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May 16, 2006

HAND DELIVERED

Incoming
C/007/0013 OK

Ms. Pamela Grubaugh-Littig
Utah Division of Oil, Gas & Mining
1594 West North Temple
Salt Lake City, Utah

RE: UtahAmerican Energy, Inc. – Lila Canyon Extension -- C/007/0013

Dear Pam:

Enclosed are three copies of the proposal prepared for UtahAmerican Energy, Inc. ("UEI") by Montgomery Archaeological Consultants ("Montgomery") regarding the Class II inventory of the area of potential subsidence, Lila Canyon Extension, Emery County, Utah. We would appreciate the Division's review and approval of Montgomery's proposed sampling design. The consultant has a crew ready to begin sampling on Monday, May 22, 2006. We would like the Division's approval to have Montgomery begin the survey on the basis of the enclosed sampling design proposal with the understanding that if additional work is required as the result of consultation under the National Historic Preservation Act, UEI will request the consultant to perform such follow-up work.

Please contact Jay Marshall at UEI or me if you have any questions. Thank you for your assistance.

Very truly yours,

Denise A. Dragoo

DAD:jmc:397513
Enclosures
cc: Jay Marshall
Keith Montgomery

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DIV. OF OIL, GAS & MINING

Mine # C/007/013
File Incoming
Record # 0124
Doc. Date 5/16/2006
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A PROPOSAL AND SAMPLING DESIGN FOR A CLASS II INVENTORY OF THE AREA OF POTENTIAL SUBSIDENCE, LILA CANYON EXTENSION EMERY COUNTY, UTAH

By:

Jody J. Patterson

Prepared For:

Utah American Energy, Inc.

Prepared By:

Montgomery Archaeological Consultants, Inc.
P.O. Box 147
Moab, Utah 84532

MOAC Report No. 06-212a

15 May 2006

Lila Canyon Extension, Horse Canyon Mine
Permit No. C/007/0013

Introduction

Utah American Energy Inc. proposes to develop a coal mine in the vicinity of Lila Canyon, east of Price, Utah and north of Green River, Utah. One of the potential impacts of the coal mining operation is surface subsidence resulting from underground mining. Given that rock shelters, as well as standing structures such as granaries, prehistoric room blocks, historic cabins and buildings, are generally considered to be important historical and scientific resources, and that subsidence could potentially effect these resources, it is necessary to identify and document them before any potential mining-related damage occurs. Furthermore, locating and documenting rock shelters, and similar standing structures, allows for resource managers and proponents to determine a set of protocols and procedures to mitigate any potential effects. Unlike ground disturbance activities such as trenching, scraping, and removing top soil, subsidence has little impact on buried resources; the situation is somewhat synonymous to seismic activity where the land moves, more or less, as a unit causing only minor alterations in subsurface contexts. This sampling design focuses primarily on locating and documenting at risk resources such as rock shelters and granaries. However, as is standard in Class III archaeological inventories, the archaeologists will record all cultural resources identified in the surveyed areas.

The project area, defined as the area of the maximum extent of subsidence, occurs in Township 16 South, Range 14 East, Sections 11, 12, 13, 14, 15, 23, 24, and 25, and Township 16 South, Range 15 East, Sections 19 and 30 (Figure 1). Bisected by Little Fork wash, the subsidence area encompasses 2822.7 acres (1142.3 hectares). More generally, the project area is atop the Book Cliffs, just south of the head of Lila Canyon and several miles north of Woodside, Utah. The bench immediately above the sheer Book Cliffs, which the project area more or less covers, is about a mile wide, though numerous ridges extend on to the bench from the north and east resulting in a very broken topography of minor alluvial valleys and long, narrow ridges. The change in elevation is abrupt from the base of the Book Cliffs (6,000 feet AMSL), to the first bench (7,100 feet AMSL), to the heavily eroded ridge system immediately to the east (8,400 feet AMSL). A moderately dense pinyon-juniper forest covers the ridges and temperate slopes of the project area, while the alluvial drainages consist primarily of sagebrush and greasewood, and their associated vegetation communities.

Cultural resources inventories in the vicinity consist entirely of environmental compliance projects related to proposed mining undertakings (see Spangler 2005 for a recent Class 1 literature review of archaeological resources and inventories in the Lila Canyon area). The results of the cultural inventories have shown that, while archaeological sites occur in the area, site density is

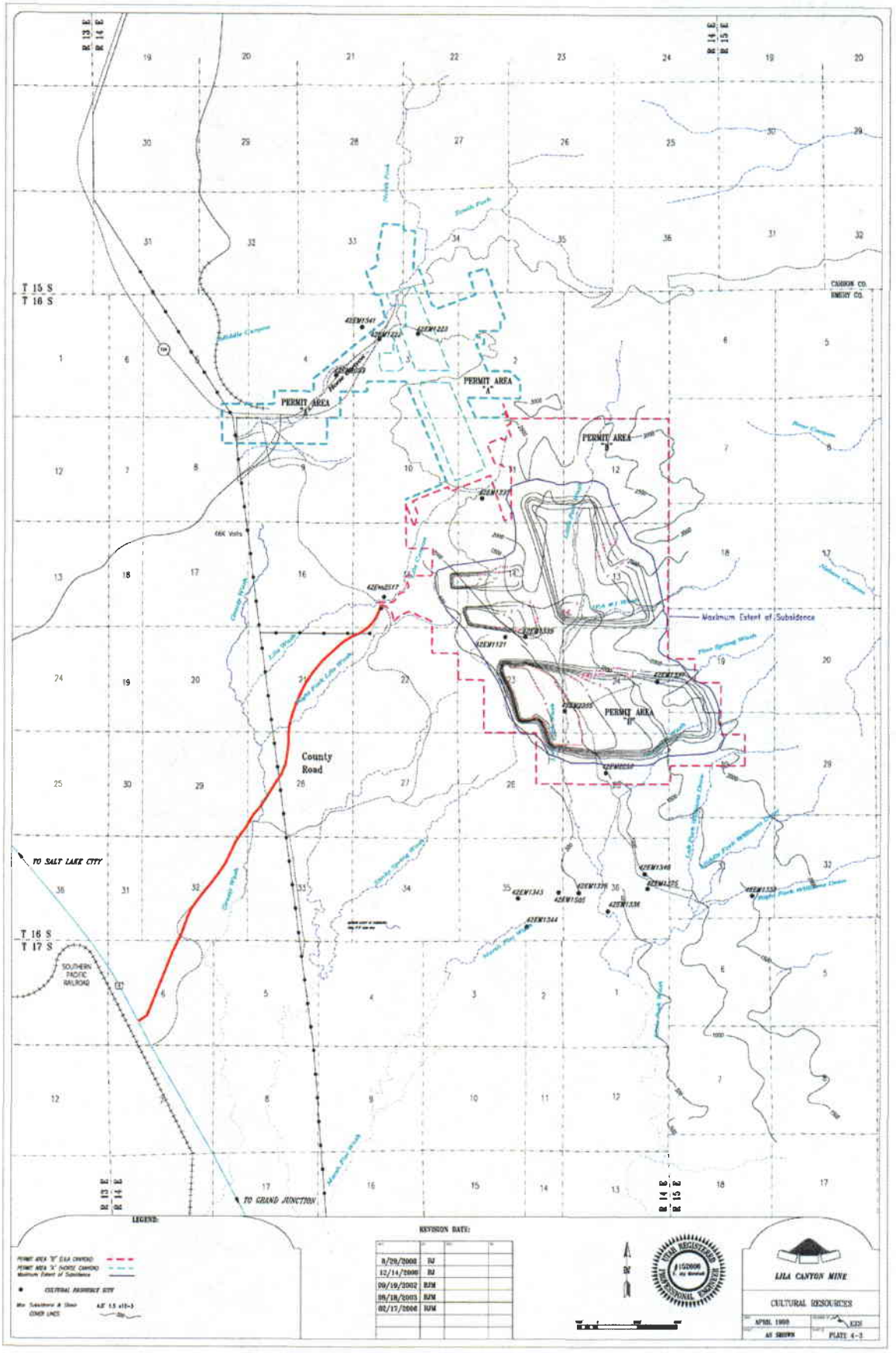

Figure 1. Plat of the Lila Canyon Mine showing the maximum extent of subsidence.

relatively low, particularly when compared with the adjacent areas of Nine Mile Canyon and Range Creek. Only five previously recorded sites occur in the area of potential subsidence. These include lithic scatters (42Em1121, 42Em2255 and 42Em2256), and the remains of log structures and their associated detritus (42Em1337 and 42Em1339). While no known rock shelters occur in the subsidence area, two rock shelters are in the general vicinity. 42Em1343 is south of the project area at the base of the Book Cliffs. Surface documentation and limited subsurface testing at the site revealed the presence of numerous chipped stone tools (projectile points and bifaces) and pieces of ground stone (manos and metates), small amounts of faunal materials, some with evidence of burning, and intact cultural deposits (Rauch 1981). Though no samples suited for absolute dating were recovered, the projectile points suggest a Fremont or Numic occupation of the shelter. A second rock shelter (42Em2517), also located at the base of the Book Cliffs, likely dates to the same broad time period. Unlike, 42Em1343, this second rock shelter has been heavily vandalized. When archaeologists originally recorded the site, the site had a looter's hole and back dirt pile (Montgomery 1999) and a subsequent visit in 2001 revealed additional looting damage (Miller 2001). A little further removed from the project area, about 11 km to the southwest, is Cedar Siding Shelter. Cedar Siding shelter is the only excavated rock shelter in the general area and consists of five utilized alcoves, a large and diverse artifact assemblage, numerous features, and rock art (Martin et al 1983). The shelter was occupied sporadically from the middle Archaic through the Fremont periods.

Purpose

The purpose of this proposal is two-fold. First, it sets forth the reasons, goals, and parameters of conducting a Class II archaeological sample inventory aimed at locating very specific types of cultural resources that could be impacted by ground subsidence related to coal mining activities. Second, the proposal identifies a set of potential scenarios that could result based on the findings of the cultural resource inventory.

Unlike many Class II inventories, the purpose of this one is to identify very specific resources that are likely to be adversely affected by ground subsidence. These cultural resources include primarily prehistoric rock shelters, but can also include other types of standing structures such as granaries and cabins. For simplicity, the term rock shelter will be used in this proposal. Furthermore, the proposed inventory is designed to identify these types of sites, though it is likely other archaeological resources exist in the area. Based on guidelines for conducting archaeological projects on BLM managed land, all in-period cultural resources identified will be documented regardless of site type; however, the thrust of the project design, remains the identification of rock shelters. As such, the project sampling design, described below, focuses on areas most likely to contain rock shelters. The results of the sampling procedure will allow for a better evaluation of impacts to cultural resources than is currently available.

Sampling Design

The proposed sampling design consists of two components: a modified simple random sample and a judgmental, or opportunistic, sample. The modified random sample will allow for a relatively unbiased approximation of the number of rock shelters in the area of potential effect. The judgmental sample, will allow for locating additional rock shelters based on professional judgment and chance. The judgmental sample can be used to qualitatively evaluate the efficacy of the modified simple random sample. Together, these two samples should provide information necessary to better manage the resources, and determine work additional work, if any, is required to bring the project under compliance with all applicable laws, regulations, and requirements.

Modified Simple Random Sample

The sample area consists of the area of potential subsidence shown in Figure 1. This area covers 2822.7 acres (1142.3 hectares). Prior to selecting sample units certain portions of the sample area where excluded. First, areas not likely to contain rock shelters were removed from consideration. These areas include the alluvial drainage bottoms, open slopes adjacent to alluvial bottomlands lacking detached boulders or cliffs, and steep upper slopes. Additionally, the survey transects surveyed by the University of Utah in the early 1980s (Rauch 1980) were removed from consideration; linear corridors surveyed along existing roads were not excluded since the area covered by them is small (Figure 2). Removing these areas results in a sample area of 1769 acres (715 hectares). The sample consists of 34% of the 1769 acres, or approximately 600 acres. The sample units consist of 20 acre blocks (n=30) randomly selected by a computer algorithm (Figure 2). Although the center of each sample unit falls on an included portion of the project area, the block itself may overlap with some of the excluded area. Despite this overlap, the sample units will be surveyed in their entirety. Sampling one-third of the project area and having at least 30 sample units is considered a representative sample amenable to inferential statistical analysis.

Judgmental Sample

The judgmental, or opportunistic, sample consists of the entire area of potential subsidence. Areas with high potential for containing rock shelters will be examined as they are encountered. The area of potential effect will not be examined in a rigorous manner, rather areas determined identified during the course of the field sampling, which lay outside the sample units, will be examined on an encounter basis, such as when walking between sample units or driving along existing roads. The opportunistic sampling serves several functions. First, it will allow for a qualitative control to compare against the random sample. Second, it increases the total area examined during the inventory. And finally, if additional rock shelters are identified, it will allow for the additional collection of data that may be used to create a predictive model for the location of rock shelters in the Lila Canyon area.

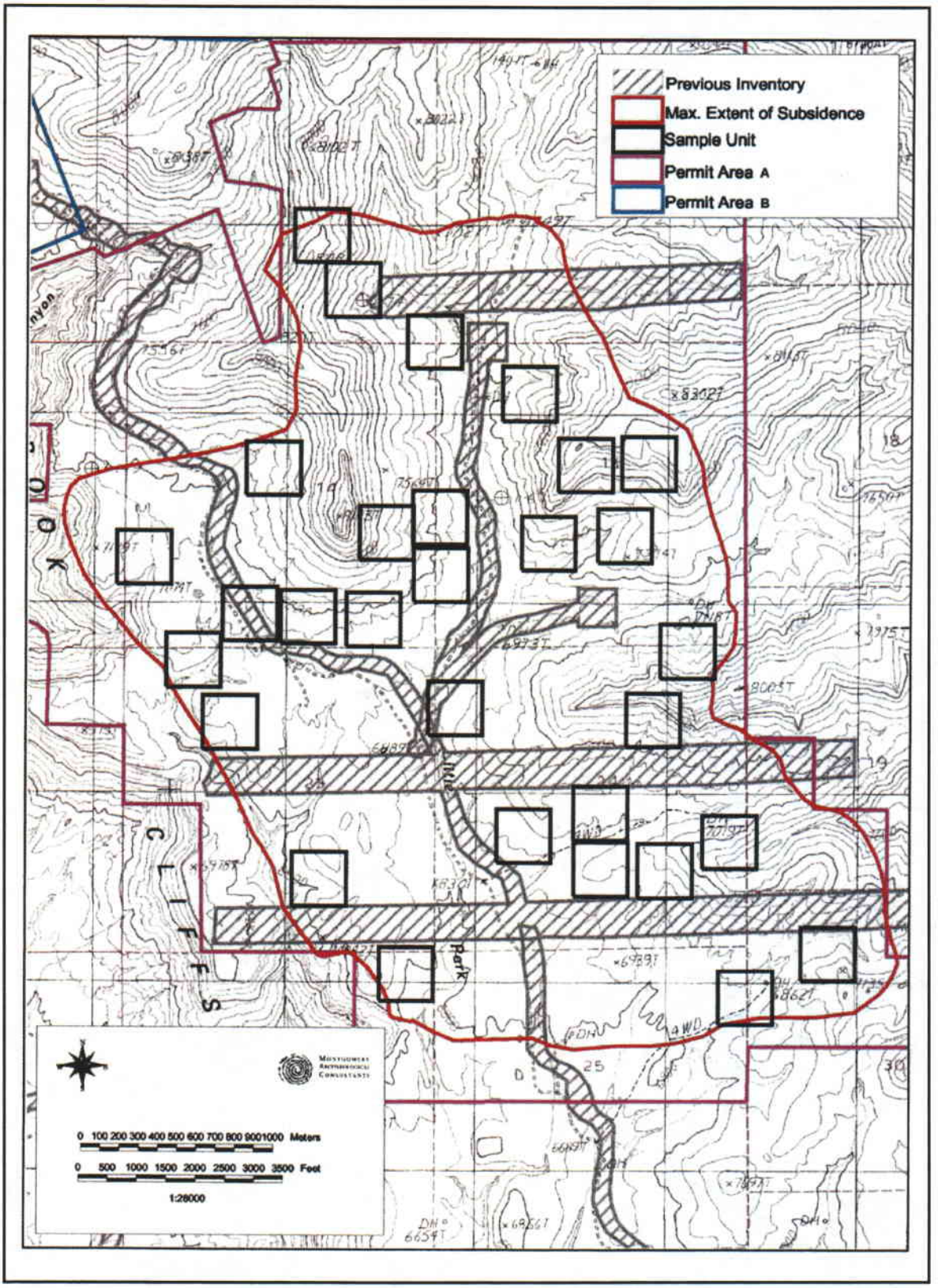

Figure 2. Map of project area showing sample units, permit areas, extent of subsidence, and previous inventories.

Anticipated Results and Alternative Scenarios

Though highly dependant on the results of the sampling, the sampling design allows for determining, with in the one to two standard deviations in a normal distribution, the number and density (defined as the number of sites/acres surveyed) of rock shelters expected to occur in the area of maximum subsidence. If the density of additional rock shelters identified through the opportunistic sampling falls within the range of the two standard deviation range, then it can be assumed that the sampling design is an adequate tool for estimating the actual number of rock shelters. If, however, the density of rock shelters identified in the opportunistic sample falls outside the two-standard deviation range of the random sample, it can be assumed that the rock shelters are not normally distributed. Though not a perfect test of normality, this qualitative assessment allows for a reasonable approximation of design's utility in accurately estimating the number and density of rock shelters.

Based on the nature of the archaeological record in the area and the nature and extent of the project area, it is expected that few rock shelters will be identified. To date, all known rock shelters in the Lila Canyon area occur at the base of the Book Cliffs and not on top of them. While several cultural resources inventories have transected the project area from north to south and east to west, no rock shelters have been identified, though two collapsed historic structures are documented. If the number of identified and predicted rock shelters is low, this inventory may be sufficient to meet the inventory requirements of the Division of Oil, Gas, and Mining (DOGM) and the federal office of surface mining (OSM). If this is the case, the project could then move to a mitigation phase.

If the number of identified and predicted rock shelters is high, or it is adequately shown that the rocks shelters are not normally distributed, then it may be necessary to conduct addition surface inventory to identify a more representative sample of these resources. The requirement of additional inventory will be at the discretion of DOGM and OSM.

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