

A Survey of U.S. CO₂ Enhanced Oil Recovery Projects

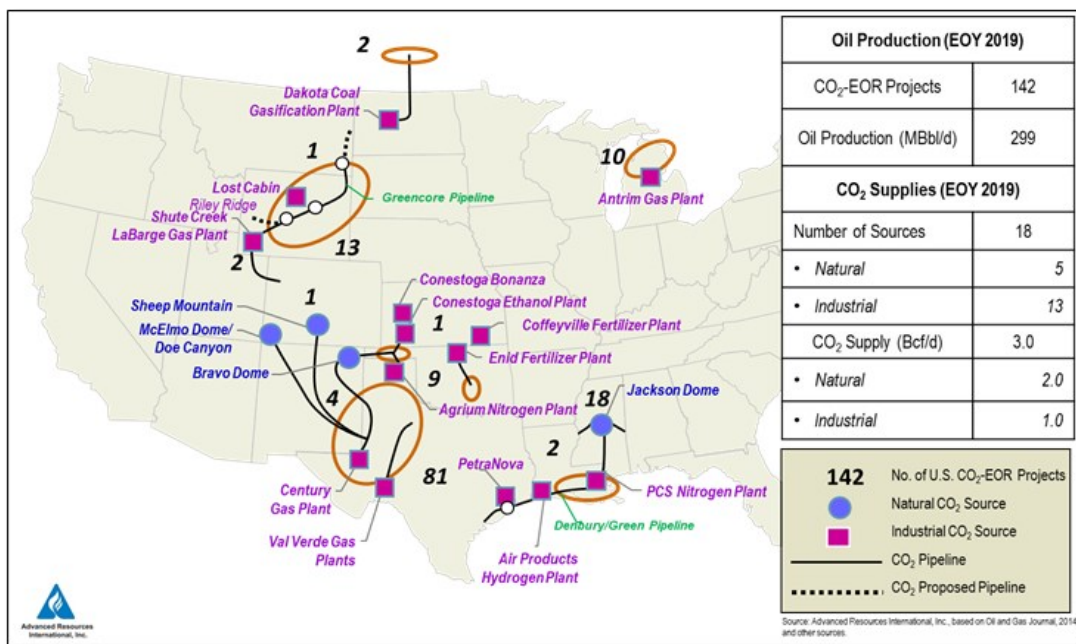
Enhanced production totals, reservoir characteristics, and project parameters for active CO₂ EOR operations in the U.S. as of end-of-year 2019.

The purpose of this survey is to provide a comprehensive status report of active CO₂ EOR projects in the U.S., as of end-of-year 2019. This survey provides the first update of CO₂ EOR project data since the final publication of the Oil & Gas Journal (OGJ) EOR Survey in 2014.

The 2019 U.S. CO₂ EOR survey shows that incremental oil recovery from CO₂ EOR in the U.S. has held steady at approximately 300,000 barrels of oil per day. A total of 3.0 Bcf per day of CO₂ is purchased for CO₂ EOR, including 1.0 Bcf per day from “industrial” sources, which represents an increase of 30% over the last seven years.

Carbon management, in the form of CO₂ capture and storage, is the most viable pathway to meeting significant carbon emission reduction targets over the next several decades. This survey demonstrates the value and potential of CO₂ EOR to the overall carbon management strategy in the U.S.

Periodic updates will be made to this survey to include the latest CO₂ EOR project data available. This publication is intended as a public resource for petroleum and energy industry stakeholders, and is offered free of charge by ARI. The next survey update is anticipated for Fall 2021.



Survey at a Glance

Total projects: 142

Total operators: 25

Total CO₂ EOR oil prod.:
299,000 bbl/d

- Permian Basin (TX, NM):
204,000 bbl/d
- SE Gulf Coast (MS, LA, TX):
43,000 bbl/d
- Mid-Continent (OK, KS):
11,000 bbl/d
- Rockies (CO, UT, WY, MT):
39,000 bbl/d
- Michigan:
1,400 bbl/d

Total CO₂ Supply: 3.0 Bcf/d

- “Natural” CO₂: 2.0 Bcf/d
- “Industrial” CO₂: 1.0 Bcf/d

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2019 Operator	Field	State	Start Date	Area	Prod.	Inj.	Pay Zone	Lithology	Porosity	Soi	Sor	Avg.Perm.	Depth	Gravity	Oil Visc.	Res. Temp.	Prev. Prod.	2019	2019
				(ac)	Wells	Wells			(%)	(%)	(%)	(md)	(ft)	(Deg API)	(cp)	(Deg F)		Tot. Prod.	Enh. Prod.
Amplify Energy Operations	Lost Soldier	WY	5/1/1989	1,795	54	61	Tensleep	SS	11.0	90	-	10	5,600	35	1.3	158	WF	872	872
Amplify Energy Operations	Lost Soldier	WY	5/89	490	22	27	Darwin-Madison	S/LS-Dolo.	13.0	89	-	4	5,800	35	1.3	162	WF	802	802
Amplify Energy Operations	Lost Soldier	WY	6/96	80	10	13	Cambrian	SS	12.3	85	-	19	6,500	35	1.2	174	WF	216	216
Amplify Energy Operations	Wertz	WY	10/86	1,540	41	49	Tensleep	SS	10.0	90	-	20	6,600	35	1.2	176	WF	1,162	1,162
Amplify Energy Operations	Wertz	WY	3/99	890	19	25	Darwin-Madison	S/LS-Dolo.	10.0	89	-	5	6,800	35	1.0	180	WF	638	638
Amplify Energy Operations Total				4,795	146	175												3,690	3,690
Apache	Adair	TX	1997	5,338	32	8	San Andres	Dolo.	14.1	-	-	4	4,789	34	-	104	WF	1,741	1,377
Apache	Adair	TX	2004	2,550	9	11	Wolfcamp	Dolo.	12.4	-	-	28	8,500	42	-	126	WF	63	51
Apache	Roberts	TX	2012	13,600	222	186	San Andres	Dolo.	8.5	-	-	-	-	-	-	-	-	1,920	1,490
Apache	Slaughter	TX	5/85	569	43	21	San Andres	Dolo.	12.5	-	-	6	4,900	32	1.3	110	WF	400	400
Apache	Slaughter	TX	6/89	8,559	259	164	San Andres	Dolo.	10.0	45	8	3	5,000	32	1.6	107	WF	1,467	1,467
Apache Total				30,616	565	390												5,591	4,785
Chevron	Rangely Weber Sand	CO	10/86	19,153	400	290	Weber SS	SS	12.0	38	29	10	6,000	35	1.7	160	WF	8,616	5,700
Chevron	Mabee	TX	1/92	3,600	220	85	San Andres	Dolo.	9.0	36	10	4	4,700	32	2.3	104	WF	1,052	1,052
Chevron	Dollarhide (Devonian) Unit	TX	5/85	6,183	83	66	Devonian	Dolo./Trip.	13.5	35	22	9	8,000	40	0.4	122	Prim./WF	1,016	1,016
Chevron	Dollarhide (Clearfork "AB") Unit	TX	11/95	160	134	3	Clearfork	Dolo.	11.5	30	10	4	6,500	40	0.5	113	Prim./WF	556	556
Chevron	Vacuum	NM	7/97	1,268	153	78	San Andres	Dolo.	12.0	36	15	22	4,550	38	1.0	101	WF	4,716	4,480
Chevron Total				30,364	990	522												15,955	12,804
ConocoPhillips	South Cowden	TX	2/81	4,900	7	1	San Andres	Dolo.	11.7	70	50	11	4,500	38	1.0	101	Prim.	108	108
ConocoPhillips	Vacuum	NM	2/81	5,732	168	112	San Andres	Dolo.	11.7	70	50	11	4,500	38	1.0	101	Prim.	7,073	6,720
ConocoPhillips Total				10,632	175	113												7,181	6,828
Core Energy	Charlton 6	MI	2006	43	1	1	Silurian - A1/Niagaran	LS/Dolo.	4.0	79	46	0.1 - 100	5,450	43	0.8	103	Prim.	4	4
Core Energy	Charlton 30-31	MI	2005	250	2	3	Silurian - A1/Niagaran	LS/Dolo.	4.0	62	35	0.1 - 100	5,450	42	0.8	103	Prim.	135	135
Core Energy	Dover 33	MI	1996	82	3	1	Silurian - A1/Niagaran	LS/Dolo.	5.0	66	37	0.1 - 100	5,500	43	0.8	100	Prim.	-	-
Core Energy	Dover 35	MI	2004	57	3	1	Silurian - A1/Niagaran	LS/Dolo.	3.0	72	36	0.1 - 100	5,500	41	0.8	101	Prim.	40	40
Core Energy	Dover 36	MI	1997	160	1	2	Silurian - A1/Niagaran	LS/Dolo.	3.0	64	41	0.1 - 100	5,600	42	0.8	102	Prim.	55	55
Core Energy	Chester 5	MI	2010	150	1	2	Silurian - A1/Niagaran	LS/Dolo.	10.0	65	35	0.1 - 100	5,500	42	0.8	101	Prim.	37	37
Core Energy	Charlton 19	MI	2015	115	2	1	Silurian - A1/Niagaran	LS/Dolo.	8.0	69	38	0.1 - 100	5,200	43	0.8	102	Prim.	113	113
Core Energy	Chester 16	MI	2017	185	2	1	Silurian - A1/Niagaran	LS/Dolo.	4.0	90	52	0.1 - 101	5,800	42	0.8	102	WF	600	600
Core Energy	Chester 2-10A	MI	2009	153	3	1	Silurian - A1/Niagaran	LS/Dolo.	4.0	62	39	0.1 - 102	5,600	42	0.8	102	Prim.	125	125
Core Energy	Bagley 11-14-23	MI	2015	450	4	3	Silurian - A1/Niagaran	LS/Dolo.	4.0	77	39	0.1 - 103	6,050	42	0.8	104	Prim.	250	250
Core Energy Total				1,645	22	16												1,359	1,359
Daylight Petroleum	Northeast Purdy	OK	9/82	3,400	85	49	Springer	SS	13.0	-	-	44	9,400	38	1.2	148	WF	824	824
Daylight Petroleum	Bradley Unit	OK	2/97	700	29	12	Springer	SS	14.0	-	-	50	9,400	38	1.0	150	WF	366	348
Daylight Petroleum Total				4,100	114	61												1,190	1,172
Denbury	Bell Creek	MT	5/13	21,771	111	102	Muddy	SS	23.0	-	-	1,035	4,500	36	2.8	108	Prim, WF	6,166	6,166
Denbury	Eucutta	MS	3/06	2,100	73	51	Eutaw, Tuscaloosa	SS	27.0	42	-	250	5,050	22	-	152	Prim./WF	2,010	1,907
Denbury	Martinville	MS	9/06	180	4	2	Wash-Fred 8500	SS	27.0	86	-	107	8,500	11	-	198	Prim	139	139
Denbury	Tinsley	MS	01/07	13,160	191	73	Woodruff	SS	23.0	30	-	500	5,000	34	-	164	Prim/WF	5,428	5,428
Denbury	Heidelberg, West	MS	12/08	2,500	110	52	Eutaw, Christmas	SS	28.0	37	-	300	4,800	22	-	152	WF	1,818	1,818
Denbury	East Heidelberg	MS	6/1/2011	857	113	59	Eutaw, Christmas	SS	28.0	-	-	10-700	5,050	23	17.4	152	Prim, WF	3,355	3,343
Denbury	West Hastings	TX	12/1/2010	4,420	120	48	Frio	SS	30.0	30	-	1,000	5,700	31	1.2	165	Prim	6,984	6,769
Denbury	Hastings	TX	5/10	4,420	13	-	Frio	SS	30.0	-	-	1,000-2,000	5,700	36	-	165	Prim, WF	-	-
Denbury	Oyster Bayou	TX	12/1/2010	3,912	36	28	Frio	SS	25 - 28	-	-	210-2300	8,600	40	0.5	190	Prim, WF	4,997	4,997
Denbury	Little Creek	MS	1985	6,200	18	14	Lower Tuscaloosa	SS	23.0	44	-	90	10,750	40	-	250	WF	279	279
Denbury	Lazy Creek	MS	12/01	840	6	3	Lower Tuscaloosa	SS	23.4	27	-	65	10,400	39	-	242	Prim	85	85
Denbury	West Mallalieu	MS	11/01	3,574	34	24	Lower Tuscaloosa	SS	26.0	44	-	75	10,550	40	-	248	Prim	854	854
Denbury	East Mallalieu	MS	12/03	880	8	3	Lower Tuscaloosa	SS	26.0	52	-	75	10,550	40	-	248	Prim./WF	79	79
Denbury	McComb	MS	11/03	12,600	20	13	Lower Tuscaloosa	SS	26.0	52	-	90	10,900	40	-	250	Prim	464	464
Denbury	Smithdale	MS	3/05	4,100	17	7	Lower Tuscaloosa	SS	23.0	50	-	90	11,000	41	-	250	Prim	188	188
Denbury	Brookhaven	MS	1/05	9,200	61	48	Lower Tuscaloosa	SS	25.5	47	-	60	10,300	40	-	250	Prim./GI/WF	1,575	1,568
Denbury	Martinville	MS	3/06	280	2	-	Mooringsport	SS	18.0	55	-	40	11,550	38	-	244	WF	7	7
Denbury	Martinville	MS	3/06	200	3	-	Rodessa	SS	12.0	64	-	200	11,600	42	-	250	WF	19	19
Denbury	Soso	MS	9/06	2,643	-	-	Rodessa 11,180	SS	17.0	55	-	171	11,500	45	-	228	WF	-	-
Denbury	Soso	MS	4/06	2,648	57	23	Bailey 11,701	SS	17.0	50	-	273	11,950	43	-	234	WF	1,049	1,049
Denbury	Cranfield	MS	07/08	7,750	32	25	Tuscaloosa	SS	23.0	32	-	100	10,300	39	-	260	Prim/GI	1,262	1,262
Denbury	Delhi	LA	11/1/2009	13,636	141	49	Tuscaloosa, Paluxy	SS	30.0	-	-	1,000	3,500	42	0.8	135	Prim, WF	6,266	6,266
Denbury	Grieve	WY	4/1/2018	2,280	15	11	Muddy	SS	20.0	-	-	275	6,700	37	-	138	Prim, GI	254	254
Denbury Total				120,151	1,185	635												43,278	42,941

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2019 Operator	Field	State	Start Date	Area	Prod.	Inj.	Pay Zone	Lithology	Porosity	Soi	Sor	Avg.Perm.	Depth	Gravity	Oil Visc.	Res. Temp.	Prev. Prod.	2019	2019
				(ac)	Wells	Wells			(%)	(%)	(%)	(md)	(ft)	(Deg API)	(cp)	(Deg F)		Tot. Prod.	Enh. Prod.
Devon	Beaver Creek	WY	7/08	16,526	18	17	Madison	Dolo.	10.0	60	50	10	11,100	40	0.6	232	Prim./WF	2,010	2,010
Devon Total				16,526	18	17												2,010	2,010
Elk Petroleum	Aneth Unit	UT	10/98	16,800	135	146	Desert Creek	LS	12.0	80	37	5	5,700	42	0.6	129	WF	4,581	2,693
Elk Petroleum	McElmo Unit	UT	1/11/1985	12,640	128	90	Desert Creek	LS	14.0	80	37	5	5,600	41	0.6	125	WF	3,593	1,608
Elk Petroleum Total				184,923	1,499	916												8,174	4,301
Fasken	Hanford East	TX	3/97	340	7	4	San Andres	Dolo.	10.0	45	19	4	5,500	32	1.4	105	WF	33	33
Fasken	Hanford (San Andres)	TX	7/09	150	7	4	San Andres ROZ	Dolo.	10.0	50	-	5	5,700	32	1.0	105	Prim.	190	56
Fasken	River Bend (Devonian)	TX	4/09	400	9	7	Devonian	Tripol.	23.7	55	46	5	5,500	42	0.5	105	WF	273	246
Fasken	Abell (Devonian)	TX	4/09	809	21	12	Devonian	Tripol.	21.9	45	-	3	5,300	42	0.5	105	WF	182	164
Fasken	Hanford	TX	7/86	1,120	29	30	San Andres	Dolo.	10.5	61	19	4	5,500	32	1.4	104	Prim.	223	223
Fasken Total				2,819	73	57												901	722
Fleur de Lis Energy	Patrick Draw Monell	WY	9/1/2003	6,400	108	85	Almond, UA-5	SS	20.0	60	34	30	4,750	43	0.5	108	Prim, WF	5,725	5,721
Fleur de Lis Energy	Salt Creek SD3	WY	10/1/2017	1,290	21	27	Sundance 3	SS	17.0	75	25	87	2,900	35	0.6	150	Prim	1,480	1,480
Fleur de Lis Energy	Salt Creek Southern Unit	WY	2012	570	42	26	Wall Creek 1 (Frontier)	SS	18.0	75	25	32	1,200	39	0.6	95	Prim, WF	714	714
Fleur de Lis Energy	Salt Creek Southern Unit	WY	2012	2,000	48	32	Wall Creek 2 (Frontier)	SS	19.0	77	23	52	2,200	37	0.6	100	Prim, WF	1,204	1,204
Fleur de Lis Energy	Salt Creek Ph 1-8	WY	1/04	6,800	321	279	Wall Creek 2 (Frontier)	SS	19.0	77	23	52	2,200	37	0.6	100	Prim, WF	6,729	6,729
Fleur de Lis Energy	Salt Creek Ph 7	WY	1/10	600	40	27	Wall Creek 1 (Frontier)	SS	18.0	75	25	32	1,200	37	0.6	95	Prim, WF	871	871
Fleur de Lis Energy Total				17,660	580	476												16,723	16,719
Four Corners Petroleum	North Ward Estes	TX	5/07	16,300	31	288	Yates	SS	16.0	27	21	37	2,600	36	1.6	83	Prim./WF	5,457	5,308
Four Corners Petroleum Total				16,300	31	288												5,457	5,308
George R. Brown	Garza	TX	11/09	1,778	-	-	San Andres	Carbonate	-	-	-	-	3,000	-	-	-		1,284	375
George R. Brown Total				1,778	-	-												1,284	375
Great Western Drilling	Twofreds	TX	1/74	4,392	29	7	Delaware, Ramsey	SS	19.5	50	-	32	4,900	36	1.5	105	WF	76	76
Great Western Drilling Total				4,392	29	7												76	76
Kinder Morgan	Reinecke	TX	1/98	700	32	8	Cisco Canyon Reef	LS/Dolo.	10.4	35	10	170	6,700	44	0.4	139	WF	163	163
Kinder Morgan	SACROC	TX	1/72	50,000	390	503	Canyon	LS	4.0	78	39	19	6,700	39	0.7	135	Prim / WF	28,694	28,694
Kinder Morgan	Katz	TX	1/1/2011	7,200	76	77	Strawn	LS	16.5	70	40	75	4,950	38	2.2	117	Prim, WF	3,084	3,084
Kinder Morgan	Goldsmith-Landreth	TX		6,166	41	39	San Andres	Carbonate	12.0	80	35	32	4,100	35	1.3	95	Prim, WF	1,761	1,710
Kinder Morgan	Yates	TX	3/04	26,000	606	123	San Andres	Dolo.	17.0	75	54	175	1,400	30	6.0	82	GI	16,147	13,166
Kinder Morgan	Tall Cotton	TX	11/14	180	24	15	San Andres	Dolo.	10.9		35	5	5300	32	1.3	102		2,666	2,666
Kinder Morgan Total				90,246	1,169	765												52,515	49,483
Hilcorp Energy Company	West Ranch	TX		4,000	48	31	41A	SS	23-27	-	-	895	5750	32	0.7	171		2,332	2,332
Hilcorp Energy Company	West Ranch	TX		4,000	48	32	98A	SS	30.0	70	-	497	6100	41	0.3	178		2,332	2,332
Hilcorp Energy Company Total				8,000	96	63												4,664	4,664
Maverick Energy	Postle - PUMU	OK	11/1/1995	4,032	43	36	Morrow	SS	16.0	75	25	10-40	6,200	40	1.3	145	WF	912	912
Maverick Energy	Postle - HMAU	OK	11/1/1995	3,396	38	29	Morrow	SS	16.0	75	25	10-40	6,200	40	1.3	145	WF	619	619
Maverick Energy	Postle - WHMU	OK	1/1/1998	7,724	96	74	Morrow	SS	16.0	75	25	10-40	6,200	40	1.3	145	WF	2,429	2,429
Maverick Energy	Postle - HMU	OK	8/1/2007	5,415	61	43	Morrow	SS	16.0	75	25	10-40	6,200	40	1.3	145	WF	3,110	3,110
Maverick Energy Total				20,567	238	182												7,070	7,070
Occidental	Anton Irish	TX	4/1/1997	7,030	197	148	Clearfork	Dolo.	11.0	85	35	8	5,250	34	1.2	105	Prim., WF	3,742	2,956
Occidental	Cedar Lake	TX	8/1/1994	5,188	204	152	San Andres	Dolo.	10.0	81	36	2	4,850	32	1.4	108	WF	2,732	1,423
Occidental	Cogdell	TX	10/1/2001	15,000	109	104	Canyon Reef	LS	0.2	70	25	5	6,700	41	0.6	130	WF	5,645	4,755
Occidental	El Mar	TX	4/1/1994	7,100	5	1	Delaware	SS	16.0	40	-	20	4,500	41	1.1	97	Prim./WF	30	27
Occidental	GMK South	TX	10/1/1982	1,949	15	15	San Andres	Dolo.	11.0	55	37	2	5,400	32	1.4	108	Prim.	209	104
Occidental	Levelland (Levelland)	TX	9/1/2004	2,673	480	379	San Andres	Dolo.	8.5	69	20	3	4,950	32	1.4	105	WF	5,124	2,928
Occidental	Devonian Unit (Mid Cross)	TX	7/1/1997	1,085	9	7	Devonian	Tripol.	14.0	65	31	2	5,200	43	0.4	105	Prim., GI	526	523
Occidental	Devonian Unit (North Cross)	TX	4/1/1972	1,530	23	18	Devonian	Tripol.	18.0	65	31	3	5,250	44	0.4	105	Prim., GI	1,297	1,252
Occidental	North Cowden	TX	2/1/1995	465	521	452	Grayburg	Dolo.	11.0	55	36	2	4,200	32	1.4	108	WF	4,045	-
Occidental	North Dollarhide Devonian	TX	11/1/1997	1,280	65	36	Devonian	Tripol.	25.0	73	28	8	8,000	40	0.4	121	WF	1,489	740
Occidental	North Hobbs	NM	3/1/2003	21,258	180	151	San Andres	Dolo.	8.7	70	30	2	4,100	33	1.4	95	WF	8,846	6,740
Occidental	South Hobbs Unit	NM	7/7/2005	4,530	61	62	San Andres	Dolo.	12.0	32	35	8	4,400	34	1.0	105	WF	6,667	5,256
Occidental	Devonian Unit (South Cross)	TX	6/1/2988	2,747	74	46	Devonian	Tripol.	16.0	65	31	3	5,200	43	0.4	105	Prim., GI	5,201	5,184
Occidental	Salt Creek	TX	10/1/1993	15,000	166	143	Canyon	LS	0.2	70	25	5	6,700	41	0.6	130	WF	7,309	5,010
Occidental	Sharon Ridge	TX	2/1/1999	7,780	34	39	Canyon Reef	LS	7.0	81	30	5	2,300	28	2.7	108	WF	1,193	1,137
Occidental	Slaughter (Alex Slaughter Estate)	TX	36739	4,530	18	8	San Andres	Dolo./LS	15.0	52	35	20	4,100	34	1.0	105	WF	92	63
Occidental	Slaughter (Central Mallet Unit)	TX	12/1/1984	340	146	131	San Andres	Dolo.	14.9	72	30	4	4,900	32	2.0	97	WF	2,150	2,036
Occidental	Slaughter (Frazier Unit)	TX	12/1/1984	1,600	54	42	San Andres	Dolo./LS	11.4	50	23	3	4,500	34	1.0	100	WF	594	370
Occidental	Slaughter (H.T. Boyd)	TX	8/1/2001	6,304	37	23	San Andres	Dolo.	14.9	72	30	4	4,900	32	2.0	97	WF	602	515
Occidental	Slaughter (Igoe Smith)	TX	9/1/2005	16,381	40	30	San Andres	Dolo.	11.0	55	36	2	4,850	32	1.4	108	WF	1,387	675

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				(ac)	Wells	Wells			(%)	(%)	(%)	(md)	(ft)	(Deg API)	(cp)	(Deg F)		bbl/d	bbl/d	
Occidental	Slaughter (North West Mallet)	TX	1/1/1992	3,040	90	50	San Andres	Dolo.	12.6	68	31	2	5,200	31	1.1	90	WF	1,040	601	
Occidental	Slaughter (Slaughter Estate Unit)	TX	12/1/1984	5,700	165	148	San Andres	Dolo./LS	11.0	82	35	4	5,000	32	1.4	108	WF	2,219	1,219	
Occidental	Slaughter (Smith Igoe)	TX	8/5/2014	16,381	40	30	San Andres	Dolo.	11.0	55	36	2	4,850	32	1.4	108	WF	110	30	
Occidental	Slaughter (West RKM Unit)	TX	11/1/2006	3,896	141	114	San Andres	Dolo.	11.0	71	32	4	4,900	32	1.4	105	WF	1,546	835	
Occidental	South Wasson Clearfork	TX	10/1/1984	4,720	80	53	Clearfork	Dolo.	7.0	70	35	2	6,600	35	1.1	120	WF	920	-	
Occidental	South Welch	TX	9/1/1993	5,428	116	115	San Andres	Dolo.	10.0	72	32	2	5,000	32	1.4	105	WF	584	343	
Occidental	T-Star (Slaughter Consolidated)	TX	7/1/1999	4,472	56	29	Abo	Dolo.	6.2	75	45	2	7,600	30	1.9	135	Prim.	1,966	1,577	
Occidental	Wasson (BRU)	TX	6/1/1995	1,246	219	182	San Andres	Dolo.	11.1	84	35	4	5,040	32	1.4	100	WF	5,512	4,998	
Occidental	Wasson (Denver Unit)	TX	4/1/1983	27,000	1,101	624	San Andres	Dolo.	9.2	51	38	3	4,925	33	1.2	105	WF	21,744	20,895	
Occidental	Wasson (ODC Unit)	TX	11/1/1984	2,820	343	312	San Andres	Dolo./LS	12.0	49	30	18	4,900	34	3.4	92	WF	8,160	5,883	
Occidental	Wasson (Willard Unit)	TX	1/1/1986	26,423	402	285	San Andres	Dolo.	17.0	56	40	175	1,400	30	7.6	82	WF	6,683	6,489	
Occidental	West Welch	TX	10/1/1997	13,379	297	170	San Andres	Dolo.	9.0	85	35	1	5,250	32	1.2	105	WF	1,111	-	
Occidental	Levelland (South East Levelland)	TX	4/1/2014	1,581	176	122	San Andres	Dolo	9.9	49	32	1	4,800	32	1.4	108	WF	2,378	1,507	
Occidental	West Seminole San Andres Unit	TX	7/1/2013	17,347	84	57	San Andres	Dolo	11.0	58	32	10	5,300	34	1.1	104	WF	4,017	3,700	
Occidental	Seminole Unit	TX	3/1/1983	5,951	325	217	San Andres	Dolo	11.0	82	35	4	5,000	32	1.4	108	WF	24,669	23,453	
Occidental	Slaughter (Sundown Unit)	TX	6/1/2017	7,879	48	32	San Andres	Dolo	11.0	85	35	5	5,250	32	1.2	105	WF	394	196	
Occidental	Slaughter (West Sundown Unit)	TX	11/1/2018	11,954	123	63	San Andres	Dolo	13.3	49	33	3	4,900	34	3.4	92	WF	1,057	56	
Occidental	COLLETT, EUGENIA	TX	8/1/2017	344	9	5	San Andres	Dolo	8.7	70	30	2	4,850	33	1.4	95	WF	234	-	
Occidental Total				283,331	6,253	4,595												143,221	113,476	
Orla Petco	East Ford	TX	7/95	1,953	52	6	Delaware, Ramsey	SS	23.0	49	36	30	2,680	40	0.8	82	Prim.	82	82	
Orla Petco Total				1,953	16	8												82	82	
Perdure Petroleum	NW Velma Hoxbar	OK	9/1/2010	410	26	9	Hoxbar	SS	26.0	77	-	280	2,228	27	2.4	84	WF	139	104	
Perdure Petroleum	Camrick	OK	4/01	2,320	38	32	Morrow	SS	15.0	52	-	63	7,260	39	2.2	152	WF	577	574	
Perdure Petroleum	Burbank	OK	6/6/2013	50,000	650	500	Burbank	SS	17.0	70	30	50	3,000	37	3.0	122	WF	3,072	2,067	
Perdure Petroleum Total				52,730	714	541												3,788	2,745	
PetroSantander	Stewart	KS	1/1/2012	8,500	50	40		SS	-	-	-	-	4,750	-	-	-		300	300	
PetroSantander Total				8,500	50	40													300	300
Remnant Energy	Hansford Marmaton	TX	6/80	2,010	7	6	Marmaton	SS	18.1	43	-	48	6,500	44	1.6	142	Prim.	16	16	
Remnant Energy Total				2,010	7	6													16	16
Sabinal Energy	Slaughter Sundown	TX	1/94	5,500	155	144	San Andres	Dolo.	11.0	41	25	6	4,950	33	1.4	105	WF	2,972	2,972	
Sabinal Energy	East Penwell (SA) Unit	TX	5/96	1,020	3	51	San Andres	Dolo.	10.0	55	40	4	4,000	34	2.0	86	WF	717	401	
Sabinal Energy Total				6,520	158	195													3,689	3,373
Tabula Rasa	East Seminole	TX	10/1/2013	160	12	4	San Andres	Dolomite	10.0	80	44	6	5,400	33	2.2	108	Prim./WF	531	468	
Tabula Rasa	Wellman	TX	7/1/1983	1,400	14	9	Wolfcamp	LS	9.2	35	10	100	9800	44	0.5	151	WF	1,484	1,484	
Tabula Rasa	North Perryton	TX	12/07	2,500	59	5	Upper Morrow	SS	15.2	52	-	63	7,300	38	2.0	152	WF	373	369	
Tabula Rasa	Albert Spicer Unit	TX	10/2009	577	5	2	Upper Morrow	SS	21.0	51	-	50	8,060	39	2.0	177	WF	97	97	
Tabula Rasa	Booker Trosper Unit	TX	10/2009	1,325	3	3	Upper Morrow	SS	20.0	56	-	50	8,060	39	2.0	177	WF	109	108	
Tabula Rasa	Gramstorff Unit	TX	10/2009	829	5	3	Upper Morrow	SS	21.0	57	-	109	8,060	39	2.0	177	WF	397	383	
Tabula Rasa	Farnsworth	TX	12/15/2010	10,300	33	18	Upper Morrow	SS	14.0	60	25	48	7,940	38	1.0	170	WF	1,304	1,297	
Tabula Rasa	Emma Field	TX	01/2015	-	164	11	San Andres	Carbonate	-	-	-	-	-	-	-	-		754	728	
Tabula Rasa Total				17,091	295	55													5,049	4,934
Tellus	West Yellow Creek	MS	03/2017	3,500	25	1	Eutaw	SS	-	-	-	-	-	-	-	-		1,601	1,504	
Tellus Total				3,500	25	1													1,601	1,504
TMR Exploration	Lockhart Crossing	LA	12/07	3,500	20	3	Wilcox	SS	20.0	32	-	30	10,100	40	-	212	Prim/WF	652	652	
TMR Exploration Total				3,500	20	3													652	652
XTO Energy Inc.	Goldsmith	TX	12/96	330	16	9	San Andres	Dolo.	11.6	-	-	32	4,200	35	-	105	WF	90	-	
XTO Energy Inc.	Cordona Lake	TX	12/85	2,084	37	19	Devonian	Tripol.	22.0	-	-	4	5,500	40	0.5	101	WF	387	387	
XTO Energy Inc.	Wasson (Cornell Unit)	TX	7/85	1,923	126	90	San Andres	Dolo.	8.6	-	-	2	4,500	33	1.0	106	WF	1,600	1,600	
XTO Energy Inc.	Wasson (Mahoney)	TX	10/85	640	71	38	San Andres	Dolo.	13.0	54	39	6	5,100	33	1.0	110	WF	800	800	
XTO Energy Inc.	Means (San Andres)	TX	11/83	8,500	471	238	San Andres	Dolo.	9.0	-	-	20	4,300	29	6.0	97	WF	5,310	5,082	
XTO Energy Inc. Total				13,477	721	394													8,187	7,869

TOTAL

343,702 299,258