

4. Natural Gas Statistics

Dry Natural Gas

Proved Reserves

The United States had 189,044 billion cubic feet of dry natural gas reserves as of December 31, 2003, a 1 percent increase over the 2002 level (**Table 8**). All natural gas proved reserves data shown in this report exclude natural gas held in underground storage.

Reserves additions were 111 percent of production (**Figure 18**), and gas production increased 0.4 percent in 2003. Production declines in the Gulf of Mexico, New Mexico, and Louisiana were offset by production increases in Colorado, Texas, Oklahoma, and Wyoming.

In 2003, Colorado, Texas, Wyoming, and Oklahoma dominated dry gas reserves additions. This activity continues the trend of developing “unconventional” gas fields, i.e., tight sands, shales, and coalbeds. Considering the growing contribution of this gas to the

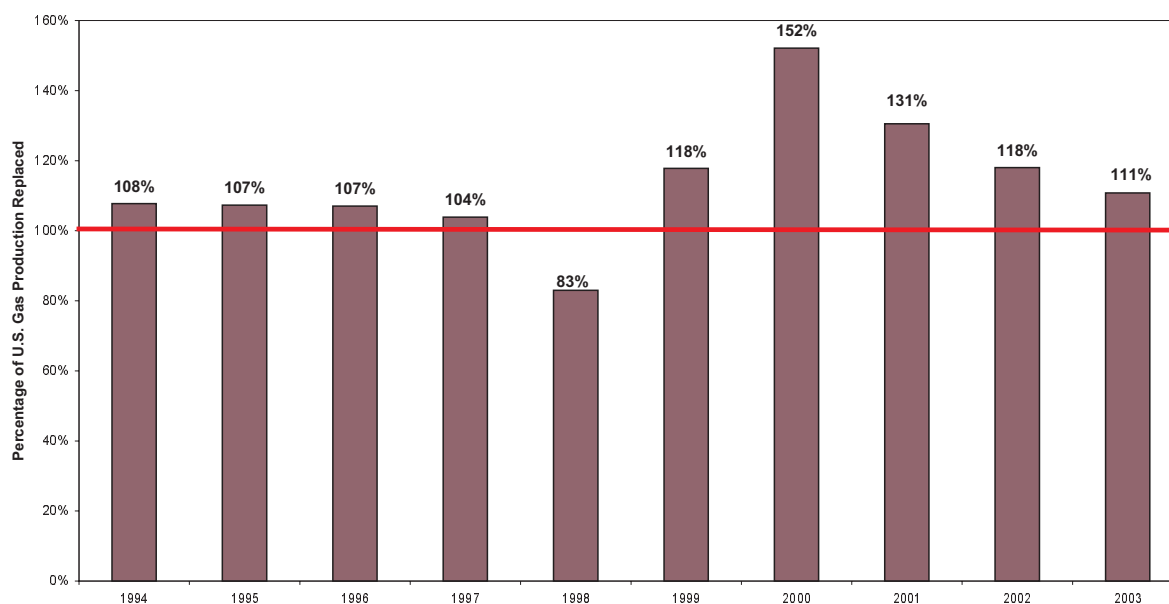
National total, the term “unconventional” is becoming a misnomer.

Additions to dry gas reserves in 2003 were 21,523 billion cubic feet, 6 percent less than in 2002. However, U.S. total discoveries of dry natural gas reserves were 19,286 billion cubic feet in 2003, up 8 percent from 2002 (17,795 billion cubic feet).

Proved reserves by State are shown on the map in **Figure 19**. Six areas account for 73 percent of the Nation’s dry natural gas proved reserves:

Area	Percent of U.S. Gas Reserves
Texas	24
Wyoming	12
Gulf of Mexico Federal Offshore	12
New Mexico	9
Colorado	8
Oklahoma	8
Area Total	73

Figure 18. Reserve Additions Replace 111% of 2003 U.S. Dry Natural Gas Production



Source: Energy Information Administration, Office of Oil and Gas.

Table 8. Dry Natural Gas Proved Reserves, Reserves Changes, and Production, 2003
(Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

State and Subdivision	Published Proved Reserves 12/31/02	Changes in Reserves During 2003							New Reservoir Discoveries in Old Fields (+)	Estimated Production (-)	Proved Reserves 12/31/03
		Adjustments (+,-)	Revision Increases (+)	Revision Decreases (-)	Sales (-)	Acquisitions (+)	Extensions (+)	New Field Discoveries (+)			
Alaska	8,468	1	427	235	0	0	81	20	1	478	8,285
Lower 48 States	178,478	2,840	19,485	21,315	10,174	11,208	16,373	1,202	1,609	18,947	180,759
Alabama	3,884	-36	588	122	246	264	315	0	4	350	4,301
Arkansas	1,650	21	148	134	63	82	125	0	0	166	1,663
California	2,591	-52	301	172	60	47	55	5	0	265	2,450
Coastal Region Onshore	190	5	13	30	2	2	0	0	0	11	167
Los Angeles Basin Onshore	207	3	19	34	25	26	1	0	0	10	187
San Joaquin Basin Onshore	2,102	-60	263	99	33	19	54	5	0	238	2,013
State Offshore	92	0	6	9	0	0	0	0	0	6	83
Colorado	13,888	-3	2,114	812	429	604	1,215	1	0	1,142	15,436
Florida	91	-9	0	0	0	0	0	0	0	3	79
Kansas	4,983	149	206	180	230	239	78	0	0	426	4,819
Kentucky	1,907	49	128	167	0	0	49	0	1	78	1,889
Louisiana	8,960	281	792	1,159	622	513	1,584	12	244	1,280	9,325
North	4,245	95	255	319	287	242	1,233	5	6	401	5,074
South Onshore	4,224	154	452	755	237	166	323	7	164	753	3,745
State Offshore	491	32	85	85	98	105	28	0	74	126	506
Michigan	3,254	65	303	235	201	386	74	0	2	220	3,428
Mississippi	744	-26	67	41	42	29	81	0	28	94	746
Montana	906	-28	46	26	225	326	146	0	0	86	1,059
New Mexico	17,320	-104	1,547	1,941	652	852	1,394	3	16	1,415	17,020
East	3,632	-14	622	950	218	242	475	3	16	507	3,301
West	13,688	-90	925	991	434	610	919	0	0	908	13,719
New York	^a 315	41	37	29	118	111	24	19	0	35	^a 365
North Dakota	471	25	36	44	1	6	5	0	0	50	448
Ohio	^a 1,117	97	121	127	7	0	7	0	0	^a 82	1,126
Oklahoma	14,886	226	2,892	2,843	1,598	1,864	1,509	6	13	1,554	15,401
Pennsylvania	2,216	314	241	263	30	1	149	21	3	165	2,487
Texas	44,297	1,289	4,462	5,100	2,552	2,878	5,044	195	383	5,166	45,730
RRC District 1	1,045	36	59	87	15	6	109	0	9	100	1,062
RRC District 2 Onshore	1,782	200	205	333	146	29	279	11	25	282	1,770
RRC District 3 Onshore	3,584	45	383	531	191	83	458	50	44	576	3,349
RRC District 4 Onshore	9,469	325	943	1,936	441	465	1,084	38	197	1,381	8,763
RRC District 5	4,602	130	706	278	336	350	638	5	47	457	5,407
RRC District 6	6,256	184	383	496	667	787	829	1	50	642	6,685
RRC District 7B	260	165	57	104	5	5	19	0	0	57	340
RRC District 7C	3,702	149	425	173	36	91	507	1	11	350	4,327
RRC District 8	5,361	-97	546	532	202	207	322	21	0	484	5,142
RRC District 8A	1,084	10	112	54	11	12	3	0	0	100	1,056
RRC District 9	2,877	0	116	154	211	563	450	0	0	332	3,309
RRC District 10	3,838	87	490	333	268	261	326	1	0	338	4,064
State Offshore	437	55	37	89	23	19	20	67	0	67	456
Utah	4,135	40	188	767	729	690	230	0	7	278	3,516
Virginia	1,673	1	45	37	0	0	117	0	0	82	1,717
West Virginia	3,360	54	182	306	1	36	167	0	3	189	3,306
Wyoming	20,527	132	2,072	2,704	333	406	3,068	32	0	1,456	21,744
Federal Offshore ^b	25,204	311	2,963	4,106	2,035	1,873	902	908	903	4,353	22,570
Pacific (California)	515	-1	41	2	0	0	5	0	0	47	511
Gulf of Mexico (Louisiana) ^b	18,500	261	1,866	2,922	1,557	1,563	713	824	724	3,244	16,728
Gulf of Mexico (Texas)	6,189	51	1,056	1,182	478	310	184	84	179	1,062	5,331
Miscellaneous ^c	99	3	6	0	0	1	35	0	2	12	134
U.S. Total	186,946	2,841	19,912	21,550	10,174	11,208	16,454	1,222	1,610	19,425	189,044

^aIndicates the estimate is associated with a sampling error (95 percent confidence interval) that exceeds 20 percent of the estimated value.

^bIncludes Federal offshore Alabama.

^cIncludes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

Note: The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," and Form EIA-64A, "Annual Report of the Origin of Natural Gas Liquids Production." They may differ from the official Energy Information Administration production data for natural gas for 2003 contained in the *Natural Gas Annual 2003*, DOE/EIA-0131(03).

Source: Energy Information Administration, Office of Oil and Gas.

Figure 19. Dry Natural Gas Proved Reserves by Area, 2003

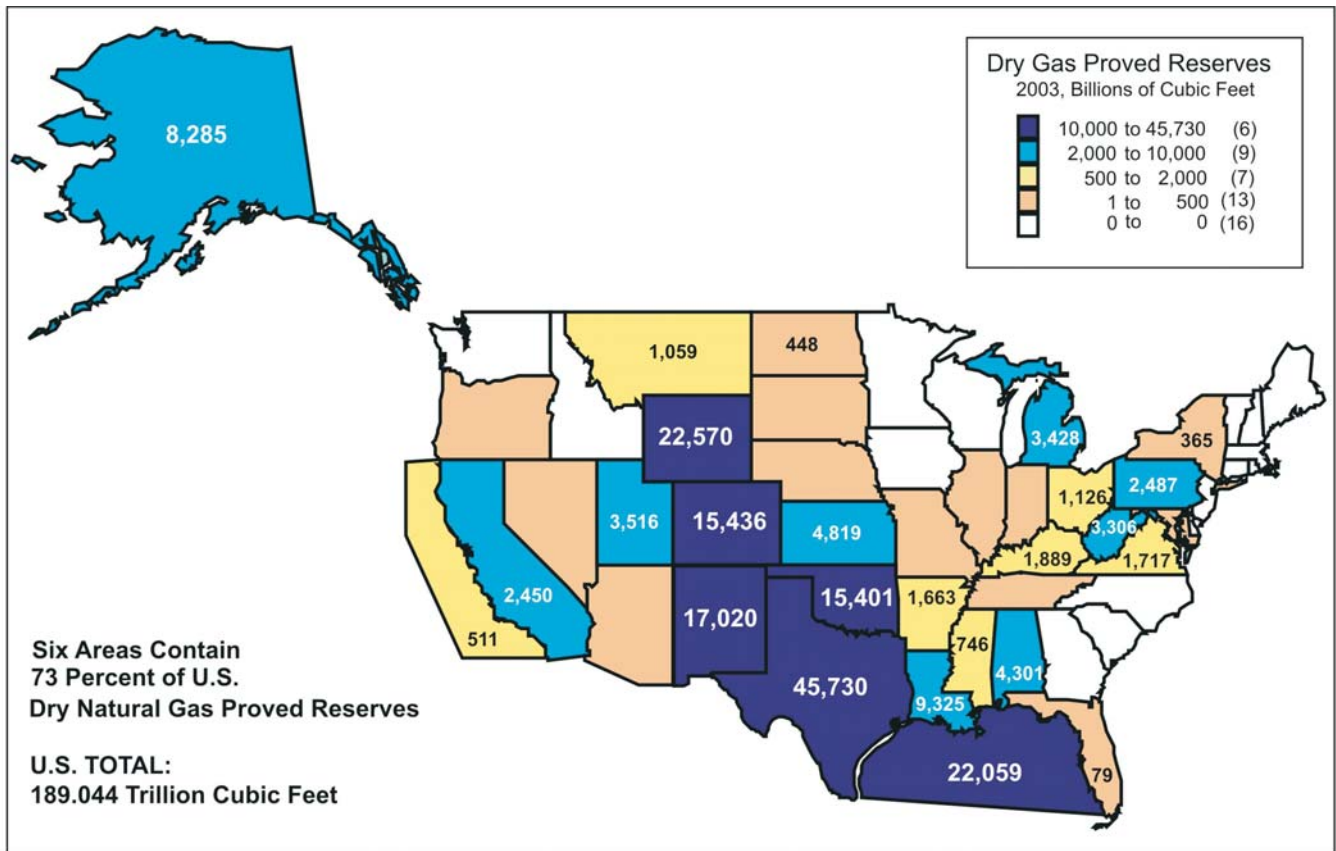
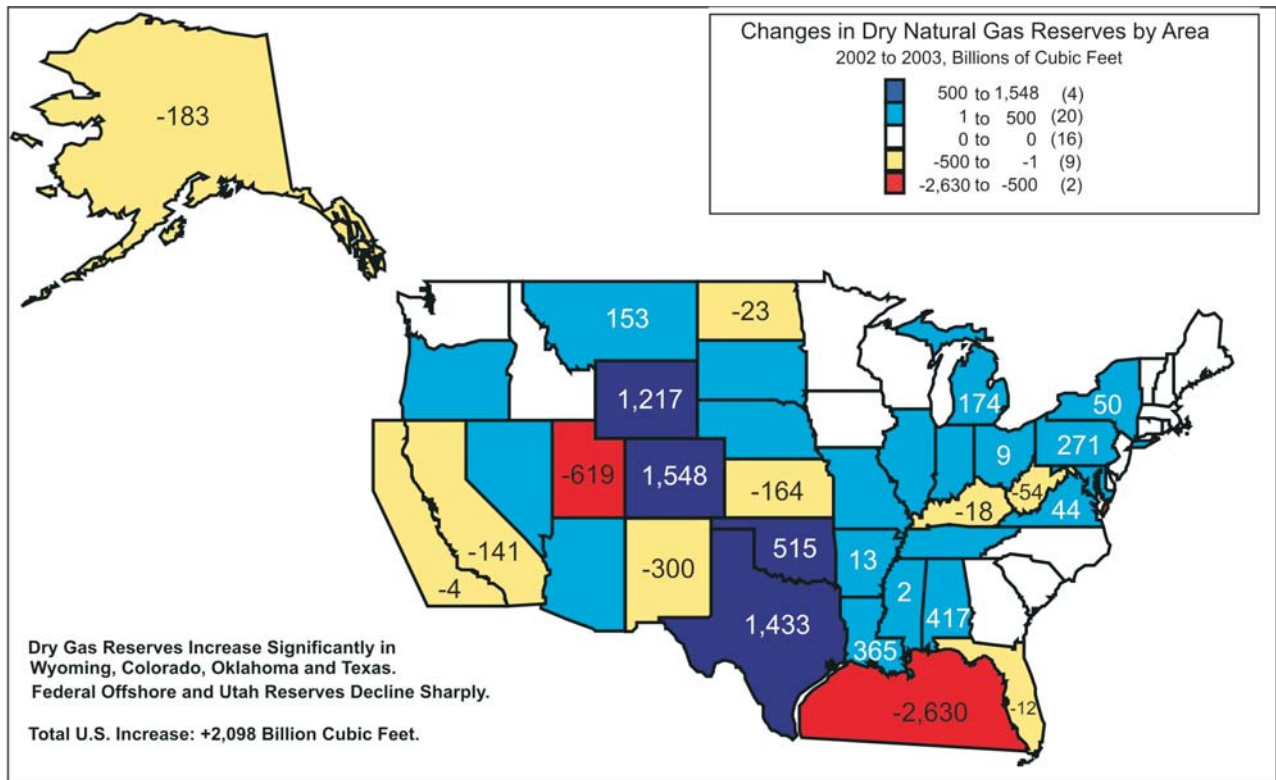


Figure 20. Changes in Dry Natural Gas Proved Reserves by Area, 2002 to 2003



Source: Energy Information Administration, Office of Oil and Gas.

Discussion of Reserves Changes

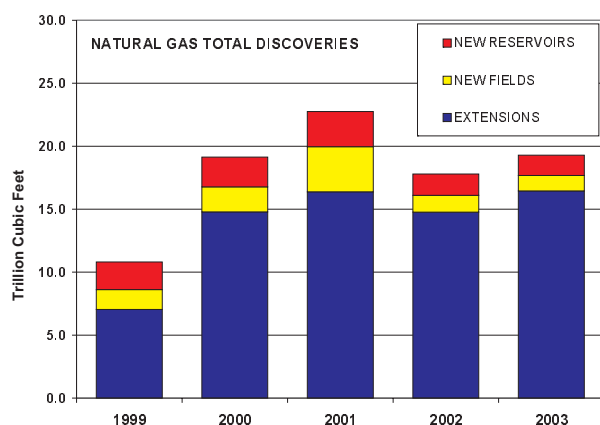
Figure 20 maps the change in dry gas proved reserves from 2002 to 2003 by area. Here's how the top six areas fared, compared to the total United States:

Area	Change in U.S. Gas Reserves (billion cubic feet)
Texas	+1,433
Wyoming	+1,217
Gulf of Mexico Federal Offshore	-2,630
New Mexico	-300
Colorado	+1,548
Oklahoma	+515
Area Total	+1,783
U.S. Total	+2,098

Figure 4 in Chapter 2 shows the components of change in dry natural gas proved reserves for 2003 and the preceding 10 years.

Total Discoveries

Total discoveries are those reserves attributable to field extensions, new field discoveries, and new reservoir discoveries in old fields; they result from drilling exploratory wells. Total discoveries of dry natural gas reserves were 19,286 billion cubic feet in 2003, an 8 percent increase from the level reported in 2002. About 29 percent of the total discoveries were in Texas, 16 percent were in Wyoming, 14 percent were in the Gulf of Mexico Federal Offshore, 10 percent were in Louisiana, 8 percent were in Oklahoma, and 7 percent were in New Mexico.



The largest component of total discoveries in 2003 were extensions of existing gas fields. Extensions were 16,454 billion cubic feet, 11 percent more than 2002 and 66 percent more than the prior 10-year average (9,941

billion cubic feet). Areas with the largest extensions and their percentage of total extensions were:

- Texas had 5,044 billion cubic feet of extensions (31 percent of the total)
- Wyoming had 3,068 billion cubic feet (19 percent)
- Louisiana had 1,584 billion cubic feet (10 percent)
- Oklahoma had 1,509 billion cubic feet (9 percent)
- New Mexico had 1,394 billion cubic feet (8 percent)
- Colorado had 1,215 billion cubic feet (7 percent).

New field discoveries were 1,222 billion cubic feet in 2003—8 percent less than in 2002. The areas with the largest new field discoveries were the Gulf of Mexico Federal Offshore (with 908 billion cubic feet of new field discoveries, 74 percent of the total), Texas (195 billion cubic feet, 16 percent), and Wyoming (32 billion cubic feet, 3 percent). In the prior 10 years, U.S. operators reported an average of 1,813 billion cubic feet of reserves from new field discoveries per year. Reserves from new field discoveries in 2003 were 33 percent less than that average.

New reservoir discoveries in old fields were 1,610 billion cubic feet, 5 percent less than 2002. The areas with the largest new reservoir discoveries in old fields and their percentage of the total were:

- Gulf of Mexico Federal Offshore (903 billion cubic feet, 56 percent)
- Texas (383 billion cubic feet, 24 percent)
- Louisiana (244 billion cubic feet, 15 percent).

In the prior 10 years, U.S. operators reported an average of 2,451 billion cubic feet of reserves from new reservoirs discovered in old fields per year. Reserves from new reservoirs discovered in old fields in 2003 were 66 percent of that average.

Revisions and Adjustments

There were 19,912 billion cubic feet of revision increases, 21,550 billion cubic feet of revision decreases, and 2,841 billion cubic feet of adjustments in 2003. Combined, there were 1,203 billion cubic feet of net revisions and adjustments in 2003, excluding reserves additions from net sales and acquisitions. This is 80 percent less than the average volume of net revisions and adjustments of the prior 10 years (6,100 billion cubic feet).

Table 9. Natural Gas Proved Reserves, Reserves Changes, and Production, Wet After Lease Separation, 2003 (Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

State and Subdivision	Published Proved Reserves 12/31/02	Changes in Reserves During 2003									Proved Reserves 12/31/03
		Adjustments (+,-)	Revision Increases (+)	Revision Decreases (-)	Sales (-)	Acquisitions (+)	Extensions (+)	New Field Discoveries (+)	New Reservoir Discoveries in Old Fields (+)	Estimated Production (-)	
Alaska	8,533	-1	428	234	0	0	81	20	1	480	8,348
Lower 48 States	187,028	2,324	20,352	22,261	10,593	11,700	17,114	1,232	1,652	19,751	188,797
Alabama	3,922	-42	598	125	251	270	321	0	4	352	4,345
Arkansas	1,654	19	149	134	63	82	125	0	0	166	1,666
California	2,696	-36	317	180	63	50	57	5	0	277	2,569
Coastal Region Onshore	197	5	14	31	2	2	0	0	0	11	174
Los Angeles Basin Onshore	218	1	20	36	26	28	1	0	0	10	196
San Joaquin Basin Onshore	2,190	-43	277	104	35	20	56	5	0	250	2,116
State Offshore	91	1	6	9	0	0	0	0	0	6	83
Colorado	14,348	-51	2,176	836	442	622	1,250	1	0	1,175	15,893
Florida	102	-7	0	0	0	0	0	0	0	3	92
Kansas	5,329	148	219	192	245	256	83	0	0	455	5,143
Kentucky	1,999	41	134	174	0	0	51	0	1	81	1,971
Louisiana	9,190	278	815	1,193	638	525	1,612	12	254	1,317	9,538
North	4,283	111	258	323	291	245	1,249	5	6	406	5,137
South Onshore	4,395	135	468	781	245	171	334	7	170	780	3,874
State Offshore	512	32	89	89	102	109	29	0	78	131	527
Michigan	3,311	69	308	240	205	392	75	0	2	224	3,488
Mississippi	746	-27	67	41	42	29	81	0	28	93	748
Montana	914	-29	46	26	227	329	147	0	0	86	1,068
New Mexico	18,453	-3	1,672	2,106	703	915	1,503	3	18	1,526	18,226
East	4,011	2	690	1,054	242	268	527	3	18	562	3,661
West	14,442	-5	982	1,052	461	647	976	0	0	964	14,565
New York	^a 315	41	37	29	118	111	24	19	0	35	^a 365
North Dakota	524	25	41	49	1	7	6	0	0	56	497
Ohio	^a 1,118	97	121	127	7	0	7	0	0	^a 82	1,127
Oklahoma	15,753	175	3,048	2,996	1,684	1,964	1,590	6	13	1,638	16,231
Pennsylvania	2,225	313	242	264	30	1	150	22	3	165	2,497
Texas	47,491	1,053	4,750	5,396	2,699	3,060	5,346	200	395	5,483	48,717
RRC District 1	1,094	20	61	89	15	6	113	0	9	104	1,095
RRC District 2 Onshore	1,867	205	214	348	153	30	292	11	26	295	1,849
RRC District 3 Onshore	3,826	18	406	562	202	88	485	53	46	610	3,548
RRC District 4 Onshore	9,861	258	974	2,000	455	481	1,121	39	203	1,427	9,055
RRC District 5	4,653	125	713	281	339	354	644	5	47	461	5,460
RRC District 6	6,561	144	399	516	695	819	862	1	52	668	6,959
RRC District 7B	294	186	64	118	6	6	22	0	0	65	383
RRC District 7C	4,167	99	471	192	40	100	561	0	12	387	4,791
RRC District 8	6,056	-80	619	604	230	235	365	24	0	550	5,835
RRC District 8A	1,167	12	121	59	12	13	3	0	0	108	1,137
RRC District 9	3,210	-50	128	169	231	620	496	0	0	365	3,639
RRC District 10	4,299	59	543	369	298	289	362	1	0	376	4,510
State Offshore	436	57	37	89	23	19	20	66	0	67	456
Utah	4,274	20	194	789	750	710	237	0	7	286	3,617
Virginia	1,673	1	45	37	0	0	117	0	0	82	1,717
West Virginia	3,498	13	187	315	1	37	171	0	3	194	3,399
Wyoming	21,531	52	2,164	2,825	347	424	3,205	33	0	1,521	22,716
Federal Offshore ^b	25,862	174	3,016	4,187	2,077	1,915	921	931	922	4,444	23,033
Pacific (California)	515	0	40	2	0	0	5	0	0	47	511
Gulf of Mexico (Louisiana) ^b	19,113	141	1,916	2,998	1,597	1,604	731	846	742	3,330	17,168
Gulf of Mexico (Texas)	6,234	33	1,060	1,187	480	311	185	85	180	1,067	5,354
Miscellaneous ^c	100	0	6	0	0	1	35	0	2	10	134
U.S. Total	195,561	2,323	20,780	22,495	10,593	11,700	17,195	1,252	1,653	20,231	197,145

^aIndicates the estimate is associated with a sampling error (95 percent confidence interval) that exceeds 20 percent of the estimated value.

^bIncludes Federal offshore Alabama.

^cIncludes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

Note: The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves." They may differ from the official Energy Information Administration production data for natural gas for 2003 contained in the *Natural Gas Annual 2003*, DOE/EIA-0131(03).

Source: Energy Information Administration, Office of Oil and Gas.

Table 10. Nonassociated Natural Gas Proved Reserves, Reserves Changes, and Production, Wet After Lease Separation, 2003 (Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

State and Subdivision	Published Proved Reserves 12/31/02	Changes in Reserves During 2003									Proved Reserves 12/31/03
		Adjustments (+,-)	Revision Increases (+)	Revision Decreases (-)	Sales (-)	Acquisitions (+)	Extensions (+)	New Field Discoveries (+)	New Reservoir Discoveries in Old Fields (+)	Estimated Production (-)	
Alaska	2,157	0	241	215	0	0	81	20	1	204	2,081
Lower 48 States	163,863	2,121	17,495	19,490	9,553	10,638	16,297	785	1,528	17,172	166,512
Alabama	3,891	-45	595	125	251	270	321	0	4	347	4,313
Arkansas	1,616	17	146	132	63	81	125	0	0	161	1,629
California	796	-22	70	28	15	4	36	5	0	87	759
Coastal Region Onshore	0	-1	2	0	0	0	0	0	0	0	1
Los Angeles Basin Onshore	0	0	0	0	0	0	0	0	0	0	0
San Joaquin Basin Onshore	790	-21	65	27	15	4	36	5	0	86	751
State Offshore	6	0	3	1	0	0	0	0	0	1	7
Colorado	13,251	-64	2,068	826	438	615	1,185	1	0	1,085	14,707
Florida	0	0	0	0	0	0	0	0	0	0	0
Kansas	5,263	144	195	187	245	255	79	0	0	446	5,058
Kentucky	1,974	40	134	174	0	0	51	0	1	80	1,946
Louisiana	8,520	270	704	1,051	559	464	1,573	12	246	1,227	8,952
North	4,124	113	241	309	283	241	1,246	5	6	386	4,998
South Onshore	3,968	126	397	671	202	142	302	7	165	728	3,506
State Offshore	428	31	66	71	74	81	25	0	75	113	448
Michigan	3,097	50	225	197	82	244	75	0	2	195	3,219
Mississippi	713	-26	59	37	40	28	81	0	28	85	721
Montana	820	-21	39	23	227	325	122	0	0	79	956
New Mexico	16,971	31	1,320	1,936	650	831	1,379	3	16	1,284	16,681
East	2,632	37	345	895	192	184	403	3	16	328	2,205
West	14,339	-6	975	1,041	458	647	976	0	0	956	14,476
New York	315	41	37	29	118	111	24	19	0	35	365
North Dakota	209	11	4	30	0	2	2	0	0	17	181
Ohio	772	107	112	106	7	0	7	0	0	62	823
Oklahoma	14,576	184	2,908	2,838	1,603	1,923	1,511	6	10	1,501	15,176
Pennsylvania	2,088	279	229	249	30	1	146	22	3	156	2,333
Texas	41,104	935	3,843	4,885	2,452	2,846	5,111	199	394	4,815	42,280
RRC District 1	1,047	20	57	87	14	6	108	0	9	99	1,047
RRC District 2 Onshore	1,797	205	189	342	150	29	276	11	26	273	1,768
RRC District 3 Onshore	3,219	8	332	433	164	78	429	53	46	524	3,044
RRC District 4 Onshore	9,711	248	955	1,971	449	476	1,116	39	202	1,408	8,919
RRC District 5	4,588	126	702	277	327	344	644	5	47	454	5,398
RRC District 6	6,161	125	340	491	692	809	862	1	52	595	6,572
RRC District 7B	237	198	26	113	4	3	19	0	0	52	314
RRC District 7C	3,430	45	319	163	26	85	474	0	12	312	3,864
RRC District 8	3,284	-87	257	443	102	94	327	23	0	321	3,032
RRC District 8A	101	0	17	4	0	2	0	0	0	16	100
RRC District 9	3,070	-57	110	140	229	620	488	0	0	348	3,514
RRC District 10	4,028	49	502	332	272	281	348	1	0	347	4,258
State Offshore	431	55	37	89	23	19	20	66	0	66	450
Utah	3,915	23	174	721	713	667	232	0	7	266	3,318
Virginia	1,673	1	45	37	0	0	117	0	0	82	1,717
West Virginia	3,477	14	182	314	1	37	171	0	3	193	3,376
Wyoming	20,970	-24	2,128	2,667	336	418	3,202	33	0	1,458	22,266
Federal Offshore ^a	17,772	171	2,272	2,898	1,723	1,515	712	485	812	3,502	15,616
Pacific (California)	56	0	1	0	0	0	0	0	0	2	55
Gulf of Mexico (Louisiana) ^a	12,749	137	1,415	1,843	1,321	1,220	527	404	638	2,600	11,326
Gulf of Mexico (Texas)	4,967	34	856	1,055	402	295	185	81	174	900	4,235
Miscellaneous ^b	80	5	6	0	0	1	35	0	2	9	120
U.S. Total	166,020	2,121	17,736	19,705	9,553	10,638	16,378	805	1,529	17,376	168,593

^aIncludes Federal offshore Alabama.

^bIncludes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

Note: The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves." They may differ from the official Energy Information Administration production data for natural gas for 2003 contained in the *Natural Gas Annual 2003*, DOE/EIA-0131(03).

Source: Energy Information Administration, Office of Oil and Gas.

Table 11. Associated-Dissolved Natural Gas Proved Reserves, Reserves Changes, and Production, Wet After Lease Separation, 2003 (Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

State and Subdivision	Published Proved Reserves 12/31/02	Changes in Reserves During 2003									Proved Reserves 12/31/03
		Adjustments (+,-)	Revision Increases (+)	Revision Decreases (-)	Sales (-)	Acquisitions (+)	Extensions (+)	New Field Discoveries (+)	New Reservoir Discoveries in Old Fields (+)	Estimated Production (-)	
Alaska	6,376	-1	187	19	0	0	0	0	0	276	6,267
Lower 48 States	23,165	203	2,857	2,771	1,040	1,062	817	447	124	2,579	22,285
Alabama	31	3	3	0	0	0	0	0	0	5	32
Arkansas	38	2	3	2	0	1	0	0	0	5	37
California	1,900	-14	247	152	48	46	21	0	0	190	1,810
Coastal Region Onshore	197	6	12	31	2	2	0	0	0	11	173
Los Angeles Basin Onshore	218	1	20	36	26	28	1	0	0	10	196
San Joaquin Basin Onshore	1,400	-22	212	77	20	16	20	0	0	164	1,365
State Offshore	85	1	3	8	0	0	0	0	0	5	76
Colorado	1,097	13	108	10	4	7	65	0	0	90	1,186
Florida	102	-7	0	0	0	0	0	0	0	3	92
Kansas	66	4	24	5	0	1	4	0	0	9	85
Kentucky	25	1	0	0	0	0	0	0	0	1	25
Louisiana	670	8	111	142	79	61	39	0	8	90	586
North	159	-2	17	14	8	4	3	0	0	20	139
South Onshore	427	9	71	110	43	29	32	0	5	52	368
State Offshore	84	1	23	18	28	28	4	0	3	18	79
Michigan	214	19	83	43	123	148	0	0	0	29	269
Mississippi	33	-1	8	4	2	1	0	0	0	8	27
Montana	94	-8	7	3	0	4	25	0	0	7	112
New Mexico	1,482	-34	352	170	53	84	124	0	2	242	1,545
East	1,379	-35	345	159	50	84	124	0	2	234	1,456
West	103	1	7	11	3	0	0	0	0	8	89
New York	0	0	0	0	0	0	0	0	0	0	0
North Dakota	315	14	37	19	1	5	4	0	0	39	316
Ohio	346	-10	9	21	0	0	0	0	0	20	304
Oklahoma	1,177	-9	140	158	81	41	79	0	3	137	1,055
Pennsylvania	137	34	13	15	0	0	4	0	0	9	164
Texas	6,387	118	907	511	247	214	235	1	1	668	6,437
RRC District 1	47	0	4	2	1	0	5	0	0	5	48
RRC District 2 Onshore	70	0	25	6	3	1	16	0	0	22	81
RRC District 3 Onshore	607	10	74	129	38	10	56	0	0	86	504
RRC District 4 Onshore	150	10	19	29	6	5	5	0	1	19	136
RRC District 5	65	-1	11	4	12	10	0	0	0	7	62
RRC District 6	400	19	59	25	3	10	0	0	0	73	387
RRC District 7B	57	-12	38	5	2	3	3	0	0	13	69
RRC District 7C	737	54	152	29	14	15	87	0	0	75	927
RRC District 8	2,772	7	362	161	128	141	38	1	0	229	2,803
RRC District 8A	1,066	12	104	55	12	11	3	0	0	92	1,037
RRC District 9	140	7	18	29	2	0	8	0	0	17	125
RRC District 10	271	10	41	37	26	8	14	0	0	29	252
State Offshore	5	2	0	0	0	0	0	0	0	1	6
Utah	359	-3	20	68	37	43	5	0	0	20	299
Virginia	0	0	0	0	0	0	0	0	0	0	0
West Virginia	21	-1	5	1	0	0	0	0	0	1	23
Wyoming	561	76	36	158	11	6	3	0	0	63	450
Federal Offshore ^a	8,090	3	744	1,289	354	400	209	446	110	942	7,417
Pacific (California)	459	0	39	2	0	0	5	0	0	45	456
Gulf of Mexico (Louisiana) ^a	6,364	4	501	1,155	276	384	204	442	104	730	5,842
Gulf of Mexico (Texas)	1,267	-1	204	132	78	16	0	4	6	167	1,119
Miscellaneous ^b	20	-5	0	0	0	0	0	0	0	1	14
U.S. Total	29,541	202	3,044	2,790	1,040	1,062	817	447	124	2,855	28,552

^aIncludes Federal offshore Alabama.

^bIncludes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

Note: The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves." They may differ from the official Energy Information Administration production data for natural gas for 2003 contained in the *Natural Gas Annual 2003*, DOE/EIA-0131(03).

Source: Energy Information Administration, Office of Oil and Gas.

Sales and Acquisitions

Sales represents that volume of dry natural gas proved reserves deducted from an operator's total through sale or transfer of operations of an existing gas field or properties to another operator (not a volume of production "sold" at the wellhead). Similarly, acquisitions are that volume of proved reserves added to an operator's total by purchase or operations transfer of an existing gas field or properties.

In 2003, there were 10,174 billion cubic feet of sales transactions between operators, and 11,208 billion cubic feet of acquisitions. The net difference of 1,034 billion cubic feet was added to the National total of dry natural gas reserves in 2003.

Production

The estimated 2003 U.S. dry natural gas production was 19,425 billion cubic feet, an increase of less than 1 percent from 2002 (**Table 8**). Areas with the largest production and their percentage of total production were:

- Texas produced 5,166 billion cubic feet (BCF) of dry natural gas (27 percent of the total)
- Gulf of Mexico Federal Offshore produced 4,306 BCF (22 percent)
- Oklahoma produced 1,554 BCF (8 percent)
- Wyoming produced 1,456 BCF (7 percent)
- New Mexico produced 1,415 BCF (7 percent)
- Louisiana produced 1,280 BCF (7 percent)
- Colorado produced 1,142 BCF (6 percent of the National total).

In 2003, Colorado's reported annual dry natural gas production exceeded 1 TCF for the first time.

Wet Natural Gas

U. S. proved reserves of wet natural gas as of December 31, 2003 were 197,145 billion cubic feet, a 1 percent increase from the volume reported in 2002 (**Table 9**). At year-end 2003, proved wet natural gas reserves for the lower 48 States had increased by 1 percent compared to 2002, while those of Alaska had decreased by 2 percent.

The volumetric differences between the estimates reported in **Table 8** (dry) and **Table 9** (wet) result from the removal of natural gas liquids at natural gas processing plants. A discussion of the methodology

used to generate wet and dry natural gas reserves tables in this report appears in Appendix F.

Nonassociated Natural Gas

Proved Reserves

Proved reserves of nonassociated (NA) natural gas, wet after lease separation, in the United States increased by 2 percent (+2,573 billion cubic feet) in 2003 to 168,593 billion cubic feet (**Table 10**). The lower 48 States' NA wet natural gas proved reserves increased 2 percent to a level of 166,512 billion cubic feet, while Alaska had a 4 percent decline to a level of 2,081 billion cubic feet. Those States with the largest increases in NA wet natural gas reserves were Colorado, Wyoming, and Texas.

Total Discoveries

NA wet natural gas *total discoveries* of 18,712 billion cubic feet in 2003 increased 9 percent compared to 2002's total of 17,182 billion cubic feet. Areas with the most *total discoveries* in 2003 were Texas (5,704 billion cubic feet), Wyoming (3,235 billion cubic feet), the Gulf of Mexico Federal Offshore (2,009 billion cubic feet), Louisiana (1,831 billion cubic feet), Oklahoma (1,527 billion cubic feet), and New Mexico (1,398 billion cubic feet).

Production

U.S. production of NA wet natural gas increased less than 1 percent from an estimated 17,260 billion cubic feet in 2002 to 17,376 billion cubic feet in 2003. The five leading producing areas were: Texas (28 percent), the Gulf of Mexico Federal Offshore (20 percent), Oklahoma (9 percent), Wyoming (8 percent), and New Mexico (7 percent).

Associated-Dissolved Natural Gas

Proved Reserves

Proved reserves of associated-dissolved (AD) natural gas, wet after lease separation, in the United States declined 3 percent to 28,552 billion cubic feet in 2003 (**Table 11**). Proved reserves of AD wet natural gas in the lower 48 States decreased by 4 percent (-880 billion cubic feet) to 22,285 billion cubic feet, and in Alaska

declined 2 percent (-109 billion cubic feet) to 6,267 billion cubic feet in 2003. The areas of the country with the largest AD wet natural gas reserves and their percentage of the total were:

- Gulf of Mexico Federal Offshore (24 percent)
- Texas (23 percent)
- Alaska (22 percent)
- California (6 percent)
- New Mexico (5 percent).

These areas logically correspond to the areas of the country with the largest volumes of crude oil reserves.

Production

U.S. production of AD wet natural gas decreased 4 percent from an estimated 2,988 billion cubic feet in 2002 to 2,855 billion cubic feet in 2003 (**Table 11**). Production of AD wet natural gas in the lower 48 States decreased from 2,726 billion cubic feet to 2,579 billion cubic feet in 2003, a decline of 5 percent. The areas of the country with the largest AD wet natural gas production and their percentage of the total were:

- Gulf of Mexico Federal Offshore (31 percent)
- Texas (23 percent)
- Alaska (10 percent)
- New Mexico (8 percent)
- California (7 percent).

Table 12. Coalbed Methane Proved Reserves and Production, 1989–2003
(Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

Year	Alabama	Colorado	New Mexico	Utah	Wyoming	Eastern States ^a	Western States ^b	Others ^c	United States
Reserves									
1989	537	1,117	2,022	NA	NA	NA	NA	0	3,676
1990	1,224	1,320	2,510	NA	NA	NA	NA	33	5,087
1991	1,714	2,076	4,206	NA	NA	NA	NA	167	8,163
1992	1,968	2,716	4,724	NA	NA	NA	NA	626	10,034
1993	1,237	3,107	4,775	NA	NA	NA	NA	1,065	10,184
1994	976	2,913	4,137	NA	NA	NA	NA	1,686	9,712
1995	972	3,461	4,299	NA	NA	NA	NA	1,767	10,499
1996	823	3,711	4,180	NA	NA	NA	NA	1,852	10,566
1997	1,077	3,890	4,351	NA	NA	NA	NA	2,144	11,462
1998	1,029	4,211	4,232	NA	NA	NA	NA	2,707	12,179
1999	1,060	4,826	4,080	NA	NA	NA	NA	3,263	13,229
2000	1,241	5,617	4,278	1,592	1,540	1,399	41	--	15,708
2001	1,162	6,252	4,324	1,685	2,297	1,453	358	--	17,531
2002	1,283	6,691	4,380	1,725	2,371	1,488	553	--	18,491
2003	1,665	6,473	4,396	1,224	2,759	1,528	698	--	18,743
Production									
1989	23	12	56	NA	NA	NA	NA	0	91
1990	36	26	133	NA	NA	NA	NA	1	196
1991	68	48	229	NA	NA	NA	NA	3	348
1992	89	82	358	NA	NA	NA	NA	10	539
1993	103	125	486	NA	NA	NA	NA	18	752
1994	108	179	530	NA	NA	NA	NA	34	851
1995	109	226	574	NA	NA	NA	NA	47	956
1996	98	274	575	NA	NA	NA	NA	56	1,003
1997	111	312	597	NA	NA	NA	NA	70	1,090
1998	123	401	571	NA	NA	NA	NA	99	1,194
1999	108	432	582	NA	NA	NA	NA	130	1,252
2000	109	451	550	74	133	58	4	--	1,379
2001	111	490	517	83	278	69	14	--	1,562
2002	117	520	471	103	302	68	33	--	1,614
2003	98	488	451	97	344	71	51	--	1,600

^aIncludes Indiana, Ohio, Pennsylvania, Virginia, and West Virginia.

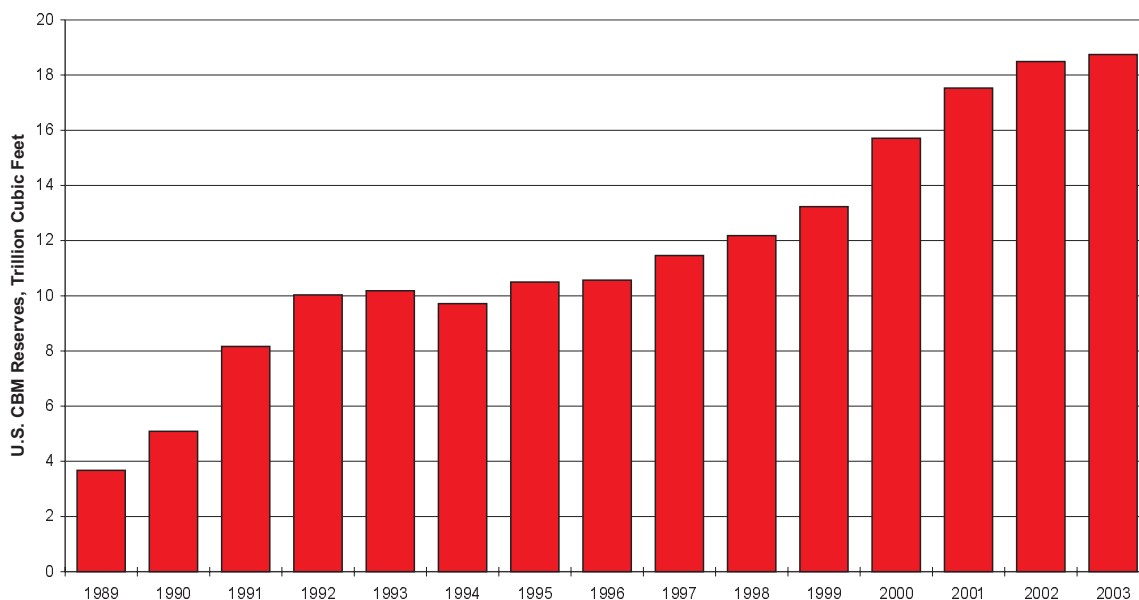
^bIncludes Arkansas, Kansas, Montana, and Oklahoma.

^cIncludes Oklahoma, Pennsylvania, Utah, Virginia, West Virginia, and Wyoming; these states are individually listed or grouped in Eastern States and Western States for 2000-2003.

NA = Not applicable.

Source: Energy Information Administration, Office of Oil and Gas.

Figure 21. Coalbed Methane Proved Reserves, 1989-2003



Source: Energy Information Administration, Office of Oil and Gas.

Again, these areas logically correspond to the areas of the country with the largest volumes of crude oil production.

Coalbed Methane

Proved Reserves

Proved reserves of coalbed methane increased to 18,743 billion cubic feet in 2003, a 1 percent increase over the 2002 level (18,491 billion cubic feet). Coalbed methane accounted for 10 percent of all 2003 dry natural gas reserves (**Table 12**). For the ninth year in a row, gas reserves of fields identified as having coalbed methane have increased (**Figure 21**). Five States (Colorado, New Mexico, Wyoming, Utah, and Alabama) currently have the majority (88 percent) of U.S. coalbed methane proved reserves. Colorado and Utah reported declines in their proved coalbed methane reserves in 2003.

Production

U.S. coalbed methane production declined less than 1 percent in 2003 to 1,600 billion cubic feet. It accounted for 8 percent of U.S. dry gas production.

Areas of Note: Large Discoveries and Reserves Additions

The following State or area discussions summarize notable activities during the year concerning expected new field reserves, development plans, and possible production rates as extracted from various trade publications and company reports. The citations do not necessarily reflect EIA's concurrence, but are considered important enough to be brought to the reader's attention.

Colorado

Colorado had a net increase of 1,548 billion cubic feet of dry natural gas proved reserves in 2003, the largest of any State. This was primarily due to development of the Wattenberg Field, the Mamm Creek Field, and coalbed methane reserves in the Raton Basin.

- **Wattenberg Field:** Onshore in the lower 48 States, Kerr-McGee Corporation's exploration and field exploitation programs target natural gas to help meet strong domestic demand. Use of 3-D seismic surveys, new well-stimulation techniques and creative collaboration with service companies enable the company to extract

additional production from mature fields. About a third of Kerr-McGee's worldwide 2003 natural gas production flowed from tight sands in Colorado and South Texas. These unconventional reservoirs consist of harder, less permeable rock formations than conventional fields but are long-lived and generate predictable cash flow at low unit cost. In Colorado's Wattenberg field, Kerr-McGee operates more than 3,100 wells and a 1,600-mile gathering system. Production techniques include infill drilling, fracture stimulation, well deepenings and recompletions. {40}

- **Mamm Creek Field:** Oil and Gas Investor Magazine recently named EnCana Corporation's Mamm Creek Field as the Best Field Rejuvenation in 2003, recognizing the tremendous growth achieved over the past couple of years from this high-quality Colorado property. This is a success story of continuous innovation. Mamm Creek's gas-bearing zone is typically 2,500 feet thick. These tight sandstone reservoirs contain large volumes of natural gas that are trapped by the dense structure of the rock. Freeing the gas requires high-pressure rock fracturing.

In 2000, the accepted technique called for splitting the gas-bearing zone into several zones through fracture stimulation, yielding typical initial gas production rates of about 500,000 cubic feet per day. Through experiment and pilot testing, EnCana has made great strides with more frequent fracs across narrower intervals. Instead of two big frac jobs, EnCana now executes up to eight fracs across the same 2,500-foot zone. When improved fracturing techniques are applied, the gains are monumental, tripling production to more than 1.4 million cubic feet per day from the same formations. {41}

Texas

Texas had a 3 percent increase in dry natural gas proved reserves in 2003 (+1,433 billion cubic feet). Production also increased 3 percent (+128 billion cubic feet). This resulted from exploration in South Texas and extensions of existing gas fields in the Permian Basin and the Newark East Field in north central Texas.

- **Newark East Field:** Devon Energy Corporation has drilled about 800 wells into the Barnett Shale

since 2001. Use of fracturing technology has helped Devon increase its Barnett production from 345 million cubic feet of natural gas equivalent per day to nearly 600 million today. In all, Devon is operating more than 1,700 wells in what is known as the Barnett's core area, where dense layers of limestone separate the shale's gas deposits from the watery Ellenberger formation which lies below.

Today, Devon is continuing to confront the most challenging questions in the Barnett. It ventured outside the core with horizontal drilling projects where geological complexities have impeded development in the past. Those projects have shown promise, and Devon geoscientists continue to explore the Barnett's non-core area, where it is a major lease holder with 390,000 net acres of land. Through Devon's pioneering effort, the Barnett Shale formation has emerged as the largest natural gas field in Texas and one of the most important gas fields in the nation. With recent inroads into the vast non-core area, the Barnett has potential to remain one of the country's most vital energy resources for years to come. Devon's accomplishments in the Barnett are an example of how technology and innovation are helping to meet growing energy demands by finding new ways to tap North America's remaining reserves. {42}

Wyoming

Wyoming's dry natural gas reserves increased by 1,217 billion cubic feet in 2003. This was the result of development in the Pinedale and Jonah fields, and in coalbed methane fields located in the Powder River Basin.

- **Jonah Field:** Spanning just 30 square miles in southwest Wyoming, the Jonah natural gas field contains an estimated 10 trillion cubic feet of original gas-in-place and EnCana Corporation owns about 75 percent of it. Jonah's gas treasures lay deep underground, in a zone between 8,000 and 11,500 feet. Since Jonah's discovery in 1986, wells have been drilled on 40 acre spacing. Through pilot projects, we have determined there's plenty of untapped natural gas between existing wells. Initial tests of these infill wells have discovered several geological horizons at original pressures and exhibited production rates similar to existing wider-spaced wells. Knowing there's far more

gas to recover, we are seeking regulatory approval to increase drilling density. This approval process includes completion of an environmental impact assessment by the U.S. Bureau of Land Management, which is expected later in 2004. Upon approval, EnCana plans to increase drilling and significantly grow production. This infill potential adds a five-year inventory of up to 1,200 wells. Add to that the application of recompletion techniques of bypassed zones in wells drilled before 2000 and the future of Jonah looks bright. In the second quarter of 2004, EnCana's gas production averaged 387 million cubic feet per day from the Jonah field. {43}

Areas of Note: Large Reserves Declines

The following areas had large declines in dry natural gas proved reserves due to downward revisions or unreplaced production.

Gulf of Mexico Federal Offshore

Proved dry natural gas reserves in the Gulf of Mexico Federal Offshore decreased by 11 percent (-2,630 billion cubic feet) in 2003. Production decreased 3 percent from 4,423 billion cubic feet in 2002 to 4,306 billion cubic feet in 2003.

Utah

Utah's proved dry natural gas reserves decreased by 15 percent (-619 billion cubic feet) in 2003. Production in Utah decreased 3 percent (-8 billion cubic feet) in 2003.

New Mexico

New Mexico's proved dry natural gas reserves decreased by 2 percent (-300 billion cubic feet) in 2003. Production in New Mexico decreased 7 percent (-109 billion cubic feet) in 2003.

Reserves in Nonproducing Status

Nonproducing proved natural gas reserves (wet after lease separation) of 49,068 billion cubic feet were reported in 2003, 2 percent less than the 49,974 billion cubic feet reported in 2002 (**Appendix D, Table D10**). About 24 percent of the reserves in nonproducing status are located in Texas. Another 22 percent are in the Gulf of Mexico Federal Offshore, as most new deepwater reserves are in the nonproducing category. Wells or reservoirs are nonproducing due to any of several operational reasons. These include awaiting well workovers, the drilling of extensions or additional development wells, installation of production or pipeline facilities, and depletion of other zones or reservoirs before recompletion in reservoirs not currently open to production (called "behind pipe" reserves).