SOUTHEASTERN RESOURCE MANAGEMENT PLAN

REASONABLY FORESEEABLE DEVELOPMENT SCENARIO FOR FLUID MINERALS

2012 REVISION

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
EASTERN STATES
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Southeastern Resource Management Plan

Oil and Gas

RFDS Revision

The Oil and Gas Reasonable Foreseeable Development Scenario (RFDS) for the Southeastern Resource Management Plan (SE RMP) contracted for in 2007 and published in 2008 was revised in 2009 and 2012. The 2009 revision was necessitated by the acquisition of updated Federal Mineral Ownership (FMO) data and the utilization of a more accurate USDA Forest Service data layer in the GIS database which were unavailable to the contractor at the time the RFDS were published. The 2012 revision was developed to account for emerging trends which had the potential to materially affect projections of wells and related disturbance in several states.

The following well forecasts and disturbance projections were based on the new data and also on updated oil and gas well statistics gathered from the appropriate state agency:

Arkansas Well Forecast (Revised):

Arkansas 10 Year Forecast Well Drilling

County	Total Projected Wells	Projected BLM Wells
Cleburne	440	60
Columbia	20	2
Conway	930	40
Crawford	130	0
Faulkner	440	10
Franklin	170	0
Independence	40	0
Jackson	70	8
Johnson	1,520	20
Lafayette	20	2
Lee	10	0
Logan	930	20
Miller	20	2
Monroe	10	10
Nevada	10	2
Phillips	10	0
Quachita	10	2
Pope	1,480	20
Prairie	10	10
Scott	270	0
Sebastian	680	20
St. Francis	40	40
Stone	10	10
Union	20	2
Van Buren	1,290	100
Washington	30	0
White	1,790	40
Woodruff	30	0
Yell	1,690	20
Total Wells	**12,120**	**440**

Source: BLM 2012

Kentucky Well Forecast (Revised):

Eastern Kentucky 10-Year Forecast Oil Drilling

Eastern Kentucky 10-Year Forecast Oil Drilling				Federal Ownership		Forecast Federal Oil Wells			
County	**Rank**	**Oil Wells**	**Dry Oil (2% average)**	**USFS %**	**Non-USFS Federal %**	**USFS Oil Wells**	**USFS Oil Dry holes**	**Non USFS Oil Wells**	**Non-USFS Oil Dry holes**
Breathitt	**Low Oil**	10	0	0.1	0	0	0	0	0
Leslie		10	0	20.0	0	1	0	0	0
Magoffin		10	0	0	0	0	0	0	0
Whitley		10	0	10.0	0	1	0	0	0
Lee		20	0	5.0	0	1	0	0	0
Total		**60**	**0**			**3**	**0**	**0**	**0**

Eastern Kentucky 10-Year Forecast Gas Drilling

Eastern Kentucky 10-Year Forecast Gas Drilling				Federal Ownership		Forecast Federal Gas Wells			
County	**Rank**	**Gas Wells**	**Dry Gas (2% average)**	**USFS %**	**Non-USFS Federal %**	**USFS Gas Wells**	**USFS Gas Dry holes**	**Non USFS Gas Wells**	**Non USFS Gas Dry holes**
Elliott	**Low Gas**	10	0	0	0.2	**0**	**0**	**1**	**0**
Rowan		10	0	10.0	-	**0**	**0**	**0**	**0**
Menifee		10	0	20.0	-	**1**	**0**	**0**	**0**
Estill		20	1	1.0	-	**1**	**0**	**0**	**0**
Carter		30	1	0	-	**0**	**0**	**1**	**0**
Lee		30	1	5.0	0	**1**	**0**	**0**	**0**
Laurel		30	1	20.0	-	**0**	**0**	**0**	**0**
Morgan		30	1	1	0.5	**0**	**0**	**1**	**0**
Lawrence	**Med Gas**	60	1	0	0	**0**	**0**	**1**	**0**
Whitley		60	1	10.0	0	**2**	**0**	**0**	**0**
Breathitt		90	2	0.1	0	**0**	**0**	**0**	**0**
Clay		90	2	15.0	0	**4**	**0**	**0**	**0**
Johnson		100	2	0	0	**0**	**0**	**1**	**0**
Harlan		110	2	0	0.5	**0**	**0**	**1**	**0**
Martin		110	2	0	0	**0**	**0**	**0**	**0**
Bell		130	2	0	4.3	**0**	**0**	**1**	**0**
Magoffin		150	3	0	0	**0**	**0**	**0**	**0**
Floyd	**High Gas**	190	4	0	0.6	**0**	**0**	**2**	**0**
Knox		210	4	0.1	0	**0**	**0**	**0**	**0**
Knott		240	5	0	0.6	**0**	**0**	**2**	**0**
Perry		260	5	0	0	**0**	**0**	**1**	**0**
Pike		270	5	2.8	0.5	**0**	**0**	**4**	**0**
Leslie		440	8	20.0	0	**7**	**0**	**0**	**0**
Letcher		530	10	3.0	0	**1**	**0**	**0**	**0**
Total		**3210**	**60**			**17**	**0**	**16**	**0**

Central Kentucky 10-Year Forecast Oil Drilling

Central Kentucky 10-Year Forecast Oil Drilling				Federal Ownership		Forecast Federal Oil Wells			
County	**Rank**	**Oil Wells**	**Dry Oil (40% average)**	**USFS %**	**Non-USFS Federal %**	**USFS Oil Wells**	**USFS Oil Dryholes**	**Non USFS Oil Wells**	**Non-USFS Oil Dryholes**
Monroe	**Low Oil**	10	4	0	0	**0**	**0**	**0**	**0**
Allen		10	4	0	0	**0**	**0**	**1**	**0**
Russell		20	8	0	9.6	**0**	**0**	**2**	**1**
Barren		30	12	0	0.3	**0**	**0**	**1**	**0**
Warren		40	16	0	0	**0**	**0**	**0**	**0**
Cumberland		60	24	0	0.9	**0**	**0**	**1**	**0**
Taylor		70	28	0	0	**0**	**0**	**1**	**0**
Clinton		80	32	0	2.5	**0**	**0**	**2**	**1**
Adair		90	36	0	0	**0**	**0**	**1**	**0**
Green	**Med Oil**	200	80	0	0	**0**	**0**	**0**	**0**
Metcalfe		220	88	0	0	**0**	**0**	**0**	**0**
Total		**830**	**332**			**0**	**0**	**9**	**2**

Central Kentucky 10-Year Forecast Gas Drilling

Central Kentucky 10-Year Forecast Gas Drilling				Federal Ownership		Forecast Federal Gas Wells			
County	**Rank**	**Gas Wells**	**Dry Gas (40% average)**	**USFS %**	**Non-USFS Federal %**	**USFS Gas Wells**	**USFS Gas Dryholes**	**Non USFS Gas Wells**	**Non-USFS Gas Dryholes**
Cumberland	**Low Gas**	10	4	0	0.9	**0**	**0**	**0**	**0**
Edmonson		10	4	0	2.0	**0**	**0**	**1**	**0**
Clark		10	4	0	0	**0**	**0**	**0**	**0**
Metcalfe		20	8	0	0	**0**	**0**	**0**	**0**
Warren		40	16	0	0	**0**	**0**	**0**	**0**
Total		**90**	**36**			**0**	**0**	**1**	**0**

Western Kentucky 10-Year Forecast Oil Drilling

Western Kentucky 10-Year Forecast Oil Drilling				Federal Ownership		Forecast Federal Oil Wells			
County	**Rank**	**Oil Wells**	**Dry Oil (37% average)**	**USFS %**	**Non-USFS Federal %**	**USFS Oil Wells**	**USFS Oil Dryholes**	**Non USFS Oil Wells**	**Non-USFS Oil Dryholes**
Hancock	**Low Oil**	10	4	0	0	**0**	**0**	**0**	**0**
Henderson		10	4	0	0	**0**	**0**	**0**	**0**
Muhlenberg		10	4	0	0	**0**	**0**	**0**	**0**
Webster		10	4	0	0	**0**	**0**	**0**	**0**
Total		**40**	**16**			**0**	**0**	**0**	**0**

Western Kentucky 10-Year Forecast Gas Drilling

Western Kentucky 10-Year Forecast Gas Drilling				Federal Ownership		Forecast Federal Gas Wells			
County	**Rank**	**Gas Wells**	**Dry Gas (37% average)**	**USFS %**	**Non-USFS Federal %**	**USFS Gas Wells**	**USFS Gas Dryholes**	**Non USFS Gas Wells**	**Non-USFS Gas Dryholes**
Christian	**Low Gas**	10	4	0	2.9	**0**	**0**	**1**	**0**
Lyon		10	4	25.3	5.5	**1**	**0**	**1**	**0**
Webster		10	4	0	0	**0**	**0**	**0**	**0**
Trigg		10	4	25.0	10.0	**1**	**0**	**1**	**0**
Hopkins		20	7	0	0	**0**	**0**	**0**	**0**
Total		**60**	**23**			**2**	**0**	**3**	**0**

Table 16: Federal Activity Forecast Ten-Year Forecast for Oil and Gas Wells in Kentucky

Region	Total Oil and Gas Wells	Total Dry-holes	USFS Oil and Gas Wells	USFS Dry-holes	Non-USFS Federal Oil and Gas Wells	Non-USFS Federal Dry-holes
Eastern	3270	60	20	0	16	0
Central	920	368	0	0	10	2
Western	100	39	2	0	3	0
State Total	**4290**	**467**	**22**	**0**	**29**	**3**

Louisiana Well Forecast (Revised):

North Louisiana	Forecast of Total Annual Production Wells	2011 Permitted Wells	Forecast of Total annual State & Fee Production Wells	Forecast Total Federal Production Wells	Yearly
PARISH					
Bossier	489	43	430	59	5.9
De Soto	1020	391	1010	10	1
Bienville	595	59	590	5	0.5
Jackson	60	6	60	0	0
Caddo	2250	146	2220	30	3
Webster	520	16	490	30	3
Lincoln	220	22	220	0	0
Claiborne	270	27	270	0	0
Union	40	4	40	0	0
Ouachita	150	15	150	0	0
Sabine	610	132	610	0	0
Caldwell	80	7	70	10	1
Red River	440	108	435	5	0.5
Rapides	69	6	60	9	0.9
La Salle	1531	153	1530	1	0.1
Vernon	60	8	60	0	0
Morehouse	200	5	200	0	0
Tensas	40	0	40	0	0
Natchitoches	40	10	30	10	1
Winn	150	20	150	0	0
Concordia	120	33	120	0	0
Avoyelles	200	10	200	0	0
Catahoula	100	12	100	0	0
Grant	90	9	90	0	0
Franklin	28	28	28	0	0
Madison	10	0	10	0	0
East Carroll	142	1	122	20	2
West Carroll	101	0	100	1	0.1
Richland	390	70	380	10	1
Total	10015		9815	200	20

South Louisiana PARISH	Forecast of Total Production Wells	2011 Permitted Wells	Forecast of Total annual State & Fee Production Wells	Forecast Total Federal Production Wells	Yearly
Plaquemines	700	111	652	48	4.8
Lafourche	650	63	625	25	2.5
Terrebonne	590	85	590	0	0
Cameron	1030	101	1010	20	2
Saint Mary	360	105	360	0	0
Vermilion	510	64	510	0	0
Calcasieu	470	64	470	0	0
Iberia	190	33	190	0	0
Jefferson Davis	120	8	120	0	0
Acadia	200	40	200	0	0
Saint Martin	220	24	220	0	0
Jefferson	140	25	140	0	0
Evangeline	400	40	400	0	0
Iberville	200	10	200	0	0
Beauregard	540	67	540	0	0
Pointe-Coupee	120	17	120	0	0
Saint Charles	62	9	60	2	0.2
Livingston	20	2	20	0	0
Lafayette	30	3	30	0	0
Saint Bernard	20	1	20	0	0
Saint Landry	80	16	80	0	0
Assumption	40	7	40	0	0
Allen	130	19	130	0	0
Saint James	25	1	25	0	0
East Baton Rouge	151	5	151	0	0
West Baton Rouge	50	12	50	0	0
Ascension	10	4	10	0	0
Saint Helena	103	5	100	3	0.3
St John the Baptist	20	0	20	0	0
Saint Tammany	10	0	10	0	0
East Feliciana	204	8	200	4	0.4
West Feliciana	201	2	200	1	0.1
Washington	151	1	136	15	1.5
Tangipahoa	32	3	30	2	0.2
Orleans	0	0	0	0	0
Total	7779		7659	120	12

Summary

Louisiana PARISH	Forecast of Total Production Wells	2011 Permitted Wells	Forecast of Total annual State & Fee Production Wells	Forecast Total Federal Production Wells	Yearly
Total South	7779	955	7659	120	12
Total North	10015	1341	9815	200	20
TOTAL	17794	2296	17474	320	32

Tennessee Wells Forecast (Revised):

Ten-Year Forecast of Gas Wells in Tennessee (Revised)

COUNTY	Gas Rank	Federal acres	Total Wells	2008 Wells	2001-2007 wells	10-year Forecast Gas Wells[1]	Forecast Federal Gas Wells	
							BLM	USFS
ANDERSON	High	14,137	433	9	214	75	0	0
MORGAN	High	6,183	2108	1	167	10	0	0
HANCOCK	Medium	0	63	0	22	5	0	0
CLAIBORNE	Medium	8,149	170	0	23	5	0	0
SCOTT	Medium	58,901	2026	2	70	15	0	0
CAMPBELL	Medium	18,238	287	0	43	5	0	0
FENTRESS	Low	28,031	1869	0	171	5	0	0
OVERTON	Low	156	2544	0	463	5	0	0
ROANE	Low	53,364	4	0	2	1	0	0
Total				**12**	**1175**	**126**	**0**	**0**

1 - Forecasted gas wells represent all mineral owners, state, fee, and federal.

Ten-Year Forecast of Oil Wells in Tennessee (Revised)

COUNTY	Oil Rank	Federal acres	Total Wells	2008 Wells	2001-2007 wells	10-year Forecast Oil Wells[1]	Forecast Federal Oil Wells	
							BLM	USFS
Overton	High	156	2544	0	463	10	0	0
Morgan	High	6,183	2108	1	167	10	0	0
Scott	Medium	58,901	2026	2	70	5	0	0
Fentress	Medium	28,031	1869	0	171	5	0	0
Pickett	Medium	15,076	1328	0	229	5	1	0
Claiborne	Medium	8,149	170	0	23	5	0	0
Campbell	Low	18,238	287	0	43	3	0	0
Anderson	Low	14,137	433	9	214	15	0	0
Hancock	Low	0	63	0	22	1	0	0
Clay	Low	19.477	1192	0	16	2	1	0
Cumberland	Low	0	238	0	2	1	0	0
Franklin	Low	0	41	0	1	2	0	0
Roane	Low	53,364	4	0	2	1	0	0
Total				**12**	**1421**	**65**	**2**	**0**

1 - Forecasted oil wells represent all mineral owners, state, fee, and federal.

Virginia Wells Forecast (Revised):

New CBNG Drilling in 2006 by County (Revised)

County	Total Active Gas Wells - 2007	Total Active CBNG Wells	Projected New Wells in the Next Ten Years
Lee	37	0	10
Wise	630	141	80
Tazewell	375	324	330
Russell	437	413	380
Dickenson	1,528	993	940
Buchanan	2,615	2,193	1,310
Total	***5,735***	***4,132***	***3,050***

10-Year Forecast Gas and CBNG Drilling Per County (Revised)

County	Total Acres	Total Forecast Wells	USFS Acres	Other Federal Acres	USFS Percentage	Other Federal Percentage	Forecast USFS Wells	Forecast Other Federal Wells
Montgomery		1					0	1
Lee	279,743	10	38,020	7,479	13.59	2.67	1	0
Wise	259,120	112	133,699	696	51.60	0.27	20	0
Tazewell	332,468	438	69,572	-	20.93	0.00	0	0
Russell	304,902	488	8,035	-	2.64	0.00	0	0
Dickenson	213,390	1,263	31,420	4,081	14.72	1.91	40	20
Buchanan	322,232	1,818	156	-	0.05	0.00	0	0
State Total	**1,711,854**	**4,130**	**280,902**	**12,256**	**16.41**	**0.72**	**62**	**21**

Arkansas Disturbance Projections (Revised):

PREDICTED DEVELOPMENT AND SURFACE DISTURBANCE (EXPLORATION AND CONSTRUCTION) FOR GAS WELLS

Well Type	Total Wells Drilled	Dry Holes	Disturbance per Dry Hole	Total Dry Hole Disturbance	Federal Producing Wells	Disturbance per Federal Well	Total Federal Disturbance	USFS Producing Wells	Disturbance per USFS Well	Total USFS Disturbance	Fee Producing Wells	Disturbance per Fee Well	Total Fee Disturbance	Total Producing wells	Total Disturbance
Gas – horizontal	8,018	160	3.43	548.80	306	6.90	2,111.40	1,174	6.90	8,100.60	6,378	6.90	44,008.20	7,858	54,769.00
Gas – horizontal (4 from single pad)	2,672	53	1.66	87.98	103	2.87	295.61	387	2.87	1,110.69	2,129	2.87	6,110.23	2,619	7,604.51
Gas – deep	1,288	26	3.96	102.96	28	6.71	187.88	149	6.71	999.79	1,085	6.71	7,280.35	1,262	8570.98
Gas – shallow	0	0	2.43	0	0	4.79	0	0	4.79	0	0	4.79	0	0	0
CBNG	71	2	1.0	2.00	2	3.25	6.50	9	3.25	29.25	58	3.25	188.50	69	226.25
CBNG – horizontal	71	1	3.43	3.43	1	6.9	6.90	11	6.9	75.90	58	6.9	400.20	70	486.43
Total	12,120	242		745.17	440		2,608.29	1,730		10,316.23	9708		57,987.48	11,878	71.657.17

.Predicted Development and residual Surface Disturbance (Production) for Gas Wells

Well Type	Total Wells Drilled	Federal Producing Wells	Disturbance per Federal Well	Total Federal Disturbance	USFS Producing Wells	Disturbance per USFS Well	Total USFS Disturbance	Fee Producing Wells	Disturbance per Fee Well	Total Fee Disturbance	Total Producing wells	Total Disturbance
Gas – horizontal	8,018	306	2.21	676.26	1,174	2.21	2,594.54	6,378	2.21	14,095.38	7,858	17,366.18
Gas – horizontal (4 from single pad)	2,672	103	0.86	88.58	387	0.86	332.82	2,129	0.86	1,830.94	2,619	2,252.34
Gas – deep	1,288	28	2.24	62.72	149	2.24	333.76	1,085	2.24	2,430.40	1,262	2,826.88
Gas – shallow	0	0	1.81	0	0	1.81	0	0	1.81	0	0	0
CBNG	71	2	2.0	4.00	9	2.0	18.00	58	2.0	116.00	69	138.00
CBNG – horizontal	71	1	2.21	2.21	11	2.21	24.31	58	2.21	128.18	70	154.70
Total	12,120	440		833.77	1,730		3303.43	9,708		18,600.90	11,878	22,738.81

Kentucky Disturbance Projections (Revised):

Predicted Development and Surface Disturbance (Exploration and Construction) for Wells

Well Type	Total Wells Drilled	Dry Holes	Disturbance per Dry Hole	Total Dry Hole Disturbance	State & Fee Producing Wells	Disturbance per State/Fee Well	Total State/Fee Disturbance	Federal Producing Wells	Disturbance per Federal Well	Total Federal Disturbance	USFS Producing Wells	Disturbance per USFS Well	Total USFS Disturbance	Total Producing wells	Total Disturbance
Oil – shallow	930	348	2.43	845.64	579	4.79	2,773.41	0	4.79	0	3	4.79	14.37	582	3,633.42
Gas – shallow	3,360	119	2.43	289.17	3,191	4.79	15,289.89	29	4.79	138.91	22	4.79	105.38	3,241	15,818.35
CBNG	0	0	1.0	0	0	3.25	0	0	3.25	0	0	3.25	0	0	0
Gas – horizontal	0	0	3.43	0	0	6.9	0	0	6.9	0	0	6.9	0	0	0
Total	4,290	467		1,134.81	3,770		18,058.30	29		138.91	25		119.75	3,823	19,451.77

Assumptions:

Disturbance per well includes the well pad plus incremental roads, utility lines, transportation lines, processing equipment areas, and produced water management as outlined in Tables 11,12,13,& 14 for exploration.

Predicted Development and residual Surface Disturbance (Production) for Wells

Well Type	Total Wells Drilled	State & Fee Producing Wells	Disturbance per State/Fee Well	Total State/Fee Disturbance	Federal Producing Wells	Disturbance per Federal Well	Total Federal Disturbance	USFS Producing Wells	Disturbance per USFS Well	Total USFS Disturbance	Total Producing wells	Total Disturbance
Oil – shallow	930	579	1.81	1,047.99	0	1.81	0	3	1.81	5.43	582	1053.42
Gas – shallow	3,360	3,191	1.81	5,775.71	29	1.81	52.49	22	1.81	39.82	3,241	5868.02
CBNG	0	0	2.0	0	0	2.0	0	0	2.0	0	0	0
Gas – horizontal	0	0	2.21	0	0	2.21	0	0	2.21	0	0	0
Total	4,290	3,770		6,823.70	29		52.49	25		45.25	3,823	6921.44

Assumptions:

Disturbance per well is the residual disturbance remaining after the mitigation measures have been implemented.

Louisiana Disturbance Projections (Revised):

Table 1: Predicted Development and Surface Disturbance (Exploration and Construction) for Wells in Louisiana (Revised 2009)

Well Type	Total Wells Drilled	Dry Holes	Disturbance per Dry Hole	Total Dry Hole Disturbance	State & Fee Producing Wells	Disturbance per State/Fee Well	Total State/Fee Disturbance	Federal Producing Wells	Disturbance per Federal Well	Total Federal Disturbance	USFS Producing Wells	Disturbance per USFS Well	Total USFS Disturbance	Total Producing wells	Total Disturbance
Gas – horizontal	3,222	79	3.43	270.97	3,083	6.90	21,272.70	60	6.90	414.00	0	6.90	0	3,143	21,957.67
Gas – horizontal (4 from single pad)	1,738	26	1.66	43.16	1,692	2.87	4,856.04	20	2.87	57.40	0	2.87	0	1,712	4,956.60
Gas/Oil – deep	12,834	1885	3.96	7464.60	10,669	6.71	71,588.99	240	6.71	1,610.40	40	6.71	268.40	10,949	80,932.39
Gas – shallow	0	0	2.43	0	0	4.79	0	0	4.79	0	0	4.79	0	0	0
CBNG	0	0	1.0	0	0	3.25	0	0	3.25	0	0	3.25	0	0	0
CBNG – horizontal	0	0	3.43	0	0	6.9	0	0	6.9	0	0	6.9	0	0	0
Total	17,794	1,990		7,778.73	15,444		97,717.73	320		2,081.80	40		268.40	15,804	107,846.66

Assumptions:

Disturbance per well includes the well pad plus incremental roads, utility lines, transportation lines, processing equipment areas, and produced water management as outlined in Tables 11,12,13,& 14 for exploration.

Table 2: Predicted Development and residual Surface Disturbance (Production) for Wells in Louisiana (Revised 2009)

Well Type	Total Wells Drilled	State & Fee Producing Wells	Disturbance per State/Fee Well	Total State/Fee Disturbance	Federal Producing Wells	Disturbance per Federal Well	Total Federal Disturbance	USFS Producing Wells	Disturbance per USFS Well	Total USFS Disturbance	Total Producing wells	Total Disturbance
Gas – horizontal	3,222	3,083	2.21	6,815.64	60	2.21	132.60	0	2.21	0	3,143	6,948.24
Gas – horizontal (4 from single pad)	1,738	1,692	0.86	1455.12	20	0.86	17.20	0	0.86	0	1,712	1472.32
Gas/Oil – deep	12,834	10,669	2.24	23,898.56	240	2.24	537.60	40	2.24	89.60	10.949	24525.76
Gas – shallow	0	0	1.81	0	0	1.81	0	0	1.81	0	0	0
CBNG	0	0	2.0	0	0	2.0	0	0	2.0	0	0	0
CBNG – horizontal	0	0	2.21	0	0	2.21	0	0	2.21	0	0	0
Total	17,794	15,444		32,169.32	320		687.40	40		89.60	15,804	32,946.32

Disturbance per well is the residual disturbance remaining after the mitigation measures have been implemented.

Tennessee Disturbance Projections (Revised):

PREDICTED DEVELOPMENT AND SURFACE DISTURBANCE (EXPLORATION AND CONSTRUCTION) FOR GAS AND OIL WELLS

Well Type	Total Wells Drilled	Dry Holes	Disturbance per Dry Hole	Total Dry Hole Disturbance	Federal Producing Wells	Disturbance per Federal Well	Total Federal Disturbance	State/Fee Producing Wells	Disturbance per State/Fee Well	Total State/Fee Disturbance	USFS Producing Wells	Disturbance per USFS Well	Total USFS Disturbance	Total Producing wells	Total Disturbance
Gas – horizontal	28	0	3.43	0	2	6.90	13.80	26	6.90	179.40	0	6.90	0	28	193.20
Gas – horizontal (2 from single pad)	0	0	4.25	0	0	7.72	0	0	7.72	0	0	7.72	0	0	0
Gas – deep	98	36	3.96	141.56	0	6.71	0	62	6.71	416.02	0	6.71	0	62	557.58
Gas – shallow	0	0	2.43	0	0	4.79	0	0	4.79	0	0	4.79	0	0	0
Oil - Deep	65	38	3.96	150.48	0	6.71	0	27	6.71	181.17	0	6.71	0	27	331.65
CBNG – horizontal	0	0	3.43	0	0	6.90	0	0	6.9	0	0	6.9	0	0	0
Total	191	74		292.04	2		13.80	115		776.59	0		0	117	1,082.43

PREDICTED DEVELOPMENT AND RESIDUAL SURFACE DISTURBANCE (PRODUCTION) FOR GAS AND OIL WELLS

Well Type	Total Wells Drilled	Federal Producing Wells	Disturbance per Federal Well	Total Federal Disturbance	State/Fee Producing Wells	Disturbance per State/Fee Well	Total State/Fee Disturbance	USFS Producing Wells	Disturbance per USFS Well	Total USFS Disturbance	Total Producing wells	Total Disturbance
Gas – horizontal	28	2	2.21	4.42	26	2.21	57.46	0	2.21	0	28	61.88
Gas – horizontal (2 from single pad)	0	0	2.5	0	0	2.5	0	0	2.5	0	0	0.00
Gas – deep	98	0	2.24	0	62	2.24	138.88	0	2.24	0	62	138.88
Gas – shallow	0	0	1.81	0	0	1.81	0	0	1.81	0	0	0.00
Oil - Deep	65	0	2.24	0	27	2.24	60.48	0	2.24	0	27	60.48
CBNG – horizontal	0	0	2.21	0	0	2.21	0	0	2.21	0	0	0.00
Total	191	2		4.42	115		256.82	0		0	117	261.24

Virginia Disturbance Projections (Revised):

Table 7: Predicted Development and Surface Disturbance (Exploration and Construction) for Gas and Oil Wells

Well Type	Total Wells Drilled	Dry Holes	Disturbance per Dry Hole	Total Dry Hole Disturbance	Federal Producing Wells	Disturbance per Federal Well	Total Federal Disturbance	State/Fee Producing Wells	Disturbance per State/Fee Well	Total State/Fee Disturbance	USFS Producing Wells	Disturbance per USFS Well	Total USFS Disturbance	Total Producing wells	Total Disturbance
Gas	1,080	32	2.43	109.76	19	4.79	90.01	973	4.79	4,660.67	56	4.79	268.24	1,048	5,128.68
CBNG	3,050	101	2.18	220.14	2	5.01	10.02	2,941	5.01	14,734.41	6	5.01	30.06	2,949	14,994.63
Total	4,130	133		329.94	21		100.03	3,914		19,395.08	62		298.30	3,997	20,123.31

Assumptions:

Disturbance per well includes the well pad plus incremental roads, utility lines, transportation lines, processing equipment areas, and produced water management as outlined in Tables 4 and 6 for exploration.

Table 8: Predicted Development and Residual Surface Disturbance (Production) for Gas and Oil Wells

Well Type	Total Wells Drilled	Federal Producing Wells	Disturbance per Federal Well	Total Federal Disturbance	State/Fee Producing Wells	Disturbance per State/Fee Well	Total State/Fee Disturbance	USFS Producing Wells	Disturbance per USFS Well	Total USFS Disturbance	Total Producing wells	Total Disturbance
Gas	1,080	19	1.81	34.39	973	1.81	1,761.13	56	1.81	101.36	1,048	1,896.88
CBNG	3,050	2	3.22	6.44	2,941	3.22	9,470.02	6	3.22	19.32	2,939	9,495.78
Total	4,130	21		40.83	3,914		11,231.15	62		120.68	3,997	11,392.66

Assumptions:

Disturbance per well is the residual disturbance remaining after the mitigation measures have been implemented.