

Natural gas extraction data

Richard Heede
 Climate Mitigation Services
 File started: 11 January 2005
 Last modified: April 2013

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BP, UK

Annual reports	yellow column indicates original reported units	Investor-owned
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Natural Gas

Company 1	Company 2	Company 3	Company 4	Company 5	Sum production	Company 1	Company 2	Company 3	Company 4	Company 5	Company 6	Sum production
Million cf/d	Million cf/d	Million cf/d	Million cf/d	Million cf/d	Million cf/d	Billion cf/yr	Billion cf/yr	Billion cf/yr	Billion cf/yr	Billion cf/yr	Billion cf/yr	Billion cf/yr
Anglo-Iranian 1950-2010	Standard Oil (Ohio), Sohio (acq 1987)	Standard Oil (Indiana) 1950-1998	Atlantic 1941-66, ARCO 1967-99 (50 percent)	Richfield Oil 1950-1966	Sum 1920-2010	Anglo-Iranian 1950-1954, BP 1954-2004	Standard Oil (Ohio), Sohio (acq 1987)	Standard Oil (Indiana) 1950-1998	Atlantic 1941-66, ARCO 1967-99 (50 percent)	Richfield Oil 1950-1966	Sinclair	Sum

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BP Annual Report and Accounts 2008
 Performance review

	\$ million		
	2008	2007	2006
Key statistics			
Total revenues*	89,902	69,376	71,868
Profit before interest and tax from continuing operations [†]	37,915	27,729	30,953
Total assets	136,665	125,736	124,803
Capital expenditure and acquisitions	22,227	14,207	13,252
	million barrels of oil equivalent		
Net proved reserves – group	12,562	12,583	13,163
Net proved reserves – equity-accounted entities	5,585	5,231	4,537
	thousand barrels per day		
Liquids production – group	1,263	1,304	1,351
Liquids production – equity-accounted entities	1,138	1,110	1,124
	million cubic feet per day		
Natural gas production – group	7,277	7,222	7,412
Natural gas production – equity-accounted entities	1,057	921	1,005

environmental emissions

	2000		1999
	BP	Underlying ^a	BP
Greenhouse gas emissions (million tonnes) ^b	80.7	72.2 ^c	79.8
Hydrocarbon emissions to air ('000 tonnes)	688	636	845
Discharges to water ('000 tonnes)	58	52	46
Number of spills reaching land or water (>1 barrel) ^d	503	413	732

^a BP operations excluding ARCO and Burmah Castrol.
^b BP share of emissions of carbon dioxide and methane, expressed as an equivalent mass of carbon dioxide.
^c 9.5% decrease from 1999 comprises 3% in respect of continuing operations and 6.5% due to asset divestment and other changes.
^d 1 barrel = 159 litres = 42 US gallons.



BP AnnRpt 2000, page 3.

Year	Amoco data 1949-1984	Richfield	Sohio gas	BP	Amoco	BP
	Bcf/yr	Bcf/yr	Bcf/yr	Bcf/yr	Bcf/yr	Bcf/yr
1949	275				15	15
1950	325				18	18
1951	446				20	20
1952	528				23	23
1953	669				26	26
1954	774				29	29
1955	919				33	33
1956	990				37	37
1957	1,086	3.8			42	42
1958	1,154	5.3			48	48
1959	1,298	2.7			54	54
1960	1,348	10.7			61	61
1961	1,509	25.5			69	69
1962	1,577	51.0			78	78
1963	1,617	52.7			89	89
1964	1,834	56.8			100	100
1965	1,966	62.4			137	137
1966	2,186	80.5			163	163
1967	2,374	90.6			193	193
1968	2,533	97.4			244	244
1969	2,738	97.6			283	283
1970	2,833	1,079			335	335
1971	3,313	1,977			361	361
1972	3,510	2,056			397	397
1973	3,631	2,064			421	421
1974	3,911	2,012			474	474
1975	3,935	1,913			492	492
1976	3,635	1,739			551	551
1977	3,388	1,586			576	576
1978	3,272	1,748			590	590
1979	3,286	1,642			669	669
1980	3,263	1,517			718	718
1981	3,328	1,486			798	798
1982	3,057	1,388			86.2	86.2
1983	2,72	1,296			65.1	65.1
1984	3,096	1,296			69.4	69.4
1985	2,789	1,272			74.1	74.1
1986	2,630	1,350			75.3	75.3
1987	2,797	1,498			123	123
1988	1,452	1,452			73.3	73.3
1989	1,385	1,385			158	158
1990	1,436	1,436			149	149
1991	1,543	1,543			122	122
1992	1,698	1,698			109	109
1993	1,747	1,747			32.7	32.7
1994	1,660	1,660			29.0	29.0
1995	1,442	1,442			31.4	31.4
1996	1,232	1,232			30.4	30.4
1997					121	121
1998					88	88
1999					24.5	24.5
2000					99	99
2001					27.4	27.4
2002					118	118
2003					29.6	29.6
2004					1,021	1,021
2005					263	263
2006					1,043	1,043
2007					216	216
2008					246	246
2009					1,066	1,066
2010					282	282

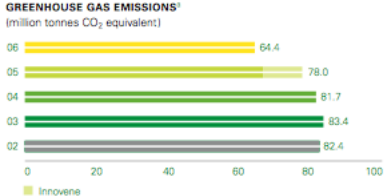
Total	na	3,037	na	na	46,227	1,109	48,245	9,824	55	1,340	106,799
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Year	Company 1	Company 2	Sum production	Company 1	Company 2	Sum production
1909	Atlantic 1950-66, ARCO 1967-1999	Sohio	Sum	BP Coal 7-1990		Sum
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Total	595	171	171	276		431

Coal extraction data

Richard Heede
Climate Mitigation Services
File started: 11 January 2005
Last modified: 11 November 2011

BP, UK



*Data is reported on an equity share basis. TNK-BP emissions are not included.

Crude oil and natural gas production (net of royalties)	1996	1997	1998	1999	2000
UK	458	437	518	580	534
USA	859	869	841	804	729
Other	586	624	690	677	665
Crude oil production (thousand barrels per day)	1,903	1,930	2,049	2,061	1,928
UK	1,335	1,423	1,258	1,301	1,652
USA	2,650	2,513	2,401	2,369	3,054
Other	1,932	1,922	2,149	2,397	2,903
Natural gas production (million cubic feet per day)	5,917	5,858	5,808	6,067	7,609
Total production (thousand barrels oil equivalent per day)	2,924	2,940	3,050	3,107	3,240

Group refinery throughputs* (thousand barrels per day)	2004	2005 ^a	2006 ^b	2007 ^b	2008 ^b
For BP by others	8	12	13	19	12
Total	2,812	2,867	2,711	2,541	2,928

* Includes crude oil and other feedstock input to BP's crude distillation units both for BP and third parties.
^a Includes BP share of the BPF/Mobil joint venture.

BP AnnRpt 2000, page 68

Sohio not included in total: get mines data and to whom sold and when

Year	Sohio coal	BP coal stats	Total
1960	4.2		3.8
1961	3.8		3.5
1962	4.1		3.8
1963	4.6		4.2
1964	5.1		4.6
1965	6.3		5.7
1966	9.9		9.0
1967	10.3		9.3
1968	9.9		9.0
1969	12.0		10.9
1970	11.7		10.6
1971	10.5		9.5
1972	11.2		10.2
1973	11.5		10.4
1974	9.5		8.6
1975	9.2		8.4
1976	9.7		8.8
1977	9.7		8.8
1978	7.8		7.1
1979	10.0	18.8	27.9
1980		20.8	20.8
1981	11.1	20.8	20.8
1982	15.8	21.3	21.3
1983	19.2	20.7	20.7
1984	16.8	26.8	26.8
1985	26.3	26.5	26.5
1986	29.8	27.8	27.8
1987	27.2	27.4	27.4
1988	26.1	26.2	26.2
1989	32.4	26.0	26.0
1990	39.4		
1991	38.3		
1992	41.6		
1993	39.8		
1994	47.7		
1995	38.4		
1996	45.7		
1997	51.0		
1998	46.4		
1999	no data		
2000	See Arch Coal for complete coal prod'n history.		
2001		6.19	6.2
2002		6.88	6.9
2003	BP sold Kaltim Prima Coal		
2004			
2005			
2006			
2007			
2008			
2009			
2010			
Total	595	171	171
			276
			431

No coal data found in subsequent BP annual reports

Cell: F8

Comment: Rick Heede:

History, 1909 to 1979 (wikipedia: en.wikipedia.org/wiki/BP)

In May 1901, William Knox D'Arcy was granted a concession by the Shah of Iran to search for oil, which he discovered in May 1908. This was the first commercially significant find in the Middle East. On 14 April 1909, the Anglo-Persian Oil Company (APOC) was incorporated as a subsidiary of Burmah Oil Company to exploit this. In 1923, it employed future Prime Minister, Winston Churchill as a paid consultant, to lobby the British government to allow Burmah to have exclusive rights to Persian oil resources, which were successfully granted. In 1935, it became the Anglo-Iranian Oil Company (AIOC).

Following World War II, AIOC and the Iranian government initially resisted nationalist pressure to revise AIOC's concession terms still further in Iran's favour. But in March 1951, the pro-western Prime Minister Ali Razmara was assassinated.[19] The Majlis of Iran (parliament) elected a nationalist, Mohammed Mossadeq, as prime minister. In April, the Majlis nationalised the oil industry by unanimous vote. The National Iranian Oil Company was formed as a result, displacing the AIOC. The AIOC withdrew its management from Iran, and organised an effective boycott of Iranian oil. The British government – which owned the AIOC – contested the nationalisation at the International Court of Justice at The Hague, but its complaint was dismissed.

By spring of 1953, incoming US President Dwight D. Eisenhower authorised the Central Intelligence Agency (CIA) to organise a coup against the Mossadeq government with support from the British government. On 19 August 1953, Mossadeq was forced from office by the CIA conspiracy, involving the Shah and the Iranian military, and known by its codename, Operation Ajax.

Mossadeq was replaced by pro-Western general Fazlollah Zahedi and the Shah, who returned to Iran after having left the country briefly to await the outcome of the coup. The Shah abolished the democratic Constitution and assumed autocratic powers.

After the coup, Mossadeq's National Iranian Oil Company became an international consortium, and AIOC resumed operations in Iran as a member of it. The consortium agreed to share profits on a 50–50 basis with Iran, "but not to open its books to Iranian auditors or to allow Iranians onto its board of directors." AIOC, as a part of the Anglo-American coup d'état deal, was not allowed to monopolise Iranian oil as before. It was limited to a 40% share in a new international consortium. For the rest, 40% went to the five major American companies and 20% went to Royal Dutch Shell and Compagnie Française des Pétroles, now Total S.A."

The AIOC became the British Petroleum Company in 1954. In 1959, the company expanded beyond the Middle East to Alaska and in 1965 it was the first company to strike oil in the North Sea. In 1978 the company acquired a controlling interest in Standard Oil of Ohio or Sohio, a breakoff of the former Standard Oil that had been broken up after anti-trust litigation.[29] In 1967 the giant oil tanker, the Torrey Canyon, foundered off the English coast, even though the ship was flying the well known flag of convenience, that of Liberia. The ship was in fact operated on behalf of BP. The Prime Minister of that time, 1967, had the ship bombed by RAF jet bombers, in an effort to break the ship up and sink it (see Torrey Canyon oil spill). This was unsuccessful, and the method has not been repeated. BP continued to operate in Iran until the Islamic Revolution in 1979. The new regime of Ayatollah Khomeini confiscated all of the company's assets in Iran without compensation, bringing to an end its 70-year presence in Iran.

Cell: P10

Comment: Rick Heede:

Total net worldwide crude oil plus natural gas liquids produced by each company or state-owned enterprise. Where data is available, we list net production (after royalty production is deducted).

We rely on company annual reports, Form 10-k, or other company data where available. In some cases – particularly for state-owned oil and gas companies -- we use production data from the Oil & Gas Journal in its OGJ150 and OGJ100.

Crude production includes natural gas liquids (NGL) unless noted.

Cell: AG10

Comment: Rick Heede:

Natural gas is typically reported as dry gas; natural gas liquids are reported under crude oil.

Carbon dioxide is normally removed from the gas flow at the production site (see "Vented Carbon Dioxide").

"SCM/d" = standard cubic meters per day. "cf/d" = cubic feet per day.

Cell: AR10

Comment: Rick Heede:

Coal production by coal mining companies and state-owned enterprises, including subsidiaries of oil and gas companies. The coal rank (which reflects the heating value and carbon content per tonne) of produced coals is noted where reported by each entity. See the coal entity workbooks or summary worksheets for details.

Cell: M13

Comment: Rick Heede:

We allocate 50 percent of AtlanticRichfield from 1967 through 2000 to BP (the other 50 percent is allocated to Phillips Petroleum -- now ConocoPhillips -- which acquired ARCO's Prudhoe Bay operations in Alaska in 2000).

ARCO 1999 production (OGJ 2000): 228 million bbl, of which we allocate half to BP and half to ConocoPhillips.

Cell: AD13

Comment: Rick Heede:

BP and ConocoPhillips are each allocated 50 percent of ARCO's natural gas production from 1967-1999.

ARCO 1998: 768 billion cf.

ARCO 1999 gas production (OGJ 2000): 868 billion cf.

Cell: J19

Comment: Rick Heede:

Anglo-Persian Oil Company, Limited

Notes from Peter Roderick 6Nov06, from:

The 5th Ordinary GM, 30 Nov 1914, re yr ended 31 March 1914 Speech of Chairman, Mr Charles Greenway.

"As to the position of the Fields, I am pleased to say that this continues as satisfactory as ever. Practically the whole of the oil delivered to us by our producing Companies during the past twelve months has been obtained from two only of their wells.... Well No.F.... still continues to give a production of 7,500 barrels daily - equivalent to about 450,000 tons per annum..."

Note by CMS: this is a curious quantification inasmuch as the 7,500 bbl per day equal annual production of 2.738 million bbl, which, if metric tonnes, = 373,465 tonnes, if short tons then 411,671 tons. In other words, the bbl to ton conversion used by Mr. Greenway is a ton 1.205 times metric tonne. Perhaps the Anglo-Persian accounting department used Imperial gallons (1 imp gal = 1.20095 US gallons), which is non-standard (the barrel equals 42 US gallons and is a measure originating in the oilfields of Pennsylvania).

"With regard to the present refinery..... You will remember that last year the figures given showed a gradual increase in throughput from a monthly average of 1,344,000 gallons for the quarter which ended in December, 1912, to 2,890,000 gallons for the quarter which ended in September 1913. To show the progress since that date I mention that the throughput -

For the 3 months ended December last averaged 3,200,000 gallons monthly.

For March: 4,169,000 gallons monthly

For June: 4,911,000 gallons monthly

For September: 7,287,000 gallons monthly

Whilst for the month of October it was 7,410,000 gallons."

CMS uses the field production data above, which references production of 7,500 bbl per day in one of two producing fields. Since a total is not given, CMS assumes total average production of 12,000 bbl per day, or 4.38 million bbl in 1913. CMS interpolates between 1913 and 1918. CMS disregards the refinery throughput data since it does not reference whether Anglo-Persian's own production is being refined.

Cell: D22

Comment: Rick Heede:

CMS assumes that reported crude oil production is given in long (Imperial) tons; 1 metric tonne = 1.016047 imp tons.

Cell: H23

Comment: Rick Heede:

Standard Oil of Indiana started acquiring stock in Midwest Refining Company in 1920. Midwest owned production wells, refineries, and pipelines in Wyoming; Standard also owned a cracking plant at Casper.

Cell: I23

Comment: Rick Heede:

Standard acquired a 27.3 percent interest in Pan American Petroleum & Transport Company in 1925 (150,000 of 550,000 shares). Pan American had very productive wells in Mexico's Golden Lane, in Venezuela, and a five percent share in Iraq Petroleum Company, plus a shipping fleet, pipelines, refineries, etc. It was a perfect match for Standard's strong marketing network acquired for \$3 million direct (plus \$1.5 million owned by its directors).

Cell: L23

Comment: Rick Heede

Standard Oil (Indiana) was established out of the Standard Oil Company by the Supreme Court's 1911 dissolution order. While Standard Oil (Indiana) was one of the largest oil products refiners and retailers in the country, the company did not have oil production properties until after World War One, when rising gasoline demand squeezed oil supplies and Standard found it difficult to secure supply contracts. Standard first acquired Dixie Oil Company in 1919, and Midwest in 1920, and by 1929 the company reported oil production of ~62 million bbl.

Data for Standard Oil (Indiana) for 1929-1951 from Giddens, Paul (1955) Standard Oil Company (Indiana): Oil Pioneer of the Middle West, pp. 562, 610, 655. Crude production data for 1929-1937 is estimated from a bar graph (Giddens, p. 562); subsequent data is from Standard's annual reports.

Natural gas data only for 1947-1951.

Oil data 1945-1951 include NGLs.

Note: Standard Oil (Indiana) annual report for 1951, with data for 1949-1951, show slightly lower crude plus NGL net production data (and much higher gross production data). Consequently, we use published Standard Oil data for 1949 and thereafter, and Giddens data for 1929 through 1948.

Cell: D24

Comment: Rick Heede:

Annual reports of Anglo Persian, courtesy of Peter Roderick at Guildhall Library in London (historical collections).

Cell: J24

Comment: Rick Heede:

Anglo Persian's production in 1918 through 1924 is from annual reports (Guildford Library in London, courtesy of Peter Roderick). Also annual report 1930-1949, with interpolation for missing data years 1925-1929, inclusive.

CMS converts long tons to million bbl per year (1 tonne = 1.016047 long tons, 1 tonne = 7.3 barrels).

Cell: F25

Comment: Rick Heede:

Standard acquired Dixie Oil Company in 1919. Standard's chairman Robert W. Stewart led an effort during tightening oil supplies after World War One to acquire crude oil supplies. Dixie was the first acquisition, and was producing ~500 bbl per day, chiefly in Louisiana, but production rose to 0.2344 million bbl in 1920 and to 0.3887 million bbl per yr in 1922. Giddens, 1955, p. 218.

Cell: L25

Comment: Rick Heede:

Standard Oil Company (Indiana) was not a crude producer until the acquisition of Dixie Oil in 1919, followed by equity interest in Midwest and Pan American. Oil production for 1918-1928 is taken from Giddens and calculated in columns F, H, and I.

Cell: H26

Comment: Rick Heede:

Standard acquired a minority interest in Midwest in 1920, when Midwest controlled 65 percent of Wyoming oil production, which totaled 16.83 million bbl in 1920 (=16.831*0.65*0.38). By 1923, Standard had increased its equity interest to 99.5 percent (=26.715*0.65*0.995). By 1922, Wyoming produced 26.7 million bbl, stated as a 38 percent increase over 1921. does not account for increased production by Midwest. Giddens, p. 220 and 221.

OilGasAdnoc_Encana.xls

Cell: N28

Comment: Rick Heede:

CMS allocates 50 percent of Richfield and later ARCO production to British Petroleum, and the other 50 percent to ConocoPhillips. These companies each acquired significant assets from ARCO. An asset allocation has not been done; instead we have assumed an equal allocation to each company.

Cell: D30

Comment: Rick Heede:

Anglo-Persian, 1924: Speech of Sir Charles Greenway, Bart., Chairman of the Anglo-Persian Oil Company, to the 15th Ordinary General Meeting of the company on 25th November 1924 at Wichester House, Old Broad Street, London. Greenway projects 1924/1925 production "should be between 4.25 and 4.5 million tons." CMS thus uses the average (4.375 Mt). CMS interpolates from 1925-1929.

Cell: N32

Comment: Rick Heede:

Richfield Oil Company of California (1927 and 1928 AnnRptso, p.5) reports oil production for 1926-1928 as well as gasoline sold 1924-1927. On the basis of gasoline sold as a proportion of oil produced in 1926 (0.7630), we estimate oil production for 1924 (1.151 million bbl sold / 0.7630 = 1.509 million bbl produced) and 1925 (2.036 million bbl sold / 0.7630 = 2.668 million bbl produced). Note: this is may be slightly inflated in view of a 1926 statement (1926, p.5) that "the Company is producing between 50% and 60% of the crude oil required in its operations. However, since data given in the 1928 report shows considerable excess production over sales in 1926-1928, we ignore making any adjustments to the estimated production for 1924 and 1925.

Cell: I33

Comment: Rick Heede:

Standard acquired 290,000 shares from two other minority shareholders in Pan American (Blair & Company and Shermar Corporation), clearing the way "for Standard to secure complete control of Pan American Petroleum & Transport." Giddens, 1955, p. 247. While CMS does not have complete information on Standard's ownership share (lacking information on total shares issued), but assuming the original issuance of 550,000 shares, Standard now has (150,000 + 290,000)/550,000 = 80.72 percent equity interest. CMS also assumes the same production level by Pan American -- 150,000 bbl per day -- 1927 and 1928 as in 1925, which is most likely a conservatism.

Cell: F34

Comment: Rick Heede:

Standard Oil transferred its Kansas oil producing properties to Dixie in 1926. "By 1928 it had more than 105,000 acres of promising oil lands in Louisiana and Texas and in the Mid-Continent field, which produced 10,167 bbl per day." Giddens, p. 219. Since Giddens does not specify production of all of Dixie's oil properties, CMS assumes that Dixie's total production is twice that of its Mid-Continent field.

Cell: L35

Comment: Rick Heede:

Standard Oil (Indiana) "net crude production of Standard and subsidiaries 1929-1944" in Giddens (1955) Standard Oil Company (Indiana): Oil Pioneer of the Middle West, p. 562. (CMS uses 1929-1937, thereafter annual reports.)

Cell: N35

Comment: Rick Heede:

Richfield 1929 Ann Rpt, p.5, shows 14.515 million bbl (Richfield) and 3.555 million bbl (Universal Consolidated Oil Company, in which Richfield acquired a 51 percent interest in 1929 (we assume equity production is reported); total = 18.07 million bbl.

Cell: D36

Comment: Rick Heede:

Oil production for 1930-1950 from Bamberg (1994) History of BP 1928-1954, pp. 69, 242, 352. Original data in million tons (presumably long tons; 1 metric tonne = 1.016047). Conversion at 7.33 bbl per tonne (tons*7.33*1.016047). In the 1930 Anglo-Persian report mentions that the "net production of oil from Masjid-Suleiman was approximately 5.5 million tons -- the rate of production differing little from that of the preceding year." CMS has no data on Anglo-Persian's production of crude oil from its other fields, eg., in Indonesia or elsewhere in Persia or Mesopotamia, hence we have no basis for increasing Bamberg's estimate.

Cell: N36

Comment: Rick Heede:

In lieu of having Richfield oil production data for 1930-1937 (lacking copies of annual reports for those years, we apply sequential interpolation using the known Standard Oil (Indiana) production decline 1930-1937 as follows: 1930: =N27/(L27/L28), 1931: =N28/(L28/L29), etc.

Note: This production decline is due to the onset of Depression as well as the resulting mayhem of excessive production capability and the "voluntary curtailment and proration" promulgated by Harold Ickes through state-by-state agreement to balance production with demand as suggested each year by the Bureau of Mines (and formalized in the 1935 Interstate Oil Compact). See Yergin (1991) The Prize, pp. 156ff and 263ff for the global "As-Is" Agreement to curtail production agreed to by oil executives at Achnacarry in Scotland based on each company's market shares in 1928.

Cell: E37

Comment: Rick Heede:

This needs to be ascertained. CMS has not verified the use of metric or english units in commerce of the day. Even though the metric system was recognized in the British Empire in 1873, the general use thereof did not take hold until the 1950s (and 1970s in Australia and New Zealand). Britain established the Imperial system in 1845.

Anglo-Persian does not specify the units it employs to convey quantities, and its 1914 GM notes puts forth that "7,500 bbl per day = ~450,000 tons per annum." This means a ton 1.2 as heavy as a metric tonne, which is a definition unknown to us. See Column J, 1914, cell note at J21 for discussion.

Cell: AC38

Comment: Rick Heede:

Amoco natural gas production is estimated for 1932-1946 on the basis of average growth of 11.71 percent per annum from 1947-1956 and applied to 1932-1946.

Cell: L44

Comment: Rick Heede:

Standard Oil Company (Indiana) Annual Report 1938, p.17, shows net crude oil production for 1938 only. The company reports operating 73 gas wells but does not report gas production; (4,091 oil wells).

Cell: M44

Comment: Rick Heede:

CMS allocates 50 percent of Atlantic and later ARCO production to British Petroleum, and the other 50 percent to ConocoPhillips. These companies each acquired significant assets from ARCO. An asset allocation has not been done; instead we have assumed an equal allocation to each company.

Cell: N44

Comment: Rick Heede:

Richfield Oil Corporation 1939 Annual Report. Data for 1939: 7.174 million bbl before royalty and 5.595 million bbl after royalty production; we use this latter net production datum.

Cell: K45

Comment: Rick Heede:

Standard Oil Company (Ohio) Annual Report 1948, pp. 14-15, shows "net production - crude oil and other liquid hydrocarbons" for 1939 through 1948. This operating summary does not report production (or sales) of natural gas, nor of gas wells owned.

Cell: L45

Comment: Rick Heede:

Standard Oil Company (Indiana) Annual Report 1938, p.14, reports net crude oil production. A bar chart shows "crude oil production" (as well as runs to stills and sales); CMS concludes that the Giddens data appears to be in close agreement with this crudely sketched chart and we use the Giddens data for crude oil production from 1929 through 1937.

Cell: F46

Comment: Rick Heede:

Standard Oil Company (Indiana) Annual Report 1940, reports net crude oil production.

Cell: L46

Comment: Rick Heede:

Standard Oil Company (Indiana) Annual Report 1940, reports net crude oil production.

Cell: G47

Comment: Rick Heede:

Data for 1941-1950 "total production, including LPG) from: Atlantic Refining Company (1951) Annual Report for the Year Ending 31Dec 1950, operating data tables. (Added 14March06.)

Data for "net production" vs "total production," 1941-1950:

1941: 15.1 thousand bbl per day vs 41.345

14.5 thousand bbl per day

17.7 thousand bbl per day

24.6 thousand bbl per day

24.8 thousand bbl per day

23.6 thousand bbl per day

24.3 thousand bbl per day

27.7 thousand bbl per day

25.8 thousand bbl per day

1950: 30.3 thousand bbl per day vs 82.974 k bb/ d

* No explanation for why these data are so different. Later annrpts only report total production, which is never called gross production. In order to make data the same units and type, we use total production here for 1941-1950. Typically, net production is in the range of 0.7 to 0.9 of gross production, for Atlantic in 1950 it is apparently 0.365.

Cell: L47

Comment: Rick Heede:

Standard Oil Company (Indiana) Annual Report 1941, reports net crude oil production. Does not report NGL, or natural gas production.

Cell: L48

Comment: Rick Heede:

Standard Oil Company (Indiana) Annual Report 1943, reports net and gross crude oil production. While the company owns 6,114 oil wells and 190 gas wells, no gas production is reported. The company does report purchases of crude oil of 110.2 million bbl in 1943, and gross oil production of 58.56 million bbl (net is thus 0.870 of gross in 1943).

Cell: N48

Comment: Rick Heede:
Richfield reports 9.3 million gross production and 7.2 million bbl net (0.774).

Cell: N49

Comment: Rick Heede:
Richfield Oil Corporation does not report gross or net production for 1943 but does report net production of 8.236 million bbl in 1944, "an increase of approx 11% over ... 1943." This is used to estimate net production in 1943; production is halved in order to allocate half to BP and half to ConocoPhillips.

Cell: L50

Comment: Rick Heede:
Standard Oil Company (Indiana) Annual Report 1945, reports net (64.69 million bbl) and gross (74.01 million bbl) crude oil production. While the company owns 6,813 oil wells and 236 gas wells, no gas production is reported. The company does report purchases of crude oil of 130 million bbl in 1945; net is oil production is 0.874 of gross in 1945). Standard also reports "natural gasoline produced" of 0.70 million bbl in 1945, which CMS adds to reported crude oil production.

Cell: O50

Comment: Rick Heede:
ARCO acquired Sinclair Oil Corporation in 1969, and since half of ARCO is allocated to both BP and Conoco half of Sinclair is also allocated to each BP and Conoco. Also see notes under columns for Atlantic Oil, ARCO, and Richfield Oil.

Cell: N51

Comment: Rick Heede:
Richfield Oil Corp does not (in our partial copy of the Annual report) show gross or net production for 1945. Refinery runs are shown, however, and we use the net production/refinery run relationship for the year known (1944: 8.236 net prod'n/25.598 refinery runs = 0.3217) times the reported refinery runs for 1945 (25.691 million bbl times 0.3217 = 8.266 million bbl estimated net production in 1945).

Cell: L52

Comment: Rick Heede:
Standard Oil Company (Indiana) Annual Report 1947, reports net (71.81 million bbl) and gross (83.73 million bbl) and "operated" (92.39 million bbl) crude oil production. While the company owns 7,772 oil wells and 579 gas wells, no gas production is reported. The company does not report purchases of crude oil for 1947 but does report refinery runs of 135 million bbl for the year; net is oil production is 0.858 of gross in 1947). Standard also reports "natural gasoline produced" of 0.93 million bbl in 1947, which CMS adds to reported crude oil production.

Cell: N52

Comment: Rick Heede:
Richfield 1946 rpt: net interest of 8.978 million bbl net production, equally allocated to BP and ConocoPhillips. Net equals 0.794 of grss (11.305 million bbl).

Cell: O52

Comment: Rick Heede:
Sinclair Oil Corporation Annual Reports for 1950, 1951, 1959, 1965, and 1968 typically shows domestic and international net production of crude oil, NGLS, natural gasoline, and LP (none of which are summed in the reports, but CMS has done so). Sinclair's total liquids net production in 1946 was 40.652 million bbl, rose to 64.736 million bbl in 1959 and to 110.06 million bbl in 1968. Half of this, as explained above, is allocated to BP and half to ConocoPhillips for each company's acquisition of ARCO assets.

Cell: N53

Comment: Rick Heede:
Richfield Oil Corporation (1956) Annual Report, 1955, p.24-25, shows "production of crude oil--net barrels" for 1946-1955. Half allocated to each BP and ConocoPhillips. Richfield has historically both refined and sold far larger quantities than own production. For example, 1955 net production totaled 20.729 million bbl, refined 44.508 million bbl, and sales totaled 50.876 million bbl.

Cell: W53

Comment: Rick Heede:
Giddens (1955), p. 655. Gas data for 1945-51 only (in thousand cubic feet per day). Note: we use Standard Oil (Indiana) Annual reports for 1949 fwd; Giddens data is 400 k cf / day for 1949, 550 in 1950, and 700 in 1951, i.e., both higher and lower than SO actual data.

Cell: L54

Comment: Rick Heede:
Production data from Giddens, to which CMS adds 1 million bbl of natural gasoline production (estimated).

Cell: F55

Comment: Rick Heede:
Standard Oil Company (Indiana) Annual Report 1953, Five-Year Operating Summary; data in net production of crude oil and natural gas liquids, kbbbl / day.

Cell: W55

Comment: Rick Heede:
Standard Oil Company (Indiana) Annual Report 1953, Five-Year Operating Summary; data in net production of natural gas, thousand cf / day converted to million cf / d.

Cell: D56

Comment: Rick Heede:
Bamberg (2000) British Petroleum and Global Oil 1950-1975, Fig. 1.1 shows BP's sources of crude oil production 1950-1954 in kbbld (850, 670, 520, 660, 740 kbbld, respectively).

Cell: E56

Comment: Rick Heede:
Standard Oil Company (Ohio) Annual Report 1959, pp. 22-23, shows "net production - crude oil and other liquid hydrocarbons, barrels per day" for 1950 through 1959. This operating summary does not report production (or sales) of natural gas, nor of gas wells owned; a few (four to eight) gas wells are reported drilled each year, however.

Cell: J56

Comment: Rick Heede:
Data for 1950, 1955, 1960, 1965, and 1970 inferred from a chart comparing crude oil production 1950-1970 (five-year "datums").
Bamberg (2000) British Petroleum and Global Oil 1950-1975, Fig. 9.1 (p. 221) shows BP's sources of crude oil production 1950-1954 in kbbld.

Cell: G57

Comment: Rick Heede:
Atlantic (1953) Annual Report for 1952. Data for "crude oil production, bbbld".

Cell: F59

Comment: Rick Heede:
Standard Oil Company (Indiana) Annual Report 1962, Ten-Year Operating Summary; data in net production of crude oil and natural gas liquids, kbbbl / day.

Note: 1961 net = 0.695 of gross, which translates to a yearly total of and 185.1 million bbl gross and 128.6 million bbl net. The disposition of this 56.5 million bbl difference is not known, but is presumably royalty production and some company use.

Cell: G59

Comment: Rick Heede:
Atlantic (1955) Annual Report for 1954. Data for "crude oil production, bbbld".

Cell: W59

Comment: Rick Heede:
Standard Oil Company (Indiana) Annual Report 1962, Ten-Year Operating Summary; data in net production of natural gas, thousand cf / day. Gross gas production is not given in any AnnRpt reviewed; the company markets more gas than it produces (esp after 1950).

Cell: Y60

Comment: Rick Heede:
Richfield Petroleum reports natural gas sales (not production, net or gross) for 1955 through 1964. No gas production is mentioned or listed in prior years' annual reports.

Cell: AE60

Comment: Rick Heede:
Richfield Petroleum reports natural gas sales (not production, net or gross) for 1955 through 1964. No gas production is mentioned or listed in prior years' annual reports.

Cell: AF60

Comment: Rick Heede:
ARCO acquired Sinclair Oil Corporation in 1969, and since half of ARCO is allocated to both BP and Conoco half of Sinclair is also allocated to each BP and Conoco. Also see notes under columns for Atlantic Oil, ARCO, and Richfield Oil.

Cell: G61

Comment: Rick Heede:
Atlantic (1957) Annual Report for 1956. Data for "crude oil production, bbl per day, net." No discussion of apparent change from total to net production.

Cell: N61

Comment: Rick Heede:
Richfield Oil Corporation (1965) Annual Report for 1964, pp. 26-27, shows net (as well as gross) production of crude oil, domestic plus foreign, to which we add net NGL production.
Net crude equals 0.679 of gross in 1955 and 0.711 of gross in 1964 (which means that we do not estimate carbon emissions from nearly 33 million bbl in 1964, some of which is, however, estimated in company own energy use).
Note: Richfield states that "certain figures for prior years are restated to include all subsidiaries," which may account for the net production in 1955 having been significantly increased from 20.729 million bbl to 65.496 million bbl. We do not have data to revise prior years' net
OilGasAdnoc_Encana.xls

production.

Cell: D62

Comment: Rick Heede:
Crude oil production for 1956 and 1957 from BP Ltd (1960) Annual Report and Accounts for 1959. Converted from long tons to million bbl/yr in column J.

Cell: J62

Comment: Rick Heede:
Converted from BP data in long tons: long tons x 7.3 bbl per metric tonne x 2240 lbs per long ton / 2204.6 lbs per metric tonne.

Cell: AF62

Comment: Rick Heede:
For natural gas production data sources, see Sinclair oil column.

Cell: G63

Comment: Rick Heede:
Atlantic (1959) Annual Report for 1958. Data for "crude oil production, bbl per day, net."

Cell: AD63

Comment: Rick Heede:
CMS allocates 50 percent of Atlantic, Richfield, and ARCO production to British Petroleum, and the other 50 percent to ConocoPhillips. These companies each acquired significant assets from ARCO, although an asset allocation has not been done; instead we have assumed an equal allocation to each company.

Cell: D64

Comment: Rick Heede:
Crude oil production for 1958-1965 from BP (1969) Annual Report, p. 32 bar graph by year (estimated). Accuracy +/- 2 percent.

Cell: J64

Comment: Rick Heede:
SALES of crude oil and products 1958, 1960, 1962, 1964, 1966, and 1968 in Bamberg (2000), p. 396. Entered provisionally (in italics) until we get production data.

Cell: X64

Comment: Rick Heede:
What is shown below, however, is all of Atlantic's, Richfield's, and ARCO's natural gas sales. Estimates are allocated equally to BP and ConocoPhillips in the annual total column (Bcf/yr), in this case column AA.

Cell: G65

Comment: Rick Heede:
Atlantic (1961) Annual Report for 1960. Data for "crude oil production, bbl per day." No mention of "total" vs "net" production.

Cell: E66

Comment: Rick Heede:
Standard Oil Company (Ohio) Annual Report 1969, pp. 30-31, shows "net production - crude oil and condensate, barrels per day" for 1960 through 1969. Natural gas production is also (finally) reported.

Cell: V66

Comment: Rick Heede:
Standard Oil Company (Ohio) Annual Report 1969, pp. 30-31, shows "net production of natural gas" is also (finally) reported (not reported in in 1959 reports or earlier, even though gas well completions were reported).

Cell: X66

Comment: Rick Heede:
Gas sales data first appeared in Atlantic's 1961 annual report with sales data for 1960. No trace of previous years' sales. Data not reported for production, but only sales.

Cell: D67

Comment: Rick Heede:
Bamberg (2000) British Petroleum and Global Oil 1950-1975, Fig. 6.1 shows comparative 1961 production by seven sisters by region: SONJ (2.7 million bbl/d), Shell (2.1 Mbbl/d), BP (1.6 Mbbl/d), Gulf (1.6 Mbbl/d), Texaco (1.5 Mbbl/d), Socal (1.1 Mbbl/d), and Socony-Mobil (0.85 Mbbl/d). BP = 584 million bbl for the year.
Note: we use the BP data series from its Annual Report for 1968, which, for 1958-1968 p. 32, shows BP crude oil production in million bbl/yr. The original data is in chart form, however, and are thus estimates within +/- 2 percent. Data presumably excludes NGL (if any).

Cell: G67

Comment: Rick Heede:
Atlantic (1963) Annual Report for 1962. Data for "crude oil production, bbl per day." No mention of net prod'n.

Cell: F68

Comment: Rick Heede:
Standard Oil Company (Indiana) Annual Report 1971, Ten-Year Operating Summary; data in net production of crude oil and natural gas liquids, kbbl / day.

Cell: G68

Comment: Rick Heede:
Data for 1962-1966 in Atlantic Refining (1967) Annual Report for 1966. This report shows "North America (net)" and "Foreign gross" as well as "net", but totals North America (net) and Foreign (gross). CMS instead reports North America (net) plus "Foreign (net)." The reason or protocol for such obscure reporting by a major oil company is unknown. We use this revised sum for all years 1962 through 1966, previous incomplete reporting notwithstanding.

Previous data for 1962-1966 (presumably revised to show all subsidiaries and acquisitions):

1962:	179.4 thousand bbl per day (1966 report: 275.4 k bbl per day)
	182.4 thousand bbl per day
	213.7 thousand bbl per day
	222.6 thousand bbl per day
1966:	200.6 thousand bbl per day (1966 report: 302.7 k bbl per day).

Cell: N68

Comment: Rick Heede:
Richfield's net production from 1962 through 1964 is accounted for in the AtlanticRichfield (ARCO) annual report for 1966. Hence we exclude Richfield's production for 1962 (91.556 million bbl), 1963 (92.093 million bbl), and 1964 (88.017 million bbl) -- half of each allocated to BP and Conoco.

Cell: W68

Comment: Rick Heede:
Standard Oil Company (Indiana) Annual Report 1971, Ten-Year Operating Summary; data in net production of natural gas. Gas sold is roughly equal to gas produced for this period.

Cell: X68

Comment: Rick Heede:
Natural gas sales in North America and Foreign reported in separate columns (previous reports only reported Gas sales in North America (e.g., 568.2 million cf / day in 1962). Data for 1962-1966 from Atlantic Refining (1967) Annual Report 1966.

North America only,	1962:	568.2 million cf / day
	1963:	623.8 million cf / day
	1964:	642.7 million cf / day
	1965:	716.5 million cf / day.

Cell: X70

Comment: Rick Heede:
"Natural gas sales, North America." Atlantic Annual report for 1964.

Cell: X71

Comment: Rick Heede:
CMS assumes that Atlantic Richfield combines Atlantic & Richfield natural gas sales 1965 fwd; previous years' sales are for each company separately.

Cell: D72

Comment: Rick Heede:
Oil production 1966-1976 from BP (1977) Annual Report.

Cell: G73

Comment: Rick Heede:
Atlantic Richfield (1969) Annual Report for 1968. Data combines North America (net) and Foreign (net) production.

Cell: X73

Comment: Rick Heede:
Atlantic Richfield (1069) Annual Report 1968. Unlike previous reports, which included foreign natural gas sales, this reports only North America.

Cell: G75

- Comment:** Rick Heede:
Atlantic Richfield (1971) Annual Report for 1970. "Crude oil and NGL production, in bbl per day (net)" summing North American and Foreign data (not summed in report).
- Cell:** E76
- Comment:** Rick Heede:
Standard Oil Company (Ohio) Annual Report 1979, Operating Statistics, shows "net production - crude oil and natural gas liquids, barrels per day" for 1970 through 1979. The large production jump in 1977 is probably North Slope operations coming on line.
- Cell:** V76
- Comment:** Rick Heede:
Standard Oil Company (Ohio) Annual Report 1979, Operating Statistics, shows "net production of natural gas" for 1970 through 1979.
- Cell:** AN76
- Comment:** Rick Heede:
Natural gas production for 1980-1984 from Standard Oil (Indiana) (1985) Annual Report, p. 50.
- Cell:** F77
- Comment:** Rick Heede:
Standard Oil Company (Indiana) Annual Report 1975, Five-Year Operating Summary; data in net production of crude oil and natural gas liquids, kbbl / day.
- Cell:** G77
- Comment:** Rick Heede:
Atlantic Richfield (1973) Annual Report for 1972. "Crude oil and NGL production, in bbl per day (net)" summing North American and Foreign data (not summed in report).
- Cell:** W77
- Comment:** Rick Heede:
Standard Oil Company (Indiana) Annual Report 1975, Five-Year Operating Summary; data in net production of crude oil and natural gas liquids, kbbl / day.
- Cell:** U78
- Comment:** Rick Heede:
BP gas sales.
- Cell:** G79
- Comment:** Rick Heede:
Atlantic Richfield (1975) Annual Report for 1974. "Crude oil and NGL production, in bbl per day (net)" summing United States and Foreign data (not summed in report).
- Cell:** X79
- Comment:** Rick Heede:
Atlantic Richfield (1975) Annual Report for 1974. Natural gas sales US only. No mention of foreign production or sales.
- Cell:** F81
- Comment:** Rick Heede:
Oil production (net) for 1975-1979 from Standard Oil (Indiana) (1980) Annual Report, p. 47.
- Cell:** G81
- Comment:** Rick Heede:
Atlantic Richfield Company (1977) Annual Report for 1976. "Crude oil and NGL production, in bbl per day (net)" summing United States and Foreign data (not summed in report).
- Cell:** W81
- Comment:** Rick Heede:
Gas production for 1975-1979 from Standard Oil (Indiana) (1980) Annual Report, p. 47.
- Cell:** X81
- Comment:** Rick Heede:
Atlantic Richfield (1977) Annual Report for 1976. "Natural gas sales United States, million cf per day."
- Cell:** G82
- Comment:** Rick Heede:
ARCO annual report 1980 shows "crude oil and NGL production - net bbl per day" for 1976-1980.
CMS shows total ARCO liquids production in this column, but attributes half of the total to each BP and ConocoPhillips in the ARCO column reporting total annual production in million bbl yr.
- Cell:** X82
- Comment:** Rick Heede:
ARCO annual report 1980, p. 54, shows "natural gas sales, domestic and foreign, million cf per day," for 1976 - 1980.
- Cell:** D83
- Comment:** Rick Heede:
British Petroleum Company Annual Report, 1981, p. 20, shows "group crude oil sources" 1977-1981, in thousand bbl per day.
- Cell:** U83
- Comment:** Rick Heede:
British Petroleum Company Annual Report, 1981, p. 20, shows "group sales of natural gas" 1977-1981, in million cubic metres per day (10.1, 10.9, 9.4, 8.7, and 9.8 million Cm /d, respectively), converted to million cf /day at 35.135 cf per cubic meter.
- Cell:** AP84
- Comment:** Rick Heede:
Our photocopy of BP annual report for 1978 might be missing pages on which coal sales or production is stated.
- Cell:** AP85
- Comment:** Rick Heede:
BP annual report for 1983, p. 53, reports coal sales in million tonnes for 1979-1983.
- Cell:** K86
- Comment:** Rick Heede:
Sohio data is interpolated for 1980-1983.
- Cell:** U86
- Comment:** Rick Heede:
British Petroleum Company PLC annual report, 1984, shows natural gas sales, in million cubic feet per day, for both BP group and Sohio, separately. CMS enters these data in BP and Sohio columns, respectively.
- Cell:** G87
- Comment:** Rick Heede:
ARCO annual report 1983 shows "crude oil and NGL production - net bbl per day." CMS shows total ARCO liquids production in this column, but attributes half of the total to each BP and ConocoPhillips in the ARCO column reporting total annual production in million bbl yr.
- Cell:** W87
- Comment:** Rick Heede:
Gas data for 1981-1984 from Amoco (1986) AnnRpt 1985.
- Cell:** X87
- Comment:** Rick Heede:
ARCO annual report 1983, p. 1, shows "natural gas sales, million cf per day," for 1981-1983.
- Cell:** AM87
- Comment:** Rick Heede:
ARCO annual report 1983 shows coal shipments 1981-1983.
- Cell:** AM89
- Comment:** Rick Heede:
Coal shipment data (which we take as equivalent to production) for 1984-1987 from ARCO (1988) Annual Report 1987, p. 60.
- Cell:** G90
- Comment:** Rick Heede:
ARCO data
- Cell:** K90
- Comment:** Rick Heede:
Oil & Gas Journal OGJ400 for 1984, 1985, and 1986. OGJ lists the company as "Standard Oil Company" and "Standard Oil Company (Ohio)."

Cell: X90

Comment: Rick Heede:
ARCO annual report 1986, Highlights, shows "natural gas sales, million cf per day," for 1984-1986.

Cell: AA90

Comment: Rick Heede:
Gas SALES data 1984-1985 from BP (1986) AnnRpt. No production data available.

Cell: AB90

Comment: Rick Heede:
Oil & Gas Journal OGJ400 for 1985, 1986, and 1987 (our photocopy of 1984 is missing the first 153 company listings, and the Table on "The Top 20 in US and World Gas Production," page 96, does not list Standard Oil Company (Sohio), unlike the following years. The upshot is that we cannot resolve the discrepancy in gas production between 1985 (525 Bcf) and 1986 (85.5 Bcf).

Cell: AP90

Comment: Rick Heede:
BP annual report for 1988, p. 60, reports coal sales in million tonnes for 1984-1988.

Cell: L91

Comment: Rick Heede:
Oil production 1985-2003 from Oil & Gas Journal (various) OGJ Databook.

Cell: AC91

Comment: Rick Heede:
Oil & Gas Journal (various) OGJ100 or OGJ200 natural gas production estimates.

Cell: D92

Comment: Rick Heede:
Oil production plus NGLs for 1986-1990 from BP (1991) Annual Report, p. 7 (Summary Statistical Information).

Cell: J92

Comment: Rick Heede:
Oil production plus NGLs for 1986-1990 from BP (1991) Annual Report, p. 7 (Summary Statistical Information).

Cell: U92

Comment: Rick Heede:
Natural gas production for 1986-1990 from BP (1991) Annual Report, p. 7 (Summary Statistical Information).

Cell: G93

Comment: Rick Heede:
ARCO data.

Cell: X93

Comment: Rick Heede:
ARCO annual report for 1988, p.1 Highlights, shows "natural gas sales, million cf per day," for 1987 - 1988.

Cell: AM94

Comment: Rick Heede:
Atlantic Richfield Annual Report for 1992, p. 1, shows "annual coal shipments" for 1988-1992.
Keystone Coal Industry Manual for 1993, p. 372, shows 1991 production data for ARCO at 32.6 million tons, and 26.9 million tons in 1988.

Cell: G95

Comment: Rick Heede:
ARCO annual report 1993 shows "crude oil nd NGL production - net bbl per day" for 1989-1993.
CMS shows total ARCO liquids production in this column, but attributes half of the total to each BP and ConocoPhillips in the ARCO column reporting total annual production in million bbl yr.

Cell: M95

Comment: Rick Heede:
ARCO annual report 1993 shows domestic and foreign net liquids production for 1989-2003; these data confirm the O&GJ data entered here. Note that ARCO production is equally divided to BP and ConocoPhillips.

Cell: X95

Comment: Rick Heede:
ARCO annual report for 1993, p.1 Highlights, shows "natural gas sales, domestic and foreign, in million cf per day," for 1989 -1993. These years, as well as years reported above, is all of Atlantic's, Richfield's, and ARCO's natural gas sales. Estimates are allocated equally to BP and ConocoPhillips in the annual total column (Bcf/yr), in this case column AA.

Cell: K96

Comment: Rick Heede:
CMS has not found any BritOil annual reports (fruitless search for electronic copies online).

Cell: J97

Comment: Rick Heede:
Data 1990-1999 from OGJ100 databooks.

Cell: AA97

Comment: Rick Heede:
Sources: OGJ100 for 1990-1999, estimates 2000-2004 are from BP's annual report 2004.

Cell: AM99

Comment: Rick Heede:
ARCO annual report 1993, Highlights, shows "coal shipments" for 1989-1993 in million tons; in 1993, 10.2 million tons foreign and 37.5 million tons domestic.

Cell: AD100

Comment: Rick Heede:
Oil & Gas Journal (various) OGJ100 or OGJ200 natural gas production estimates.

Cell: AM100

Comment: Rick Heede:
EIA Coal Industry Annual 1994, p. 23.

Cell: AM101

Comment: Rick Heede:
EIA Coal Industry Annual 1995, p. 24.

Cell: D102

Comment: Rick Heede:
BP Annual Report for 2000, p. 68, crude oil production "net of royalties" for 1996 through 2000. The BP report does not clearly state whether NGLs are included or excluded.
Geography of BP crude oil production in 2000: UK (534 k bbl per day), USA (729 k bbl per day), and other (665 k bbl per day), total (1,928 k bbl per day).

Cell: U102

Comment: Rick Heede:
BP Annual Report for 2000, p. 68, natural gas production "net of royalties."

Cell: AM102

Comment: Rick Heede:
EIA Coal Industry Annual 1997, p. 23, ARCO 51.013 million tons.

Cell: AM103

Comment: Rick Heede:
No data in Keystone Coal Industry Manual. ARCO 1997 coal production from EIA Coal Industry Annual 1997, p. 23.

Cell: M104

Comment: Rick Heede:
We allocate 50 percent of AtlanticRichfield from 1967 through 2000 to BP (the other 50 percent is allocated to Phillips Petroleum -- now ConocoPhillips -- which acquired ARCO's Prudhoe Bay operations in Alaska in 2000).
ARCO 1999 production (OGJ 2000): 228 million bbl, of which we allocate half to BP and half to ConocoPhillips.

Cell: AA104

Comment: Rick Heede:

BP production for 1998-2004 from BP Annual Report.
OGJ (2001) datum for BP gas is 2,095 Bcf in 1998. 1997 = 2,216 Bcf.

Cell: AM104**Comment:** Rick Heede:

Keystone (1999) states that "during 1998, Arch Coal purchased ARCO Coal Company."

Cell: M105**Comment:** Rick Heede:

No ARCO oil or gas production data in OGJ2001 or 2000 found.

Cell: AD105**Comment:** Rick Heede:

We allocate 50 percent of ARCO to BP and 50 percent to Phillips Petroleum, which acquired ARCO in 1999.
1999 ARCO total gas production = 868 Bcf.

Cell: J106**Comment:** Rick Heede:

Production estimates 2000-2004 are from BP's annual report 2004. The overlap in years 2000-2003 with Oil & Gas Journal's OGJ100 differ: OGJ are somewhat lower (690 in 2000, 677 in 2001, and 711 million bbl/yr in 2002) is due to O&GJ reporting net production "after royalties."
Production prior to 2000 is from Oil & Gas Journal.

Cell: K106**Comment:** Rick Heede:

http://en.wikipedia.org/wiki/Burmah_Oil_Company_Ltd. "The Burmah Oil Company was founded in Glasgow, Scotland in 1886 by David Sime Cargill to develop oil interests on the Indian subcontinent. It became an early and major shareholder in British Petroleum, so restricted its downstream interests to the subcontinent, where BP had no business. It played a major role in the oil industry in South Asia for about a century through its subsidiaries and in discovery of oil in the Middle East though its significant interest in British Petroleum. It marketed under the BOC brand in Burma, Pakistan and Assam (in India) and through a joint venture Burmah-Shell with Shell in the rest of India. Burmah Oil Company created mechanised drilling in Magwe Division's oil fields (Yenangyaung, Chauk, and Minbu). Until 1901, when Standard Oil Company began operating in Burma (also known as Myanmar), Burmah Oil Company was the sole oil company to operate in Burma. The company operated in Burma until 1963, when Ne Win nationalised all industries in the country. The company was involved in a landmark legal case, Burmah Oil Co. v Lord Advocate. In 1966, Castrol was acquired by Burmah, which was renamed Burmah-Castrol. In 2000, Burmah-Castrol was acquired by the then BP Amoco plc (now renamed BP plc). A two-volume history of the company was written by T.A.B. Corley: A history of the Burmah Oil Company, 1886-1924 (published 1983) and A history of the Burmah Oil Company. Vol 2, 1924-66 (published 1988)."
CMS has not reviewed the Corley works, and has not secured any Burmah annual reports (fruitless search for electronic copies online).

Cell: U106**Comment:** Rick Heede:

Data from BP (2005) Annual Report 2004, p. 108. Reported in kbbl/d.

Cell: AA106**Comment:** Rick Heede:

Data from BP (2005) Annual Report 2004, p. 108. Reported in kbbl/d.

Cell: H109**Comment:** Rick Heede:

BP Product emissions, www.bp.com/extendedsectiongenericarticle.do?categoryId=2011564&contentId=2017151. Viewed 8Apr05.
The CMS emissions estimates ignore BP's own assessment chiefly because BP is here estimating emissions from total marketed products, and CMS is estimating emissions only from each entity's net production. That said, we commend BP for its carbon "product stewardship" in this regard.
Quoted in full: "Methods for measuring and reporting operating emissions have evolved over several years. In 2003, we started developing a system for quantifying greenhouse gas (GHG) emissions from use of our products. In 2003 we also started developing a new way of measuring the positive impacts our cleaner products have on greenhouse gas (GHG) emission levels. This is vital because we believe that simply targeting an absolute reduction in emissions from our products would lead to the wrong outcome – cutting back production; including production of cleaner products.
Product GHG emissions in 2003. We estimate total emissions from use of BP products sold in 2003 at 1,298 million tonnes. We have assumed that 100% of carbon in our products was oxidised to carbon dioxide (CO₂). We have used this simplifying approach to ensure that the numbers presented are simple and clear. Our approach does not take into account the length of time that some of our products (including some petrochemicals, bitumen and lubricants) are in use, nor the post consumer treatment of the products.
We break down the emissions in the following way:
Coal (divested during 2003): 15 million tonnes CO₂
Fuels and lubricants: 590 million tonnes CO₂
Gas: 610 million tonnes CO₂
Petrochemicals: 83 million tonnes CO₂
These estimates indicate that GHG emissions from BP products sold (including coal, oil based products, gas and chemicals) are about 15 times greater than from BP operations. Emissions from products sold are greater than from the oil and gas we extract because we purchase additional oil and gas for refining, processing and retail." *
* Total: 1,298 million tonnes CO₂. (= 354 MtC; my CJP est 2001 = 120 MtC oil + gas only).

Cell: AN109**Comment:** Rick Heede:

BP Annual Report 2004, p.58, "In 2003, the group sold its 50% interest in Kaltim Prima Coal, an Indonesian company." No coal production data is reported. However, in BP's report on "BP Product emissions" (see www.bp.com/extendedsectiongenericarticle.do?categoryId=2011564&contentId=2017151) shows emissions from coal production (noted as divested during 2003) resulting in emissions of 15 million tonnes CO₂. This suggests mining (at CMS carbon content [thermal coal assumed] of 2.18 tonnes CO₂ per tonne of coal produced) suggests BP coal production of 15/2.18 = 6.88 million tonnes of coal. CMS does not have a record of BP's 50% ownership of Kaltim Prima Coal, hence only assumes (until ownership and production data becomes available) for 2002 and 2003.

Cell: D110**Comment:** Rick Heede:

BP 2005 annual report confirms 2004 datum (2.531 million bbl /day), and reports 2.562 million bbl /day in 2005.

Cell: U110**Comment:** Rick Heede:

BP 2005 annual report confirms 2004 datum (8.503 Bcf/day), and reports 8.424 Bcf/day in 2005.

Cell: J111**Comment:** Rick Heede:

Oil & Gas Journal OGJ100, 17Sep07, p. 41.

Cell: D112**Comment:** Rick Heede:

BP 2008 Annual Rpt, p.18. Includes groups liquids production and equity-accounted entities (in 2008, for example, 1.26 and 1.14 million bbl per day, respectively).

Cell: U112**Comment:** Rick Heede (Dec09):

BP 2008 Annual Rpt, p.18. Includes group natural gas production and equity-accounted entities (in 2008, for example, 7.28 and 1.06 Bcf per day, respectively).

Cell: D115**Comment:** Rick Heede:

BP AR 2010, pg 55, total subsidiaries and equity accounted entities

Cell: U115**Comment:** Rick Heede:

BP AR 2010 pdf pg 56, total subsidiaries and equity accounted entities

Cell: M116**Comment:** Rick Heede (Jun10):

Krosinsky sent BP brief (which values spilled oil (1,888 m³ in 2006 at 15 million GBP) or \$1,681/bbl, for BP's Macondo blow out in the Gulf (at USGS Best Case 20,000 bbl/day, or 1.06 million bbl through day 53, or \$1.78 billion. Calculation by CMS. Spill is on-going, flow rate estimates increasing (USGS 20,000 to 40,000 bbl per day), re-assessment by National Incident Command Flow Rate Technical Group under way. CMS will investigate the gas-oil ratio and estimate methane content and fraction reaching the surface and atmosphere. See Ari Leifer, UC-SB, and FRGT Plume Team. CMS calcs below preliminary:
BP.com Accessed 12Jun10, 4:36 pm MST, Gulf of Mexico Response / Subsea operational update: For the last 12 hours on June 11 (noon to midnight), approximately 7,835 barrels of oil were collected and 15.7 million cubic feet of natural gas were flared. On June 11, a total of approximately 15,550 barrels of oil were collected and 31.2 million cubic feet of natural gas were flared. Total oil collected since the LMRP Cap containment system was implemented is approximately 104,300 barrels. Operations were stable.
CMS: If we assume mid-point USGS leakage estimate of 30,000 bbl per day and that half is captured by BP's LMRP Cap containment system, further assume that the oil-gas ratio is the same for captured and escaped hydrocarbons, then 31.2 MMcf times (15,000/15,550 or 0.9646 =) 30.1 MMcf gas escapes per day, times 53 days to date = 1.595 Bcf. 1 Bcf, if combusted, equals 0.0582 MtCO₂. However, as methane (at 25xCO₂) equals 1.455 MtCO₂e. Daily rate of 0.031 Bcf = 0.0018MtCO₂ if combusted or 0.0451 MtCO₂e as methane. Compare BP's gas production in 2008 (3.044 Tcf) and emissions of 177 MtCO₂ (daily rate of 0.485 MtCO₂, 10.75 times Gulf gas spill rate of methane as CO₂e. Not adjusted for transit time of natural gas from well-head to surface, nor for non-methane in gas-flow, nor CH absorption, chemical, or biological degradation (i.e., assumes 100 percent of gas is methane and all reaches the atmosphere).