

ATLANTIC RIM PROJECT REVIEW TEAM MEETING

December 10, 2008
Rawlins, Wyoming

ATTENDEES

Review Team

Patrick Madigan, Bureau of Land Management, Rawlins Field Office
Dave Simons, Bureau of Land Management, Rawlins Field Office
Rick Robitaille, Anadarko Petroleum
Ken Gobble, Warren Resources
Steve Degenfelder, Double Eagle Petroleum
Richard Pate, Redwine Rockies
Tim Morrison, Little Snake River Conservation District
Gary Strong, Wyoming Oil and Gas Commission
Rick Huber, Wyoming Game and Fish Department
Pete Vogel, Wyoming Department of Environmental Quality
Chris Wichmann, Wyoming Department of Agriculture

MEETING NOTES

Patrick Madigan opened the meeting by welcoming those in attendance. He explained the goals of the meeting were to discuss: 1) what issues are of concern in the Atlantic Rim project area; 2) what accomplishments have been completed; and 3) what efforts need to be addressed to allow work to continue.

The group elected Tim Morrison, Little Snake Conservation District, as Chairperson. Duties will include running the meetings and working with Dave Simons, Project Manager, to create agendas, schedule meetings, and ensure timely notification of issues. As issues arise, they will be given to Dave and presented to the group at the next meeting. Issues that need to be addressed include a plan of development for the following year, best management practices, and concerns and issues that could impede on-going work. Rick Huber, Wyoming Game and Fish representative will serve as Vice-Chairperson.

- Patrick Madigan will verify these selections with the Solicitor to ensure all rules and regulations are being met. Federal Advisory Committee Act (FACA) information will be sent to all Review Team members. Meeting agendas, presentations, and handouts will be sent to the Review Team prior to each meeting.

Atlantic Rim Review Team Charter - Dave Simons led the discussion on the Charter. The Charter will help outline roles and responsibilities. The intent of the Review Team is to keep a collaborative program working with the all parties to help understand issues on the field level. Some issues will be worked out one-on-one, with evaluation by the Review Team. Issues will be communicated to the entire group to make sure they are resolved.

- Rick Huber and Tim Morrison will work with Dave to complete the Charter. The Charter will be finalized at the next meeting. A recommendation was made that the Charter should state that at least two meetings per year should be held.

Anadarko Annual Plans - Dave Applegate, Paul Avant, Larry Chambers, Jeff Swaggert, Tom Mariccino - Four pods were approved totaling 92 wells. Of those, 36 were drilled. There were 66 wells drilled in pods that were approved prior to 2008. The Jack Sparrow Pod will be drilled in 2009. In 2009 and 2010 the following chart represents what will be occurring.

Pod /NOS	Sun Dog G	Doty D	Jolly Roger A	Doty A	SJB	Jack Sparrow B	Brown Cow A	Totals
Federal Wells/Fee Wells	16/0	12/1	12/2	55/0	54/0	59/0	64/0	275 (272/3)
NRS Assigned	H. Hurla	H. Hurla	E. Norelius		E. Norelius	J. Ahlbrandt		
Surveying	X	X	X	X	X	X	X	
Archeology Surveys	X	X	X		X	X		
Biology Surveys	X	X	X		X	X	X	
On-Sites	X							

Of the total wells shown above, 11 are injector wells, 2 are monitoring wells, and the remaining are production wells.

Infrastructure - Anadarko is looking at innovative ways to develop sites that limit impacts and make processes more efficient and effective. They plan to minimize environmental impacts and disturbance by laying the gathering and electrical lines in the same ditch and not duplicating sales pipelines. Sump pumps have replaced surface storage tanks and they are looking at methods of reducing the bacteria counts in the re-injected water. Co producers and injection wells are being placed on the same pad, and five bores for pipeline gathering have been constructed under streams in the Jack Sparrow pod. A centralized cement system has been implemented, which allows for a reduced cycle time, less trucking time, quicker response time reacting to loss circulation occurrences. Different types of cement are being utilized allowing for better cement bonds. The drilling program will be completed before winter conditions become severe, minimizing surface damage. A Drilling Clerk has been hired to help with timely filing. Portable trailer-mounted generators are being used, as well as well site telemetry. A Compliance Officer will help with construction, drilling and production operations.

Disturbance - Disturbance acres were projected to year end. These figures will be confirmed when the annual March 1 is submitted. Only one project was completed in 2008--the Aztec line with 89 acres total.

Storm Water Program - Anadarko has six permits that cover the entire Atlantic Rim project area. A full-time contractor has been hired to focus on storm water compliance. All inspections that have been conducted are documented and that documentation is retained at the field office. All storm water controls and ground coverage is gathered on the ground using GIS and is digitally maintained in a geo-database. They are working with both the BLM and DEQ on the Aztec line drainage features and crossings.

Reclamation - Anadarko seeded 980 acres utilizing 860 ton of straw mulch; of those, 43 acres were hydro seeded. They are working with landowners to provide vegetation diversity on private lands. A public tour was held to show what is being accomplished on the ground.

Best Management Practices are being implemented by trial studies. Some of those include:

1. Pre-Emergence Weed Trial - a two-part action that uses Telar for alyssum and halogeton; there has been no evidence of damage to the desirables. The WLCI will be working on this target area.
2. Soil Amendment Pilot Trial - utilizes mycorrhizal fungi application on the Doty Mountain pipeline, which helps to enhance growth in sterile soils. No shrubs or forbs have been produced, but efforts will continue. The area will be signed to promote public awareness of reclamation. Rhizobium bacteria were utilized in the Fillmore Allotment. Approximately 2,000 cubic yards of wood chips were utilized in the project area. This was a cooperative effort with the BLM, the Forest Service, Little Snake Conservation District, and the Rocky Mountain Elk Foundation as part of an aspen restoration project and is an alternative to straw mulch.

3. Snow Fencing Trial - old WYDOT snow fences or mesh from other projects are being placed to not interfere with traffic on roads. These are temporary fences that can be moved around. It allows moisture to be gathered and wind to be diverted around sensitive soils.
4. Vegetation Monitoring Trial - Pictures of vegetation were shown. In the Brown Cow Pod there is cheat grass in the lower third. They are still working on getting shrubs and forbs to re-establish. They modified the point-line intercept monitoring method. The pad has reclaimed 113% of canopy cover compared to the reference site. In the Jolly Roger Pod, the pad has reclaimed 87% of canopy cover. They are working with the private landowner on vegetation mixes.

In their 2009 program, Anadarko plans to expand their internal geo-database to include reclamation, process and evaluate the latest satellite imagery, test a micorrhizal plot utilizing a coated seed application, hot wire fence applications until vegetation is established, utilize livestock in seeding applications in some areas, and emphasize continuous improvement in all restoration efforts. Their internal education will continue.

Anadarko is very close to having all reclamation information in a database. They plan to have this ready sometime next year. They will continue working with the Reclamation Group to figure out how to report reclamation efforts. The group is working on a mechanism to track roll-back acres. The U.S. Geologic Survey is interested in working with the Reclamation Group on remote sensing and other efforts. They would like to make a presentation on what is available. Anadarko has digitized the disturbance and overlaid it on aerial photography. Double Eagle charts their disturbance as it is caused by GPSing it into files. The information due by March 1 will be compiled and brought to the Review Team to discuss. Research is ongoing on sage brush recovery after disturbance. The key thing is having a roll over mechanism and acknowledging that sage brush is going to take a long time to come back. Concern was expressed over not being able to count some roll back acres due to the inability to have sagebrush recovery. Alternative reclamation methods will be looked studied.

Best Management Practices (BMPs) - Anadarko has seven unit areas. The unit agreement is a good tool that allows the companies to develop a particular area, but you have to drill a certain number of obligation wells to keep the agreement going. However, in order to allow for logical and systematic development within a centralized area for maintenance of unit continuity and integrity, two larger than standard units have been created. This will allow companies to minimize disturbance and allow for planning and protection of other surface resources, including Muddy Creek. Agreements have been reached with 80% of the working interest owners in these two units. They hope to have some large unit put together for the 2009 drilling area. A question was asked if all the water was going to be able to re-injected. The company is not sure, and contingency plans have been created. They are looking at alternatives now, before run out of options. Salinity is a big issue in the project area. Redwine is using electronic purification methods on their produced water. This has occurred on their Three Forks Ranch wells. They are looking at different methods of disposal beyond surface and subsurface. The Wyoming Game and Fish Department encourages other points of discharge. They would like to see discharge go to a reservoir and not into Muddy Creek. All of the companies in the project area were encouraged to talk with the Wyoming Department of Environmental Quality (WDEQ) on water issues. The WYDEQ would like to do permitting on a watershed basis. The benefit of doing this is that it brings all parties in together to look at the best way to discharge water. This discussion was tabled until the next meeting. Data will be in place at that time and a briefing paper can be developed. It may be possible to have a presentation at the next meeting that would conceptually outline other methods of discharge.

Double Eagle Annual Plans - Steve Degenfelder - The Catalina Unit has been in operation since 2000 and 70 coalbed natural gas wells, 15 injection wells, 1 surface discharge site, and 1 treated water site have been developed. In 2001, 4 wells were drilled; 4 more in 2002; in 2004 to 2006 no activity occurred; in 2007 33 wells were drilled in Pods A and B; in 2008 Pod C development began with 12 locations spudded and construction work began on Pod D. Onsite inspections were completed in the summer of 2008 on Pods E, F, G, H, and I. In 2009, the company expects to build out the rest of Pod D and into Pod

E. Pods A, B, C, and D currently have 590 acres disturbed. Of those, 426 acres are reclaimable and 164 acres will have long-term disturbance. Preconstruction vegetation monitoring has occurred in Pods A, B, and C, and will continue into Pods D and E. This monitoring establishes baseline data. As reclamation occurs, yearly monitoring data will be given to the BLM. The company utilized a spider plow to put in the utilities in Pod C. This minimized disturbance and cultural clearances were waived when this method was used. A water treatment plant and pipeline and central delivery site were constructed in 2008. Water treatment will begin around the end of 2008. The 47 wells have produced 27 million cubic feet of gas and approximately 40,000 barrels of water a day. With the development of Pod C, beginning the week of December 15, production is expected to increase to 30-35 million cubic feet a day.

Double Eagle Petroleum Company is requesting the following:

- a general waiver for reclamation and reseeding
- if weather permits, early start to work approval; the company would rather ask for exceptions during the beginning of the stipulations period rather than the end of it
- consideration of the impact of additional stipulations that are imposed as work is in progress, i.e., pygmy rabbit, wintering sage-grouse, mule deer migration routes; Anadarko feels the mule deer study results are being used to impact operations
- additional discussions on transportation routes; there is one exit route out of the area that currently serves 200-250 wells; the company would like another access route in the northern part of the project area
- a review of the 8 locations per section constraint; this requires the companies to co-locate injection and production wells, which can cause difficulties
- a review at lands being considered for roll-over; the company can be successful with soil stabilization and plant growth, but still fail the reclamation criteria in the Record of Decision; if successful reclamation includes sagebrush, some areas may never attain the required criteria
- more discussion on No Surface Occupancy (NSO) areas; resources are being left in the ground due to NSO requirements

A question was asked if the BLM was planning to shut in the existing spitter well that has been producing water for some time. The BLM has asked the School of Mines to look at the well and provide information on how it could be plugged. There is no money in the current budget for plugging this well. As there is a water right on this well, the Little Snake River Conservation District asked to be included in the decision making process on how best to close in the well.

Redwine Annual Plan - Dick Pate - Redwine Resources plans to begin drilling sometime in January. Their areas contain a blend of fee and federal lands and minerals. The company drilled 8 wells in 2007, all on Three Forks Ranch surface and minerals. The wells were completed in June and have been pumping since October. A water injection well has been developed and a treatment facility has been planned. The Company plans to drill 8 production wells in 2009 and 1 monitoring well. They will then begin development of a new Pod in other sections. They may go back out and stake more areas. Because they are able to use simple drills, the footprint averages 6/10 of an acre per well. They have reseeded and completed reclamation on all of the Three Forks Ranch wells. Produced water is being run through an electronic water purification (EWP) process. Capacitance Deionization (CDI) is capable of reducing the TDS of up to 95% of coalbed natural gas produced water. They are trying to get the water down to 400 TDS. The Company was given a 15-day permit to test this process and plan they plan to develop a treatment facility on private lands. Some of the water will be re-injected because there is a limited amount of beneficial use needs.

2008 Atlantic Rim Accomplishments - John Ahlbrandt - Atlantic Rim project area accomplishments from October 2007 to present are summarized in the table below.

Company	Pod	Federal	State	Fee	Injection	Additional Wells
Anadarko	Sun Dog C	14	0	1	1	0
	Sun Dog D	23	0	0	3	0
	Sun Dog E	11	0	0	1	0
	Sun Dog B	0				3 monitoring
	Doty B	11	0	3	2	0
	Doty C	6	0	1	1	1 monitoring
	Sun Dog F	14	3	0	1	0
	Jack Sparrow	52	4	0	9	2 monitoring
Subtotal		131				6
Double Eagle	Catalina C	26	0	3	3	2 injection
	Catalina D	28	0	0	4	0
	Catalina E	19 (17)	9	0	4	0
	Catalina F	27	0	0	3	0
	Catalina A	0	0	0	0	2 injection
Subtotal		98				4
Grand Total		229				10

The following have been received but not yet approved.

Company	Pod	Federal	State	Fee
Anadarko	Jolly Roger A	10	2	0
	SJB	51	0	0
	Jack Sparrow B	49	0	0
	Doty D	10	0	0
	Sun Dog G	13	0	0
Double Eagle	Catalina G	19	5	1
	Catalina H	6	0	0
	Catalina I	14	2	8
Redwine	Morgan Run	8	0	0

Adaptive Management Development in 2008 - Dave Simons - Dave brought two proposals for the Review Team to consider pursuing. The first was blanket exception requests for projects in crucial winter range if they were beneficial to wildlife. The second proposal was for the use of hyper reclamation. Dave asked anyone interested in helping develop formal proposals to let him know. These proposals would be developed and brought to the Review Team.

Rick Robitaille posed the question as to whether more "pilot" projects should be considered for implementation--are we doing enough in a diverse enough way to see what works?. An effort will be

made to look at what other offices are trying that could be adapted to this project area. Other suggested projects include: watering sagebrush like they are doing in the Jonah Field, roads, reclamation, and using University of Wyoming graduate students to do studies. Staffing constraints could dictate what projects are able to be completed. If anyone has any ideas on what projects they would like to see developed, please let Dave Simons know.

Industry Participation in Collaborative Monitoring - Dave Applegate and Paula Guenther-Gloss - There are implementation requirements associated with the Record of Decision associated with the Atlantic Rim project. Many of these requirements are overlapping.

1. Historic Trails - A Programmatic Agreement for Adverse Impacts to the trail setting was signed on July 31, 2007. Mitigation included defined transportation corridors across contributing segments of trails, No Surface Occupancy within ¼ mile of either side of the contributing segments, and some compensatory mitigation. Compensatory mitigation includes: contracts with Cloud Peak Production for a documentary and a contact with Interpretive Graphics for interpretive signs. The documentary and signs are expected to be completed in 2009.
2. Air Monitoring - An 80-foot meteorological tower and air quality monitoring shelter was installed in 2007. This station continuously monitors O₃, NO_x, and dispersion meteorology (winds, turbulence, temperature, solar radiation, barometric pressure, and atmospheric stability). Ambient ozone standards were exceeded in June/July 2008. Data was analyzed and the report indicated that the event could have occurred because of fires in California and unique meteorological conditions in southwest Wyoming during that timeframe. The company and the Wyoming DEQ continue to investigate the cause of this incident.
3. Methane Seeps - Anadarko has hired a contractor to conduct monitoring on methane seeps. A Work Group was developed and includes the Wyoming Oil and Gas Conservation Commission, Wyoming Geologic Survey, Wyoming Department of Environmental Quality, and the BLM. This group agreed that these seeps are naturally occurring and have likely been in existence for millions of years. In the late 1800s, seeps were noted by those traveling through the area. Based on aerial photography analyses, there appears to be no change in the area over the past decade. It appears that re-injection of water is not causing the seeps. A Work Group meeting has been planned sometime in the first quarter of 2009.
4. Groundwater Monitoring - Monitoring wells have been drilled are in the process of being equipped in the Sun Dog, Doty Mountain, and Jack Sparrow pods.
5. Performance Goals - In 2008, over 20 Work Group meetings were held to discuss Performance Goal monitoring programs and to share results of monitoring. There are specific programs in place for sage-grouse, mule deer, Muddy Creek, and shrub-dependent song birds.
 - a. Sage Grouse - Thirteen Work Group meetings were held to discuss monitoring approaches and results. Anadarko spent \$75,000 in 2007 to collar birds and almost \$150,000 in 2008 for the University of Wyoming to continue the study. Funding has been committed to continue the study through 2009. Data received to date is providing detailed information on locations used for nesting and brood-rearing. Vegetation data will be used to describe the quality of other habitats and to predict the probability of use by sage-grouse hens that had successfully nested and raised their brood. Mitigation may be necessary in some areas. Goals for 2009 include continuing to identify source/sink habitats and monitoring for the West Nile Virus. Adaptive management techniques will be studied to determine if implementation and/or reclamation can be designed to create habitats that are more beneficial or attractive to sage-grouse hens.
 - b. Mule Deer - A baseline mule deer study was conducted during 2005 and 2006. Anadarko and Warren have provided the funding to continue this study through 2009.

Over 35 mule deer have been collared and their movements tracked. Funding was also contributed by the WGF and BLM to expand the scope of the study. Additional collars will be placed soon. The Work Group intends to continue refining data display and analysis techniques. Phases I and II will be compared to 2010 study results.

- c. Muddy Creek Sensitive Fish - A national engineering firm was contracted to develop a monitoring plan for field geomorphic and aquatic habitat assessment. The first phase was completed in August 2008. Sediment was monitored at six locations within the reach of the Upper Muddy Creek with the EIS study area. A Rosgen Level II geomorphic assessment was completed. Photo points were established at each site and bank pins embedded to precisely measure bank erosion. These sites will continue to be monitored annually and data received compared to baseline information. High profile changes in Muddy Creek are not expected.
 - d. Shrub-Dependent Song Birds - Work Group meetings were held to discuss monitoring approaches and results. Breeding Bird Surveys (BBS) were selected to give the most consistent baseline data. Four additional survey routes were added in 2008 and a BBS completed each spring to establish a baseline and look at trends.
 - e. Rangeland Management - Work Group meetings were held to discuss monitoring approaches. Monitoring programs associated with other Work Groups overlapped this issue. The Work Group will continue to work with those other groups to monitoring rangeland management issues.
6. Reclamation Requirements - The BLM is finalizing the allocation of the disturbance cap. Database requirements to track reclamation progress have been identified. There was good reclamation during the spring and summer of 2008 due to moisture and cool June temperature. In 2009, a roll over process for meeting reclamation success will be implemented.

Monitoring Group Updates

Disturbance Tracking - A disturbance tracking database has been incorporated. A new Team Lead will be selected.

Reclamation - This Work Group has been working on the reclamation policy, which will be tied into the disturbance tracking and reclamation database. The BLM has talked with a contractor to see if this is feasible. This database will not be specific to Atlantic Rim and will be used across the entire Field Office management area. A proposal has been sent to the BLM's IT Investment Board for approval. The BLM is hoping to hear by the end of 2008 if the creation of the database has been approved. The Reclamation Policy will be tiered to the BLM Wyoming Policy. The Work Group plans to release the plan during the spring of 2009. The database will have query and report features.

Programmatic Agreement - This Work Group is working on mitigation of adverse effects to historic trails. There have been 362 cultural approvals--155 projects less than 2 miles, of those, 15 were less than 2 miles but not visible, and the rest were visible and less than 2 miles. There were 206 approvals outside of the 2 miles, 1 at the 2 miles, and 1 will be within ¼ mile, but not visible. Nine projects used the existing transportation corridors. There is compensatory mitigation for those that cannot be modified. A documentary is expected to be completed in May 2009. Interpretive signs will also be used in the area. There are a significant number of prehistoric sites. A protocol was established to deal with these. If there is an adverse effect, the Memorandum of Agreement process will be implemented.

Transportation Planning - The initial transportation planning meeting was held in March 2008. Field tour dates were established. Participants in those field tours looked at existing road system and deficiencies. There was good participation. There are still several items to be worked on. Larger-scale transportation planning is anticipated once the Rawlins Resource Management Plan is implemented. The BLM will work with operators to extend the road into Brown Cow. Operators continue to work with permittees and local land owners. Fence crossings continue to be an issue. Weeds also continue to be a concern and companies will work with permittees on weed treatment priorities.

Collaborative Management - Each party has a different implementation objective. We have to find ways to balance programs, minimize impacts, and increase efficiency and profit. The six Cs of success include: 1) Communication, 2) Conflict Management, 3) Compromise, 4) Continuity, 5) Cash, and 6) Caveat. All parties must remain flexible and be open to change.