

## Appendix 5 Cumulative Effects of Implementing the Atlantic Rim Natural Gas Development Project and Catalina PODs G&I

This appendix details the past, present and reasonably foreseeable development activities for Catalina PODs G&I (PODs G&I). 19 PODs have been proposed and approved by the BLM to date. The PODs G&I EA is the 20th proposal.

### Summary

The Record of Decision (ROD) for the Atlantic Rim Final Environmental Impact Statement (AREIS) was released in May of 2007. The decision in the document was to adopt the AREIS's Alternative C, which paralleled much of the proposed action but also included reduced disturbance amounts and an unreclaimed disturbance limit of 7,600 acres. Prior to the ROD the companies conducted an interim development program to determine coal composition, natural gas condition and amounts, water composition and pressure and other elements relative to natural gas development in the area, including effective reclamation.

### Reclamation

Interim exploratory development activities resulted in the approval and development of about 200 coal bed natural gas wells prior to the ROD. An on-going drought resulted in generally poor reclamation of disturbed sites and highlighted the need for provisions in the ROD for effective and timely reclamation. Poor reclamation usually results in soil erosion, the presence of weeds, and a general loss of productivity of the land. The ROD emphasized the need to reduce the extent of disturbance, to reclaim disturbed sites within the next growing season and to return disturbed sites to their original condition and function as quickly as possible.

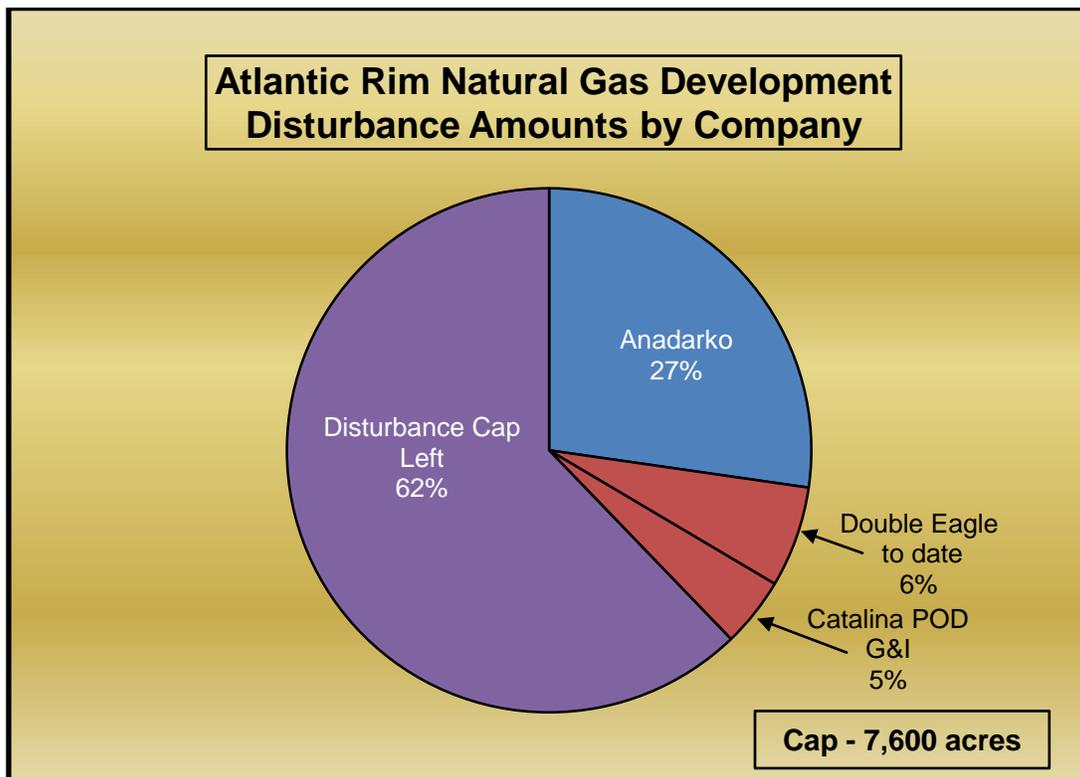
Included within the ROD were provisions for geo-spatial monitoring of disturbed sites on an annual basis, annual reports on the results of monitoring, and adaptive management of reclamation techniques to address challenges presented by the area's high altitude, cold desert environment. The companies began monitoring disturbed sites in 2007 and the first formal reports were delivered in the spring of 2008. 2007 was a normal precipitation year, and reclamation was much more successful than previous years. The following years have also been normal to wet and reclamation success has been high.

### Project Area Surface Disturbance

The companies report 2,547 acres of disturbance to date including 1,778 in the interim development period and 769 acres in 2008. No construction related disturbance has occurred since 2008. The total disturbance is about one third of the 7,600 acre disturbance cap. 2008 was the largest build out year to date with about 185 wells drilled during the period equaling about 10 percent of the disturbance cap in one year.

Atlantic Rim Surface Disturbance						
Company	Acres					
	2001 to 2007	2008	Cumulative	Rolled Over	POD G&I	Totals
Anadarko	1679	394	2,073	4.1	NM	2,073
Double Eagle	99	375	474	0.0	326*	800
Totals	1778	769	2,547	4.1	326*	2,873

\* = worst case



BLM has approved 19 individual plans of development (PODs) since the project began in 2001. PODs are site specific environmental analyses of company proposals to develop wells within the Atlantic Rim Project (ARP) area. The AREIS used several assumptions in developing the analysis of environmental effects. The table below details some of the assumptions and what was approved by the BLM for development on the ground.

## Atlantic Rim Surface Disturbance Status

		# Wells	# Acres	Average/ Wellpad Disturbance	PODs G&I
FEIS Projected		2,000	13,000	6.5*	NM
19 PODs	Approved	519	2,757	5.31	6.39
	As-built	430	2,547	5.92	NM

\* Page 2-14, Final EIS

In addition to the wells, about 151 miles of new road / road reconstruction has been approved under the POD EAs. The AREIS (page 2-2) predicted 1,000 miles of road would be built during the life of the project. This is equivalent to 15% of the predicted miles of road development. Not all approved roads have been constructed yet. PODs G&I propose to add about 23 miles of road with a disturbance extent of 210 acres. Road approvals including PODs G&I would cumulatively equal 17% of the predicted miles from the AREIS.

## Natural Gas Well Status

No new wells have been drilled at Atlantic Rim since 2008. The departure from the predicted drilling rate is generally attributed to the decline in natural gas prices. Additionally, wells that are not economical to operate at current natural gas prices have been shut-in or temporarily abandoned. As of April, 2011 the Wyoming Oil and Gas Conservation Commission lists the status of wells within the ARP area as:

## Atlantic Rim Drilled Well Status

	Anadarko	Double Eagle	Other Companies
Description	# Wells	# Wells	# Wells
Active Injector	15	13	0
Plugged and Abandoned	13	0	0
Flowing	9	68	5
Producing Gas Well	3	1	1
Pumping Rod	103	0	0
Pumping Submersible	32	0	0
Shut-in/Dormant	87	5	14
Well Spudded	1	0	0
Report of Abandonment	1	1	0
Temporarily Abandoned	43	0	0
Suspended Operations	1	4	0
Monitoring Well	9	1	0
Drilled Wells	317	93	20

## Active Wells Summary

	Anadarko	Double Eagle	Other Companies
Active Injector	15	13	0
Flowing	9	68	5
Producing Gas Well	3	1	1
Well Spudded	1	0	0
Monitoring Wells	9	1	0
Pumping Rods	103	0	0
Pumping Submersible	32	0	0
Totals	172	83	6

## Inactive Well Summary

	Anadarko	Double Eagle	Other Companies
Plugged and Abandoned	13	0	0
Shut-in	87	5	14
Report of Abandonment	1	1	0
Temporarily Abandoned	43	0	0
Suspended Operations	1	4	0
Totals	145	10	14

The total number of Atlantic Rim wells drilled to date is 430. Total number of active wells is 261 and inactive wells is 169.

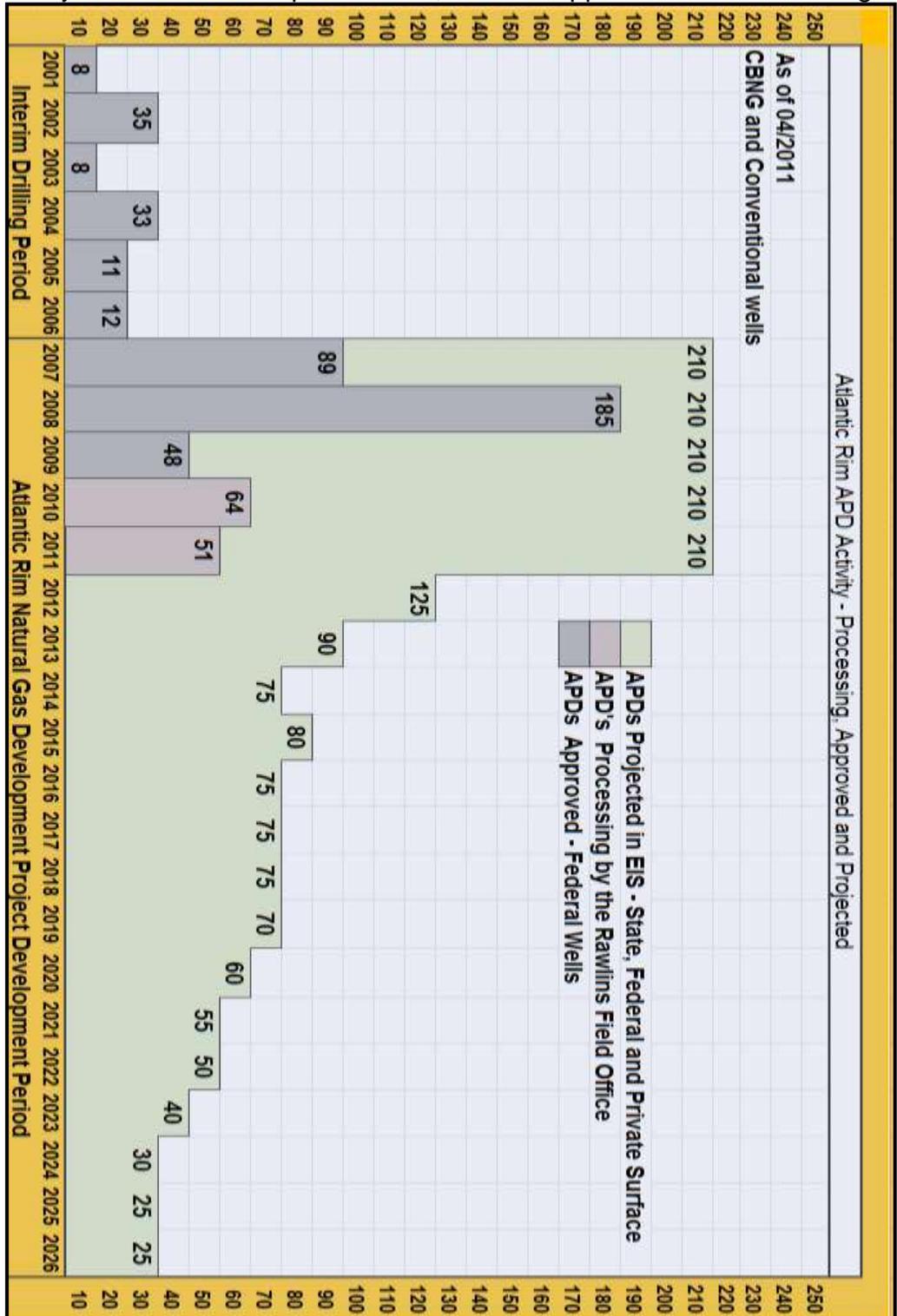
## Natural Gas and Produced Water Production\*

Period	Production
Atlantic Rim - January, 2011	1,655,073 MCF
Atlantic Rim - 07/2001 to 04/2011	74,790,000 MCF
Produced water - 2001 to present	2,560,532,786 BBLs

\*=Source: Wyoming Oil and Gas Conservation Commission

Monthly natural Gas production has remained steady over the last couple of years running from 1.5 million MCF to 1.7 Million MCF.

Projected Well Development Rate, Federal Approvals and Processing



## Air Quality

### Affected Environment

As discussed within the AREIS, regional background values are below established standards, and all areas within the cumulative study area are designated as attainment for all criteria pollutants.

### Impact Analysis

Air quality impacts from the project would occur from pollutants emitted during construction (due to potential surface disturbance by earth-moving equipment, vehicle traffic fugitive dust, well completion and testing, and drilling rig and vehicle engine exhaust) and production (natural gas well-site production equipment, reciprocating pipeline compression engine exhausts, vehicle traffic engine exhausts, and fugitive dust). Pollutants emitted from these activities include PM<sub>10</sub>, PM<sub>2.5</sub>, nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), SO<sub>2</sub>, volatile organic compounds (VOCs), and HAPs (benzene, toluene, ethylbenzene, xylene, n-hexane, and formaldehyde). Ozone (O<sub>3</sub>) may also develop from NO<sub>x</sub> and VOC emissions. The amount of air pollutant emissions during construction and production could be controlled in part by BACT requirements implemented by WDEQ-AQD. Actual air quality impacts from these air pollutants would depend on the amount, duration, location, and emission characteristics of emission sources, as well as meteorological conditions (wind speed and direction, precipitation, relative humidity, etc.). See the AREIS for a more detailed discussion of air quality impacts from project implementation.

### Cumulative Impacts:

As discussed within the AREIS, no significant cumulative air quality impacts are expected from implementation of this project when combined with other reasonably foreseeable actions. Well field development continues to be within the expected range as disclosed in the AREIS and AQ Technical support document.

### Wildlife Monitoring

#### Wildlife Performance Goal Accomplishments to Date

Atlantic Rim Wildlife Performance Goal Meetings		
Big Game Meetings	Sage Grouse	Song Birds
02/05/2008	07/18/2007	05/15/2009
01/15/2009	09/18/2007	08/28/09
07/28/2009	08/21/2008	11/18/2009
07/07/2009	10/28/2008	01/18/2010
08/25/2009	12/03/2008	01/29/2010
11/18/2009	07/07/2009	02/02/2010
04/14/2010	08/24/2009	
05/12/2010	12/10/2009	

## Wildlife Related Studies within the Atlantic Rim Natural Gas Development Area

Mule Deer

## Mule Deer Collaring Study

2006 2007 Phase I (Final Report)  
2008 2010 Phase II (Final Report)  
2010 Phase III (funding in 2009, implementation spring 2010, report in 2011: (vegetation monitoring in migration corridors)

Sage Grouse

## Sage Grouse Collaring Study

2007 Collaring Study – track and monitor sage grouse locations – aerial  
2008 Collaring Study – identify important nesting and brood rearing habitat – air and ground  
2009 Collaring Study – identify important nesting and brood rearing habitat – air and ground  
2008 Predation Study (ongoing study with University of Utah)  
2010 Trend monitoring proposal with USGS (pending funding)

Song Birds

2008 Shrub dependent song bird survey & report (breeding bird survey)  
2009 Shrub dependent song bird survey & report (breeding bird survey)  
2010 Shrub dependent song bird survey & report (breeding bird survey)  
2010 Shrub dependent song bird survey & report (GRID monitoring) and report  
2010 Review and compare results from BBS and GRID monitoring