

Attachment Crude–1, CBE Comments to CARB July 2011

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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 (“H₂ purch.”) or “third-party H₂ 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 °F) (9), most of the CO₂ 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

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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 CO₂ 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/m³). These emissions for California refineries (354–401 kg/m³, 2004–2009), span previously reported S.F. Bay Area emissions (360 kg/m³, 2008), which exceed reported average U.S. refinery emissions (277–315 kg/m³, 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/m³ with purchased H₂, 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 (*Exhibit A*) (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

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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 table¹ 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

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

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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.

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.

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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; feed volume, fuels consumption, products yield and emissions verification data as well as crude feed density and sulfur content for most refineries were not reported. Facility-level data quality was judged poor for this reason. 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.

Emission measurement warrants explicit attention. Briefly: Applying emission factors developed from measurements taken elsewhere to a new, unmeasured source requires

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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 CO₂. Importantly, CO₂ predominates among greenhouse gases in refinery emissions, accounting for more than 98% of emitted CO₂e 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.

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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	Year	Feed volume (m ³ /d x 10 ³)	Density (kg/m ³)	Sulfur (kg/m ³)	Source countries	Atm. dist. (m ³ /d x 10 ³)	Vacuum dist. (m ³ /d x 10 ³)	Coking & therm. (m ³ /d x 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 x 10 ³)	Density (kg/m ³)	Sulfur (kg/m ³)	Source countries	Atm. dist. (m ³ /d x 10 ³)	Vacuum dist. (m ³ /d x 10 ³)	Coking & therm. (m ³ /d x 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

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

Refinery process capacity, <i>continued</i>							
California refineries		Cat. cracking (m ³ /d x 10 ³)	Hydrocracking (m ³ /d x 10 ³)	1 ^o hydrotreating (m ³ /d x 10 ³) ^a	2 ^o hydrotreating (m ³ /d x 10 ³) ^a	Reforming (m ³ /d x 10 ³)	Alkylation (m ³ /d x 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		--	--	--	--	--	--

Refinery process capacity, <i>continued</i>							
U.S. refineries		Cat. cracking (m ³ /d x 10 ³)	Hydrocracking (m ³ /d x 10 ³)	1 ^o hydrotreating (m ³ /d x 10 ³) ^a	2 ^o hydrotreating (m ³ /d x 10 ³) ^a	Reforming (m ³ /d x 10 ³)	Alkylation (m ³ /d x 10 ³)
PADD	Year						
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 (1^o) of gas oil, residua and cat. cracking feeds or secondary processing (2^o) of product streams

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

Refinery process capacity, <i>continued</i>								
California refineries		Pol./Dim. (m ³ /d × 10 ³)	Aromatics (m ³ /d × 10 ³)	Isomerization (m ³ /d × 10 ³)	Lubes (m ³ /d × 10 ³)	Asphalt (m ³ /d × 10 ³)	Sulfur (kg/d × 10 ⁵)	H ₂ (total) (m ³ × 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, <i>continued</i>								
U.S. refineries		Pol./Dim. (m ³ /d × 10 ³)	Aromatics (m ³ /d × 10 ³)	Isomerization (m ³ /d × 10 ³)	Lubes (m ³ /d × 10 ³)	Asphalt (m ³ /d × 10 ³)	Sulfur (kg/d × 10 ⁵)	H ₂ (total) (m ³ × 10 ⁸)
PADD	Year	(m ³ /d × 10 ³)	(m ³ /d × 10 ³)	(m ³ /d × 10 ³)	(m ³ /d × 10 ³)	(m ³ /d × 10 ³)	(kg/d × 10 ⁵)	(m ³ × 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

Attachment Crude-1, CBE Comments to CARB July 2011

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 × 10 ⁸)	Crude oil (m ³ × 10 ⁴)	LPG (m ³ × 10 ⁴)	Distillate (m ³ × 10 ⁴)	Res. fuel oil (m ³ × 10 ⁴)	Fuel gas (bl) (m ³ × 10 ⁴)	Pet. coke (m ³ × 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 PADD	Year	H ₂ (purch.) (m ³ × 10 ⁸)	Crude oil (m ³ × 10 ⁴)	LPG (m ³ × 10 ⁴)	Distillate (m ³ × 10 ⁴)	Res. fuel oil (m ³ × 10 ⁴)	Fuel gas (bl) (m ³ × 10 ⁴)	Pet. coke (m ³ × 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

Attachment Crude-1, CBE Comments to CARB July 2011

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

California refineries		Fuels consumed in refineries <i>continued</i>				Refinery products yield		
	Year	Other products (petajoules)	Natural gas (m ³ × 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 factor		73.20	55.98	99.58	97.22	91.63	--	--

U.S. refineries		Fuels consumed in refineries <i>continued</i>				Refinery products yield		
PADD	Year	Other products (m ³ × 10 ⁴)	Natural gas (m ³ × 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 factor		73.20	55.98	99.58	187.78	91.63	--	--

Data sources given in part 1 narrative description of data

Attachment Crude-1, CBE Comments to CARB July 2011

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

Refinery products yield <i>continued</i>									
California refineries		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		--	--	--	--	--	--	--	--

Refinery products yield <i>continued</i>									
U.S. refineries PADD		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

Attachment Crude-1, CBE Comments to CARB July 2011

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

California refineries		Refinery products yield <i>continued</i>						Utilization of		
	Year	Special naphtha (%)	Lubricants (%)	Waxes (%)	Petroleum coke (%)	Asphalt & road oil (%)	Fuel gas (%)	Miscellaneous products (%)	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		Refinery products yield <i>continued</i>						Utilization of		
	Year	Special naphtha (%)	Lubricants (%)	Waxes (%)	Petroleum coke (%)	Asphalt & road oil (%)	Fuel gas (%)	Miscellaneous products (%)	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

Attachment Crude-1, CBE Comments to CARB July 2011

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

Energy consumed/vol. crude feed (GJ/m ³) and CO ₂ emitted/vol. crude feed (kg/m ³) for refinery fuels											
California refineries		3rd-party H ₂ prod. (GJ/m ³)	Crude oil consmd. (kg/m ³)	Crude oil consmd. (GJ/m ³)	Crude oil consmd. (kg/m ³)	LPG consumed (GJ/m ³)	LPG consumed (kg/m ³)	Distillate consmd. (GJ/m ³)	Distillate consmd. (kg/m ³)	Res. Fuel Oil cons. (GJ/m ³)	Res. Fuel Oil cons. (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

Energy consumed/vol. crude feed (GJ/m ³) and CO ₂ emitted/vol. crude feed (kg/m ³) for refinery fuels											
U.S. refineries		Hydrogen prod. (GJ/m ³)	Crude oil consmd. (kg/m ³)	Crude oil consmd. (GJ/m ³)	Crude oil consmd. (kg/m ³)	LPG consumed (GJ/m ³)	LPG consumed (kg/m ³)	Distillate consmd. (GJ/m ³)	Distillate consmd. (kg/m ³)	Res. Fuel Oil cons. (GJ/m ³)	Res. Fuel Oil cons. (kg/m ³)
PADD	Year										
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

Attachment Crude-1, CBE Comments to CARB July 2011

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 <i>continued</i>											
California refineries	Year	Fuel Gas (bl) (GJ/m ³)	Petroleum coke (kg/m ³) (GJ/m ³)	Other products (kg/m ³) (GJ/m ³)	Natural Gas (kg/m ³) (GJ/m ³)	Coal consumed (kg/m ³) (GJ/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 <i>continued</i>											
U.S. refineries PADD	Year	Fuel Gas (bl) (GJ/m ³)	Petroleum coke (kg/m ³) (GJ/m ³)	Other products (kg/m ³) (GJ/m ³)	Natural Gas (kg/m ³) (GJ/m ³)	Coal consumed (kg/m ³) (GJ/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

Attachment Crude-1, CBE Comments to CARB July 2011

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

		Energy consumed & CO ₂ emitted/vol. crude feed for refinery fuels <i>continued</i>				Refinery energy intensity (EI)	Fuel mix emit intensity (CO ₂)	Refinery emission intensity (CO ₂)
California refineries		Electricity purchased (GJ/m ³)	Steam purchased (kg/m ³)	(GJ/m ³)	(kg/m ³)	(GJ/m ³)	(kg/GJ)	(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	--	--	--

		Energy & CO ₂ /vol. crude for fuels <i>continued</i>				Refinery energy intensity (EI)	Fuel mix emit intensity (CO ₂)	Refinery emission intensity (CO ₂)
U.S. refineries		Electricity purchased (GJ/m ³)	Steam purchased (kg/m ³)	(GJ/m ³)	(kg/m ³)	(GJ/m ³)	(kg/GJ)	(kg/m ³)
PADD	Year							
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

Attachment Crude-1, CBE Comments to CARB July 2011

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 • 10 ⁸)	29.15	29.15
Production at typical (90%) capacity utilization		
Third-party at 90% of capacity (m ³ • 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/m³ 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).

Attachment Crude–1, CBE Comments to CARB July 2011

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 <i>d</i> (kg/m ³)	Feed <i>S</i> (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-produced 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 • 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	Field	Aliso	0.969 c	0.94 c	1.512	1.297	1.036	0.307	0.690	0.481
Aliso Canyon	Field	Aliso, West	0.993 c	0.80 b	0.604	0.490	0.454	0.378	0.201	0.166
Aliso Canyon	Field	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	Field	Porter, West	0.911 c	0.80 b	0.000	0.000	0.000	0.000	0.010	0.028
Aliso Canyon	Field	Mission-Adrian	0.882 c	0.80 b	0.000	0.000	0.000	0.000	0.000	0.000
Aliso Canyon	Field	Monterey	0.917 b	0.80 b	0.000	0.000	0.000	0.000	0.000	0.018
Aliso Canyon	Field	Sesnon-Frew A/	0.840 c	0.80 b	15.219	16.550	15.626	14.589	11.970	14.820
Aliso Canyon	Field	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	Field	Olcese	0.968 b	0.68 b	12.225	12.145	15.664	17.945	12.714	9.251
Ant Hill	Field	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	Field	Phacoides	0.871 c	0.69 c	0.363	0.339	0.251	0.222	0.254	0.210
Antelope Hills	Field	Eocene	0.953 c	0.69 c	0.560	0.560	0.486	0.469	0.543	0.382
Antelope Hills	Field	No breakdown by pool	0.957 c	0.69 c	0.000	0.000	0.000	0.000	0.006	1.967
Antelope Hills	Field	Gas Zone	0.946 c	0.69 c	0.000	0.000	0.000	0.000	0.000	0.000
Antelope Hills	Field	Upper	0.986 c	0.69 c	1.311	2.208	0.951	0.695	1.550	0.676
Antelope Hills	Field	East Block-Button Bed	0.953 c	0.69 c	12.877	7.884	6.092	6.695	5.371	4.259
Antelope Hills	Field	East Block-Agua	0.947 c	0.69 c	4.322	2.483	3.335	6.243	4.232	4.220
Antelope Hills	Field	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	Field	Point of Rocks	0.953 c	0.69 c	11.659	12.979	11.938	8.977	8.580	7.627
Antelope Hills	Field	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	Field	Miocene-Eocene	0.974 c		12.912	13.516	13.064	11.733	11.885	14.800
Antelope Hills, North	Field	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	Field	Martin-Elberta	0.966 c	1.30 b	0.069	0.003	0.016	0.000	0.000	0.394
Arroyo Grande	Field	Dollie	0.973 c	1.30 b	97.856	92.772	92.822	87.130	75.491	71.415
Asphalt	Field	Field total			21.839	21.726	19.621	31.842	41.838	38.404
Asphalt	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-produced 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 •10 ³) ^a					
					2004	2005	2006	2007	2008	2009
Asphaltito		Etchegoin	0.973 c	0.42 b	0.000	0.000	0.000	1.120	0.866	0.703
Asphaltito		Olig	0.789 c	0.42 b	0.000	0.000	0.000	0.000	0.000	0.000
Asphaltito		Antelope Shale	0.846 c	0.42 b	2.978	2.804	0.363	1.349	3.153	4.903
Asphaltito		Stevens	0.849 b	0.42 b	17.510	17.959	18.539	28.593	37.315	31.671
Asphaltito		1st Carreros	0.805 c	0.42 b	1.352	0.962	0.719	0.780	0.504	1.019
Asphaltito		Carreros	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	Field	Pliocene	0.837 c		2.647	3.271	3.476	3.432	3.123	1.571
Bandini	Field	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	Field	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	Field	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	Field	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-produced 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 • 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	Field	Tulare	0.972 b	1.14 b	29.653	21.937	150.161	18.346	23.115	19.580
Belridge, North	Field	Diatomite	0.890 c	1.14 b	559.721	548.835	502.891	492.418	525.835	486.952
Belridge, North	Field	Tembler	0.825 c	0.69 c	2.260	1.186	2.557	2.211	2.373	1.781
Belridge, North	Field	R Sand	0.771 c	0.17 c	1.055	1.179	5.091	3.607	2.522	2.311
Belridge, North	Field	Belridge 64	0.828 c	0.17 c	16.655	18.284	15.037	9.414	9.735	8.809
Belridge, North	Field	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	Field	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	Field	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	Field	Diatomite-Antelope Shale	0.886 c	0.86 b	2.074	2.567	3.163	7.187	6.114	6.784
Belridge, South	Field	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	Field	Sespe	0.932 c		5.287	3.486	4.818	5.460	5.778	5.622
Big Mountain	Field	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-produced 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 • 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	55S 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	0.000
Bunker Gas		No breakdown by pool	0.978		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	0.000
Burrel	Field	Field total			0.162	0.164	0.168	0.086	0.155	0.140

Table 2-4. California-produced 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 • 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	Field	Etchegoin	0.820 c	0.16 c	0.028	0.023	0.000	0.000	0.000	0.008
Cal Canal Gas	Field	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	Field	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	Field	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			0.000	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	0.845 c	0.50 b,c	0.000	0.000	0.000	0.000	0.000	0.299
Canal	Main Area	Middle Stevens	0.850 c	0.41 c	0.555	0.395	0.425	0.411	0.354	0.299
Canal	Main Area	Lower Stevens	0.850 c	0.41 b	1.938	1.458	1.708	1.643	1.415	1.197
Canal	Pioneer Canal	Upper Stevens	0.850 c	0.70 c	0.000	0.000	0.000	0.000	0.060	0.523
Canal	Pioneer Canal	Lower Stevens	0.833 c	0.26 b	1.141	0.869	0.442	0.626	0.608	0.740
Canal	Pioneer Canal	Field total	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-produced 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 • 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	Field	No breakdown by pool	0.885 c		1.846	1.446	2.124	3.479	2.732	3.197
Cascade	Field	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	Field	Golden	1.007 c	0.51 b	0.000	0.000	0.000	0.000	0.000	0.000
Castaic Hills	Field	Sterling	0.863 c	0.51 b	0.976	1.846	2.369	2.658	2.541	2.595
Castaic Hills	Field	Sterling East	0.863 c	0.51 b	0.000	0.000	0.000	0.000	0.000	0.000
Castaic Hills	Field	Rynne-Fisher	0.860 c	0.51 b	0.232	0.250	0.148	0.218	0.288	0.266
Castaic Hills	Field	Upper Radovich	1.014 c	0.51 b	0.000	0.000	0.000	0.000	0.000	0.000
Castaic Hills	Field	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	Tinaquic 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-produced 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 • 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	0.000	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	Field	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	Field	Temblor	0.931 c	0.64 c	953.461	936.150	913.298	893.683	913.671	934.137
Coalinga	Field	Cretaceous	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	Field	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	Field	Stevens Undifferentiated	0.859 b	0.58 b	25.500	25.106	23.549	23.388	26.236	24.788
Coles Levee North	Field	Miocene-Eocene	0.751 c	0.39 c	0.000	0.000	0.000	0.000	0.000	0.000
Coles Levee North	Field	Field total			14.511	15.111	15.375	15.098	14.667	10.912
Coles Levee North	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 North	Field	Gas Zone	0.834 b,c	0.38 b	0.000	0.000	0.000	0.000	0.000	0.000
Coles Levee North	Field	Stevens	0.840 b	0.38 b	14.511	15.111	15.375	15.098	14.667	14.393
Coles Levee North	Field	Nozu	0.829 c	0.38 b	0.000	0.000	0.000	0.000	0.000	0.000
Coles Levee North	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	Field	No breakdown by pool	0.966 c	1.16 c	0.000	0.586	0.723	0.576	0.324	0.336
Comanche Point	Field	Santa Margarita	0.966 c	1.16 c	0.000	0.000	0.000	0.000	0.652	0.532

Table 2-4. California-produced crude data by field, area, and pool, formation or zone, 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 • 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	Wellport Area	No breakdown by pool	0.907 c	0.68 b	0.000	0.000	0.000	0.000	0.000	0.000	
Cymric	Wellport Area	Tulare-Antelope	0.979 c	1.16 b	145,560	279,075	287,711	253,195	295,886	295,336	
Cymric	Wellport 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	Wellport 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	Wellport Area	San Joaquin	0.985 c	1.38 b	0.000	0.000	0.000	0.000	0.000	0.000	
Cymric	Wellport Area	Reef Ridge-Antelope	0.960 c	0.86 b	270,520	226,043	228,528	248,238	240,793	203,307	
Cymric	Wellport Area	McDonald-Devilwater	0.891 c	0.86 b	0.016	4,855	2,637	1,481	1,879	1,195	
Cymric	Wellport Area	Cameros	0.866 c	0.44 b	2,170	0.715	0.638	1,246	3,196	4,153	
Cymric	Wellport Area	Agua	0.871 c	0.44 b	0.000	0.000	0.000	0.000	0.000	0.000	
Cymric	Wellport Area	Phacoides	0.860 c	0.44 b	0.161	0.211	2,117	2,321	1,264	0,640	
Cymric	Wellport Area	Oceanic	0.821 c	0.23 b	0.000	0.000	0.000	0.000	0.622	0.902	

Table 2-4. California-produced 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 • 10 ³) ^a						
					2004	2005	2006	2007	2008	2009	
Cymric	Welpport 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	Field	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	
Denver Crk. Gas	Field	Field total			0.189	0.158	0.096	0.052	0.032	0.009	
Denver Crk. Gas	Field	Not matched to pool/OQ	0.189		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	0.000	
Dunnigan Hills Gas	Main Area		0.000		0.000	0.000	0.000	0.000	0.001	0.000	
Dunnigan Hills Gas	Southeast Area		0.000		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		0.097	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-produced 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 • 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	0.979 c	0.20 c	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	Field	Chanac	0.979 c	0.20 c	0.138	0.236	0.551	0.000	0.000	0.000
El Segundo	Field	Field total	0.949 b	4.33 b	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	0.882 c	0.64 b	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	Field	No breakdown by pool	0.882 c	0.64 b	0.000	0.217	0.742	0.790	1.085	1.190
Elk Hills	Field	Tulare	1.000 c	1.02 b	6.677	6.074	7.999	8.305	6.875	4.004
Elk Hills	Field	Gas Zone	0.924 b	0.82 b	0.000	0.000	0.648	0.834	0.436	8.212
Elk Hills	Field	4th Mya	0.947 c	0.82 b	9.931	9.940	7.909	8.230	9.450	5.128
Elk Hills	Field	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	Field	Upper Sub-Scalez	0.859 c	0.83 b	0.000	0.000	0.000	0.000	0.000	0.000
Elk Hills	Field	Reef Ridge	0.882 c	0.64 b	0.109	0.228	0.007	0.000	0.000	14.471
Elk Hills	Field	Stevens	0.845 c	0.49 b	0.000	0.000	0.000	0.000	0.000	0.000
Elk Hills	Field	Stevens 29R	0.845 c	0.49 b	226.734	227.119	226.399	205.279	199.585	178.097
Elk Hills	Field	Stevens Northwest	0.904 c	0.49 b	153.316	142.235	134.023	120.068	118.314	124.094
Elk Hills	Field	Stevens 31S	0.845 c	0.49 b	915.403	877.087	797.902	711.270	674.112	597.304
Elk Hills	Field	Cameros	0.780 c	0.63 b	2.807	2.432	2.587	5.234	24.640	74.029
Elk Hills	Field	Agua	0.840 c		0.322	0.290	0.210	0.148	0.000	0.000
Elwood S. Offshore	Field	Field total	0.870 c	1.10 b,c	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
Elwood S. Offshore	Field	Field total	0.855 c		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	Field	Stevens	0.855 c		0.000	0.000	0.000	0.000	0.000	0.000
Esperanza	Field	Field total	0.893 c		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-produced crude data by field, area, and pool, formation or zone, 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 • 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
Helm	Main Area	Miocene	0.837	b 0.26	b	3,864	3,646	6,828	6,101	11,291
Helm	Main Area	Eocene & Cretaceous	0.808	c 0.30	c	2,565	1,771	1,794	6,170	4,540
Helm	Southeast Area	Miocene	0.837	b 0.26	b	1,911	0.432	0.146	0.108	0.089
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
Holser	Field	Conglomerate	0.953	c		0.065	0.042	0.053	0.052	0.046
Holser	Field	Holser-Nuevo	0.893	c		3,990	2,773	3,219	3,354	3,025
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	973,919	894,604	899,656	873,872
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
Honor Rancho	Main Area	Gabriel	0.840	c 0.40	b	0.107	0.063	0.129	0.229	0.248
Honor Rancho	Main Area	Rancho	0.850	c 0.40	b	0.000	0.000	0.000	1.047	1.146
Honor Rancho	Main Area	Wayside	0.850	c 0.40	b	2,516	2,193	1,424	2,592	1,980
Honor Rancho	Southeast Area	Wayside 13	0.830	c 0.40	b	8,113	9,582	9,779	10,418	10,558
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
Hopper Canyon	Main Area		0.911	c		1,863	0.364	1,134	1,321	1,163
Hopper Canyon	North Area		0.973	c		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
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
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
Huntington Beach	Offshore		0.929	b 1.60	b	337,116	309,991	276,390	251,715	237,291
Huntington Beach	Onshore		0.929	b 1.60	b	89,352	83,113	77,880	73,851	71,691
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	1,560
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
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
Jacalitos	Field	Temblor	0.832	b 0.34	b	9,944	11,819	15,437	21,410	26,355

Table 2-4. California-produced crude data by field, area, and pool, formation or zone, 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 • 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-produced 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 • 10 ³) ^a				
					2004	2005	2006	2007	2008
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	
La Honda	Main Area		0.867 c	0.000	0.000	0.000	0.000	0.000	
La Honda	South Area		0.913 c	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	
Landslide	Boulder Creek		0.872 c	1.418	1.320	1.250	1.373	1.529	
Landslide	Main Area		0.872 c	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	0.000	0.000	0.000	0.000	0.000	
Las Cienagas	Fourth Avenue		0.869 c	2.961	6.386	6.348	7.429	10.624	
Las Cienagas	Good Shepard		0.871 c	0.000	2.317	0.371	0.000	0.000	
Las Cienagas	Jefferson Area		0.861 c	24.896	32.301	34.795	33.363	29.179	
Las Cienagas	Murphy Area	No breakdown by pool	0.862 c	31.557	40.531	36.761	37.639	34.781	
Las Cienagas	Murphy Area	A,B,C & PE zones, B Block	0.870 c	7.662	0.000	0.000	1.480	3.554	
Las Cienagas	Pacific Electric		0.855 c	0.000	0.000	0.000	0.000	0.000	
Las Lajas	Field	Field total	0.000	0.000	0.000	0.000	0.000	0.000	
Las Lajas	Field	Not matched to pool/OQ	0.896 c	0.000	0.000	0.000	0.000	0.000	
Las Lajas	Las Lajas		0.896 c	0.000	0.000	0.000	0.000	0.000	
Las Lajas	Santa Susana		0.896 c	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	0.000	0.000	0.000	0.000	0.000	
Lawndale	Upper		0.879 c	0.000	0.000	0.000	0.000	0.000	
Lawndale	Schist Conglomerate		0.887 c	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	1.794	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	0.000	0.000	0.000	0.000	0.000	
Lompoc	Main Area	Monterey	0.932 c	8.524	18.262	20.572	26.510	29.763	
Lompoc	Northwest Area	Monterey	0.945 c	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	0.000	0.000	0.000	0.000	0.000	

Table 2-4. California-produced 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 • 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	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	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	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	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	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	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	216.636
Long Beach	Recreation Park		0.893 c	1.30 b	4.167	4.289	4.264	4.658	4.331	4.395	4.395
Long Beach Airport	Field	Field total	0.855 c		0.175	0.380	1.310	1.917	1.808	1.750	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	0.000
Long Beach Airport	Field	Deep	0.855 c		0.175	0.380	1.310	1.917	1.808	1.750	1.750
Los Alamos	Field	Field total	0.845 c		0.000	0.083	0.000	0.375	0.000	0.035	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	0.000
Los Alamos	Field	Monterey	0.845 c		0.000	0.083	0.000	0.375	0.000	0.035	0.035
Los Angeles City	Field	Field total	0.960 c		0.397	0.304	0.255	0.235	0.205	0.202	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	0.202
Los Angeles Downtn.	Field	Field total			15.111	14.233	1.945	0.924	5.319	5.167	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	0.000
Los Angeles Downtn.	Field	No breakdown by pool	0.857 c	1.58 c	15.111	14.233	1.945	0.924	5.319	5.167	5.167
Los Angeles Downtn.	Field	Hill Gas Sands	0.857 c	1.58 c	0.000	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	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	3.866
Los Lobos	Field	Field total			0.000	0.000	1.299	8.663	2.693	0.000	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	0.000
Los Lobos	Field	Etchegoin	0.953 c		0.000	0.000	1.299	2.376	0.305	0.000	0.000
Los Lobos	Field	Reef Ridge	0.904 c		0.000	0.000	0.000	0.000	0.000	0.000	0.000
Los Lobos	Field	Monterey	0.990 c		0.000	0.000	0.000	6.288	2.388	0.000	0.000
Los Hills	Field	Field total			1,783.149	1,820.338	1,883.906	1,929.043	1,873.020	1,839.112	1,839.112
Los 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	0.000
Los Hills	Field	No breakdown by pool	0.909 b	0.71 b	0.000	0.000	0.000	0.000	0.000	0.000	0.872
Los Hills	Field	Tulare	0.934 d	0.83 b	14.142	32.613	43.832	55.518	101.136	151.557	151.557
Los Hills	Field	Tulare-Etchegoin	0.892 b	0.59 b	1,096.131	1,116.993	1,070.442	1,037.618	970.994	860.645	860.645
Los Hills	Field	Etchegoin	0.858 b	0.33 b	39.465	136.192	291.041	404.895	418.818	456.193	456.193
Los Hills	Field	Etchegoin-Cahn	0.909 b	0.71 b	145.947	138.768	126.662	113.640	97.778	116.788	116.788
Los Hills	Field	Cahn	0.880 c	0.71 b	482.263	389.604	345.600	313.022	279.407	226.494	226.494
Los Hills	Field	Devilwater	0.865 c	0.71 b	3.518	3.152	2.296	4.351	4.886	22.534	22.534

Table 2-4. California-produced 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 • 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	0.000	0.354
Lost Hills		Antelope/McDonald	0.909 b	0.71 b	1.683	3.015	4.032	0.000	0.000	0.000	3.789
Lost Hills Northwest	Field	Field total			3.378	3.019	2.831	2.434	3.201	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	0.000
Lost Hills Northwest	Field	Etchegoin	0.885 c	0.33 c	2.084	1.946	1.866	1.632	2.257	2.257	2.566
Lost Hills Northwest	Field	Antelope Shale	0.934 c	0.33 c	1.293	1.073	0.965	0.803	0.942	0.942	0.841
Lynch Canyon	Field	Field total	0.000	0.000	4.818	4.818	10.225	17.692	20.365	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	0.000
Lynch Canyon	Field	Lanigan	0.993 c		0.000	4.818	10.225	17.692	20.365	20.365	23.877
Mahala	Field	Field total	0.444		0.444	0.340	0.416	0.287	0.246	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	0.000
Mahala	Abacherli Area		0.923 c		0.404	0.314	0.327	0.262	0.216	0.216	0.079
Mahala	Mahala Area		0.921 c		0.040	0.026	0.021	0.025	0.029	0.029	0.025
Mahala	Mahala West Area		0.871 c		0.000	0.000	0.068	0.000	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	0.000
Maine Prairie Gas	Field	Field total			0.006	0.065	0.004	0.002	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	0.002	0.004
McCool Ranch	Field	Field total			0.000	0.000	0.000	0.000	0.000	0.000	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	0.000
McCool Ranch	Field	Lombardi	0.988 c	1.20 c	0.000	0.000	0.000	0.000	0.618	0.618	0.194
McDonald Anticline	Field	Field total			11.087	13.129	12.258	12.192	14.821	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	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	0.000
McDonald Anticline	Bacon Hills Area	Antelope	0.979 c		0.048	0.163	0.141	0.000	0.373	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	0.000
McDonald Anticline	Layman Area		0.913 c		11.040	12.965	12.118	12.192	14.448	14.448	9.384
McKittrick	Field	Field total			404.989	406.531	445.962	434.653	395.041	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	0.000
McKittrick	Main Area	Tulare	0.962 b	0.96 b	2.328	3.061	16.439	42.995	40.318	40.318	42.625
McKittrick	Main Area	Upper	0.962 b	0.96 b	40.613	47.795	72.613	88.855	101.789	101.789	101.718
McKittrick	Main Area	Olig	0.973 c	0.96 b	0.000	0.000	0.000	0.000	1.108	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	0.000
McKittrick	Main Area	Stevens	0.903 c	1.02 c	3.489	6.503	4.058	20.762	13.409	13.409	12.499
McKittrick	Northeast Area	Upper	0.949 c	0.96 b	258.285	259.160	264.895	213.143	174.632	174.632	138.170
McKittrick	Northeast Area	Tulare	0.962 b	0.96 b	5.470	9.659	16.536	14.865	13.971	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	4.565	2.572

Table 2-4. California-produced crude data by field, area, and pool, formation or zone, 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 • 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		0.013	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	0.000
Medora Lake Gas	Field	Winters	0.013		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	0.000
Merrill Avenue Gas	Field	Not matched to pool/OQ	0.000		0.000	0.000	0.000	0.000	0.000	0.000
Merrill Avenue Gas	Field	Blewett	0.000		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		0.164	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	0.000
Millar Gas	Main Area		0.025		0.025	0.001	0.041	0.047	0.034	0.000
Millar Gas	West Area		0.139		0.139	0.076	0.007	0.000	0.000	0.000
Monroe Swell	Field	Field total	2,282		2,233	2,670	2,233	1,204	1,381	1,148
Monroe Swell	Field	Not matched to pool/OQ	0.000		0.000	0.000	0.000	0.000	0.000	0.000
Monroe Swell	Northwest Area		1.255		1.255	1.502	1.142	0.524	0.901	0.516
Monroe Swell	Old Area		1.027		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		0.922 c	4.10 c	3,805	3,923	3,422	4,796	3,947	3,684
Montalvo West	Offshore	Colonias	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	Colonias	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-produced crude data by field, area, and pool, formation or zone, 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 • 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	Government 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	Richards	0.873 c	0.36 c	1.295	1.178	1.050	1.087	1.625	1.405
Mountain View	Arvin West Area	Chanaq-Cattani	0.863 c	0.44 b	0.869	0.949	1.219	1.308	1.311	1.119
Mountain View	Arvin West Area	Cattani	0.871 c	0.51 c	0.240	0.192	0.099	0.152	0.288	0.191
Mountain View	Arvin West Area	Houchin Main	0.876 c	0.44 b	0.994	0.976	0.955	0.972	1.024	1.015
Mountain View	Arvin West Area		0.850 c	0.44 b	0.287	0.265	0.202	0.178	0.161	0.161

Table 2-4. California-produced 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 • 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	Field	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-produced crude data by field, area, and pool, formation or zone, 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 • 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	Field	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	Field	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	Field	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
Oil Creek	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	Field	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-produced crude data by field, area, and pool, formation or zone, 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 • 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-produced 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 • 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	Field	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	Field	No breakdown by pool	0.927 b	1.30 b	0.000	172.576	162.715	152.629	0.000	18.667
Placerita	Field	Upper Kraft	0.986 c	1.30 b	0.000	0.000	0.000	0.000	0.000	0.000
Placerita	Field	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	Field	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	Field	Kidson Area	0.876 c	2.65 b	0.000	0.000	0.000	0.000	0.000	0.000
Playa Del Rey	Field	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	Field	Tembler	0.850 c	0.35 c	0.000	0.000	0.000	0.000	0.000	0.000
Pleasant Valley	Field	Kreyenhagen	0.866 c	0.35 c	0.000	0.000	0.000	0.000	0.000	0.000
Pleasant Valley	Field	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	Field	Creek Area	0.953 c	1.18 c	2.197	2.279	2.002	1.988	11.106	14.054
Pleito	Field	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	Field	Enas Area	0.983 c	0.98 c	1.125	1.493	1.057	1.395	2.645	2.041
Poso Creek	Field	McVan Area	0.973 c	0.80 c	12.682	34.283	62.896	131.810	207.814	210.001
Poso Creek	Field	Premier Area	0.978 c	0.98 c	31.536	39.345	50.558	73.069	109.931	140.919
Poso Creek	Field	Premier Area	0.981 c	0.98 c	0.000	0.000	0.000	0.000	0.066	3.429
Pyramid Hills	Field	Etchegoin-Chanac			10.547	11.282	10.089	10.377	10.652	9.084
Pyramid Hills	Field	Field total			0.000	0.000	0.000	0.000	0.000	0.000
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-produced crude data by field, area, and pool, formation or zone, 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 • 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-produced crude data by field, area, and pool, formation or zone, 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 • 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	Field	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	Field	No breakdown by pool			0.000	0.000	0.000	0.000	0.000	0.000
River Island Gas	Field	Markley-Nortonville			0.000	0.000	0.000	0.000	0.000	0.000
River Island Gas	Field	Nortonville			0.000	0.000	0.000	0.000	0.000	0.000
River Island Gas	Field	Domengine-Capay			0.000	0.000	0.000	0.000	0.000	0.000
River Island Gas	Field	Mokulumne River			0.000	0.000	0.000	0.000	0.000	0.000
River Island Gas	Field	Starkey			0.000	0.000	0.000	0.000	0.000	0.000
River Island Gas	Field	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	Field	Miocene	0.825 b	0.22 b	2.814	3.947	4.596	3.671	3.841	8.826
Riverdale	Field	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	Field	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-produced 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 •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	0.000
Ryer Island Gas	Offshore		0.000		0.000	0.000	0.000	0.000	0.000	0.000
Ryer Island Gas	Onshore		0.055		0.055	0.018	0.018	0.105	0.068	0.090

Table 2-4. California-produced 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 • 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 Ardo	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	Field	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	Field	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	Field	Grubb 1-3	0.871 c	0.87 c	0.000	0.000	10.072	25.301	40.036	57.045
San Miguelito	Field	Grubb 4-5	0.888 c	0.90 b	0.000	0.000	43.121	41.983	39.550	41.871
San Miguelito	Field	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	Field	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-produced 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 •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-produced crude data by field, area, and pool, formation or zone, 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 • 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	Waseem	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.	Waseem	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-produced crude data by field, area, and pool, formation or zone, 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 • 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	0.000	6.147
Simi	Field	Field total			0.069	0.122	0.132	0.146	0.123	0.114	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	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	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	0.000
Simi	Old Area	Llajas	0.876 c	0.68 b	0.000	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	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	0.000
Simi	Alamos Canyon		0.931 c	0.68 b	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sockeye Offshore	Field	Field total	0.917 c	3.26 e	270.434	278.630	234.778	245.710	239.933	243.032	243.032
Sockeye Offshore	Field	Not matched to pool/OQ			270.434	278.630	234.778	245.710	239.933	243.032	243.032
South Mountain	Field	Field total			79.072	74.778	74.022	71.815	72.153	76.341	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	76.341
Stockdale	Field	Field total			14.895	16.045	15.150	15.203	15.381	15.514	15.514
Stockdale	Field	Not matched to pool/OQ	0.893 c		0.000	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	0.000
Stockdale	Panama Lane	Nozu	0.887 c		14.895	16.045	15.150	15.203	15.381	15.514	15.514
Strand	Field	Field total			1.127	0.715	0.648	0.647	0.622	0.785	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	0.000
Strand	East Area	Stevens	0.855 c	0.41 c	0.418	0.067	0.000	0.000	0.000	0.264	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	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	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	0.000
Strand	Main Area	Vedder	0.835 c	0.47 b	0.000	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	0.000
Strand	Northwest Area	Stevens	0.857 c	0.54 c	0.709	0.648	0.648	0.647	0.622	0.521	0.521
Strand	South Area	Stevens	0.871 c	0.43 b	0.000	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	0.000
Suisun Bay Gas	Field	Not matched to pool/OQ			0.000	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	9.108
Tapia	Field	Not matched to pool/OQ	0.953 c		0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tapia	Field	No breakdown by pool	0.953 c		1.863	6.186	8.391	7.641	9.042	9.108	9.108
Tapia	Field	Saugus	0.953 c		0.000	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	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	0.000
Tapo Canyon South	Field	No breakdown by pool	0.926 c		1.636	1.427	1.908	1.950	1.712	1.354	1.354

Table 2-4. California-produced 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 • 10 ³) ^a				
					2004	2005	2006	2007	2008
Tapo Canyon South		Sespe	0.947 c		0.356	0.467	0.426	0.405	0.418
Tapo North	Field	Field total			0.072	1.023	0.931	1.029	0.940
Tapo North	Field	Not matched to pool/OQ	0.930 c		0.072	1.023	0.931	1.029	0.940
Tapo Ridge	Field	Field total			0.465	0.379	0.535	0.451	0.316
Tapo Ridge	Field	Not matched to pool/OQ	0.956 c		0.465	0.379	0.535	0.451	0.316
Tejon	Field	Field total			53.970	53.910	48.997	54.131	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
Tejon	Central Area		0.879 b	0.28 c	7.095	9.593	9.124	12.926	11.118
Tejon	Eastern Area		0.947 c	0.27 b	2.658	2.566	2.428	1.935	2.449
Tejon	Southeast Area		0.943 c	0.27 b	2.988	3.143	2.881	3.000	2.834
Tejon	Western Area		0.944 c	0.40 c	41.229	38.608	34.563	36.270	76.979
Tejon Hills	Field	Field total			2.434	1.767	1.950	1.945	1.671
Tejon Hills	Field	Not matched to pool/OQ	0.866 b	0.26 b	2.434	1.767	1.950	1.945	1.671
Tejon North	Field	Field total			9.579	10.009	9.313	8.882	7.395
Tejon North	Field	Not matched to pool/OQ	0.846 b	0.20 b	0.000	0.000	0.000	0.000	0.000
Tejon North	Field	Not matched to pool/OQ	0.846 b	0.20 b	0.000	0.000	0.000	0.000	0.000
Tejon North	Field	No breakdown by pool	0.846 b	0.20 b	0.000	0.000	0.000	0.000	0.000
Tejon North	Field	Fruitvale	0.917 c	0.20 b	0.000	0.000	0.000	0.000	0.000
Tejon North	Field	Olcese	0.845 c	0.20 b	0.000	0.000	0.000	0.000	0.000
Tejon North	Field	Olcese-Eocene	0.811 c	0.20 c	3.468	3.844	3.056	3.076	2.803
Tejon North	Field	JV-Basalt	0.797 c	0.16 c	0.000	0.000	0.000	0.000	0.000
Tejon North	Field	Vedder-Eocene	0.810 c	0.24 c	6.111	6.165	6.257	5.805	4.592
Temblor Ranch	Field	Field total			0.221	0.141	0.138	0.064	0.033
Temblor Ranch	Field	Not matched to pool/OQ	0.959 c		0.000	0.000	0.000	0.000	0.000
Temblor Ranch	Field	Miocene	0.959 c		0.221	0.141	0.138	0.064	0.033
Temescal	Field	Field total			4.834	5.118	5.337	5.348	4.819
Temescal	Field	Not matched to pool/OQ	0.920 b	0.55 b	4.834	5.118	5.337	5.348	4.819
Ten Section	Field	Field total			19.630	18.551	18.466	19.041	14.455
Ten Section	Field	Not matched to pool/OQ	0.845 b	0.41 b	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
Ten Section	Main Area	Upper Stevens	0.845 c	0.41 b	17.533	17.205	17.120	17.423	12.811
Ten Section	Main Area	Lower Stevens	0.860 c	0.41 b	2.098	1.346	1.346	1.617	1.644
Ten Section	Northwest Area	No breakdown by pool	0.845 b	0.41 b	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
Thomton WWG Gas	Field	Field total			0.000	0.000	0.038	0.153	0.014
Thomton WWG Gas	Field	Not matched to pool/OQ	0.000		0.000	0.000	0.038	0.153	0.014
Timber Canyon	Field	Field total			6.187	3.250	6.000	5.497	4.888

Table 2-4. California-produced crude data by field, area, and pool, formation or zone, 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 • 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	Field	Sespe	0.896 c	2.74 b	1.686	1.417	1.757	1.691	1.664	1.621
Torrey Canyon	Field	First Sespe	0.910 c	2.74 b	0.828	0.626	0.871	0.876	0.733	0.526
Torrey Canyon	Field	Second Sespe	0.882 c	2.74 b	0.836	0.727	1.007	0.935	0.945	0.873
Torrey Canyon	Field	Third Sespe	0.896 c	2.74 c	1.172	1.187	1.452	1.479	1.343	1.333
Torrey Canyon	Field	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	Field	Salyer	0.771 c		0.000	0.000	0.000	0.000	0.000	0.000
Tulare Lake	Field	KCDC	0.826 c		0.000	0.000	0.000	0.000	0.000	0.000
Tulare Lake	Field	54-8U	0.865 c		1.521	0.283	0.000	0.000	0.000	0.000
Tulare Lake	Field	54-8M	0.850 c		0.000	0.000	0.000	0.000	0.000	0.000
Tulare Lake	Field	54-8L	0.865 c		0.507	0.094	0.000	0.000	0.000	0.000
Tulare Lake	Field	Boswell	0.876 c		0.490	0.015	0.000	0.000	0.000	0.000
Tulare Lake	Field	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-produced crude data by field, area, and pool, formation or zone, 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 • 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	0.699 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	Field	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	Field	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-produced crude data by field, area, and pool, formation or zone, 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 • 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	
Whittier	Field	Field total			2,381.235	2,387.980	2,358.855	2,366.217	2,319.053	2,173.822	
Whittier	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-produced 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 • 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. 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.

Attachment Crude-1, CBE Comments to CARB July 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.

Attachment Crude–1, CBE Comments to CARB July 2011

Table 2-5. Facility-level capacity data, California refineries, continued^a

Facility	Year	1 ^o hydrotreating of gas oil, resid. & cracking feeds (b/cd)	2 ^o 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.

Attachment Crude–1, CBE Comments to CARB July 2011

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.

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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.

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

<i>Fuels refineries</i>	Year	Reported emissions ^a (tonnes)	Reported H ₂ purchased ^b (m ³ • 10 ⁷)	Regional purch. shares		Corrected emissions	
				H ₂ cap. ^c (%)	H ₂ emit ^d (tonnes)	Mass (tonnes)	Intensity ^e (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
<i>Third-party hydrogen plants supplying purchased H₂</i>							
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 H₂ emissions in region & year added back to refinery emissions.

^e CO₂ emitted per cubic meter crude refined estimated from atm. distillation capacities in Table 2-5.

^f Not co-located with refineries: Emissions from "other" H₂ plants are not added to refinery emissions.

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

Parameter, facility or region	Crude feed component streams			Crude feed ^d
	Foreign ^a	SJV ^b	ANS ^c	
<i>Crude volume (m³/day)</i>				
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
<i>Crude mass (tonnes/day)</i>				
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
<i>Sulfur mass in crude (tonnes/d)</i>				
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
<i>Estimated crude feed quality (kg/m³)</i>				
			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.

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

Year	Refinery crude feed volume data reported ^a				Anomalous oil assumption ^c		Potential crude feed effect ^d	
	Potentially anomalous streams ^b			Other streams	Predicted by density, sulfur	Excess in anomalous oil	Crude feed predicted	Crude feed with anomaly
	Stream 1 (% vol.)	Stream 2 (% vol.)	Stream 3 (% 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 characteristic 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.

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Exhibit A. ARB response to California Public Records Act request.



Linda S. Adams
*Acting Secretary for
Environmental Protection*

Air Resources Board

Mary D. Nichols, Chairman
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Edmund G. Brown Jr.
Governor

June 23, 2011

Greg Karras
Senior Scientist
Communities for a Better Environment
1940 Franklin Street, Suite 600
Oakland, California 94612

EMAIL to gkatche@gmail.com

Dear Mr. Karras:

This letter responds to your request dated May 19, 2011 to the California Air Resources Board (ARB) regarding average density and total sulfur content of crude oil inputs to petroleum refining in California and documents that include the type and amount of each fuel consumed by petroleum refining in California. Unfortunately, staff was unable to find any responsive documents to your request.

ARB is closing your request as completed. If you have any questions, please contact me at 916-322-0362.

Sincerely,

Alexa Barron
Public Records Coordinator
Office of Legal Affairs

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption.
For a list of simple ways you can reduce demand and cut your energy costs, see our website: <http://www.arb.ca.gov>.*

California Environmental Protection Agency

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