



CONCORD, MA - WASHINGTON, DC

47 Junction Square Drive
Concord, MA 01742

978-369-5533

www.mjbradley.com

To: Peter Zalzal, EDF
From: Dana Lowell
Date: November 12, 2019
Re: **Overlap of Oil and Gas Upstream and Midstream Operations**

As requested, MJB&A investigated ownership of various types of facilities throughout the oil and natural gas value chain to identify overlap between companies operating upstream and those operating mid-stream. In this context “upstream” encompasses oil and natural gas well sites, gathering and boosting activities, and natural gas processing; while “midstream” includes transmission via inter- and intra-state pipelines, natural gas storage, and liquefied natural gas (LNG) production and storage.

MJB&A identified 50 of the largest companies operating upstream (by number of wells owned/operated) and determined that at least 20 of these companies (40%) also operate in the midstream. Of these 20 companies, 7 (30%) operate in at least two different areas of the mid-stream (transmission, storage, LNG).

As expected, the well-known “major” petroleum companies such as Chevron, Exxon Mobil, BP, and Conoco Phillips all own/operate a significant number of oil and gas wells, and also have significant operations in the mid-stream, including 2,900 miles of pipeline, 12 LNG facilities, and 3 natural gas storage facilities. Other less well-known companies together own a greater number of oil and natural gas wells, and a similar number of mid-stream assets.

Each of the 50 companies identified and investigated is shown in attachment 1 to this memo. For each company available data on the mid-stream assets they own/operate are also included.

Methodology

To identify companies operating in the upstream oil and gas segment, MJB&A used two different sets of data extracted from Well Drilling Info for previous projects. The first data set includes all oil and natural gas wells in operation as of December 2016 on federal land overseen by the Bureau of Land Management (BLM). This data set includes 96,566 wells operated by 2,179 different companies. The second data set includes all wells newly drilled, or modified, between January 2013 and September 2018 across the entire U.S. This data set includes 18,578 wells owned by 3,177 different companies. Each of these data sets was sorted to identify the largest companies (by number of wells owned) which were operating on BLM land in 2016, and which drilled new wells between 2013 and 2018.

These two lists were then compared to identify the 50 largest companies on both lists – representing companies with both a significant base of existing wells and significant activity drilling new wells over the last five years. The 50 companies identified in this way operated 49,956 wells on BLM land as of December 2016 (52% of total BLM wells at the time) and also newly drilled or modified a total of 5,409 wells between 2013 and 2018 (29% of all new wells drilled in the US during that period).

Each of these 50 large companies operating in the upstream oil and gas segment was then investigated to determine whether or not they also operate in the midstream oil and gas segment. This investigation utilized three data sources:

- 1) The ABB Ability Velocity Suite™
- 2) EPA's Greenhouse Gas Reporting Program (GHGRP) data for reporting year 2017, and
- 3) Company websites and filings with the Securities and Exchange Commission (SEC)

The ABB Ability Velocity Suite is a database that includes most assets in the processing, transmission, storage, and LNG segments of the oil and gas industry. If available, miles of transmission pipeline, number of storage facilities, and number of LNG operating facilities were identified for each of the 50 large upstream companies.

EPA's Greenhouse Gas Reporting Program (GHGRP) includes ownership data for various types of facilities in the oil and gas value chain which have reported emissions data to the program. Reported data for 2017 was used to identify any companies among the 50 large downstream companies which reported emissions data to GHGRP from "gathering and boosting" facilities. GHGRP alone significantly under-reports the number and ownership of gathering and boosting assets nationwide, because there is a relatively high reporting threshold of 25,000 metric tons CO₂e for all facilities reporting to GHGRP. In 2017 data was reported to GHGRP from only 321 gathering and boosting facilities nation-wide. This is a very small fraction of all such facilities.

Company websites and SEC filings for the 50 large upstream companies were also reviewed to identify statements about ownership of mid-stream assets, or participation in midstream operations (transmission, storage, LNG) by the company.

All of the data gathered from all three above sources on each of the 50 companies investigated is summarized in Attachment 1. For data identified via the ABB Ability Velocity Suite, available scaling information is provided (number of LNG facilities, pipeline miles, processing plant capacity – MMcf/day, number of storage facilities). For gathering and boosting facilities identified via GHGRP the number of separate facilities reporting to GHGRP is also shown. In Attachment 1, if "Y" is listed under the columns "LNG", "Pipeline", "Processing Plant", "NG Storage" or "Gathering and Boosting" it means that ownership/participation in the mid-stream sub-segment was confirmed by statement(s) on the company website or SEC filings, but information about the exact scale or scope of the activity(s) was not provided.

ATTACHMENT 1

COMPANY	UP-STREAM ASSETS				MID-STREAM ASSETS				Notes
	New Wells 2013-2018	Wells on BLM Land in 2016	Gathering and Boosting Facilities	Processing Plant (Capacity in MMcf/day)	Owns Midstream Assets?	LNG (no. operating facilities)	Pipeline (miles in service)	NG Storage (no. existing facilities)	
CHEVRON, U.S.A., INC.	995	980	5	1,006	Y	2	2,157	2	LNG, pipeline, processing
AERA ENERGY SERVICES COMPANY	868	218	2	184					Jointly Owned by Shell (52%) and Exxon Mobil (48%)
BERRY PETROLEUM COMPANY	326	630	1						https://ir.berrypetroleum.com/static-files/803cf4ea-9675-4dee-874b-1296ce468f1a
CATALYST ENERGY, INC.	277	954		1	Y		Y		Owns 10 mcf/d processing facility, intrastate pipeline transportation, https://www.catalystenergyinc.com/transport-processing
CALIFORNIA RESOURCES ELK HILLS, LLC	217	3,315	2	774					Joint venture of California Resources Corporation and Ares Management, LP
ENERVEST OPERATING, LLC	187	1,875	4						
NATIONAL FUEL GAS COMPANY	153	282			Y		2,084	Y	Owns interstate pipeline system and storage
APACHE CORPORATION	131	456		55	Y		290	Y	Owns Apache Midstream, which operates storage and processing facilities
HILCORP ENERGY COMPANY, INC.	123	8,631	Y	Y					Subsidiary Pennant Midstream LLC operates gas-gathering system and processing plant in Ohio
SENTINEL PEAK RESOURCES CA, LLC	118	131		15					
E & B NAT. RES. MGMT. CORP.	116	195							
EXXON MOBIL CORPORATION	111	3,209	1	3,438	Y	6	426		
CAMERON ENERGY CO	91	809							
OCCIDENTAL ENERGY COMPANY, INC.	85	850	2	2,571	Y	1	18		https://www.oxy.com/OurBusinesses/MidstreamMarketing/Pages/default.aspx
DENBURY RESOURCES INC.	81	179	5		Y		129		Primarily focused on Enhanced Oil Recovery w/ CO2 injection
HOWARD DRILLING INC	80	256							Small Drilling Company
BP AMERICA PRODUCTION COMPANY	79	3,272	1	2,200	Y	2	283		Website: "natural gas production assets include well, gathering centres, export systems, and LNG plant facilities"
DEVON ENERGY CORPORATION	77	1,081		270	Y		188		Website: "Devon's marketing function is responsible for... transportation, storage, processing, and treating of hydrocarbons"
MERIT ENERGY COMPANY	75	1,363	2	1,111					
CONOCOPHILLIPS COMPANY	68	2,562		2,034	Y	2	97	1	NGL liquid transport intra state, natural gas interstate
GAS & OIL MGMT ASSN INC	63	680							
CARBON CREEK ENERGY LLC	61	1,419			Y		Y		Operates an intrastate pipeline
URBAN OIL AND GAS GROUP LLC	53	155	1		Y				Purchase oil and gas wells with declining production
EQT PRODUCTION LLC	51	509	4		Y		1,177		
NOBLE ENERGY, INC.	49	125		23	Y		62		Noble Energy Midstream provides services for Noble Energy
DIVERSIFIED RESOURCES, LTD.	48	681	Y		Y		Y		Investor report mentions "midstream assets" and pipeline assets
ANADARKO E&P ONSHORE, LLC	46	196		2,025	Y		627		Anadarko purchased by Occidental, owns processing plants, pipelines

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ARG RESOURCES INC	44	830							Seems to be wells only
WARREN E & P, INC.	43	167	1						Owns Gathering and boosting
EOG RESOURCES INCORPORATED	42	2,361	6		Y		57		Owns Gathering and boosting infrastructure
MINARD RUN OIL COMPANY	40	1,429	Y	4					website: "Minard Run Oil Company maintains and operates nearly 300 miles of midstream pipeline and facilities - including 11 compressor stations"
MSL OIL & GAS CORP	40	604							
EL PASO CORPORATION	39	70			Y			2	Owned by Kinder Morgan. KM owns pipelines, LNG facilities, gathering, compression, processing stations https://www.kindermorgan.com/pages/business/gas_pipeline
CONCHO RESOURCES INC.	36	1,863							Operates > 6000 wells, entered into a contract with Frontier to build crude oil gathering, transportation and storage in the Northern midland basin
BREITBURN ENERGY COMPANY LLC	35	412		214					Breitburn is now Maverick Natural Resources, LLC
CHESAPEAKE ENERGY CORPORATION	35	130	1		Y		56	1	May still partially own Access Midstream Partners
SCOUT ENERGY MANAGEMENT LLC	35	1,008							
WELDBANK ENERGY CORP	35	175							Oil and gas field services
FDL OPERATING, LLC	32	570							
SNYDER BROS INC	32	927							Potential to own gathering and boosting/distribution systems. Has Marketing division and supply nd users in PA, OH, and WV
EOG Y RESOURCES, INC.	31	1,246	Y		Y		57		Gathering and processing facilities in Eagle Ford, Bakken, Three Forks, Barnett Shale, Permian Basin
M & R INVESTMENTS OHIO LLC	31	74							
HOWELLS OIL & GAS	29	59							
PETROHAWK ENERGY CORPORATION	29	704	Y						Petrohawk operates gathering and boosting infrastructure for BHP in Eagle Ford, Permian, Fayetteville, Haynesville
VANGUARD OPERATING, LLC	29	824	2	202					Processing ABB
VINLAND ENERGY OPERATIONS, LLC	29	364		27					Processing ABB
DUGAN PRODUCTION CORP	25	550	1						GHGRP
OTTER EXPLORATION INC	25	50							
SUMMIT GAS RESOURCES, INC.	22	51							
CRESCENT POINT ENERGY US CORP	21	240	1						GHGRP
TOTAL	5,409	49,956	42	16,154	20	13	7,708	6	