| River Island Gas | | No breakdown by pool | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| River Island Gas | | Markley-Nortonville | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| River Island Gas | | Nortonville | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| River Island Gas | | Domengine-Capay | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| River Island Gas | | Mokulumne River | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| River Island Gas | | Starkey | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| River Island Gas | | Winters | | | 0.000 | 0.182 | 0.539 | 0.189 | 0.100 | 0.073 |
| Riverdale | Field | Field total | | | 4.617 | 5.907 | 6.286 | 5.628 | 6.032 | 14.486 |
| Riverdale | Field | Not matched to pool/*OQ* | 0.832 *b* | 0.25 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Riverdale | | Miocene | 0.825 *b* | 0.22 *b* | 2.814 | 3.947 | 4.596 | 3.671 | 3.841 | 8.826 |
| Riverdale | | Eocene | 0.839 *b* | 0.27 *b* | 1.803 | 1.960 | 1.690 | 1.956 | 2.192 | 5.613 |
| Rocky Point Offshore | Field | Field total | | | 24.235 | 125.927 | 113.716 | 50.316 | 29.825 | 0.000 |
| Rocky Point Offshore | Field | Not matched to pool/*OQ* | | | 24.235 | 125.927 | 113.716 | 50.316 | 29.825 | 0.000 |
| Rose | Field | Field total | | | 39.785 | 46.649 | 40.802 | 37.673 | 34.009 | 29.466 |
| Rose | Field | Not matched to pool/*OQ* | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Rose | | McClure | | | 39.785 | 46.649 | 40.802 | 37.673 | 34.009 | 29.466 |
| Rosecrans | Field | Field total | | | 29.175 | 30.476 | 29.771 | 29.732 | 27.545 | 27.829 |
| Rosecrans | Field | Not matched to pool/*OQ* | 0.838 *b* | 0.54 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Rosecrans | Main Area | | 0.838 *b* | 0.54 *b* | 27.910 | 28.617 | 27.778 | 27.448 | 25.236 | 25.624 |
| Rosecrans | Athens Area | | 0.838 *b* | 0.54 *b* | 0.000 | 0.532 | 0.836 | 1.012 | 1.109 | 1.060 |
| Rosecrans | Central Area | | 0.838 *b* | 0.54 *b* | 1.265 | 1.327 | 1.157 | 1.272 | 1.199 | 1.145 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rosecrans East | Field | Field total | | | 0.423 | 0.281 | 0.269 | 0.273 | 0.231 | 0.007 |
| Rosecrans East | Field | Not matched to pool/*OQ* | 0.876 *c* | 0.52 *b* | 0.423 | 0.281 | 0.269 | 0.273 | 0.231 | 0.007 |
| Rosecrans South | Field | Field total | | | 2.365 | 2.371 | 2.312 | 2.072 | 1.983 | 1.826 |
| Rosecrans South | Field | Not matched to pool/*OQ* | 0.857 *c* | 0.52 *b* | 2.365 | 2.371 | 2.312 | 2.072 | 1.983 | 1.826 |
| Rosedale | Field | Field total | | | 4.351 | 4.159 | 3.840 | 3.206 | 3.234 | 2.851 |
| Rosedale | Field | Not matched to pool/*OQ* | 0.873 *c* | 0.75 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Rosedale | East Area | Stevens | 0.887 *c* | 0.75 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Rosedale | Main Area | Stevens | 0.870 *c* | 0.75 *c* | 4.243 | 3.917 | 3.630 | 3.031 | 3.077 | 2.676 |
| Rosedale | North Area | Stevens | 0.871 *c* | 0.75 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Rosedale | South Area | Stevens | 0.865 *c* | 0.75 *c* | 0.107 | 0.242 | 0.210 | 0.175 | 0.157 | 0.175 |
| Rosedale Ranch | Field | Field total | | | 16.283 | 16.480 | 18.188 | 26.072 | 29.861 | 31.335 |
| Rosedale Ranch | Field | Not matched to pool/*OQ* | 0.934 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Rosedale Ranch | Main Area | Etchegoin | 0.966 *c* | | 2.441 | 2.056 | 1.037 | 2.312 | 2.825 | 3.290 |
| Rosedale Ranch | Main Area | Lerdo-Chanac | 0.932 *c* | | 12.817 | 13.344 | 16.277 | 17.078 | 18.215 | 16.584 |
| Rosedale Ranch | Main Area | Chanac | 0.922 *c* | | 0.000 | 0.000 | 0.000 | 5.892 | 8.108 | 11.035 |
| Rosedale Ranch | Northeast Area | Lerdo-Chanac | 0.934 *c* | | 0.615 | 0.647 | 0.525 | 0.474 | 0.370 | 0.137 |
| Rosedale Ranch | Northeast Area | Chanac | 0.917 *c* | | 0.410 | 0.431 | 0.350 | 0.316 | 0.343 | 0.290 |
| Round Mountain | Field | Field total | | | 205.980 | 251.643 | 222.346 | 214.102 | 219.044 | 304.064 |
| Round Mountain | Field | Not matched to pool/*OQ* | 0.956 *c* | 0.59 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 4.036 |
| Round Mountain | Alma Area | Vedder | 0.979 *c* | 0.60 *b* | 0.000 | 0.072 | 0.046 | 0.144 | 0.198 | 0.210 |
| Round Mountain | Coffee Canyon | Pyramid Hill | 0.943 *c* | 0.59 *b* | 0.399 | 0.454 | 0.446 | 0.290 | 0.315 | 0.384 |
| Round Mountain | Coffee Canyon | Pyramid Hill-Vedder | 0.956 *c* | 0.71 *c* | 6.031 | 6.073 | 7.946 | 7.386 | 6.685 | 5.890 |
| Round Mountain | Main Area | No breakdown by pool | 0.943 *c* | 0.49 *c* | 0.000 | 0.474 | 8.631 | 19.596 | 20.961 | 10.784 |
| Round Mountain | Main Area | Jewett-Vedder | 0.943 *c* | 0.54 *b* | 198.829 | 243.861 | 194.472 | 163.863 | 173.850 | 230.360 |
| Round Mountain | Main Area | Vedder | 0.959 *c* | 0.60 *b* | 0.000 | 0.000 | 1.857 | 5.686 | 3.943 | 6.892 |
| Round Mountain | Main Area | Pyramid Hill | 0.947 *c* | 0.43 *c* | 0.000 | 0.000 | 8.231 | 16.505 | 12.253 | 44.840 |
| Round Mountain | Pyramid Hill | Vedder | 0.959 *c* | 0.60 *b* | 0.721 | 0.710 | 0.636 | 0.626 | 0.742 | 0.710 |
| Round Mountain | Sharktooth Area | Vedder | 0.979 *c* | 0.60 *b* | 0.000 | 0.000 | 0.082 | 0.005 | 0.097 | 0.017 |
| Russell Ranch | Field | Field total | | | 7.048 | 8.636 | 10.559 | 10.958 | 10.592 | 10.718 |
| Russell Ranch | Field | Not matched to pool/*OQ* | 0.778 *c* | 0.31 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Russell Ranch | Main Area | | 0.726 *c* | 0.36 *c* | 6.953 | 8.544 | 10.502 | 10.956 | 10.451 | 10.716 |
| Russell Ranch | Southeast Area | Dibblee | 0.830 *c* | 0.29 *b* | 0.095 | 0.092 | 0.057 | 0.002 | 0.141 | 0.002 |
| Ryer Island Gas | Field | Field total | | | 0.055 | 0.018 | 0.018 | 0.105 | 0.068 | 0.090 |
| Ryer Island Gas | Field | Not matched to pool/*OQ* | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ryer Island Gas | Offshore | | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ryer Island Gas | Onshore | | | | 0.055 | 0.018 | 0.018 | 0.105 | 0.068 | 0.090 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sacate Offshore | Field | Field total | | | 470.309 | 598.889 | 654.297 | 612.861 | 501.797 | 475.563 |
| Sacate Offshore | Field | Not matched to pool/*OQ* | 0.868 *c* | | 470.309 | 598.889 | 654.297 | 612.861 | 501.797 | 475.563 |
| Salt Lake | Field | Field total | | | 17.538 | 9.032 | 7.933 | 8.851 | 8.221 | 7.886 |
| Salt Lake | Field | Not matched to pool/*OQ* | 0.954 *c* | 2.73 *b* | 17.538 | 9.032 | 7.933 | 8.851 | 8.221 | 7.886 |
| Salt Lake South | Field | Field total | | | 8.688 | 8.474 | 8.739 | 7.203 | 5.401 | 5.642 |
| Salt Lake South | Field | Not matched to pool/*OQ* | 0.910 *c* | | 8.688 | 8.474 | 8.739 | 7.203 | 5.401 | 5.642 |
| San Ardo | Field | Field total | | | 634.214 | 558.932 | 500.897 | 546.406 | 662.852 | 838.089 |
| San Ardo | Field | Not matched to pool/*OQ* | 0.985 *b* | 2.20 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| San Ardo | Main Area | Lombardi | 0.985 *b* | 2.14 *b* | 572.288 | 496.403 | 447.748 | 483.180 | 583.547 | 763.518 |
| San Ardo | Main Area | Auriguac | 0.985 *b* | 2.25 *b* | 61.926 | 62.530 | 52.977 | 51.027 | 43.023 | 55.308 |
| San Ardo | North Area | Lombardi | 0.990 *c* | 2.37 *c* | 0.000 | 0.000 | 0.172 | 12.200 | 36.282 | 19.263 |
| San Emidio Nose | Field | Field total | | | 5.987 | 5.327 | 4.643 | 5.148 | 4.376 | 3.058 |
| San Emidio Nose | Field | Not matched to pool/*OQ* | 0.866 *c* | 0.93 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| San Emidio Nose | Main Area | Reef Ridge | 0.868 *c* | 0.83 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| San Emidio Nose | Main Area | Stevens | 0.865 *c* | 0.93 *b* | 4.455 | 3.947 | 3.307 | 3.808 | 3.310 | 2.916 |
| San Emidio Nose | Northwest Area | Stevens | 0.863 *c* | 0.93 *b* | 1.532 | 1.380 | 1.336 | 1.341 | 1.066 | 0.142 |
| San Joaquin | Field | Field total | | | 0.569 | 0.508 | 0.555 | 0.476 | 0.543 | 0.578 |
| San Joaquin | Field | Not matched to pool/*OQ* | 0.876 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| San Joaquin | | Eocene | 0.876 *c* | | 0.569 | 0.508 | 0.555 | 0.476 | 0.543 | 0.578 |
| San Miguelito | Field | Field total | | | 101.467 | 87.233 | 79.298 | 89.552 | 87.439 | 106.832 |
| San Miguelito | Field | Not matched to pool/*OQ* | 0.876 *c* | 0.90 *b* | 101.467 | 87.233 | 0.000 | 0.000 | 0.000 | 0.000 |
| San Miguelito | | Grubb 1-3 | 0.871 *c* | 0.87 *c* | 0.000 | 0.000 | 10.072 | 25.301 | 40.036 | 57.045 |
| San Miguelito | | Grubb 4-5 | 0.888 *c* | 0.90 *b* | 0.000 | 0.000 | 43.121 | 41.983 | 39.550 | 41.871 |
| San Miguelito | | Grubb D | 0.871 *c* | 0.87 *c* | 0.000 | 0.000 | 1.165 | 7.728 | 7.852 | 7.916 |
| San Vicente | Field | Field total | | | 109.898 | 93.731 | 76.938 | 67.028 | 63.297 | 57.065 |
| San Vicente | Field | Not matched to pool/*OQ* | 0.912 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| San Vicente | | Clifton, Dayton and Hay | 0.912 *c* | | 109.898 | 93.731 | 76.938 | 67.028 | 63.297 | 57.065 |
| Sansinena | Field | Field total | | | 43.991 | 42.390 | 45.511 | 44.600 | 41.504 | 29.622 |
| Sansinena | Field | Not matched to pool/*OQ* | 0.925 *c* | 0.87 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Sansinena | 12-G Area | | 0.949 *c* | 0.87 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Sansinena | Central Area | | 0.905 *c* | 0.87 *b* | 2.863 | 3.482 | 3.916 | 3.989 | 4.135 | 3.755 |
| Sansinena | Curtis Area | | 0.925 *c* | 0.87 *b* | 1.508 | 0.929 | 0.736 | 0.269 | 0.367 | 0.408 |
| Sansinena | East Area | | 0.897 *c* | 0.87 *b* | 13.343 | 11.719 | 12.694 | 11.617 | 11.014 | 7.814 |
| Sansinena | New England Area | | 0.932 *c* | 0.87 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Sansinena | West Area | | 0.940 *c* | 0.87 *b* | 26.277 | 26.261 | 28.165 | 28.725 | 25.988 | 17.646 |
| Santa Clara Avenue | Field | Field total | | | 11.258 | 10.644 | 10.691 | 11.276 | 11.604 | 12.201 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Santa Clara Avenue | Field | Not matched to pool/*OQ* | 0.914 *c* | 2.00 *c* | 11.258 | 10.644 | 10.691 | 11.276 | 11.604 | 12.201 |
| Santa Clara Offshore | Field | Field total | | | 108.134 | 92.569 | 96.149 | 85.175 | 95.437 | 98.940 |
| Santa Clara Offshore | Field | Not matched to pool/*OQ* | 0.887 *c* | 2.85 *e* | 108.134 | 92.569 | 96.149 | 85.175 | 95.437 | 98.940 |
| Santa Fe Springs | Field | Field total | | | 98.086 | 113.841 | 108.169 | 101.717 | 102.800 | 100.605 |
| Santa Fe Springs | Field | Not matched to pool/*OQ* | 0.861 *b* | 0.41 *b* | 98.086 | 113.841 | 108.169 | 101.717 | 102.800 | 100.605 |
| Santa Maria Valley | Field | Field total | | | 31.291 | 23.323 | 20.581 | 19.320 | 13.833 | 20.823 |
| Santa Maria Valley | Field | Not matched to pool/*OQ* | 0.987 *c* | 4.35 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Santa Maria Valley | Bradley Area | Foxen | 0.987 *c* | 4.35 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Santa Maria Valley | Bradley Area | Basal Sisquoc | 0.973 *c* | 4.13 *c* | 6.843 | 2.969 | 2.476 | 3.298 | 1.511 | 5.276 |
| Santa Maria Valley | Bradley Area | Monterey | 0.973 *c* | 4.35 *b* | 1.236 | 0.699 | 1.214 | 1.031 | 0.083 | 0.744 |
| Santa Maria Valley | Clark Area | Foxen | 1.000 *c* | 4.35 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Santa Maria Valley | Clark Area | Sisquoc | 1.011 *c* | 4.35 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Santa Maria Valley | Clark Area | Clark | 0.987 *c* | 4.35 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Santa Maria Valley | Main Area | | 0.965 *c* | 3.00 *c* | 7.980 | 9.062 | 7.902 | 5.912 | 8.720 | 7.112 |
| Santa Maria Valley | North Area | Foxen | 0.979 *c* | 4.35 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Santa Maria Valley | Southeast Area | Foxen | 1.000 *c* | 4.35 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Santa Maria Valley | Southeast Area | Sisquoc | 0.990 *c* | 4.35 *b* | 10.036 | 5.598 | 4.001 | 4.679 | 0.592 | 3.035 |
| Santa Maria Valley | Southeast Area | Houk | 0.990 *c* | 4.35 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Santa Maria Valley | Southeast Area | Monterey | 1.014 *c* | 4.35 *b* | 1.730 | 1.818 | 1.826 | 1.362 | 0.000 | 1.510 |
| Santa Maria Valley | West Area | | 0.964 *c* | 0.60 *c* | 3.466 | 3.177 | 3.162 | 3.037 | 2.926 | 2.939 |
| Santa Susana | Field | Field total | | | 5.646 | 3.556 | 4.525 | 4.349 | 3.612 | 3.107 |
| Santa Susana | Field | Not matched to pool/*OQ* | 0.821 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Santa Susana | | Sespe | 0.821 *c* | | 0.979 | 0.642 | 0.652 | 0.943 | 0.786 | 0.882 |
| Santa Susana | | First Sespe | 0.806 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Santa Susana | | Second and Third Sespe | 0.835 *c* | | 4.668 | 2.914 | 3.873 | 3.406 | 2.826 | 2.225 |
| Sargent | Field | Field total | | | 3.285 | 2.848 | 2.954 | 3.825 | 4.486 | 4.007 |
| Sargent | Field | Not matched to pool/*OQ* | 0.952 *b* | 0.86 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Sargent | | No breakdown by pool | 0.952 *b* | 0.86 *b* | 3.285 | 2.848 | 2.954 | 3.032 | 2.571 | 2.473 |
| Sargent | | Purisma Sand | 0.932 *c* | 0.62 *c* | 0.000 | 0.000 | 0.000 | 0.792 | 1.915 | 1.534 |
| Saticoy | Field | Field total | | | 7.596 | 7.182 | 8.792 | 8.326 | 7.076 | 6.566 |
| Saticoy | Field | Not matched to pool/*OQ* | 0.854 *c* | 0.94 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Saticoy | Main Area | | 0.854 *c* | 0.94 *b* | 7.029 | 6.990 | 8.284 | 7.741 | 6.597 | 5.937 |
| Saticoy | South Area | | 0.854 *c* | 0.94 *b* | 0.568 | 0.192 | 0.508 | 0.586 | 0.479 | 0.629 |
| Sawtelle | Field | Field total | | | 38.476 | 33.490 | 33.706 | 29.285 | 28.826 | 28.695 |
| Sawtelle | Field | Not matched to pool/*OQ* | 0.902 *b* | 1.99 *b* | 38.476 | 33.490 | 33.706 | 29.285 | 28.826 | 28.695 |
| Seal Beach | Field | Field total | | | 74.059 | 70.371 | 76.528 | 77.406 | 78.039 | 74.269 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Seal Beach | Field | Not matched to pool/*OQ* | 0.867 *b* | 0.55 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Seal Beach | Alamitos Area | | 0.886 *c* | 0.55 *b* | 4.439 | 4.324 | 4.068 | 4.406 | 3.873 | 6.394 |
| Seal Beach | Marine Area | Wasem | 0.888 *c* | 0.55 *b* | 0.197 | 0.472 | 0.331 | 0.432 | 0.405 | 0.268 |
| Seal Beach | Marine Area | McGrath | 0.904 *c* | 0.55 *b* | 6.223 | 6.196 | 7.177 | 7.425 | 7.402 | 6.676 |
| Seal Beach | North Block | No breakdown by pool | 0.898 *c* | 0.55 *b* | 31.606 | 30.164 | 31.712 | 32.274 | 33.351 | 31.777 |
| Seal Beach | North Block | Selover | 0.893 *c* | 0.55 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Seal Beach | N. Block-East Ext. | Recent | 0.867 *b* | 0.55 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Seal Beach | N. Block-East Ext. | Wasem | 0.887 *c* | 0.55 *b* | 1.775 | 1.500 | 1.419 | 1.371 | 1.447 | 1.401 |
| Seal Beach | N. Block-East Ext. | McGrath | 0.877 *c* | 0.55 *b* | 2.048 | 2.159 | 1.954 | 1.897 | 2.161 | 2.048 |
| Seal Beach | South Block | | 0.896 *c* | 1.00 *c* | 27.770 | 25.557 | 29.867 | 29.590 | 29.401 | 28.241 |
| Semitropic | Field | Field total | | | 6.478 | 6.442 | 6.175 | 5.660 | 5.896 | 4.797 |
| Semitropic | Field | Not matched to pool/*OQ* | 0.846 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.438 |
| Semitropic | | Gas Zone | 0.846 *c* | | 0.022 | 0.045 | 0.181 | 0.000 | 0.043 | 0.128 |
| Semitropic | | Randolph | 0.876 *c* | | 6.456 | 6.397 | 5.994 | 5.660 | 5.853 | 5.120 |
| Semitropic | | Vedder | 0.816 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Sespe | Field | Field total | | | 71.285 | 61.951 | 62.307 | 61.906 | 62.563 | 54.681 |
| Sespe | Field | Not matched to pool/*OQ* | 0.887 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Sespe | Foot of the Hills | Middle Sespe | 0.934 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Sespe | Foot of the Hills | Basal Sespe | 0.910 *c* | | 1.322 | 1.018 | 1.206 | 1.080 | 1.151 | 0.448 |
| Sespe | Foot of the Hills | Eocene | 0.910 *c* | | 0.052 | 0.054 | 0.056 | 0.052 | 0.057 | 0.049 |
| Sespe | Little Sespe Creek | Upper Sespe | 0.887 *c* | | 1.150 | 0.745 | 0.698 | 0.654 | 0.499 | 0.135 |
| Sespe | Little Sespe Creek | Basal Sespe | 0.871 *c* | | 0.644 | 0.667 | 0.729 | 0.720 | 0.731 | 0.570 |
| Sespe | Tar Crk-Topatopa | No breakdown by pool | 0.875 *c* | | 4.600 | 3.189 | 4.393 | 4.218 | 4.391 | 5.485 |
| Sespe | Tar Crk-Topatopa | Rincon-Vaqueros | 0.865 *c* | | 0.163 | 0.078 | 0.276 | 0.633 | 0.575 | 0.223 |
| Sespe | Tar Crk-Topatopa | Vaqueros | 0.865 *c* | | 0.922 | 1.116 | 1.008 | 1.185 | 1.221 | 1.346 |
| Sespe | Tar Crk-Topatopa | Upper Sespe | 0.887 *c* | | 1.676 | 1.288 | 1.225 | 1.076 | 0.717 | 0.931 |
| Sespe | Tar Crk-Topatopa | Middle Sespe | 0.887 *c* | | 2.015 | 2.034 | 2.205 | 1.745 | 1.319 | 1.227 |
| Sespe | Tar Crk-Topatopa | Basal Sespe | 0.871 *c* | | 56.577 | 49.781 | 48.420 | 48.362 | 49.174 | 42.028 |
| Sespe | Tar Crk-Topatopa | Coldwater | 0.876 *c* | | 2.164 | 1.981 | 2.091 | 2.180 | 2.729 | 2.236 |
| Shafter North | Field | Field total | | | 122.413 | 113.215 | 103.849 | 103.572 | 107.392 | 91.598 |
| Shafter North | Field | Not matched to pool/*OQ* | 0.890 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Shafter North | | McClure | 0.890 *c* | | 122.413 | 113.215 | 103.849 | 103.572 | 107.392 | 91.598 |
| Shiells Canyon | Field | Field total | | | 9.511 | 10.536 | 10.608 | 10.747 | 13.778 | 12.902 |
| Shiells Canyon | Field | Not matched to pool/*OQ* | 0.866 *c* | 0.78 *c* | 9.511 | 0.000 | 0.000 | 0.000 | 13.778 | 5.125 |
| Shiells Canyon | Main Area | No breakdown by pool | 0.866 *c* | 0.78 *c* | 0.000 | 10.536 | 10.608 | 10.747 | 0.000 | 0.670 |
| Shiells Canyon | Main Area | Sespe | 0.865 *c* | 0.78 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.960 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Shiells Canyon | Main Area | Eocene | 0.860 *c* | 0.78 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 6.147 |
| Simi | Field | Field total | | | 0.069 | 0.122 | 0.132 | 0.146 | 0.123 | 0.114 |
| Simi | Field | Not matched to pool/*OQ* | 0.900 *c* | 0.68 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Simi | Old Area | No breakdown by pool | 0.882 *c* | 0.68 *b* | 0.069 | 0.122 | 0.132 | 0.146 | 0.123 | 0.114 |
| Simi | Old Area | Gas Zone | 0.900 *c* | 0.68 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Simi | Old Area | Llajas | 0.876 *c* | 0.68 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Simi | Strathearn Area | | 0.860 *c* | 0.68 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Simi | Canada da la Brea | | 0.948 *c* | 0.68 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Simi | Alamos Canyon | | 0.931 *c* | 0.68 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Sockeye Offshore | Field | Field total | | | 270.434 | 278.630 | 234.778 | 245.710 | 239.933 | 243.032 |
| Sockeye Offshore | Field | Not matched to pool/*OQ* | 0.917 *c* | 3.26 *e* | 270.434 | 278.630 | 234.778 | 245.710 | 239.933 | 243.032 |
| South Mountain | Field | Field total | | | 79.072 | 74.778 | 74.022 | 71.815 | 72.153 | 76.341 |
| South Mountain | Field | Not matched to pool/*OQ* | 0.886 *b* | 1.73 *b* | 79.072 | 74.778 | 74.022 | 71.815 | 72.153 | 76.341 |
| Stockdale | Field | Field total | | | 14.895 | 16.045 | 15.150 | 15.203 | 15.381 | 15.514 |
| Stockdale | Field | Not matched to pool/*OQ* | 0.893 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Stockdale | Old Area | Chanac | 0.898 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Stockdale | Panama Lane | Nozu | 0.887 *c* | | 14.895 | 16.045 | 15.150 | 15.203 | 15.381 | 15.514 |
| Strand | Field | Field total | | | 1.127 | 0.715 | 0.648 | 0.647 | 0.622 | 0.785 |
| Strand | Field | Not matched to pool/*OQ* | 0.855 *c* | 0.47 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Strand | East Area | Stevens | 0.855 *c* | 0.41 *c* | 0.418 | 0.067 | 0.000 | 0.000 | 0.000 | 0.264 |
| Strand | Main Area | Gas Zone | 0.855 *c* | 0.47 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Strand | Main Area | Upper Stevens | 0.850 *c* | 0.43 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Strand | Main Area | Lower Stevens | 0.860 *c* | 0.45 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Strand | Main Area | Vedder | 0.835 *c* | 0.47 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Strand | Northwest Area | Gas Zone | 0.855 *c* | 0.47 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Strand | Northwest Area | Stevens | 0.857 *c* | 0.54 *c* | 0.709 | 0.648 | 0.648 | 0.647 | 0.622 | 0.521 |
| Strand | South Area | Stevens | 0.871 *c* | 0.43 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Suisun Bay Gas | Field | Field total | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Suisun Bay Gas | Field | Not matched to pool/*OQ* | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tapia | Field | Field total | | | 1.863 | 6.186 | 8.391 | 7.641 | 9.042 | 9.108 |
| Tapia | Field | Not matched to pool/*OQ* | 0.953 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tapia | | No breakdown by pool | 0.953 *c* | | 1.863 | 6.186 | 8.391 | 7.641 | 9.042 | 9.108 |
| Tapia | | Saugus | 0.953 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tapo Canyon South | Field | Field total | | | 1.992 | 1.799 | 2.374 | 2.375 | 2.117 | 1.773 |
| Tapo Canyon South | Field | Not matched to pool/*OQ* | 0.926 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tapo Canyon South | | No breakdown by pool | 0.926 *c* | | 1.636 | 1.427 | 1.908 | 1.950 | 1.712 | 1.354 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Tapo Canyon South | | Sespe | 0.947 *c* | | 0.356 | 0.372 | 0.467 | 0.426 | 0.405 | 0.418 |
| Tapo North | Field | Field total | | | 0.072 | 0.148 | 1.023 | 0.931 | 1.029 | 0.940 |
| Tapo North | Field | Not matched to pool/*OQ* | 0.930 *c* | | 0.072 | 0.148 | 1.023 | 0.931 | 1.029 | 0.940 |
| Tapo Ridge | Field | Field total | | | 0.465 | 0.379 | 0.557 | 0.535 | 0.451 | 0.316 |
| Tapo Ridge | Field | Not matched to pool/*OQ* | 0.956 *c* | | 0.465 | 0.379 | 0.557 | 0.535 | 0.451 | 0.316 |
| Tejon | Field | Field total | | | 53.970 | 53.910 | 48.997 | 54.131 | 93.381 | 84.936 |
| Tejon | Field | Not matched to pool/*OQ* | 0.879 *b* | 0.27 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tejon | Central Area | | 0.879 *b* | 0.28 *c* | 7.095 | 9.593 | 9.124 | 12.926 | 11.118 | 9.129 |
| Tejon | Eastern Area | | 0.947 *c* | 0.27 *b* | 2.658 | 2.566 | 2.428 | 1.935 | 2.449 | 2.369 |
| Tejon | Southeast Area | | 0.943 *c* | 0.27 *b* | 2.988 | 3.143 | 2.881 | 3.000 | 2.834 | 2.675 |
| Tejon | Western Area | | 0.944 *c* | 0.40 *c* | 41.229 | 38.608 | 34.563 | 36.270 | 76.979 | 70.763 |
| Tejon Hills | Field | Field total | | | 2.434 | 1.767 | 1.950 | 1.945 | 1.671 | 2.241 |
| Tejon Hills | Field | Not matched to pool/*OQ* | 0.866 *b* | 0.26 *b* | 2.434 | 1.767 | 1.950 | 1.945 | 1.671 | 2.241 |
| Tejon North | Field | Field total | | | 9.579 | 10.009 | 9.313 | 8.882 | 7.395 | 6.739 |
| Tejon North | Field | Not matched to pool/*OQ* | 0.846 *b* | 0.20 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tejon North | | No breakdown by pool | 0.846 *b* | 0.20 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tejon North | | Fruitvale | 0.917 *c* | 0.20 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tejon North | | Olcese | 0.845 *c* | 0.20 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tejon North | | Olcese-Eocene | 0.811 *c* | 0.20 *c* | 3.468 | 3.844 | 3.056 | 3.076 | 2.803 | 2.547 |
| Tejon North | | JV-Basalt | 0.797 *c* | 0.16 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tejon North | | Vedder-Eocene | 0.810 *c* | 0.24 *c* | 6.111 | 6.165 | 6.257 | 5.805 | 4.592 | 4.191 |
| Temblor Ranch | Field | Field total | | | 0.221 | 0.141 | 0.138 | 0.064 | 0.033 | 0.023 |
| Temblor Ranch | Field | Not matched to pool/*OQ* | 0.959 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Temblor Ranch | | Miocene | 0.959 *c* | | 0.221 | 0.141 | 0.138 | 0.064 | 0.033 | 0.023 |
| Temescal | Field | Field total | | | 4.834 | 5.118 | 5.337 | 5.348 | 4.819 | 3.891 |
| Temescal | Field | Not matched to pool/*OQ* | 0.920 *b* | 0.55 *b* | 4.834 | 5.118 | 5.337 | 5.348 | 4.819 | 3.891 |
| Ten Section | Field | Field total | | | 19.630 | 18.551 | 18.466 | 19.041 | 14.455 | 14.692 |
| Ten Section | Field | Not matched to pool/*OQ* | 0.845 *b* | 0.41 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ten Section | Main Area | Gas Zone | 0.845 *b* | 0.41 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ten Section | Main Area | Upper Stevens | 0.845 *c* | 0.41 *b* | 17.533 | 17.205 | 17.120 | 17.423 | 12.811 | 13.159 |
| Ten Section | Main Area | Lower Stevens | 0.860 *c* | 0.41 *b* | 2.098 | 1.346 | 1.346 | 1.617 | 1.644 | 1.533 |
| Ten Section | Northwest Area | No breakdown by pool | 0.845 *b* | 0.41 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ten Section | Northwest Area | Stevens | 0.852 *c* | 0.41 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Thornton WWG Gas | Field | Field total | | | 0.000 | 0.000 | 0.038 | 0.153 | 0.014 | 0.000 |
| Thornton WWG Gas | Field | Not matched to pool/*OQ* | | | 0.000 | 0.000 | 0.038 | 0.153 | 0.014 | 0.000 |
| Timber Canyon | Field | Field total | | | 6.187 | 3.250 | 6.000 | 5.497 | 4.888 | 6.278 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Timber Canyon | Field | Not matched to pool/*OQ* | 0.847 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Timber Canyon | Loel-Maxwell Area | | 0.840 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Timber Canyon | Main Area | | 0.855 *c* | | 6.187 | 3.250 | 6.000 | 5.497 | 4.888 | 6.278 |
| Tisdale Gas | Field | Field total | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.008 | 0.000 |
| Tisdale Gas | Field | Not matched to pool/*OQ* | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tisdale Gas | Main Area | Forbes | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.008 | 0.000 |
| Tisdale Gas | Southeast Area | Forbes | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tisdale Gas | Southeast Area | Guinda | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Torrance | Field | Field total | | | 60.768 | 58.047 | 61.020 | 61.287 | 61.560 | 59.173 |
| Torrance | Field | Not matched to pool/*OQ* | 0.934 *b* | 2.26 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Torrance | Offshore | Del Amo | 0.887 *c* | 2.42 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Torrance | Offshore | Others | 0.930 *c* | 2.43 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Torrance | Onshore | Tar-Ranger & Main, East | 0.936 *c* | 1.37 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Torrance | Onshore | Others | 0.934 *b* | 2.26 *b* | 57.219 | 54.931 | 57.893 | 58.047 | 58.323 | 55.642 |
| Torrance | Onshore | Del Amo | 0.887 *c* | 2.42 *b* | 3.549 | 3.116 | 3.127 | 3.240 | 3.237 | 3.531 |
| Torrey Canyon | Field | Field total | | | 13.830 | 10.938 | 14.342 | 14.046 | 13.976 | 12.720 |
| Torrey Canyon | Field | Not matched to pool/*OQ* | 0.896 *c* | 2.74 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Torrey Canyon | | Sespe | 0.896 *c* | 2.74 *b* | 1.686 | 1.417 | 1.757 | 1.691 | 1.664 | 1.621 |
| Torrey Canyon | | First Sespe | 0.910 *c* | 2.74 *b* | 0.828 | 0.626 | 0.871 | 0.876 | 0.733 | 0.526 |
| Torrey Canyon | | Second Sespe | 0.882 *c* | 2.74 *b* | 0.836 | 0.727 | 1.007 | 0.935 | 0.945 | 0.873 |
| Torrey Canyon | | Third Sespe | 0.896 *c* | 2.74 *c* | 1.172 | 1.187 | 1.452 | 1.479 | 1.343 | 1.333 |
| Torrey Canyon | | Deep | 0.896 *c* | 2.74 *b* | 9.308 | 6.982 | 9.255 | 9.065 | 9.291 | 8.367 |
| Tulare Lake | Field | Field total | | | 2.518 | 0.391 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tulare Lake | Field | Not matched to pool/*OQ* | 0.843 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tulare Lake | | Salyer | 0.771 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tulare Lake | | KCDC | 0.826 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tulare Lake | | 54-8U | 0.865 *c* | | 1.521 | 0.283 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tulare Lake | | 54-8M | 0.850 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tulare Lake | | 54-8L | 0.865 *c* | | 0.507 | 0.094 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tulare Lake | | Boswell | 0.876 *c* | | 0.490 | 0.015 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tulare Lake | | Vaqueros | 0.845 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Union Avenue | Field | Field total | | | 0.812 | 1.077 | 0.848 | 0.600 | 0.888 | 2.902 |
| Union Avenue | Field | Not matched to pool/*OQ* | 0.966 *c* | 2.25 *c* | 0.812 | 1.077 | 0.848 | 0.600 | 0.888 | 2.902 |
| Union Station | Field | Field total | | | 2.358 | 0.651 | 0.225 | 0.000 | 0.000 | 0.000 |
| Union Station | Field | Not matched to pool/*OQ* | 0.829 *c* | | 2.358 | 0.651 | 0.225 | 0.000 | 0.000 | 0.000 |
| Vallecitos | Field | Field total | | | 1.159 | 1.161 | 0.857 | 0.829 | 0.825 | 1.161 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Vallecitos | Field | Not matched to pool/*OQ* | 0.877 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Vallecitos | Ashurst Area | Domengine-Yokut | 0.900 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Vallecitos | Cedar Flat Area | San Carlos | 0.921 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Vallecitos | Central Area | Ashurst | 0.840 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Vallecitos | Central Area | Domengine-Yokut | 0.850 *c* | | 0.699 | 0.716 | 0.585 | 0.567 | 0.653 | 0.755 |
| Vallecitos | Franco Area | Yokut | 0.860 *c* | | 0.195 | 0.244 | 0.215 | 0.232 | 0.056 | 0.247 |
| Vallecitos | Griswold Canyon | San Carlos | 0.845 *c* | | 0.035 | 0.021 | 0.035 | 0.028 | 0.031 | 0.028 |
| Vallecitos | Los Pinos Canyon | | 0.898 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Vallecitos | Silver Creek Area | San Carlos | 0.904 *c* | | 0.230 | 0.179 | 0.022 | 0.003 | 0.085 | 0.132 |
| Vallecitos | Pimental Cn. Gas | Yokut | 0.877 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Valpredo | Field | Field total | | | 0.000 | 0.000 | 0.000 | 0.006 | 0.003 | 0.000 |
| Valpredo | Field | Not matched to pool/*OQ* | 0.898 *c* | 1.80 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Valpredo | | Miocene | 0.898 *c* | 1.80 *c* | 0.000 | 0.000 | 0.000 | 0.006 | 0.003 | 0.000 |
| Van Ness Slough | Field | Field total | | | 0.398 | 0.199 | 0.176 | 0.131 | 0.071 | 0.020 |
| Van Ness Slough | Field | Not matched to pool/*OQ* | 0.845 *c* | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Van Ness Slough | | Miocene | 0.845 *c* | | 0.398 | 0.199 | 0.176 | 0.131 | 0.071 | 0.020 |
| Van Sickle Island Gas | Field | Field total | | | 0.000 | 0.000 | 0.120 | 0.350 | 1.297 | 1.254 |
| Van Sickle Island Gas | Field | Not matched to pool/*OQ* | | | 0.000 | 0.000 | 0.120 | 0.350 | 1.297 | 1.254 |
| Ventura | Field | Field total | | | 697.753 | 627.288 | 675.084 | 671.198 | 664.385 | 666.861 |
| Ventura | Field | Not matched to pool/*OQ* | 0.866 *b* | 1.08 *b* | 697.753 | 627.288 | 675.084 | 671.198 | 664.385 | 666.861 |
| Walnut | Field | Field total | | | 1.688 | 1.554 | 1.347 | 1.391 | 1.304 | 1.277 |
| Walnut | Field | Not matched to pool/*OQ* | 0.959 *c* | | 1.688 | 1.554 | 1.347 | 1.391 | 1.304 | 1.277 |
| Wasco | Field | Field total | | | 0.083 | 0.049 | 0.000 | 0.000 | 0.000 | 0.006 |
| Wasco | Field | Not matched to pool/*OQ* | 0.836 *c* | 0.21 *b* | 0.083 | 0.049 | 0.000 | 0.000 | 0.000 | 0.006 |
| Wayside Canyon | Field | Field total | | | 2.874 | 2.959 | 2.728 | 2.639 | 1.978 | 1.457 |
| Wayside Canyon | Field | Not matched to pool/*OQ* | 0.925 *c* | | 2.874 | 2.959 | 2.728 | 2.639 | 1.978 | 1.457 |
| West Mountain | Field | Field total | | | 1.560 | 1.621 | 1.610 | 1.533 | 1.268 | 1.169 |
| West Mountain | Field | Not matched to pool/*OQ* | 0.934 *c* | | 1.560 | 1.621 | 1.610 | 1.533 | 1.268 | 1.169 |
| Wheeler Ridge | Field | Field total | | | 16.243 | 15.655 | 15.391 | 16.355 | 12.306 | 11.231 |
| Wheeler Ridge | Field | Not matched to pool/*OQ* | 0.884 *b* | 0.46 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Wheeler Ridge | Central Area | No breakdown by pool | 0.884 *b* | 0.46 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Wheeler Ridge | Central Area | Coal Oil Canyon | 0.916 *c* | 0.69 *c* | 1.690 | 1.417 | 1.787 | 1.581 | 1.186 | 0.473 |
| Wheeler Ridge | Central Area | Coal Oil Canyon-Main | 0.896 *c* | 0.69 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Wheeler Ridge | Central Area | Miocene-Oligocene | 0.852 *c* | 0.55 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Wheeler Ridge | Central Area | Main | 0.876 *c* | 0.69 *c* | 0.698 | 0.633 | 0.616 | 0.750 | 1.526 | 0.887 |
| Wheeler Ridge | Central Area | Valv | 0.898 *c* | 0.40 *c* | 0.763 | 0.427 | 0.247 | 0.288 | 0.065 | 0.113 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Wheeler Ridge | Central Area | 2-38 pool | 0.825 *c* | 0.40 *c* | 0.311 | 0.351 | 0.475 | 0.483 | 0.493 | 0.551 |
| Wheeler Ridge | Central Area | Olcese | 0.825 *c* | 0.40 *b* | 0.284 | 0.232 | 0.236 | 0.460 | 0.919 | 0.517 |
| Wheeler Ridge | Central Area | Oligocene-Eocene | 0.827 *c* | 0.46 *b* | 0.536 | 0.479 | 0.523 | 0.400 | 0.173 | 0.080 |
| Wheeler Ridge | Central Area | ZA-5 | 0.806 *c* | 0.46 *b* | 0.000 | 0.000 | 0.000 | 0.045 | 0.283 | 0.134 |
| Wheeler Ridge | Central Area | ZB-3 | 0.884 *b* | 0.46 *b* | 0.771 | 0.636 | 0.377 | 0.329 | 0.190 | 0.199 |
| Wheeler Ridge | Central Area | ZB-5 | 0.806 *c* | 0.46 *b* | 0.810 | 0.710 | 0.668 | 0.564 | 0.437 | 0.459 |
| Wheeler Ridge | Central Area | Refugian Eocene | 0.847 *c* | 0.29 *c* | 4.224 | 5.508 | 5.403 | 6.270 | 2.911 | 4.342 |
| Wheeler Ridge | Northeast Area | FA-2 | 0.947 *c* | 0.69 *b* | 0.880 | 1.010 | 1.046 | 0.852 | 0.716 | 0.973 |
| Wheeler Ridge | Northeast Area | Hagood | 0.953 *c* | 0.46 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Wheeler Ridge | Northeast Area | ZB-1 | 0.830 *c* | 0.46 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Wheeler Ridge | Northeast Area | Vedder | 0.830 *c* | 0.46 *b* | 1.552 | 1.197 | 0.915 | 1.267 | 0.732 | 0.348 |
| Wheeler Ridge | Southeast Area | Olcese | 0.811 *c* | 0.46 *b* | 0.037 | 0.049 | 0.684 | 0.991 | 1.206 | 0.516 |
| Wheeler Ridge | Telegraph Canyon | Eocene | 0.780 *c* | 0.29 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Wheeler Ridge | Windgap Area | No breakdown by pool | 0.826 *c* | 0.46 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Wheeler Ridge | Windgap Area | Reserve | 0.928 *c* | 0.69 *b* | 3.688 | 3.005 | 2.413 | 2.072 | 1.466 | 1.676 |
| Wheeler Ridge | Windgap Area | Olcese | 0.724 *c* | 0.40 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| White Wolf | Field | Field total | | | 0.814 | 0.744 | 0.863 | 1.650 | 2.553 | 2.252 |
| White Wolf | Field | Not matched to pool/*OQ* | 0.968 *c* | | 0.814 | 0.744 | 0.863 | 1.650 | 2.553 | 2.252 |
| Whittier | Field | Field total | | | 13.743 | 8.347 | 9.841 | 14.217 | 19.606 | 17.754 |
| Whittier | Field | Not matched to pool/*OQ* | 0.922 *c* | 0.60 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Whittier | Central Area | Upper | 0.945 *c* | 0.60 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Whittier | Central Area | 6th, 184 Anticline | 0.874 *c* | 0.60 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Whittier | Central Area | 184 Anticline | 0.845 *c* | 0.60 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Whittier | La Habra Area | | 0.931 *c* | 0.60 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Whittier | Rideout Heights | No breakdown by pool | 0.952 *c* | 0.60 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.584 | 0.454 |
| Whittier | Rideout Heights | Pliocene | 0.969 *c* | 0.60 *b* | 11.565 | 7.064 | 8.074 | 12.863 | 17.201 | 15.427 |
| Whittier | Rideout Heights | Miocene | 0.936 *c* | 0.53 *c* | 2.178 | 1.283 | 1.767 | 1.354 | 1.821 | 1.873 |
| Wilmington | Field | Field total | | | 2,381.235 | 2,387.980 | 2,358.855 | 2,366.217 | 2,319.053 | 2,173.822 |
| Wilmington | Field | Not matched to pool/*OQ* | | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Wilmington | Offshore | | 0.908 *b,c* | 1.54 *b,c* | 1,874.608 | 1,870.824 | 1,812.232 | 1,757.379 | 1,710.736 | 1,618.035 |
| Wilmington | Onshore | | 0.914 *b,c* | 1.39 *b,c* | 506.626 | 517.156 | 546.624 | 608.839 | 608.317 | 555.787 |
| Yorba Linda | Field | Field total | | | 10.795 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Yorba Linda | Field | Not matched to pool/*OQ* | 0.963 *c* | 1.90 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Yorba Linda | | Shallow | 0.979 *c* | 1.86 *b* | 10.795 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Yorba Linda | | Main | 0.966 *c* | 1.68 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Yorba Linda | | Shell | 0.957 *c* | 1.99 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

**Table 2-4. California-producted crude data by field, area, and pool, formation or zone, *continued***

***Data sources:*** *Cal. Div. Oil , Gas & Geothermal Res. (a, c); U.S. DOE (b, d); Environment Canada (e); Santa. Barbara County (f).*

| Field | Area | Pool, formation or zone | Specific gravity | Sulfur % wt. | Production by year ($m^3 \cdot 10^3$)[a] 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Yorba Linda | | F Sand | 0.957 *c* | 1.99 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Yorba Linda | | E Sand | 0.957 *c* | 1.99 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Yorba Linda | | Miocene Contact | 0.966 *c* | 1.90 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Yowlumne | Field | Field total | | | 54.905 | 43.902 | 37.742 | 37.305 | 31.424 | 26.902 |
| Yowlumne | Field | Not matched to pool/*OQ* | 0.865 *c* | 0.42 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Yowlumne | | Etchegoin | 0.865 *c* | 0.42 *c* | 0.680 | 0.599 | 0.419 | 0.632 | 0.042 | 0.489 |
| Yowlumne | | Stevens | 0.868 *c* | 0.60 *c* | 54.225 | 43.303 | 37.324 | 36.672 | 31.382 | 26.412 |
| Yowlumne | | South Yowlumne | 0.871 *c* | 0.42 *c* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zaca | Field | Field total | | | 35.787 | 28.823 | 24.952 | 24.608 | 12.486 | 31.853 |
| Zaca | Field | Not matched to pool/*OQ* | 1.008 *b* | 5.65 *b* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zaca | | Monterey North Block | 1.008 *b* | 5.65 *b* | 11.778 | 9.395 | 8.658 | 8.552 | 4.047 | 10.975 |
| Zaca | | Monterey South Block | 1.008 *b* | 5.65 *b* | 24.009 | 19.428 | 16.294 | 16.055 | 8.439 | 20.878 |
| **Grand total crude and condensate production reported by Cal. Div. Oil & Gas[a]** | | | | | **42,567** | **40,685** | **39,649** | **38,686** | **37,956** | **36,583** |

[a] *Annual Report of the State Oil & Gas Supervisor, 2004–2008, and Monthly Oil and Gas Production and Injection reports 2009*. Reports PR06; PR04. California Department of Conservation, Division of Oil, Gas, & Geothermal Resources: Sacramento, CA. Production and reserves.

[b] *California Oil and Gas Fields.* Cal. Dept. Conservation, Division of Oil, Gas, & Geothermal Resources: Sacramento, CA. 1998. Three volumes. http://www.conservation.ca.gov/dog/pubs_stats/Pages/technical_reports.aspx; accessed 2 June 2011.

[c] *Crude Oil Analysis Database.* U.S. Department of Energy, National Energy Technology Laboratory: Bartlesville OK. Summary of Analyses; www.netl.doe.gov/technologies/oil-gas/Software/database.html; Crude Oil Analysis Database. Accessed 19 May 2011.

[d] *Heavy Oil Database.* U.S. Department of Energy, National Energy Technology Laboratory: Bartlesville OK. Composite of databases; www.netl.doe.gov/technologies/oil-gas/Software/database.html; Heavy Oil Database. Accessed 19 May 2011.

[e] *Oil Properties Database.* Environment Canada: Canada. www.etc-cte.ec.gc.ca/databases/oilproperties. Accessed 13 June 2011.

[f] *Fields/Production History.* County of Santa Barbara Planning and Development, Energy Division: Santa Barbara, CA. http://www.countyofsb.org/energy/projects/exxon.asp; Fields Production/History. Accessed 4 June 2011.

**Table 2-5. Facility-level capacity data, California refineries[a]**

*Barrels/calendar day: (b/cd)*

| Facility | Year | Atm. dist. (b/cd) | Vacuum dist. (b/cd) | Coking & therm. (b/cd) | Cat. cracking (b/cd) | Hydrocracking (b/cd) |
|---|---|---|---|---|---|---|
| Chevron El Segundo | 2008 | 265,000 | 147,000 | 59,000 | 65,000 | 46,000 |
| Chevron El Segundo | 2009 | 269,000 | 147,000 | 67,500 | 65,000 | 46,000 |
| BP Carson | 2008 | 252,225 | 133,000 | 63,450 | 91,800 | 45,000 |
| BP Carson | 2009 | 252,225 | 133,000 | 63,450 | 92,250 | 45,000 |
| Chevron Richmond | 2008 | 243,000 | 110,000 | 0 | 80,000 | 154,250 |
| Chevron Richmond | 2009 | 243,000 | 110,000 | 0 | 80,000 | 151,000 |
| Tesoro Avon | 2008 | 161,000 | 144,000 | 42,000 | 66,500 | 32,000 |
| Tesoro Avon | 2009 | 161,000 | 144,000 | 42,000 | 66,500 | 32,000 |
| Shell Martinez | 2008 | 158,600 | 91,100 | 46,500 | 68,870 | 37,900 |
| Shell Martinez | 2009 | 145,000 | 91,100 | 46,500 | 68,870 | 37,900 |
| ExxonMobil Torrance | 2008 | 149,500 | 98,500 | 52,500 | 96,000 | 20,500 |
| ExxonMobil Torrance | 2009 | 149,500 | 98,000 | 52,000 | 83,500 | 20,500 |
| Valero Benicia | 2008 | 139,500 | 78,500 | 28,000 | 69,000 | 36,000 |
| Valero Benicia | 2009 | 139,500 | 78,500 | 28,000 | 69,000 | 36,000 |
| ConocoPh. Carson & Wilmington[b] | 2008 | 138,700 | 80,000 | 48,000 | 45,000 | 24,750 |
| ConocoPh. Carson & Wilmington[b] | 2009 | 138,700 | 80,000 | 48,000 | 45,000 | 24,750 |
| Tesoro Wilmington & Carson[b] | 2008 | 100,000 | 62,000 | 40,000 | 36,000 | 32,000 |
| Tesoro Wilmington & Carson[b] | 2009 | 100,000 | 62,000 | 40,000 | 36,000 | 32,000 |
| Ultramar-Valero Wilmington | 2008 | 80,000 | 46,000 | 28,000 | 54,000 | 0 |
| Ultramar-Valero Wilmington | 2009 | 80,000 | 46,000 | 28,000 | 54,000 | 0 |
| ConocoPhillips Rodeo[c] | 2008 | 76,000 | 59,600 | 25,700 | 0 | 37,000 |
| ConocoPhillips Rodeo[c] | 2009 | 76,000 | 59,600 | 25,700 | 0 | 56,000 |
| Paramount | 2008 | 53,000 | 33,800 | 0 | 0 | 0 |
| Paramount | 2009 | 88,000 | 59,800 | 0 | 0 | 0 |
| Big West Bakersfield | 2008 | 65,000 | 39,000 | 22,000 | 0 | 23,500 |
| Big West Bakersfield | 2009 | 65,000 | 39,000 | 22,000 | 0 | 23,500 |
| ConocoPhillips Santa Maria[c] | 2008 | 44,200 | 27,400 | 21,100 | 0 | 0 |
| ConocoPhillips Santa Maria[c] | 2009 | 44,200 | 27,400 | 21,100 | 0 | 0 |
| Kern Oil & Refining | 2008 | 25,000 | 0 | 0 | 0 | 0 |
| Kern Oil & Refining | 2009 | 25,000 | 0 | 0 | 0 | 0 |
| San Joaquin Refining | 2008 | 24,300 | 14,300 | 10,000 | 0 | 0 |
| San Joaquin Refining | 2009 | 24,300 | 14,000 | 10,000 | 0 | 0 |

[a] Data from *Oil & Gas Journal* Worldwide refining *(6)* except as noted. Includes all large California fuels refineries. Some small facilities limited to other products, such as asphalt blowing plants, are not shown.

[b] Capacity data for separate closely located facilities are aggregated as reported by *Oil & Gas Journal* (6).

[c] Facilities reported b/cd capacities in aggregate *(6)* but stream-day capacities separately *(14)* and are ~250 miles apart. Capacities were disaggregated by comparison of b/cd and b/sd data *(6, 14)*. Data shown are in b/cd.

**Table 2-5. Facility-level capacity data, California refineries, *continued*[a]**

| *Barrels/calendar day: (b/cd)* Facility | Year | 1º hydrotreating of gas oil, resid. & cracking feeds (b/cd) | 2º hydrotreating of hydrocarbon product streams (b/cd) | Reforming (b/cd) | Alkylation (b/cd) | Pol./Dim. (b/cd) |
|---|---|---|---|---|---|---|
| Chevron El Segundo | 2008 | 65,000 | 136,000 | 44,000 | 30,000 | 0 |
| Chevron El Segundo | 2009 | 65,000 | 136,000 | 44,000 | 30,000 | 0 |
| BP Carson | 2008 | 85,500 | 134,730 | 46,800 | 13,950 | 0 |
| BP Carson | 2009 | 85,500 | 132,030 | 46,800 | 15,300 | 0 |
| Chevron Richmond | 2008 | 0 | 197,340 | 69,000 | 24,000 | 3,700 |
| Chevron Richmond | 2009 | 0 | 197,340 | 69,000 | 24,000 | 3,700 |
| Tesoro Avon | 2008 | 62,000 | 110,500 | 42,000 | 14,000 | 0 |
| Tesoro Avon | 2009 | 62,000 | 110,500 | 42,000 | 14,000 | 0 |
| Shell Martinez | 2008 | 0 | 117,950 | 29,400 | 11,000 | 2,470 |
| Shell Martinez | 2009 | 0 | 117,950 | 29,400 | 11,000 | 2,470 |
| ExxonMobil Torrance | 2008 | 102,000 | 41,500 | 19,000 | 23,500 | 0 |
| ExxonMobil Torrance | 2009 | 102,000 | 41,500 | 19,000 | 23,500 | 0 |
| Valero Benicia | 2008 | 37,000 | 109,000 | 36,000 | 17,100 | 2,900 |
| Valero Benicia | 2009 | 37,000 | 109,000 | 36,000 | 17,100 | 2,900 |
| ConocoPh. Carson & Wilmington[b] | 2008 | 50,000 | 85,850 | 35,200 | 14,200 | 0 |
| ConocoPh. Carson & Wilmington[b] | 2009 | 50,000 | 85,850 | 35,200 | 14,200 | 0 |
| Tesoro Wilmington & Carson[b] | 2008 | 38,000 | 63,250 | 32,500 | 12,000 | 0 |
| Tesoro Wilmington & Carson[b] | 2009 | 38,000 | 63,250 | 32,500 | 12,000 | 0 |
| Ultramar-Valero Wilmington | 2008 | 62,500 | 77,000 | 17,500 | 14,500 | 0 |
| Ultramar-Valero Wilmington | 2009 | 62,500 | 77,000 | 17,500 | 14,500 | 0 |
| ConocoPhillips Rodeo[c] | 2008 | 0 | 73,000 | 31,000 | 0 | 0 |
| ConocoPhillips Rodeo[c] | 2009 | 0 | 73,000 | 31,000 | 0 | 0 |
| Paramount | 2008 | 0 | 35,250 | 11,600 | 0 | 0 |
| Paramount | 2009 | 0 | 35,250 | 11,600 | 0 | 0 |
| Big West Bakersfield | 2008 | 21,900 | 0 | 14,700 | 0 | 0 |
| Big West Bakersfield | 2009 | 0 | 21,900 | 14,700 | 0 | 0 |
| ConocoPhillips Santa Maria[c] | 2008 | 0 | 0 | 0 | 0 | 0 |
| ConocoPhillips Santa Maria[c] | 2009 | 0 | 0 | 0 | 0 | 0 |
| Kern Oil & Refining | 2008 | 0 | 13,000 | 3,000 | 0 | 0 |
| Kern Oil & Refining | 2009 | 0 | 13,000 | 3,000 | 0 | 0 |
| San Joaquin Refining | 2008 | 1,800 | 3,000 | 0 | 0 | 0 |
| San Joaquin Refining | 2009 | 1,800 | 3,000 | 0 | 0 | 0 |

[a] Data from *Oil & Gas Journal* Worldwide refining *(6)* except as noted. Includes all large California fuels refineries. Some small facilities limited to other products, such as asphalt blowing plants, are not shown.

[b] Capacity data for separate closely located facilities are aggregated as reported by *Oil & Gas Journal* (6).

[c] Facilities reported b/cd capacities in aggregate *(6)* but stream-day capacities separately *(14)* and are ~250 miles apart. Capacities were disaggregated by comparison of b/cd and b/sd data *(6, 14)*. Data shown are in b/cd.

**Table 2-5. Facility-level capacity data, California refineries, *continued*[a]**

*Barrels/calendar day: (b/cd)*

| Facility | Year | Aromatics (b/cd) | Isomerization (b/cd) | Lubes (b/cd) | Asphalt (b/cd) | Sulfur (tonnes/d) |
|---|---|---|---|---|---|---|
| Chevron El Segundo | 2008 | 0 | 27,000 | 0 | 0 | 544 |
| Chevron El Segundo | 2009 | 0 | 27,000 | 0 | 0 | 544 |
| BP Carson | 2008 | 0 | 28,170 | 0 | 0 | 446 |
| BP Carson | 2009 | 0 | 28,193 | 0 | 0 | 446 |
| Chevron Richmond | 2008 | 0 | 36,600 | 16,000 | 0 | 600 |
| Chevron Richmond | 2009 | 0 | 36,600 | 16,000 | 0 | 600 |
| Tesoro Avon | 2008 | 0 | 0 | 0 | 0 | 140 |
| Tesoro Avon | 2009 | 0 | 0 | 0 | 0 | 140 |
| Shell Martinez | 2008 | 0 | 15,000 | 0 | 15,000 | 360 |
| Shell Martinez | 2009 | 0 | 15,000 | 0 | 15,000 | 360.0 |
| ExxonMobil Torrance | 2008 | 0 | 0 | 0 | 0 | 400 |
| ExxonMobil Torrance | 2009 | 0 | 0 | 0 | 0 | 380 |
| Valero Benicia | 2008 | 0 | 0 | 0 | 5,000 | 275 |
| Valero Benicia | 2009 | 0 | 0 | 0 | 5,000 | 275 |
| ConocoPh. Carson & Wilmington[b] | 2008 | 0 | 17,500 | 0 | 0 | 340 |
| ConocoPh. Carson & Wilmington[b] | 2009 | 0 | 17,500 | 0 | 0 | 340 |
| Tesoro Wilmington & Carson[b] | 2008 | 0 | 8,000 | 0 | 0 | 265 |
| Tesoro Wilmington & Carson[b] | 2009 | 0 | 8,000 | 0 | 0 | 265 |
| Ultramar-Valero Wilmington | 2008 | 0 | 10,200 | 0 | 0 | 250 |
| Ultramar-Valero Wilmington | 2009 | 0 | 10,200 | 0 | 0 | 250 |
| ConocoPhillips Rodeo[c] | 2008 | 0 | 9,000 | 0 | 0 | 310 |
| ConocoPhillips Rodeo[c] | 2009 | 0 | 9,000 | 0 | 0 | 472 |
| Paramount | 2008 | 0 | 3,750 | 0 | 16,500 | 40 |
| Paramount | 2009 | 0 | 3,750 | 0 | 35,000 | 40 |
| Big West Bakersfield | 2008 | 0 | 0 | 0 | 0 | 103 |
| Big West Bakersfield | 2009 | 0 | 0 | 0 | 0 | 103 |
| ConocoPhillips Santa Maria[c] | 2008 | 0 | 0 | 0 | 0 | 120 |
| ConocoPhillips Santa Maria[c] | 2009 | 0 | 0 | 0 | 0 | 120 |
| Kern Oil & Refining | 2008 | 0 | 0 | 0 | 0 | 5 |
| Kern Oil & Refining | 2009 | 0 | 0 | 0 | 0 | 5 |
| San Joaquin Refining | 2008 | 0 | 0 | 4,000 | 6,500 | 6 |
| San Joaquin Refining | 2009 | 0 | 0 | 4,000 | 6,500 | 6 |

[a] Data from *Oil & Gas Journal* Worldwide refining *(6)* except as noted. Includes all large California fuels refineries. Some small facilities limited to other products, such as asphalt blowing plants, are not shown.

[b] Capacity data for separate closely located facilities are aggregated as reported by *Oil & Gas Journal* (6).

[c] Facilities reported b/cd capacities in aggregate *(6)* but stream-day capacities separately *(14)* and are ~250 miles apart. Capacities were disaggregated by comparison of b/cd and b/sd data *(6, 14)*. Data shown are in b/cd.

**Table 2-5. Facility-level capacity data, California refineries, *continued*[a]**

*Barrels/calendar day: (b/cd)*

| Facility | Year | Total hydrogen excpt. CCR $H_2$ (MMcfd) | Hydrogen purchased (MMcfd) | Pet. coke production (tonnes/d) |
|---|---|---|---|---|
| Chevron El Segundo | 2008 | 71.0 | 146.0 | 4,064 |
| Chevron El Segundo | 2009 | 71.0 | 146.0 | 4,064 |
| BP Carson | 2008 | 133.0 | 0.0 | 2,108 |
| BP Carson | 2009 | 133.0 | 0.0 | 2,108 |
| Chevron Richmond | 2008 | 170.0 | 0.0 | 0 |
| Chevron Richmond | 2009 | 170.0 | 0.0 | 0 |
| Tesoro Avon | 2008 | 74.0 | 31.0 | 1,500 |
| Tesoro Avon | 2009 | 74.0 | 31.0 | 1,500 |
| Shell Martinez | 2008 | 101.0 | 0.0 | 1,150 |
| Shell Martinez | 2009 | 101.0 | 0.0 | 1,150 |
| ExxonMobil Torrance | 2008 | 160.0 | 0.0 | 3,050 |
| ExxonMobil Torrance | 2009 | 160.0 | 0.0 | 3,050 |
| Valero Benicia | 2008 | 131.5 | 0.0 | 1,080 |
| Valero Benicia | 2009 | 131.5 | 0.0 | 1,080 |
| ConocoPh. Carson & Wilmington[b] | 2008 | 100.8 | 0.0 | 2,000 |
| ConocoPh. Carson & Wilmington[b] | 2009 | 100.8 | 0.0 | 2,000 |
| Tesoro Wilmington & Carson[b] | 2008 | 55.0 | 55.0 | 1,615 |
| Tesoro Wilmington & Carson[b] | 2009 | 55.0 | 55.0 | 1,615 |
| Ultramar-Valero Wilmington | 2008 | 0.0 | 50.0 | 1,700 |
| Ultramar-Valero Wilmington | 2009 | 0.0 | 50.0 | 1,700 |
| ConocoPhillips Rodeo[c] | 2008 | 91.0 | | 1,127 |
| ConocoPhillips Rodeo[c] | 2009 | 91.0 | | 1,127 |
| Paramount | 2008 | 0.0 | 0.0 | 0 |
| Paramount | 2009 | 0.0 | 0.0 | 0 |
| Big West Bakersfield | 2008 | 29.7 | 0.0 | 1,200 |
| Big West Bakersfield | 2009 | 29.7 | 0.0 | 1,200 |
| ConocoPhillips Santa Maria[c] | 2008 | 0.0 | 0.0 | 1,053 |
| ConocoPhillips Santa Maria[c] | 2009 | 0.0 | 0.0 | 1,053 |
| Kern Oil & Refining | 2008 | 0.0 | 0.0 | 0 |
| Kern Oil & Refining | 2009 | 0.0 | 0.0 | 0 |
| San Joaquin Refining | 2008 | 4.2 | 0.0 | 0 |
| San Joaquin Refining | 2009 | 4.2 | 0.0 | 0 |

[a] Data from *Oil & Gas Journal* Worldwide refining *(6)* except as noted. Includes all large California fuels refineries. Some small facilities limited to other products, such as asphalt blowing plants, are not shown.

[b] Capacity data for separate closely located facilities are aggregated as reported by *Oil & Gas Journal* (6).

[c] Facilities reported b/cd capacities in aggregate *(6)* but stream-day capacities separately *(14)* and are ~250 miles apart. Capacities were disaggregated by comparison of b/cd and b/sd data *(6, 14)*. Data shown are in b/cd.

**Table 2-6. Re-assignment of emissions from hydrogen production refiners rely upon from co-located third-party hydrogen plants that are reported separately under California Mandatory GHG Reporting.**

| | | Reported emissions[a] | Reported $H_2$ purchased[b] | Regional purch. shares | | Corrected emissions | |
|---|---|---|---|---|---|---|---|
| | | | | $H_2$ cap.[c] | $H_2$ emit[d] | Mass | Intensity[e] |
| *Fuels refineries* | Year | (tonnes) | ($m^3 \bullet 10^7$) | (%) | (tonnes) | (tonnes) | ($kg/m^3$) |
| S.F. Bay Area | | | | | | | |
| Chevron Richmond | 2008 | 4,792,052 | 0.000 | 0.00 | 0 | 4,792,052 | 339.8 |
| Shell Martinez | 2008 | 4,570,475 | 0.000 | 0.00 | 0 | 4,570,475 | 496.6 |
| Valero Benicia | 2008 | 2,796,057 | 0.000 | 0.00 | 0 | 2,796,057 | 345.4 |
| Tesoro Avon | 2008 | 2,703,145 | 32.040 | 100.00 | 220,179 | 2,923,324 | 312.9 |
| ConocoPhillips Rodeo | 2008 | 1,888,895 | 0.000 | 0.00 | 0 | 1,888,895 | 428.3 |
| Chevron Richmond | 2009 | 4,522,383 | 0.000 | 0.00 | 0 | 4,522,383 | 320.7 |
| Shell Martinez | 2009 | 4,322,192 | 0.000 | 0.00 | 0 | 4,322,192 | 513.7 |
| Valero Benicia | 2009 | 2,889,104 | 0.000 | 0.00 | 0 | 2,889,104 | 356.9 |
| Tesoro Avon | 2009 | 2,291,909 | 32.040 | 100.00 | 285,442 | 2,577,351 | 275.9 |
| ConocoPhillips Rodeo | 2009 | 1,873,464 | 0.000 | 0.00 | 0 | 1,873,464 | 424.8 |
| L.A. Area | | | | | | | |
| BP Carson | 2008 | 4,504,286 | 0.000 | 0.00 | 0 | 4,504,286 | 307.7 |
| Chevron El Segundo | 2008 | 3,603,446 | 150.900 | 58.17 | 1,116,950 | 4,720,396 | 307.0 |
| CP Carson & Wilmington | 2008 | 2,924,503 | 0.000 | 0.00 | 0 | 2,924,503 | 363.3 |
| ExxonMobil Torrance | 2008 | 2,852,374 | 0.000 | 0.00 | 0 | 2,852,374 | 328.8 |
| Tesoro Wilm. & Carson | 2008 | 1,761,136 | 56.846 | 21.91 | 420,770 | 2,181,906 | 376.0 |
| Ultramar-Valero Wilm. | 2008 | 951,913 | 51.678 | 19.92 | 382,516 | 1,334,429 | 287.4 |
| BP Carson | 2009 | 4,425,697 | 0.000 | 0.00 | 0 | 4,425,697 | 302.4 |
| Chevron El Segundo | 2009 | 3,205,873 | 150.900 | 58.17 | 1,061,092 | 4,266,965 | 273.3 |
| CP Carson & Wilmington | 2009 | 2,578,050 | 0.000 | 0.00 | 0 | 2,578,050 | 320.3 |
| ExxonMobil Torrance | 2009 | 2,694,574 | 0.000 | 0.00 | 0 | 2,694,574 | 310.6 |
| Tesoro Wilm. & Carson | 2009 | 1,577,507 | 56.846 | 21.91 | 399,727 | 1,977,234 | 340.7 |
| Ultramar-Valero Wilm. | 2009 | 994,536 | 51.678 | 19.92 | 363,387 | 1,357,923 | 292.5 |
| *Third-party hydrogen plants supplying purchased $H_2$* | | | | | | | |
| S.F. Bay Area | | | | | | | |
| Air Products Martinez | 2008 | 220,179 | | | | | |
| Air Products Martinez | 2009 | 285,442 | | | | | |
| L.A. Area | | | | | | | |
| Air Products Wilmington | 2008 | 674,672 | | | | | |
| Air Liquide El Segundo | 2008 | 667,096 | | | | | |
| Air Products Carson | 2008 | 578,468 | | | | | |
| Air Products Wilmington | 2009 | 693,003 | | | | | |
| Air Liquide El Segundo | 2009 | 540,999 | | | | | |
| Air Products Carson | 2009 | 590,204 | | | | | |
| Other areas[f] | | | | | | | |
| Air Products Sacramento | 2008 | 43,168 | | | | | |
| Praxair Ontario | 2008 | 41,195 | | | | | |
| Air Products Sacramento | 2009 | 45,545 | | | | | |
| Praxair Ontario | 2009 | 38,491 | | | | | |

[a] California Mandatory GHG Reporting Rule public facility reports by Cal. Air Resources Board *(2)*.

[b] Third-party hydrogen production capacity, as reported by *Oil & Gas Journal* for each refinery *(6)*.

[c] Percentage share of total third-party hydrogen capacity in the region held by a refinery in a given year.

[d] Emission increment (from "c") of third-party $H_2$ emissions in region & year added back to refinery emissions.

[e] $CO_2$ emitted per cubic meter crude refined estimated from atm. distillation capacities in Table 2-5.

[f] Not co-located with refineries: Emissions from "other" $H_2$ plants are not added to refinery emissions.

**Table 2-7. Estimate calculation, 2008 San Francisco Bay Area crude feed quality**

| | Crude feed component streams | | | |
|---|---|---|---|---|
| Parameter, facility or region | Foreign[a] | SJV[b] | ANS[c] | Crude feed[d] |
| *Crude volume ($m^3$/day)* | | | | |
| Valero Benicia | 8,870 | 5,323 | 7,986 | 22,179 |
| Tesoro Avon | 9,683 | 7,935 | 7,979 | 25,597 |
| Shell Martinez | 4,837 | 19,920 | 458 | 25,215 |
| Chevron Richmond | 29,921 | 0 | 8,713 | 38,634 |
| ConocoPhillips Rodeo | 1,611 | 9,183 | 1,289 | 12,083 |
| SFBA total | 54,922 | 42,361 | 26,425 | 123,708 |
| *Crude mass (tonnes/day)* | | | | |
| Valero Benicia | 8,108 | 4,965 | 6,958 | 20,031 |
| Tesoro Avon | 8,664 | 7,401 | 6,953 | 23,018 |
| Shell Martinez | 4,524 | 18,580 | 399 | 23,503 |
| Chevron Richmond | 25,566 | 0 | 7,592 | 33,159 |
| ConocoPhillips Rodeo | 1,409 | 8,565 | 1,123 | 11,098 |
| SFBA total | 48,271 | 39,511 | 23,026 | 110,808 |
| *Sulfur mass in crude (tonnes/d)* | | | | |
| Valero Benicia | 111 | 43 | 77 | 230 |
| Tesoro Avon | 110 | 64 | 77 | 251 |
| Shell Martinez | 84 | 160 | 4 | 249 |
| Chevron Richmond | 442 | 0 | 84 | 526 |
| ConocoPhillips Rodeo | 13 | 74 | 12 | 99 |
| SFBA total | 759 | 340 | 256 | 1,355 |

| *Estimated crude feed quality ($kg/m^3$)* | density | sulfur |
|---|---|---|
| Valero Benicia | 903.15 | 10.39 |
| Tesoro Avon | 899.24 | 9.80 |
| Shell Martinez | 932.08 | 9.86 |
| Chevron Richmond | 858.28 | 13.61 |
| ConocoPhillips Rodeo | 918.45 | 8.22 |
| SFBA total | 895.72 | 10.95 |

[a] Foreign crude feed volume, density and sulfur content reported for each plant *(14).* in 2008. Density and sulfur are weighted averages for foreign crude processed.

[b] San Joaquin Valley pipeline crude volume based on SJV percentage of refinery feed reported *(27),* and crude charge capacities (Table 2-5). Weighted average density (0.9327 SG) and sulfur (0.861 % wt.) calculated for all crude streams produced in the SJV (Districts 4 and 5) during 2008 from data in Table 2-4.

[c] Alaskan North Slope (ANS) volume estimated by difference of other streams from . charge capacity given in note d. ANS density (0.8714 SG) and sulfur (1.11 % wt.) as reported for the TAPS pipeline terminus at Valdez *(16).*

[d] Crude feed volume from atmospheric distillation charge capacities in Table 2-5. Crude feed mass and mass of sulfur in feed are the sums of component streams. Crude feed density and sulfur content estimates are from data in this column.

**Table 2-8. Simplified mixing analysis for potential effects of anomalous oils on average California crude feeds**

| | Refinery crude feed volume data reported[a] | | | | Anomalous oil assumption[c] | | Potential crude feed effect[d] | |
|---|---|---|---|---|---|---|---|---|
| | Potentially anomalous streams[b] | | | Other | Predicted by | Excess in | Crude feed | Crude feed |
| | Stream 1 | Stream 2 | Stream 3 | streams | density, sulfur | anomalous oil | predicted | with anomaly |
| Year | (% vol.) | (% vol.) | (% vol.) | (% vol.) | (factor) | (factor) | (factor) | (factor) |
| 2004 | 29.28 | 21.68 | 13.13 | 35.91 | 1 | 2 | 1.00 | 1.43 |
| 2005 | 27.16 | 20.16 | 14.12 | 38.57 | 1 | 2 | 1.00 | 1.41 |
| 2006 | 26.93 | 16.12 | 13.27 | 43.68 | 1 | 2 | 1.00 | 1.38 |
| 2007 | 26.98 | 15.79 | 11.31 | 45.92 | 1 | 2 | 1.00 | 1.38 |
| 2008 | 25.72 | 13.41 | 12.65 | 48.21 | 1 | 2 | 1.00 | 1.36 |
| 2009 | 26.44 | 15.06 | 11.29 | 47.21 | 1 | 2 | 1.00 | 1.37 |
| | | | | | | | *PADDs 1-3, 5 range 2003–2008:* | 1.26–1.40 |
| | | | | | | | *PADDs 1-3, 5 range 1999–2008:* | 1.26–1.40 |

Legend: Density and sulfur content predict unreported characteristics of crude oils more reliably in well-mixed crude feeds than in poorly mixed crude feeds. Anomalies in one oil stream have less potential to affect total feed quality when that stream is mixed with many others of equal or greater volume. This table presents results from a simplified four-component mixing analysis for potential effects of anomalous oils on the crude feeds processed in California each year. It is adapted from recent published work using the same method to validate crude feed quality data among U.S PADDs *(1)*.

a. Refinery crude feed component streams represent a foreign country from which California refiners import and process crude *(14),* the Alaska North Slope (ANS) stream, or California-produced crude from either the San Joaquin Valley (Calif. Div. of Oil & Gas districts 4 and 5), California's coastal and offshore reserves (districts 1–3) or northern California (District 6). Stream values are shown as percentages of total crude feed volume *(5)*.

b. Potentially anomalous streams might be dominated by oils in which unreported characteristics that affect processing occur in anomalously high amounts *(1)*. The streams are ranked based on their volume and the assumption that oils from a single country of origin, region in California, or the ANS, may originate from similar geology and have similar anomalies. Note that this assumption may be overly conservative for purposes other than checking the reliability of predictions based on density and sulfur for these crude feeds.

   Stream 1 in the table represents the San Joaquin Valley, the largest of the streams (as designated above) refined by California refineries in all years. Stream 2 was from the ANS in all years. The third largest stream was from Saudi Arabia during 2004–2008 and from California's coastal region in 2009. Other streams were from 20–26 other countries or regions in California and comprised 36–48% of the crude feed.

c. It was assumed that an unreported charactistic of crude which affects processing was twice as abundant in the anomalous oil as predicted by density and sulfur. This assumption appears plausible as an extreme case *(1)*.

**Table 2-8 *continued***
**Table legend continued**

d. Results estimate the potential for crude feeds to have anomalous high content for unreported characteristics that are not predicted by crude feed density and sulfur. They do not show that any such anomaly actually occurred. Potential effects in the total refinery crude feed assume that the anomalous oil is 100% of stream 1, 50% of stream 2, and 25% of stream 3 for each district and year. This reflects the decreasing likelihood of the same anomaly in multiple separate streams. The predicted factor is assigned to the balance of the streams for each year. Results are show increases from the predicted crude feed factor of 1.00 on the right of Table 2-8.

   Relatively well-mixed crude feeds limit the effect of the anomaly to less than half of its assumed magnitude in the anomalous oil stream. For context, crude sulfur content exceeds that of other process catalyst poisons by eight times in the case of nitrogen and by 160 to 500 times in the cases of nickel and vanadium *(1, 28).* The range of annual estimates for California overlap with those from U.S. PADDs 1, 2, 3 and 5 reported from the original use of this check on crude feed mixing. Those U.S. regions were found to have reasonably well mixed crude feeds for purposes of predicting crude feed quality based on density and sulfur content *(1).* The ranges for PADDs 1, 2, 3 and 5 from that study *(1)* are shown at the bottom right of Table 2-8.

   This check is limited to a simple blending analysis, and the anomalous oil stream assumptions described above. It represents an extreme and unlikely scenario for California given the number of its crude sources and the relatively well-understood refining characteristics of the San Joaquin Valley and ANS streams.

**Table 2-9. Energy and emission intensity drivers, nonparametric regressions on all data.**

| | | Observed values (analysis inputs)[a] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| All data | | *EI* GJ/m$^3$ | FMEI kg/GJ | emit kg/m$^3$ | density kg/m$^3$ | sulfur kg/m$^3$ | cap. util. % | products ratio | 1º proc. cap. |
| PADD 1 | 1999 | 3.451 | 81.53 | 281.3 | 858.20 | 8.24 | 90.9 | 3.668 | 0.972 |
| PADD 1 | 2000 | 3.430 | 80.34 | 275.6 | 860.18 | 8.00 | 91.7 | 3.489 | 0.974 |
| PADD 1 | 2001 | 3.518 | 81.85 | 288.0 | 866.34 | 7.71 | 87.2 | 3.479 | 0.897 |
| PADD 1 | 2002 | 3.426 | 81.08 | 277.8 | 865.71 | 7.45 | 88.9 | 3.605 | 0.944 |
| PADD 1 | 2003 | 3.364 | 81.51 | 274.2 | 863.44 | 7.43 | 92.7 | 3.321 | 0.930 |
| PADD 1 | 2004 | 3.416 | 81.46 | 278.3 | 865.44 | 7.79 | 90.4 | 3.397 | 0.932 |
| PADD 1 | 2005 | 3.404 | 81.23 | 276.5 | 863.38 | 7.17 | 93.1 | 3.756 | 0.936 |
| PADD 1 | 2006 | 3.440 | 80.40 | 276.5 | 864.12 | 7.17 | 86.7 | 3.522 | 0.906 |
| PADD 1 | 2007 | 3.499 | 82.28 | 287.9 | 864.33 | 7.26 | 85.6 | 3.443 | 0.906 |
| PADD 1 | 2008 | 3.551 | 83.26 | 295.7 | 863.65 | 7.08 | 80.8 | 3.400 | 0.906 |
| PADD 2 | 1999 | 3.368 | 78.11 | 263.1 | 858.25 | 10.64 | 93.3 | 4.077 | 1.018 |
| PADD 2 | 2000 | 3.361 | 77.56 | 260.6 | 860.03 | 11.35 | 94.2 | 4.132 | 1.010 |
| PADD 2 | 2001 | 3.396 | 77.46 | 263.1 | 861.33 | 11.37 | 93.9 | 4.313 | 0.988 |
| PADD 2 | 2002 | 3.393 | 77.90 | 264.3 | 861.02 | 11.28 | 90.0 | 4.345 | 1.015 |
| PADD 2 | 2003 | 3.298 | 78.00 | 257.3 | 862.80 | 11.65 | 91.6 | 4.281 | 1.017 |
| PADD 2 | 2004 | 3.376 | 77.25 | 260.8 | 865.65 | 11.86 | 93.6 | 4.167 | 1.035 |
| PADD 2 | 2005 | 3.496 | 77.27 | 270.2 | 865.65 | 11.95 | 92.9 | 4.207 | 1.051 |
| PADD 2 | 2006 | 3.738 | 75.84 | 283.5 | 865.44 | 11.60 | 92.4 | 3.907 | 1.051 |
| PADD 2 | 2007 | 3.800 | 75.55 | 287.1 | 864.07 | 11.84 | 90.1 | 4.161 | 1.017 |
| PADD 2 | 2008 | 3.858 | 74.97 | 289.3 | 862.59 | 11.73 | 88.4 | 4.333 | 1.038 |
| PADD 3 | 1999 | 4.546 | 71.61 | 325.5 | 869.00 | 12.86 | 94.7 | 3.120 | 1.184 |
| PADD 3 | 2000 | 4.563 | 71.87 | 327.9 | 870.29 | 12.97 | 93.9 | 3.120 | 1.213 |
| PADD 3 | 2001 | 4.348 | 72.43 | 315.0 | 874.43 | 14.34 | 94.8 | 3.128 | 1.199 |
| PADD 3 | 2002 | 4.434 | 72.71 | 322.4 | 876.70 | 14.47 | 91.5 | 3.251 | 1.215 |
| PADD 3 | 2003 | 4.381 | 72.81 | 319.0 | 874.48 | 14.43 | 93.6 | 3.160 | 1.232 |
| PADD 3 | 2004 | 4.204 | 73.43 | 308.7 | 877.79 | 14.40 | 94.1 | 3.228 | 1.255 |
| PADD 3 | 2005 | 4.205 | 73.24 | 308.0 | 878.01 | 14.40 | 88.3 | 3.316 | 1.207 |
| PADD 3 | 2006 | 4.367 | 74.15 | 323.8 | 875.67 | 14.36 | 88.7 | 3.176 | 1.203 |
| PADD 3 | 2007 | 4.226 | 74.93 | 316.7 | 876.98 | 14.47 | 88.7 | 3.205 | 1.233 |
| PADD 3 | 2008 | 4.361 | 74.48 | 324.8 | 878.66 | 14.94 | 83.6 | 3.229 | 1.230 |
| PADD 5 | 1999 | 4.908 | 70.27 | 344.9 | 894.61 | 11.09 | 87.1 | 2.952 | 1.275 |
| PADD 5 | 2000 | 5.189 | 69.09 | 358.5 | 895.85 | 10.84 | 87.5 | 3.160 | 1.245 |
| PADD 5 | 2001 | 5.039 | 69.38 | 349.6 | 893.76 | 10.99 | 89.1 | 3.231 | 1.271 |
| PADD 5 | 2002 | 4.881 | 69.15 | 337.5 | 889.99 | 10.86 | 90.0 | 3.460 | 1.315 |
| PADD 5 | 2003 | 4.885 | 69.40 | 339.0 | 889.10 | 10.94 | 91.3 | 3.487 | 1.267 |
| PADD 5 | 1999 | 4.908 | 70.27 | 344.9 | 894.61 | 11.09 | 87.1 | 2.952 | 1.275 |
| PADD 5 | 2000 | 5.189 | 69.09 | 358.5 | 895.85 | 10.84 | 87.5 | 3.160 | 1.245 |
| PADD 5 | 2001 | 5.039 | 69.38 | 349.6 | 893.76 | 10.99 | 89.1 | 3.231 | 1.271 |
| PADD 5 | 2002 | 4.881 | 69.15 | 337.5 | 889.99 | 10.86 | 90.0 | 3.460 | 1.315 |
| PADD 5 | 2003 | 4.885 | 69.40 | 339.0 | 889.10 | 10.94 | 91.3 | 3.487 | 1.267 |
| Calif. | 2004 | 4.994 | 70.82 | 353.7 | 899.23 | 11.46 | 93.0 | 3.631 | 1.652 |
| Calif. | 2005 | 5.032 | 71.06 | 357.5 | 900.56 | 11.82 | 95.0 | 3.800 | 1.646 |
| Calif. | 2006 | 5.280 | 72.65 | 383.6 | 899.56 | 11.73 | 91.5 | 3.846 | 1.665 |
| Calif. | 2007 | 5.611 | 71.43 | 400.8 | 899.84 | 11.89 | 88.3 | 3.814 | 1.684 |
| Calif. | 2008 | 5.397 | 71.02 | 383.3 | 902.00 | 12.85 | 91.0 | 4.088 | 1.682 |
| Calif. | 2009 | 5.628 | 70.54 | 397.0 | 901.38 | 11.70 | 82.9 | 4.043 | 1.676 |
| Calif. | 2004 | 4.994 | 70.82 | 353.7 | 899.23 | 11.46 | 93.0 | 3.631 | 1.652 |
| Calif. | 2005 | 5.032 | 71.06 | 357.5 | 900.56 | 11.82 | 95.0 | 3.800 | 1.646 |
| Calif. | 2006 | 5.280 | 72.65 | 383.6 | 899.56 | 11.73 | 91.5 | 3.846 | 1.665 |
| Calif. | 2007 | 5.611 | 71.43 | 400.8 | 899.84 | 11.89 | 88.3 | 3.814 | 1.684 |
| Calif. | 2008 | 5.397 | 71.02 | 383.3 | 902.00 | 12.85 | 91.0 | 4.088 | 1.682 |
| Calif. | 2009 | 5.628 | 70.54 | 397.0 | 901.38 | 11.70 | 82.9 | 4.043 | 1.676 |

***EI:*** energy intensity. ***FMEI:*** fuel mix emission intensity. **Pratio:** light liquids/other products ratio. **Primary processing capacity:** the ratio of vacuum distillation, conversion and gas oil/residua hydrotreating to atm. crude distillation capacity.

[a] Data from Table 2-1. 2004–2008 PADD 5 data excluded to avoid errors due to inclusion of Calif. in PADD 5. Calif. data (2004–2009), and PADD 5 data (1999–2003) resampled to balance data counts among regions for regression analyses.

**Table 2-9. Energy and emission intensity drivers, nonparametric regressions, continued.**

| | | Predicted *EI* (GJ/m³) and emissions (kg/m³) values[b] | | | | | | Observation vs prediction %Δ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All data | | 1 (GJ/m³) | 2 (kg/m³) | 3 (kg/m³) | 4 (kg/m³) | 5 (kg/m³) | 6 (kg/m³) | 1 | 2 | 3 | 4 | 5 | 6 |
| PADD 1 | 1999 | 3.208 | 271.5 | 265.1 | 265.1 | 273.9 | 339.3 | 8% | 4% | 6% | 6% | 3% | -17% |
| PADD 1 | 2000 | 3.316 | 272.5 | 270.5 | 272.8 | 271.4 | 321.7 | 3% | 1% | 2% | 1% | 2% | -14% |
| PADD 1 | 2001 | 3.598 | 286.7 | 282.6 | 288.1 | 275.7 | 321.6 | -2% | 0% | 2% | 0% | 4% | -10% |
| PADD 1 | 2002 | 3.532 | 282.8 | 283.4 | 284.1 | 278.8 | 339.6 | -3% | -2% | -2% | -2% | 0% | -18% |
| PADD 1 | 2003 | 3.478 | 282.6 | 278.3 | 281.2 | 256.7 | 320.7 | -3% | -3% | -1% | -2% | 7% | -14% |
| PADD 1 | 2004 | 3.558 | 285.3 | 283.0 | 284.3 | 274.5 | 320.9 | -4% | -2% | -2% | -2% | 1% | -13% |
| PADD 1 | 2005 | 3.132 | 267.9 | 277.4 | 257.4 | 255.2 | 334.1 | 9% | 3% | 0% | 7% | 8% | -17% |
| PADD 1 | 2006 | 3.427 | 276.7 | 285.6 | 283.3 | 284.5 | 325.9 | 0% | 0% | -3% | -2% | -3% | -15% |
| PADD 1 | 2007 | 3.463 | 282.9 | 285.0 | 284.6 | 281.9 | 316.5 | 1% | 2% | 1% | 1% | 2% | -9% |
| PADD 1 | 2008 | 3.540 | 287.1 | 295.8 | 295.8 | 281.9 | 349.1 | 0% | 3% | 0% | 0% | 5% | -15% |
| PADD 2 | 1999 | 3.279 | 266.3 | 252.8 | 260.6 | 275.7 | 295.2 | 3% | -1% | 4% | 1% | -5% | -11% |
| PADD 2 | 2000 | 3.327 | 267.3 | 266.0 | 259.5 | 273.0 | 279.2 | 1% | -3% | -2% | 0% | -5% | -7% |
| PADD 2 | 2001 | 3.141 | 258.5 | 270.4 | 248.4 | 267.7 | 236.4 | 8% | 2% | -3% | 6% | -2% | 11% |
| PADD 2 | 2002 | 3.573 | 277.5 | 275.8 | 274.2 | 285.0 | 288.6 | -5% | -5% | -4% | -4% | -7% | -8% |
| PADD 2 | 2003 | 3.531 | 276.2 | 276.3 | 271.0 | 280.0 | 278.6 | -7% | -7% | -7% | -5% | -8% | -8% |
| PADD 2 | 2004 | 3.556 | 275.9 | 285.7 | 272.1 | 279.1 | 277.0 | -5% | -5% | -9% | -4% | -7% | -6% |
| PADD 2 | 2005 | 3.558 | 275.2 | 284.1 | 271.5 | 283.0 | 274.7 | -2% | -2% | -5% | 0% | -5% | -2% |
| PADD 2 | 2006 | 3.777 | 287.2 | 279.9 | 284.4 | 283.0 | 327.4 | -1% | -1% | 1% | 0% | 0% | -13% |
| PADD 2 | 2007 | 3.716 | 286.0 | 278.4 | 280.9 | 281.7 | 319.6 | 2% | 0% | 3% | 2% | 2% | -10% |
| PADD 2 | 2008 | 3.592 | 282.9 | 278.0 | 275.4 | 297.0 | 298.6 | 7% | 2% | 4% | 5% | -3% | -3% |
| PADD 3 | 1999 | 4.516 | 325.7 | 293.0 | 324.3 | 303.7 | 314.4 | 1% | 0% | 11% | 0% | 7% | 4% |
| PADD 3 | 2000 | 4.534 | 326.5 | 297.9 | 325.0 | 315.3 | 313.3 | 1% | 0% | 10% | 1% | 4% | 5% |
| PADD 3 | 2001 | 4.403 | 322.2 | 326.5 | 320.1 | 311.1 | 319.1 | -1% | -2% | -4% | -2% | 1% | -1% |
| PADD 3 | 2002 | 4.236 | 311.7 | 318.7 | 312.0 | 320.5 | 319.0 | 5% | 3% | 1% | 3% | 1% | 1% |
| PADD 3 | 2003 | 4.321 | 317.4 | 321.6 | 315.7 | 323.1 | 315.9 | 1% | 1% | -1% | 1% | -1% | 1% |
| PADD 3 | 2004 | 4.441 | 324.6 | 334.3 | 323.1 | 334.7 | 320.1 | -5% | -5% | -8% | -4% | -8% | -4% |
| PADD 3 | 2005 | 4.397 | 321.9 | 324.6 | 324.8 | 331.4 | 324.1 | -4% | -4% | -5% | -5% | -7% | -5% |
| PADD 3 | 2006 | 4.322 | 314.2 | 313.6 | 318.7 | 326.9 | 338.0 | 1% | 3% | 3% | 2% | -1% | -4% |
| PADD 3 | 2007 | 4.343 | 313.7 | 317.9 | 319.5 | 334.8 | 335.8 | -3% | 1% | 0% | -1% | -5% | -6% |
| PADD 3 | 2008 | 4.220 | 307.3 | 333.6 | 319.2 | 340.1 | 315.7 | 3% | 6% | -3% | 2% | -4% | 3% |
| PADD 5 | 1999 | 5.001 | 352.7 | 359.6 | 348.1 | 347.2 | 361.4 | -2% | -2% | -4% | -1% | -1% | -5% |
| PADD 5 | 2000 | 5.125 | 353.7 | 359.8 | 357.0 | 337.1 | 331.5 | 1% | 1% | 0% | 0% | 6% | 8% |
| PADD 5 | 2001 | 4.973 | 345.1 | 351.6 | 346.4 | 339.6 | 330.1 | 1% | 1% | -1% | 1% | 3% | 6% |
| PADD 5 | 2002 | 4.987 | 346.5 | 337.8 | 345.2 | 350.9 | 312.1 | -2% | -3% | 0% | -2% | -4% | 8% |
| PADD 5 | 2003 | 4.796 | 333.9 | 333.2 | 333.0 | 332.2 | 315.2 | 2% | 2% | 2% | 2% | 2% | 8% |
| Calif. | 2004 | 5.061 | 359.8 | 361.5 | 358.3 | 368.3 | 322.6 | -1% | -2% | -2% | -1% | -4% | 10% |
| Calif. | 2005 | 4.967 | 353.1 | 356.4 | 355.2 | 351.7 | 311.7 | 1% | 1% | 0% | 1% | 2% | 15% |
| Calif. | 2006 | 5.298 | 389.3 | 368.6 | 379.0 | 376.1 | 333.3 | 0% | -1% | 4% | 1% | 2% | 15% |
| Calif. | 2007 | 5.411 | 386.0 | 379.7 | 383.8 | 394.6 | 336.2 | 4% | 4% | 6% | 4% | 2% | 19% |
| Calif. | 2008 | 5.422 | 386.3 | 394.2 | 386.6 | 382.5 | 311.6 | 0% | -1% | -3% | -1% | 0% | 23% |
| Calif. | 2009 | 5.683 | 403.2 | 394.8 | 401.7 | 396.5 | 371.4 | -1% | -2% | 1% | -1% | 0% | 7% |

**Obs–pred %Δ:** percent by which observed value exceeds central prediction of nonparametric analysis.

[b] Central predictions from the following analyses:

1 ($R^2$ 0.97): Observed *EI* vs observed crude density, crude sulfur, products ratio and refinery capacity utilization.
2 ($R^2$ 0.96): Observed emit vs *EI* predicted by analysis 1, and observed fuel mix emission intensity (FMEI).
3 ($R^2$ 0.92): Observed emit vs observed crude density, crude sulfur content, and refinery capacity utilization.
4 ($R^2$ 0.96): Observed emit vs observed crude density, crude sulfur, products ratio and refinery capacity utilization.
5 ($R^2$ 0.92): Observed emit vs observed primary processing capacity and refinery capacity utilization.
6 ($R^2$ 0.29): Observed emit vs observed light liquids/other products ratio and refinery capacity utilization.