

SUMMARY OF
BILL BARRETT CORPORATION'S
WEST TAVAPUTS PLATEAU
CULTURAL RESOURCE MONITORING PLAN
BASELINE DATA COLLECTION, FALL 2010



(Comparison of Rock art at Daddy Canyon (42Cb9829) between ca. 1931 and 2011.

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By:

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Prepared for:

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Prepared under contract with

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INTRODUCTION

As per the Programmatic Agreement (PA) regarding The West Tavaputs Plateau Natural Gas Full Field Development Plan in Carbon and Duchesne Counties, Utah, the Bill Barrett Corporation (BBC) is required to fund a Cultural Resource Monitoring Plan (CRMP) with the express goal of avoiding, minimizing, and mitigating adverse effects to historic properties. More specifically, the PA states that “the objectives of the Cultural Resource Monitoring Plan are to determine baseline information about a sample of sites, monitor those sites over time, and collect samples of dust from sites to determine if dust is being deposited on them.” This summary details the first collection of baseline data from a predetermined sample of sites in the West Tavaputs Plateau (WTP) Area of Potential Effect (APE).

In August 2010, Montgomery Archaeological Consultants, Inc. (MOAC) implemented the baseline data collection for the predetermined site sample. The work was authorized by Mr. Scot Donato, Bill Barrett Corporation, Denver, Colorado, and overseen by Ms. Julie Howard, Bureau of Land Management (BLM) Utah State Office. MOAC personnel responsible for collecting the baseline data included Jody Patterson, Kelly Jo Jackson, Roger Stash, and Adam Thomas.

SITE SELECTION AND IMPLEMENTATION

In June 2010, Julie Howard, Blaine Miller (BLM Price Field Office), and Jody Patterson (MOAC) visited the WTP APE to compile a list of possible monitoring sites for both the predetermined and discretionary site samples. The compiled list of predetermined sites was presented to the WTP consulting parties for review. Documentation protocols were developed for how to establish the monitoring program and collect the baseline information. The BLM finalized the list of predetermined sites and provided BBC with a notice to proceed on September 3, 2010. Scot Donato asked MOAC to complete the documentation for the baseline data collection phase of the project. MOAC received a BLM Field Authorization permit on September 17, 2010. Permission letters to access private property (owned by Hunt Oil and BBC) were received by the BLM between September 5 and 23, 2010.

The predetermined site sample includes 42Cb0016, 42Cb0031, 42Cb0041, 42Cb0238, 42Cb0239, 42Cb0240, 42Cb0241, 42Cb0242, 42Cb0446, 42Cb0829, 42Cb0891, 42Cb0956, 42Cb0970, 42Cb0972, 42Cb0974, 42Cb1279, 42Cb1733, 42Cb2000, 42Cb2007, 42Cb2027, 42Cb2702, 42Cb2817, 42Cb2896, 42Dc0229, 42Dc0950, and 42Dc1111 (Figure 1). Due to problems (unavailable data, delays in obtaining information, weather, and scheduling) beyond the control of BLM, BBC, or MOAC, two sites (42Cb2007 and 42Cb2702), have not yet been documented under the WTP CRMP protocol. These sites will be added to the database once the field data are collected.

METHODS

The collection of baseline data consisted of identifying and documenting the current impacts to each site in the predetermined sample. In general, this consisted of updating existing site documentation, examining each feature or panel for impacts, new documentation (photographs, sketches, descriptions, site maps), and qualitatively assessing the impacts in regard to site condition.

Site condition assessments were made using the site condition criteria provided in the Intermountain Antiquities Computer System (IMACS) manual. The criteria include

Excellent	– virtually undisturbed
Good	– 75 percent undisturbed
Fair	– 50-75 percent undisturbed
Poor	– more then 50 percent disturbed
Inundated	– covered with water
Destroyed	– no longer exists
Unknown	– no information available

In addition to overall site condition, these criteria were also applied to subsurface disturbance and rock art condition. For example, if a rock art site contained graffiti or some other impact on every nearly every panel (e.g., Figure 2), the criteria could be applied specifically to the rock art.

At each site, the archaeologists located each feature and panel described in the existing site forms. Prior to the initiation of the CRMP, site 42Cb2896 (the Family Panel) had not yet been recorded, and, as part of this project, this site was fully documented and assigned a permanent site number. In at least two instances, additional features or panels were identified during the site examinations. This new information was included on updated site forms (Appendix A). Sketches of impacts to panels and features were added to copies of existing drawings from previous documentation efforts. Field notes and sketches should provide invaluable information beyond what can be captured on the site assessment form.

New site maps were completed for each site. Data was collected using a combination of survey-grade Trimble GPS units and a Sokkia total station. In addition to the site boundary, topography, and the location of features, the mapping effort focused on documenting the spatial location of impacts (looter holes, social trails, etc.), and placing the site in the context of its constructed environment (e.g., how the site is situated in regards to roads, pipelines, trails), both of which may be directly or indirectly impacting the site. Based on the site examination, site documentation, and professional judgement, qualitative assessments were made utilizing the WTP site assessment form included in the PA (Appendix B).

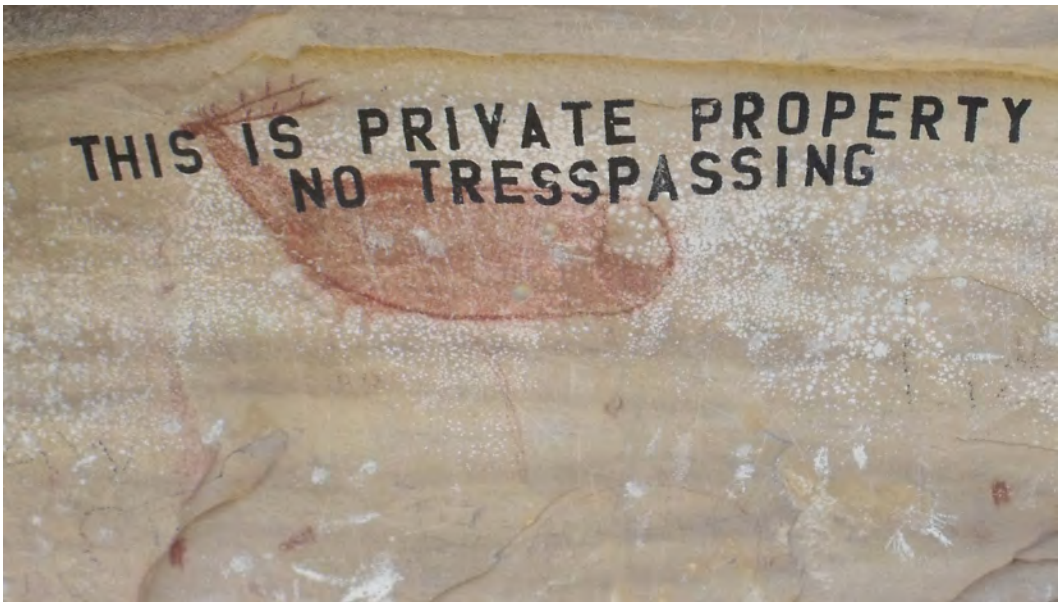


Figure 2. Comparison of Elk in Rasmussen Cave ca 1931 and 2010.

Two types of photographs were taken at each site: control point monitoring photographs (Appendix B) and general (snapshot) photographs. For the control-point photograph documentation, three to five control points were established at each site and marked by a short length of rebar with an aluminum cap. Control points were established at places that offered a good overview of the site or gave a representative view of a specific feature(s), panel(s), or impact(s). Additional control points, marked by 10-inch brite spikes, were placed at topical photograph locations. The purpose of these secondary points is to help realign future photographs and to provide specific reference points as a control. General photographs, or snapshots, were taken of most panels and features to document their condition. Although not as directly replicable as the control point photographs, these snapshots will provide valuable information during future assessments.

Control point photographs were taken using both a 35 mm SLR camera and a comparable digital camera. The aperture and shutter speed settings, the date and time, the weather conditions, and the tripod settings (height, bearing, and tilt) were recorded (Appendix B). Additional information pertaining to each camera's make and model, film, lenses, and filters were noted. For each control point photograph, a tripod was set over the control point, leveled, and aligned to true north. In some instances, a meterboard was placed on the secondary control point for scale and contrast. Snapshots were taken only with a digital camera.

RESULTS OF BASELINE DATA COLLECTION

Baseline information was collected from 24 of the 26 sites in the predetermined site sample. Condition assessments will be conducted on the two remaining sites as weather permits. Overall, there is not a single site that does not have any impacts. Of the 24 predetermined sites examined to date, the condition of one is rated as excellent, eight are rated as good, 11 are rated as fair, and four are rated as poor (Table 1). The four sites rated as poor include interpreted or protected sites, such as the Hunt Panel (42Cb0239), Rasmussen Cave (42Cb0016), and First Site (42Cb1279) (Figures 3, 4, and 5). Given the protection measures now in place at these sites, it will be interesting to determine if impacts continue to occur. The greatest number of impacts pertain to visitation and manifest themselves as litter and pedestrian impacts. Data was also collected for site 42Cb2896 (the Family Panel), which was newly documented as part of this project, and this site is rated as fair.

Impacts to rock art mostly include dust accumulation and graffiti (scratches, initials, inscriptions, art images). In some cases, dust accumulation could be tied to runoff from above or from road dust, but in many instances both processes of accumulation appear to be happening. Dated initials and inscriptions were uncommon, but most of the observed recent dates are from the 1990s. Evidence of chalking and latex peels were noted only at major rock art sites such as Rasmussen Cave (42Cb0016) and the Hunt Panel (42Cb0239). Attempted removal of rock art elements were noted at 42Cb1279 (First Site)



Figure 3. Graffiti (ca. 1978) and Chalking (ca. 1931) at Rasmussen Cave (42Cb0016)



Figure 4. Graffiti associated with shields at the Hunt Panel (42Cb0239)



Figure 5. Pack rat urine, dust, graffiti and attempted removal of element at First Site (42Cb1279).

and 42Cb2896 (the Family Panel). Natural weathering and erosion is also occurring but was not adequately addressed during the baseline data collection. Differentiating between certain types of natural and cultural transformations will be a continuing challenge that should be addressed.

Very few impacts from agriculture were noted at any of the sites. However, livestock impacts were identified at eight sites. These impacts were mostly livestock trails and dung, but in a couple of instances, cattle hair was adhering to cliff faces adjacent to rock art panels. Likewise, impacts from oil and gas development were noted at about one-third of the sites. These include direct impacts, such as from road maintenance (e.g., 42Cb0446 and 42Cb0956), and more indirect impacts, such as from pipelines adjacent to sites.

Evidence of looting was identified at many sites, but all the observed evidence of looting has been previously documented. No evidence of new looting was identified at any of the sites in the predetermined sample.

RECOMMENDATIONS

Overall, the assessments made will be useful in long-term monitoring of impacts to the sites in the predetermine sample. Certain direct impacts, such as graffiti, can now be readily monitored. However, several issues need to be resolved. These interrelated issues include subjectivity, linking impacts to specific causes, and quantifying impacts throughout the life of the project.

The condition assessments call for the recorder to make some very subjective calls regarding condition, extent of impact, and underlying cause of observed impact. The subjectivity inherent in the process means that professional judgement is the foundation on which the determinations will be made. Certain aspects of the recording, such as controlled photography and updated site maps, add a measure of replicability to the process, but only specific impacts can be addressed with these methods. The subjectivity of assessments and a reliance on individual experience could easily result in issues pertaining to replicability and inter-observer error. It would be to the benefit of the BLM, BBC, and the consulting parties to revisit this issue and develop a more specific plan and/or additional study parameters. Even if developed using a qualitative framework, we believe that much of the subjectivity can be eliminated, and a more useful, focused approach can be devised. This would not negate the efforts already initiated, just streamline the process to ensure that we are measuring what we want to measure.

Another important problem to consider is the linking of impacts to a particular cause or causes. As it stands now, it is up to the recorder to link an impact to a cause. In some cases, such as graffiti at rock art sites, this is not necessarily a difficult task (direct impacts are less ambiguous than indirect or cumulative ones). In other situations, impacts may be the result of multiple causes that have occurred over long periods of time. For example, livestock and social trails at a site could lead to increased erosion that damages a feature some distance from the trails. To clarify this issue, it may be more meaningful to assess the nature, extent, and threat of the impact than to focus on the cause itself. Without clear linkages between cause and effect, it will be difficult to adequately avoid, lessen, or mitigate impacts to many of these sites. As developed in the assessment form, the impacts are linked to specific causes, but the impacts themselves are not clearly defined. For example, what is a “pipeline” impact? Impacts from pipeline construction and maintenance are potentially numerous, and may or may not be similar to those caused by other impact agents (e.g., roads).

Finally, a replicable and more objective system needs to be developed to somehow quantify change through time, and trigger mechanisms need to be developed to determine when some form avoidance, minimization, or mitigation is required. Such a system could be qualitative in nature and rely on nonparametric data. However, any categorical data would have to be clearly defined to be useful. Such a system could be used to demonstrate the nature, extent, and rate of change due to different types of impacts and to determine when corrective measures need to be taken.

SUMMARY

To date, initial condition assessments have been made at 24 of the 26 sites in the predetermined site sample for the first phase of the WTP CRMP. Of these 24 sites, the condition of one is rated as excellent (42Cb0970), eight are rated as good (42Cb0031, 42Cb0041, 42Cb0829, 42Cb1733, 42Cb2000, 42Cb2027, 42Cb2817, and 42Dc1111), 11 are rated as fair (42Cb0238, 42Cb0240, 42Cb0241, 42Cb0242, 42Cb0446, 42Cb0891, 42Cb0974, 42Cb2896, 42Dc0229, and 42Dc0950), and four are rated as poor (42Cb0016, 42Cb0239, 42Cb956, 42Cb1279). Two additional sites (42Cb2007 and 42Cb2702) still require their initial assessments; these assessments will be completed in early spring when conditions permit.

The programmatic agreement calls for the yearly monitoring of sites in the predetermined sample. As such, the sites in the predetermined sample will be revisited, during the fall of 2011. The 2011 yearly monitoring report will be provided to the BLM by December 31, 2011. In addition to the predetermined site sample, baseline data will be collected from sites in the discretionary site sample. While some sites in the discretionary sample have been tentatively selected by the BLM, a final list of sites, and the number of sites, is still being considered. Once a final list is produced and a notice to proceed is given, baseline data will be collected and initial site assessments will be made for the sites in this secondary sample during the spring of 2011.

Table 1: Summary of West Tavaputs Plateau Area of Potential Effect Baseline Data Assessment

Site	Type	Location	Ownership	Overall Condition	Subsurface Condition	Rock Art Condition	Impacts							
							Litter	Camping	ATV	Pedestrian	Agriculture	Livestock	Development	Rock Art Impacts
42Cb0016	Rockshelter, Rock Art	Nine Mile Cyn	Private	Poor	Poor	Poor	X	X		X				Dust, Chalking, Latex, Bullet Holes, Graffiti
42Cb0031	Rock Art	Dry Cyn	BLM	Good	Excellent	Good	X							Dust, Graffiti
42Cb0041	Rock Art, Historic Inscriptions	Dry Cyn	BLM	Good	Excellent	Good	X					X		Dust, Graffiti
42Cb0238	Rock Art	Cottonwood Cyn	SITLA	Fair	Excellent	Fair	X	X		X			X	Dust, Graffiti
42Cb0239	Rock Art	Cottonwood Cyn	SITLA	Poor	Unknown	Poor	X			X			X	Dust, Graffiti, Chalking, Latex
42Cb0240	Rock Art	Cottonwood Cyn	BLM	Fair	Excellent	Good	X			X				Dust, Graffiti
42Cb0241	Rock Art	Jacks Cyn	BLM	Fair	Fair	Excellent	X	X		X		X		
42Cb0242	Open Residential, Rock Art, Historic	Nine Mile Cyn	BLM	Fair	Unknown	Fair	X	X		X		X		Dust, Graffiti
42Cb0446	Open Residential, Rock art	Nine Mile Cyn/Cottonwood Cyn	BLM	Fair	Good	Excellent	X			X			X	
42Cb0829	Rock Art	Nine Mile Cyn/Daddy Cyn	BLM	Good	Good	Good				X		X	X	Dust, Bullet Holes, Mud Splatter
42Cb0891	Open Residential, Rock Art	Nine Mile Cyn	BLM	Fair	Fair	Excellent	X			X		X		Dust
42Cb0956	Rockshelter, Midden	Cottonwood Cyn	BLM	Poor	Fair	N/A							X	
42Cb0970	Rock Art	Nine Mile Cyn	BLM	Excellent	Excellent	Excellent	X							Natural Weathering
42Cb0972	Open Residential	Nine Mile Cyn	BLM	Poor	Poor	N/A				X			X	
42Cb0974	Rock Art	Nine Mile Cyn	BLM	Fair	Excellent	Good	X				X			Dust, Graffiti
42Cb1279	Rock Art, Rockshelter	Nine Mile Cyn	BLM	Poor	Fair	Poor	X			X		X	X	Dust, Graffiti, Attempted Removal
42Cb1733	Open Camp, Linear Berm and Corral	Prickly Pear	BLM	Good	Good	N/A	X	X		X		X	X	
42Cb2000	Residential, Granary, Rockshelter, Rock art	Nine Mile Cyn	BLM	Good	Excellent	Good	X		X	X		X		Dust, Graffiti
42Cb2027	Rock Art	Nine Mile Cyn	BLM	Good	Excellent	Good	X						X	Dust, Graffiti
42Cb2817	Rock Art	Nine Mile Cyn	BLM	Good	Excellent	Good	X	X		X				Dust, Bullet Holes
42Cb2896	Rock Art	Nine Mile Cyn	BLM	Fair	Excellent	Fair	X			X				Dust, Bullet Holes, Attempted Removal
42Dc0229	Granary	Nine Mile Cyn	Private	Fair	Excellent	N/A	X							
42Dc0950	Open Residential	Nine Mile Cyn	Private	Fair	Fair	N/A	X			X		X		
42Dc1111	Rock Art	Nine Mile Cyn	Private	Good	Excellent	Excellent	X			X				Dust, Fading
Totals							21	6	1	17	1	8	10	

APPENDIX A

IMACS Site Forms

(Part A, Maps, Photographs, Photo Logs, and Assessment Forms)

APPENDIX B
Forms

BBC WEST TAVAPUTS PLATEAU SITE MONITORING
CONTROL POINT LOCATION FORM

Site: _____ Date Set: _____
 Control Point (CP) Number: _____
 CP Label: _____
 Location: UTM: Z 12 _____ East _____ North _____
 Description
 Control Point (CP) Type: ___ General ___ Topic ___ Other
 Meterboards (MB) Used: ___ Yes ___ No

MB # _____ m at _____° from CP# _____
 MB # _____ m at _____° from CP# _____
 MB # _____ m at _____° from CP# _____
 CP # _____ m at _____° from CP# _____

Site: _____ Date Set: _____
 Control Point (CP) Number: _____
 CP Label: _____
 Location: UTM: Z 12 _____ East _____ North _____
 Description
 Control Point (CP) Type: ___ General ___ Topic ___ Other
 Meterboards (MB) Used: ___ Yes ___ No

MB # _____ m at _____° from CP# _____
 MB # _____ m at _____° from CP# _____
 MB # _____ m at _____° from CP# _____
 CP # _____ m at _____° from CP# _____

Site: _____ Date Set: _____
 Control Point (CP) Number: _____
 CP Label: _____
 Location: UTM: Z 12 _____ East _____ North _____
 Description
 Control Point (CP) Type: ___ General ___ Topic ___ Other
 Meterboards (MB) Used: ___ Yes ___ No

MB # _____ m at _____° from CP# _____
 MB # _____ m at _____° from CP# _____
 MB # _____ m at _____° from CP# _____
 CP # _____ m at _____° from CP# _____

Site: _____ Date Set: _____
 Control Point (CP) Number: _____
 CP Label: _____
 Location: UTM: Z 12 _____ East _____ North _____
 Description
 Control Point (CP) Type: ___ General ___ Topic ___ Other
 Meterboards (MB) Used: ___ Yes ___ No

MB # _____ m at _____° from CP# _____
 MB # _____ m at _____° from CP# _____
 MB # _____ m at _____° from CP# _____
 CP # _____ m at _____° from CP# _____

West Tavaputs Plateau Photopoint Monitoring Photograph Log
 BASELINE COLLECTION

Site #: _____

Camera Type: _____

Film Type: Print Digital

Photographer: _____

Lens/Filter: _____

ASA/ISO: _____

PHOTO #	CONTROL POINT #	DESCRIPTION	GENERAL			CAMERA		CAMERA MOUNT		
			Date	Time	Weather	Aperture	Shutter Speed	Height	Bearing	Tilt
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										

Additional Comments: