

Oil and NGL extraction data

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 Climate Mitigation Services
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Saudi Aramco, Saudi Arabia

www.saudiaramco.com Dhahran

yellow column indicates original reported units

100% State-owned enterprise

Production / Extraction data

Year

Crude Oil & NGL

Aramco NGL production	Aramco crude oil production		Subtotal Crude + NGL	Aramco NGL production	Aramco crude oil production	Notes	Company 2	Total	Allocation	Total
Thousand bbl / d	Thousand bbl / d	Thousand bbl / d	Thousand bbl / d	Million bbl / yr	Million bbl / yr	Million bbl / yr	Million bbl / yr	Million bbl / yr	Percent	Million bbl / yr
Arabian American Oil Co 1944-1974; Saudi Aramco 1974-	Saudi Aramco	Saudi Aramco	Saudi Aramco	Saudi Aramco	Saudi Aramco	Saudi Aramco	Arabian Oil Company	Total		Total

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2010

Year	Aramco crude production (Thousand bbl / d)	Aramco crude & NGL (Thousand bbl / d)	Aramco crude production (Million bbl / yr)	Aramco NGL production (Million bbl / yr)	Notes	Company 2 (Million bbl / yr)	Saudi Aramco Total Oil & NGL prod 1958-2010 (Million bbl / yr)	Percent to Saudi Aramco	Allocated to Saudi Aramco 1958-2010 (Million bbl / yr)	
1935			0.5				0.5	10.0%	0.0	
1936			3.9				4	10.0%	0.4	
1937			5.1				5	10.0%	0.5	
1938			4.3				4	10.0%	0.4	
1939			4.5				5	10.0%	0.5	
1940			4.9				5	10.0%	0.5	
1941			7.8				8	10.0%	0.8	
1942			21				21	10.0%	2.1	
1943			58				60	10.0%	6.0	
1944			164				90	10.0%	9.0	
1945			246				143	10.0%	14	
1946			391				174	10.0%	17	
1947	500	477	477				200	10.0%	20	
1948			547				278	10.0%	28	
1949			762				302	10.0%	30	
1950			827				308	10.0%	31	
1951			845				348	10.0%	35	
1952			953				352	10.0%	35	
1953	1,000	953	953				361	10.0%	36	
1954			965				362	10.0%	36	
1955			989				370	10.0%	37	
1956			992				400	10.0%	40	
1957			1,015				456	10.0%	46	
1958			1,095				515	10.0%	52	
1959			1,095				578	10.0%	58	
1960			1,251				645	10.0%	64	
1961			1,393				695	10.0%	70	
1962			1,524				810	10.0%	81	
1963			1,635				92	10.0%	97	
1964			1,732				101	10.0%	106	
1965			2,039				110	10.0%	116	
1966			2,408				118	10.0%	123	
1967			2,618				125	10.0%	144	
1968			2,876				131	10.0%	179	
1969			3,039				150	10.0%	227	
1970			3,601				144	10.0%	714	
1971			4,550				2,856	25.0%		
1972			5,803				3,047	60.0%	1,828	
1973			7,432				2,543	60.0%	1,526	
1974			8,347				3,121	100.0%	3,121	
1975			9,698				3,371	100.0%	3,371	
1976			8,552				3,037	100.0%	3,037	
1977			9,236				3,490	100.0%	3,490	
1978			8,319				3,660	100.0%	3,660	
1979			9,560				3,676	100.0%	3,676	
1980			10,027				2,466	100.0%	2,466	
1981			10,072				1,717	100.0%	1,717	
1982			6,757				1,565	100.0%	1,565	
1983			4,704				1,225	100.0%	1,225	
1984			4,288				1,823	100.0%	1,823	
1985			3,357				1,583	100.0%	1,583	
1986			4,994				1,956	100.0%	1,956	
1987			4,336				1,929	100.0%	1,929	
1988			5,358				2,479	100.0%	2,479	
1989			5,284				3,148	100.0%	3,148	
1990			6,791				3,208	100.0%	3,208	
1991			8,625				3,108	100.0%	3,108	
1992			8,789				3,118	100.0%	3,118	
1993			8,515				3,117	100.0%	3,117	
1994			8,543				2,956	100.0%	2,956	
1995			8,539				2,900	100.0%	2,900	
1996			8,645				2,945	100.0%	2,945	
1997			8,519				2,879	100.0%	2,879	
1998			8,771				2,929	100.0%	2,929	
1999			8,011				2,829	100.0%	2,829	
2000			8,581				2,922	100.0%	2,922	
2001			8,372				2,655	100.0%	2,655	
2002			7,593				2,700	100.0%	2,700	
2003			8,905				2,800	100.0%	2,800	
2004			9,431				3,056	100.0%	3,056	
2005							2,479	100.0%	2,479	
2006							2,500	100.0%	2,500	
2007							3,000	100.0%	3,000	
2008							3,150	100.0%	3,150	
2009							3,150	100.0%	3,150	
2010							3,320	100.0%	3,320	
Total	na	na	na	8,532	118,392	27,312	33,286	128,100	84.3%	108,050



Add AOC Ltd to ARAMCO

Saudi Aramco takes 25% stake in 1973

OGJ100 1987-2010 for comparison

ARAMCO data Crude only

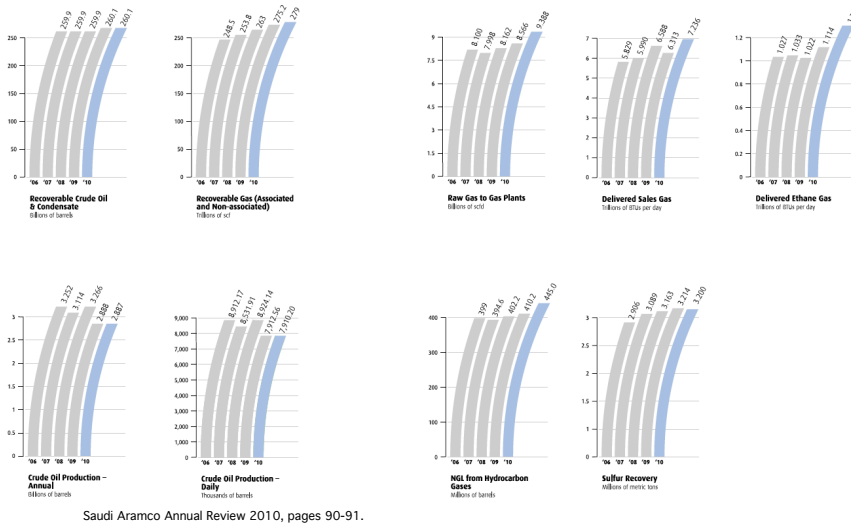
Alt oil prod'n estimate for 2008
 Thousand bbl / d | Million bbl / yr
 10,669 | 3,894
 Hults, & Thurber, Introduction, Table 1.1, in Victor, 2012, Oil and Governance.
 Data from Wood Mackenzie's Pathfinder Database; www.woodmacresearch.com

US Energy Information Administration, International Energy Statistics

www.eia.gov/emeu/internationalenergy.html

	Saudi Arabia		Saudi Arabia		Saudi Arabia		Saudi Arabia		Saudi Arabia		Vented & Flared of gross gas prod'n	Vented & Flared of dry gas production
	Crude oil, condensate, & NGPL k bbl per day	million bbl per yr	Gross NatGas Prod Bcf per year	Prod Market Gas Bcf per year	Reinjected NatGas Bcf per year	Vented & Flared Bcf per year	Dry NatGas Prod Bcf per year			%	%	
1980	10,269	3,748	NA	NA	NA	1,355	334				406%	
1981	10,248	3,741	NA	NA	NA	903	564				160%	
1982	6,913	2,523	NA	NA	NA	755	430				176%	
1983	5,416	1,977	NA	NA	NA	576	418				138%	
1984	5,018	1,832	NA	NA	NA	525	620				85%	
1985	3,763	1,373	NA	NA	NA	110	716				15%	
1986	5,255	1,918	NA	NA	NA	98	890				11%	
1987	4,683	1,709	NA	NA	NA	71	946				8%	
1988	5,585	2,039	NA	NA	NA	117	1,028				11%	
1989	5,567	2,032	NA	NA	NA	138	1,052				13%	
1990	7,030	2,566	1,741.0	1,465	92	184	1,077	11%			17%	
1991	8,795	3,210	2,284.0	1,666	155	462	1,130	20%			41%	
1992	9,045	3,301	2,334.4	1,745	177	413	1,201	18%			34%	
1993	8,902	3,249	2,376.7	1,822	205	350	1,268	15%			28%	
1994	9,071	3,311	2,479.1	1,893	226	360	1,331	15%			27%	
1995	9,193	3,355	2,612.3	1,915	248	449	1,343	17%			33%	
1996	9,186	3,353	2,742.2	2,038	265	440	1,460	16%			30%	
1997	9,344	3,411	1,679.9	1,634	11	35	1,601	2%			2%	
1998	9,409	3,434	1,758.0	1,685	22	51	1,653	3%			3%	
1999	8,843	3,228	1,719.5	1,707	2	11	1,632	1%			1%	
2000	9,412	3,435	1,887.9	1,864	4	20	1,759	1%			1%	
2001	9,082	3,315	2,013.0	2,002	3	8	1,896	0%			0%	
2002	8,729	3,186	2,119.6	2,108	3	8	2,002	0%			0%	
2003	9,995	3,648	2,398.6	2,379	16	4	2,121	0%			0%	
2004	10,411	3,800	2,700.2	2,676	17	8	2,319	0%			0%	
2005	11,010	4,019	2,872.9	2,860	6	7	2,516	0%			0%	
2006	10,579	3,861	3,001.8	2,992	8	2	2,594	0%			0%	
2007	10,162	3,709	2,941.0	2,930	4	7	2,628	0%			0%	
2008	10,695	3,904	3,051.2	3,046	6	-	2,841	0%			0%	
2009	9,673	3,530	3,164.6	3,163	2	-	2,770	0%			0%	
2010	10,434	3,808	3,426.6	3,424	2	-	3,096	0%			0%	
2011	11,066	4,039	3,617.3	3,616	1	-	3,258	0%			0%	
1990-2011 totals			33,010	30,138	880	2.4%	2,499	36,393				

Saudi Aramco production data



Saudi Aramco Annual Review 2010, pages 90-91.

SAUDI ARAMCO PRODUCTION, 2001 - 2006 (billions of barrels)				SAUDI ARAMCO EXPORTS, 2001 - 2006 (barrels)			
Year	Crude Oil	Refined Products	Year	Crude Oil	Refined Products	NGL*	
2006	3.25	0.59	2006	2,541,692,569	183,985,356	285,374,991	
2005	3.31	0.59	2005	2,622,997,627	201,589,157	289,485,392	
2004	3.15	0.57	2004	2,479,269,999	191,648,785	273,984,183	
2003	3.0	0.52	2003	2,357,921,983	158,047,102	265,929,431	
2002	2.5	0.52	2002	1,897,875,597	145,084,881	239,265,378	
2001	2.8	0.50	2001	2,178,362,274	169,281,494	230,072,047	
2000	2.8	0.50					
1999	2.7	0.47					
1998	2.9	0.47					
1997	2.8	0.44					
1996	2.9	0.44					

*Natural gas liquids comprising propane, butane, condensate and natural gasoline

Crude Oil, Natural Gas & Refined Products

Crude Oil & Refined Products (barrels)	2009	2010
Crude Oil Production, excluding NG blended	2,888,082,578	2,887,223,698
Crude Oil Exports	2,060,741,025	2,020,345,893
Crude Oil Transported Using company or Chartered Vessels	487,631,000	471,324,000
Refined Products Production	496,197,789	499,777,459
Refined Products Exports	149,367,259	133,423,868

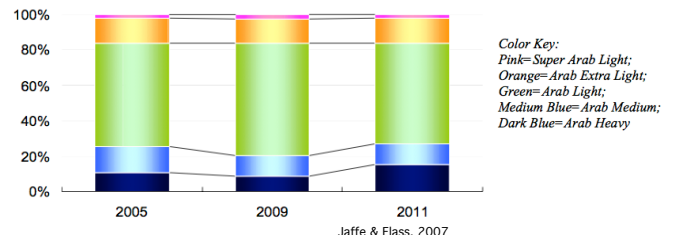
Natural Gas	2009	2010
Feed to Gas Plants (billions SCF/day)	8.556	9.388
Sales Gas (methane) (trillions BTUs/day)	6.313	7.236
Ethane (trillions BTUs/day)	1.114	1.334
Total Delivered Gas	7.427	8.319
Liquids in-lieu of methane (trillions BTUs daily)	0	0.251

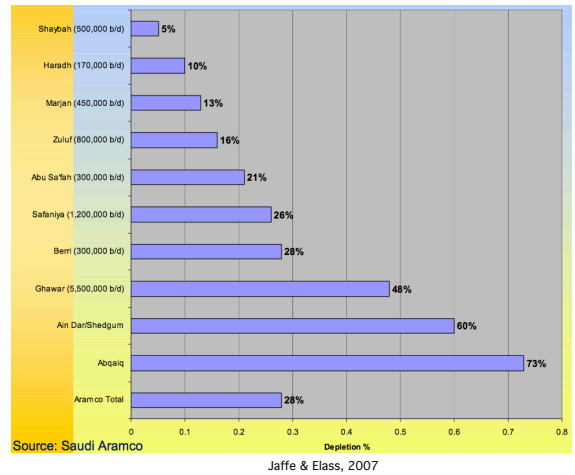
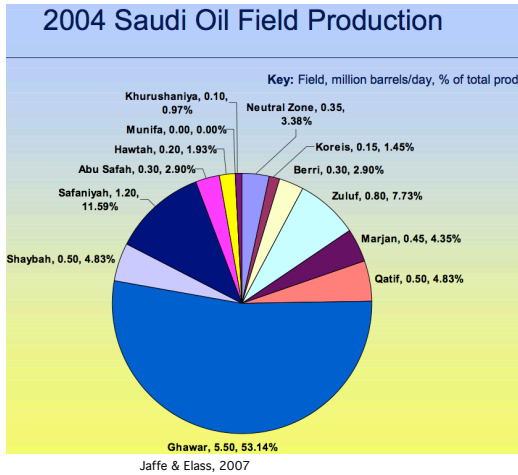
Natural Gas Liquids - Production	2009	2010
NGL Production from Hydrocarbon Gases (barrels)		
Propane	152,261,722	168,512,868
Butane	100,679,040	106,639,505
Condensate	82,839,545	93,969,126
Natural Gasoline	74,467,706	75,924,401
Total NGL Production	410,248,013	445,045,900

Natural Gas Liquids - Produced for Sale	2009	2010
NGL Sales from Hydrocarbon Gases (barrels)		
Propane	137,503,460	157,086,648
Butane	79,748,080	90,267,407
Condensate	8,881,499	11,454,420
Natural Gasoline	51,438,402	57,611,673
Total NGL Exports (excludes sales on behalf of SAMREF and SASREF)	277,571,441	316,420,148

Saudi Aramco Annual Review 2010, page 96.

FIGURE 4: PERCENTAGE SHARE OF EACH SAUDI CRUDE GRADE





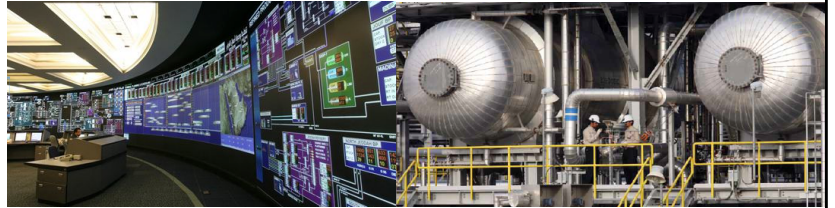
Main refining projects

Location	Added capacity	Partner	Status	Start-up
Fujian, China	+160 kb/d	ExxonMobil, Sinopec	Under construction	2008-09
Seosan, ROK	+480 kb/d	S-Oil	BOD approved	2010
Yanbu, KSA	+400 kb/d	ConocoPhillips	MOU signed	2011
Jubail, KSA	+400 kb/d	Total	MOU signed	2011
Port Arthur, US	+325 kb/d	Shell	Planned	2010
Qingdao, China	+200 kb/d	Sinopec, Local gov't	Planned	2012

Refining / petrochemical integration projects

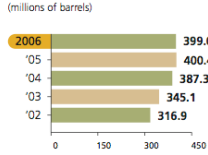
Location	Plants	Partner	Status	Start-up
Rabigh, KSA	Ethane cracker, HOFCC	Sumitomo	Under construction	2008
Ras Tanura, KSA	Ethane cracker, Aromatics	Dow	MOU signed	2012

Kobayashi, 2007, Saudi Aramco's downstream strategies.

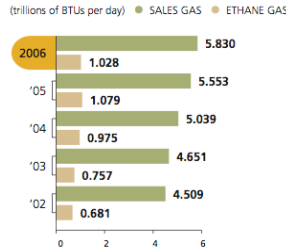


The digital display wall in the Operations Coordination Center is the largest in the petroleum industry (2005).

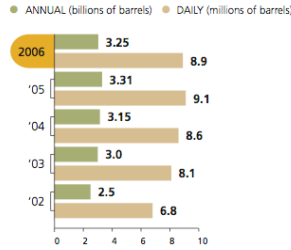
NGL FROM HYDROCARBON GASES



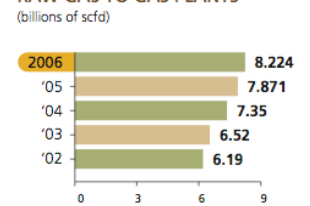
DELIVERED SALES GAS & ETHANE GAS



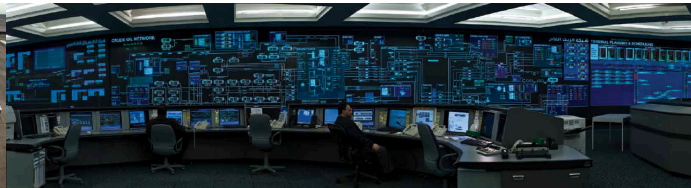
CRUDE OIL PRODUCTION



RAW GAS TO GAS PLANTS



Pipe yard in Yanbu (history, 1982)



Ras Tanura Refinery upgrade completed (1999).



The Leo Star, a double-hulled supertanker capable of transporting 2 million barrels of crude oil, joins the Vela fleet (2002).



www.saudiaramco.com history, 1974: "Tankers take on crude oil at the Ras Tanura Sea Island Terminal, 1974."

Cell: H9**Comment:** Rick Heede:

Wikipedia (viewed Dec2011):

Saudi Aramco, officially the Saudi Arabian Oil Company, is the state-owned national oil company of Saudi Arabia. Saudi Aramco is estimated to be worth \$8 trillion USD, making it the world's most valuable non-publicly listed company.

Saudi Aramco has both the largest proven crude oil reserves, at more than 260 billion barrels (41 billion m³), and largest daily oil production.[6] Headquartered in Dhahran, Saudi Arabia, Saudi Aramco operates the world's largest single hydrocarbon network, the Master Gas System. Its yearly production is 7.9 billion barrels (1.26 billion m³), and it managed over 100 oil and gas fields in Saudi Arabia, including 279 trillion scf of natural gas reserves. Saudi Aramco owns the Ghawar Field, the world's largest oil field, and the Shaybah Field, one of the world's largest oil fields.

History The origins of Saudi Aramco can be traced back to May 29, 1933, when the Saudi government granted a concession to Standard Oil of California (Socal) which allowed the company to explore for oil in Saudi Arabia. Socal assigned this concession to a wholly owned subsidiary called California-Arabian Standard Oil Co. (Casoc). In 1936, with the company having no success at locating oil, the Texas Oil Company (Texaco) purchased a 50% stake of the concession.

After four years of fruitless exploration, the first success came with the seventh drill site in Dammam, a few miles north of Dhahran in 1938, a well referred to as Dammam No. 7. This well immediately produced over 1,500 barrels per day (240 m³/d), giving the company confidence to continue. The company name was changed in 1944 from California-Arabian Standard Oil Company to Arabian American Oil Company (or Aramco). In 1948, Socal and Texaco were joined as investors by Standard Oil of New Jersey (Esso) which purchased 30% of the company, and Socony Vacuum (later Mobil) which purchased 10% of the company, leaving Socal and Texaco with 30% each.

In 1950, King Abdul Aziz Ibn Saud threatened to nationalize his country's oil facilities, thus pressuring Aramco to agree to share profits 50/50. A similar process had taken place with American oil companies in Venezuela a few years earlier. The American government granted US Aramco member companies a tax break known as the golden gimmick equivalent to the profits given to Ibn Saud. In the wake of the new arrangement, the company's headquarters were moved from New York to Dhahran.

In 1973, following US support for Israel during the Yom Kippur War, the Saudi Arabian government acquired a 25% share of Aramco, increased the share to 60% by 1974, and finally acquired full control of Aramco by 1980. In November 1988, the company changed its name from Arabian American Oil Company to Saudi Arabian Oil Company (or Saudi Aramco) and officially cut all oil supply to Israel by order of the CEO. In addition, Saudi Aramco has become a fully owned privately held company with no shareholders or partners in business.

http://en.wikipedia.org/wiki/Saudi_Aramco

See also: Stevens, Paul (2012) "Saudi Aramco: the jewel in the crown," in Victor et al, eds, Oil and Governance, pp. 173-233, Cambridge University Press, 1034 pp.

Jaffe, Amy Myers, & Jareer Elass (2007) "Case Study on Saudi Aramco," in: The Changing Role of National Oil Companies in International Energy Markets, Baker Institute for Public Policy, Rice University, 2 March 2007.

Jaffe, Amy Myers, & Jareer Elass (2007b) Saudi Aramco: National Flagship with Global Responsibilities, Case Study Series: The Changing Role of National Oil Companies in International Energy Markets, Baker Institute for Public Policy, March, 103 pp.

Cell: N9**Comment:** Rick Heede:

100 percent government owned. World Bank (2008b) A Citizen's Guide to National Oil Companies, Part B: Data Directory, World Bank, Washington, & Center for Energy Economics, Bureau of Economic Geology Jackson School of Geosciences University of Texas, Austin, 764 pp. At page 506.

See also Stevens, Paul (2012) "Saudi Aramco: the jewel in the crown," in Victor et al, eds, Oil and Governance, pp. 173-233, Cambridge Univ. Press

Cell: W9**Comment:** Rick Heede:

Stevens, Paul (2012) "Saudi Aramco: the jewel in the crown," in Victor et al, eds, Oil and Governance, pp. 173-233, Cambridge Univ. Press.

Myers Jaffe, Amy, & Jareer Elass (2007) "Case Study on Saudi Aramco," in: The Changing Role of National Oil Companies in International Energy Markets, James Baker III Institute for Public Policy, Rice University, 2 March 2007.

Cell: I12**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 or equity or working interest production.

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

Cell: V12**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.

Net production typically excludes a number of diverted gas streams. Quantities and fractions vary; ExxonMobil's exclusions are probably typical of the industry: "Net production available for sale quantities are the volumes withdrawn from ... natural gas reserves, excluding royalties and volumes due to others when produced, and excluding gas purchased from others, gas consumed in producing operations, field processing plant losses, volumes used for gas lift, gas injections and cycling operations, quantities flared, and volume shrinkage due to the removal of condensate or natural gas liquids production."

ExxonMobil Corporation (2004) 2003 Financial and Operating Review, www.exxonmobil.com, p. 55.

Cell: B17**Comment:** Rick Heede:

"On May 29 1933, an oil concession agreement is signed between Saudi Arabia and Standard Oil Company of California (Socal). On November 8, a subsidiary company, California Arabian Standard Oil Company (Casoc) is created to manage the concession." In 1935 the first test well is drilled at Dhahran into the Dammam Dome.

1936: Texas Co. (now Chevron Corporation) acquires a 50% interest in Socal's concession.

1938: "The success of the Saudi Arabian oil enterprise rests on Well No. 7. After five years of fruitless drilling, Well No.7 seems like a dead end. Socal department heads seek advice from renowned geologist Max Steineke. Drawing on years of fieldwork in the Saudi desert and his own encyclopedic knowledge, Steineke tells them to keep drilling. Finally, on March 4, 1938, Dammam No. 7 starts producing 1,585 bpd at a depth of nearly 1½ kilometers."

1939: "In May, King 'Abd al-'Aziz travels to Ras Tanura for a ceremony to mark the first export of crude oil from Saudi Arabia, loaded onto the D. G. Scofield. The ship, named after a co-founder of Socal, holds just under 1/20th the load of a modern supertanker."

Source: Saudi Aramco "Our History" 1930s.

Cell: T17**Comment:** Rick Heede:

EIA data on country-by-country NGL production from 1970-1992 provided by Michael Grillot, Industry Economist, EIA International Energy Statistics Team. The EIA table is based on US Bureau of Mines' Minerals Yearbooks, various years.

Cell: M18**Comment:** Rick Heede:

The Saudi government nationalized 25 percent of Aramco in 1973, 60 percent in 1974, and 100 percent in 1980.

Until a clear picture of the Saudi government's contracts, shared production agreements, and other pre-nationalization equity production details and the like come to light, we allocate 10 percent of Aramco production to Saudi Aramco since production began in 1938 to 1972.

Aramco history (www.saudiaramco.com): "The government increases its participation interest in Aramco's crude oil concession rights, production and facilities to 100% (1980), with retroactive financial effect to 1976." CMS attributes 100 percent of production to Saudi Aramco, effective 1976.

Also see: Stevens, Paul (2012) "Saudi Aramco: the jewel in the crown," in Victor et al, eds, Oil and Governance, pp. 173-233, Cambridge University Press, 1034 pp.

Cell: U19**Comment:** Rick Heede:

CMS uses proxy data -- Saudi production of natural gas liquids (for which we use the EIA dataset 1970-1990 -- to approximate Saudi production of natural gas for 1970 through 1979. Later research, or ARAMCO statistics, may refine this gas production estimate. Meanwhile CMS uses 70 percent of Saudi NGL production (in thousand bbl per day) to estimate Saudi ARAMCO annual production of natural gas 1970-1979 (Bcf/yr). This is thus a mere arithmetic estimate but one that is both quantitatively conservative in order to account for re-injected, flared, or vented gas and reasonably well in agreement with the later gas production data sets based on a fraction of total gas attributed to ARAMCO and actual production estimates by Oil & Gas Journal; see notes below.

Note: Saudi ARAMCO gas production for 1980 - 1986 is based on an estimated fraction of total Saudi natural gas production attributable to ARAMCO (see note below). ARAMCO gas production for 1987-2004 uses Oil & Gas Journal OGI100 production estimates.

Cell: I20**Comment:** Rick Heede:

Saudi Aramco annual report 1990 shows crude oil production for 1938-1990 (also shows NGL production 1962-1990, but no raw gas production is shown).

Cell: E29

Comment: Rick Heede:

Stevens reports Aramco production in 1947 at 90,000 bbl per day, to 278,000 bbl per day in 1951, and to 480,000 bbl per day in 1960, citing Darmstadter, 1971, Energy in the World Economy. CMS does not know why the Saudi Aramco dataset differs so strongly from Darmstadter's data.

Stevens, Paul (2012) "Saudi Aramco: the jewel in the crown," in Victor et al, eds, Oil and Governance, pp. 173-233, Cambridge Univ. Press, 1034 pp.

Cell: B31**Comment:** Rick Heede:

Aramco's history at website: "Crude oil production of 500,000 bpd is achieved early in the year." (1949).

Cell: W34**Comment:** Rick Heede:

Reported in 1964 and 1965 annual reports; roughly half of production is re-injected into the Abqaiq reservoir and ~half sold (to cement plants and other industrial users).

Cell: Z35**Comment:** Rick Heede:

The Saudi government nationalized 25 percent of Aramco in 1973, 60 percent in 1974, and 100 percent in 1980.

Until a clear picture of the Saudi government's contracts, shared production agreements, and other pre-nationalization equity production details and the like come to light, we allocate 10 percent of Aramco production to Saudi Aramco since production began in 1938 to 1972.

Aramco history (www.saudiaramco.com): "The government increases its participation interest in Aramco's crude oil concession rights, production and facilities to 100% (1980), with retroactive financial effect to 1976." CMS attributes 100 percent of production to Saudi Aramco, effective 1976.

Also see: Stevens, Paul (2012) "Saudi Aramco: the jewel in the crown," in Victor et al, eds, Oil and Governance, pp. 173-233, Cambridge University Press, 1034 pp.

Cell: B36**Comment:** Rick Heede:

Aramco company history (www.saudiaramco.com): "In May 1954, oil production exceeds 1 million bpd for the first time."

Cell: B40**Comment:** Rick Heede:

Aramco history (www.saudiaramco.com): "Over the course of 1958, the company averages more than 1 million barrels of oil per day for the first time."

Cell: D41**Comment:** Rick Heede:

Aramco (1979) Annual Report for 1978, production summary for 1938-1978: "NGL production from gases associated with crude production began in late 1962."

Cell: U42**Comment:** Rick Heede:

ARAMCO annual report 1964, p. 31, shows "sale of ARAMCO ... natural gas in Saudi Arabia in barrels" for 1960-1964.

Cell: K43**Comment:** Rick Heede:

Crude oil production for 1961-1973 from Arabian Oil Company Ltd (1974) Facts and Figures.

Cell: D44**Comment:** Rick Heede:

Saudi Aramco Annual Report for 1990, statistical data shows NGL production for 1938-1990 and notes that "NGL production from gases associated with crude production began in late 1962."

Cell: F44**Comment:** Rick Heede:

Aramco history (www.saudiaramco.com): "Cumulative crude oil production reaches 5 billion barrels." (1962)

CMS note: cumulative total in our dataset equals 5.06 billion bbl through June 1962.

Cell: W44**Comment:** Rick Heede:

ARAMCO annual Report 1962, p. 13, shows "total energy content of natural gas sold to industries was 605,743 million Btu", which, at 1,037 btu per cf, equals ~600 million cf, or ~0.6 Bcf/yr. The company "utilized 48.2 percent of the gas produced in association with crude oil (an increase of 17.5 percent)."

which, at 5.8 million Btu per bbl oil equiv

Cell: T45**Comment:** Rick Heede:

U.S. Bureau of Mines, Minerals Yearbook 1967, page 779, shows marketed natural gas production for 1963-1967. No prior edition listed marketed (or gross) production for Saudi Arabia.

Cell: T46**Comment:** Rick Heede:

U.S. Bureau of Mines, Minerals Yearbook 1968, page 750, marketed production 1964-1967. Gross production not shown.

Cell: B47**Comment:** Rick Heede:

Aramco history (www.saudiaramco.com): "The production capacity of the Safaniya field increases by 150,000 bpd to more than 600,000 bpd, a gain that helps the company produce an average of over 2 million bpd, a record high.." (1965)

Cell: B50**Comment:** Rick Heede:

Aramco history (www.saudiaramco.com): "We become the first company to produce a billion barrels of crude oil in a single year." (1968)

Cell: T50**Comment:** Rick Heede:

U.S. Bureau of Mines, Minerals Yearbook 1970, page 764, gross and marketed production 1968-1969. (1970 data revised in 1971 Yearbook.)

Cell: T52**Comment:** Rick Heede:

U.S. Bureau of Mines, Minerals Yearbook 1972, page 846, gross and marketed production 1970-1971.

Cell: T54**Comment:** Rick Heede:

U.S. Bureau of Mines Minerals Yearbook 1974, page 887, reports both gross and marketed production for 1972-1973. Footnote to table: Includes half of production for the former Kuwait-Saudi Arabia Neutral Zone.

Cell: B55**Comment:** Rick Heede:

Aramco history (www.saudiaramco.com): "The Saudi government buys a 25% participation interest in Aramco, increasing it to 60% the following year." (1973)

Cell: T56**Comment:** Rick Heede:

U.S. Bureau of Mines Minerals Yearbook 1976, page 887, reports both gross and marketed production for 1974-1976.

Cell: W57

Comment: Rick Heede:

"In 1975, the oil ministry decided that the extensive flaring of associated gas should cease." Stevens, page 207.

Stevens, Paul (2012) "Saudi Aramco: the jewel in the crown," in Victor et al, eds, Oil and Governance, pp. 173-233, Cambridge Univ. Press, 1034 pp.

Note: Interesting discussion of pros and cons of increasing gas utilization domestically; some argue that using more gas will allow higher oil exports, which may then force world oil prices lower, thus decreasing revenue. Stevens, page 207.

Cell: B58**Comment:** Rick Heede:

Aramco history (www.saudiaramco.com): "We become the only company to produce more than 3 billion barrels of oil in a year." (1976)

Cell: I58**Comment:** Rick Heede:

U.S. Bureau of Mines estimates differs slightly: 66.4 million bbl of "propane, butane, natural gasolines, and other" and 3,139.7 million bbl of crude oil in 1976. Total of 3,428.0 million bbl in 1977, 3,120.9 million bbl in 1978, 3,579.0 million bbl in 1979, and 3,635.0 million bbl in 1980 (prelim).

U.S. Bureau of Mines, Minerals Yearbook 1980, International Area Report, Saudi Arabia, Peter J. Clarke, Table 1, page 845. Gross and marketed production of natural gas, 1976-1980.

Cell: T58**Comment:** Rick Heede:

U.S. Bureau of Mines, Minerals Yearbook 1980, International Area Report, Saudi Arabia, Peter J. Clarke, Table 1, page 845. Gross and marketed production of natural gas, 1976-1980.

Cell: B62**Comment:** Rick Heede:

Aramco history (www.saudiaramco.com): "The government increases its participation interest in Aramco's crude oil concession rights, production and facilities to 100%, with retroactive financial effect to 1976." (1980)

Cell: J69**Comment:** Rick Heede:

Crude oil production listed for 1987-2010 from Oil & Gas Journal O&GJ100, various years. CMS cites Saudia Aramco production for all years available, and shows O&GJ data for comparison.

Cell: W69**Comment:** Rick Heede:

Oil & Gas Journal, various years, O&GJ100.

Cell: B70**Comment:** Rick Heede:

Aramco history (www.saudiaramco.com): "On November 8, 1988, the Council of Ministers approves a charter for a new national oil enterprise — the Saudi Arabian Oil Company. A Royal Decree issued by King Fahd ratifies that decision, establishing a new company to take over all the responsibilities of Aramco." (1988)

Cell: X70**Comment:** Rick Heede:

CMS uses ARAMCO data for 1990 through 2001 on raw gas delivered to gas plants in 1999 and 2001 annual reports.

Cell: L72**Comment:** Rick Heede:

ARAMCO data from columns "H" and "I".

Cell: AB72**Comment:** Rick Heede:

Saudi Aramco annual report 1999 shows raw gas delivered to gas plants for 1990-1999.

Note: no mention of natural gas in earlier annual reports.

Cell: D73**Comment:** Rick Heede:

ARAMCO production of NGLs interpolated for 1991-1993. Daat not shown in ARAMCO annual reports.

Cell: I73**Comment:** Rick Heede:

Saudi Aramco annual report 1999 shows crude oil production for 1990-1999.

Cell: AA75**Comment:** Rick Heede:

Energy Intelligence, Inc. production stats.

Cell: H76**Comment:** Rick Heede:

Saudi Aramco Annual Report for 1995.

Cell: K76**Comment:** Rick Heede (Jan10):

ARAMCO (2007) Annual Report 2006, "Saudi ARAMCO by the Numbers, page 25. This table is reproduced above. The data is fairly close to O&GJ100 data, and does not include production of condensate -- which CMS includes in ARAMCO data in columns "H" and "I", the sum of which CMS reports in teh summary column "L".

Cell: H78**Comment:** Rick Heede:

Saudi Aramco Annual report for 2000, shows NGL from hydrocarbon gases for 1996-2000.

Cell: L78**Comment:** Rick Heede:

CMS uses ARAMCO data for 1996-2006 from their Annual Report 2006, page 25 (see column "K" and table above) -- "crude oil production" plus "refined products."

Cell: H79**Comment:** Rick Heede:

Saudi Aramco Annual Report for 2001 "Energy to the World," production and reserves data, "NGL from hydrocarbon gases" data in millions of bbl for 1997-2001.

Cell: I79**Comment:** Rick Heede:

Saudi Aramco Annual Report for 2001 "Energy to the World," production and reserves data, "crude oil production" data in millions of bbl for 1997-2001.

Cell: AB79**Comment:** Rick Heede:

Saudi Aramco Annual Report for 2001 "Energy to the World," "raw gas to gas plants" in billion of scfd for 1997-2001. Delivered gas sales also shown in trillion Btu per day: 0.718 in 1997, 0.704 in 1998, 0.704 in 1999, 0.689 in 2000, and 0.681 in 2001. CMS reports raw gas to gas plants, insofar as LNG production is not shown; the reported data is gross production, not net, and includes gass used in refineries and processing plants (although does not include, we surmise, re-injected gas. Also, the gas CMS reports is nearly identical to the data reported in Oil & Gas Journal.

Cell: AA82

Comment: Rick Heede:
Oil and gas production for 200-2001 from EI (2003) Top 100, p. 231.

Cell: H84

Comment: Rick Heede:
ARAMCO "NGL from hydrocarbon gases" reported in Annual Reports for 2008 and 2006 (tables reproduced above).

Cell: W84

Comment: Rick Heede (Jan10):
Oil & Gas Journal OGJ100, various years.

Cell: I89

Comment: Rick Heede (Jan10):
ARAMCO (2009) By the Numbers, page 50 (part of the 2008 Annual Report). Shows "crude oil" production (except "NG blended"), which CMS adds as NGL production at left.

Cell: X89

Comment: Rick Heede (Jan10):
ARAMCO (2009) By the Numbers, page 50 (part of the 2008 Annual Report). Shows "raw gas to gas plants" as 7.998 Bcf per day (and 7.023 Bcf/day of delivered gas) in 2007; raw gas 8.336 Bcf (and 7.610 delivered gas) in 2008.

Cell: AA89

Comment: Rick Heede (Jan10):
ARAMCO (2009) By the Numbers, page 50 (part of the 2008 Annual Report). Shows "raw gas to gas plants" as 7.998 Bcf per day (and 7.023 Bcf/day of delivered gas) in 2007; raw gas 8.336 Bcf (and 7.610 delivered gas) in 2008.

Cell: AB89

Comment: Rick Heede (Jan10):
ARAMCO (2009) By the Numbers, page 50 (part of the 2008 Annual Report). Shows "raw gas to gas plants" as 7.998 Bcf per day (and 7.023 Bcf/day of delivered gas) in 2007; raw gas 8.336 Bcf (and 7.610 delivered gas) in 2008.

Cell: E90

Comment: Rick Heede:
Saudi Aramco "working interest liquids production in 2008" at 10,669 thousand bbl per day.
Victor, Hults, & Thurber, 2012, Introduction, Table 1.1, page 24, in Victor et al, eds, 2012, Oil and Governance. Table 1.1 is based on information from Wood Mackenzie's Pathfinder Database; www.woodmacresearch.com

Cell: V90

Comment: Rick Heede:
Saudi Aramco "working interest natural gas production in 2008" at 6,677 thousand cf per day.
Victor, Hults, & Thurber, 2012, Introduction, Table 1.1, page 24, in Victor et al, eds, 2012, Oil and Governance. Table 1.1 is based on information from Wood Mackenzie's Pathfinder Database; www.woodmacresearch.com

Cell: B91

Comment: Rick Heede:
Aramco history (www.saudiaramco.com): "We complete a multi-stage, large-scale project spanning our entire business, expanding our production and processing capacity of oil, gas, natural gas liquids, refining and petrochemicals. With this expansion, maximum sustainable crude oil production capacity reaches 12 million bpd, nearly 15% of total global oil demand." (2009)

Cell: I91

Comment: Rick Heede:
AR 2010 modified 080611 pg96; NGL in column H, crude oil production excluding NG blended in column I; report also includes production for sale, Rhea did not use those figures

Cell: J91

Comment: Rick Heede:
Oil & Gas Journal OGJ100, 30Oct2011, page 49. Oil reserves listed as 260.1 billion bbl.

Cell: W91

Comment: Rick Heede:
Oil & Gas Journal OGJ100, 30Oct2011, page 49. Gas reserves listed as 275.2 Tcf.

Cell: AA91

Comment: Rick Heede:
AR 2010 modified 080611 pg 96; "feed to gas plants"

Cell: T126

Comment: Rick Heede:
Jaffe, Amy Myers, & Jareer Elass (2007) "Case Study on Saudi Aramco," in: The Changing Role of National Oil Companies in International Energy Markets, Baker Institute for Public Policy, Rice University, 2 March 2007.

Cell: S147

Comment: Rick Heede:
Kobayashi, Yoshikazu (2007) "Saudi Aramco's Downstream Strategies," in: The Changing Role of National Oil Companies in International Energy Markets, James Baker III Institute for Public Policy, Rice University, 2 March 2007.