THE WYOMING ARCHAEOLOGIST

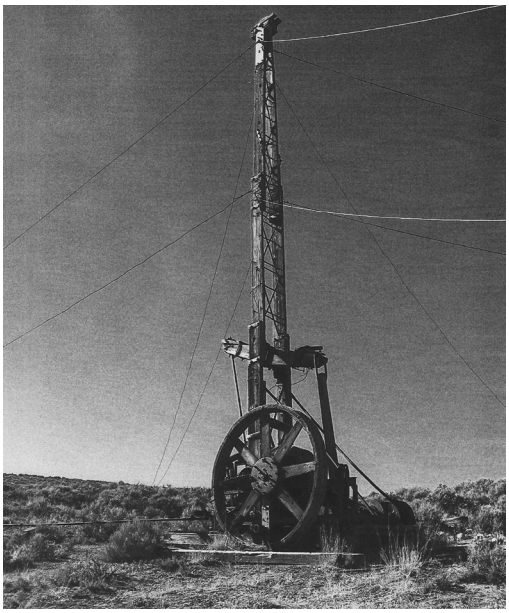

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Table of Contents

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TWENTYMILE BIFACE: A HILLTOP OFFERING IN NORTHEASTERN WYOMING

by
John Greer and Mavis Greer

ABSTRACT

A finely made bifacial skinning knife was left on a small natural pointed hill apparently as a non-utilitarian offering placed on a high promontory, a common prehistoric practice across much of western North America. Age is unknown, but the tool is believed to date from the Late Prehistoric Period or terminal Archaic, or about A.D. 200-1200.

INTRODUCTION

An isolated prehistoric chipped-stone tool was found during an energy related survey in northeastern Wyoming, northeast of Gillette, in Campbell County (Figure 1) (Greer and Greer 2005). This is generally a hilly zone of rather high sandstone and clay hills and ridges, bordering lower scoria capped drumlin shaped hills, and a dendritic or branching pattern of wide valleys to narrower arroyo systems with considerable relief. The site (48CA5772) is on a small rocky point, or projection, on a high, narrow divide crest overlooking lower country with dissected drainage systems to the north, east, and west (Figure 2). The artifact was on the small, eroded, gravelly crest of the highest point of the ridge. The finger crest is generally rocky with sandstone gravel and relatively small angular chunks of sandstone bedrock. Exposed basal sediment across the crest is compact silty clay full of sandstone gravel and areas of exposed bedrock, with no possibility for buried cultural materials or deposits. The immediate location is considerably bare, with some scattered short bunchgrass, while spaced and sparse vegetation in surrounding areas consists of scattered bunchgrass, rabbitbrush, sage, yucca, and prickly pear. The site is in good condition and appears not to have been disturbed since original use of the location and placement of the artifact.

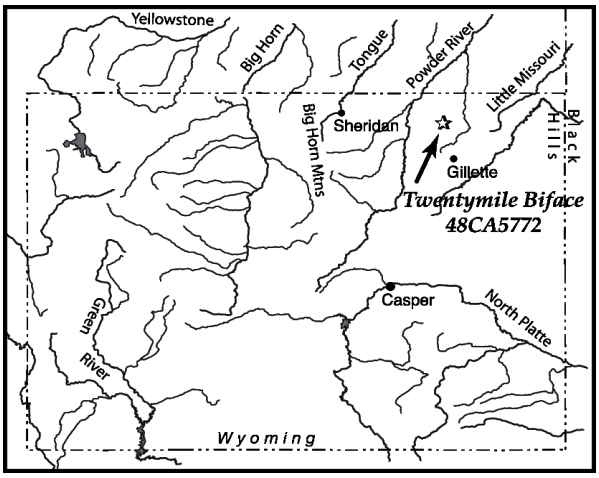

Figure 1: Site location in northeastern Wyoming.

ARTIFACT DESCRIPTION

The large skinning knife (Figure 3) is of nonlocal, yellowish-gray, fine-grained quartzite. Technologically it is a classic transverse scraper with the primary worked edge perpendicular to the axis of the large sequent flake (removed in sequence from a common platform). It is quite large and measures 69 mm long, 110 mm wide, and 13 mm thick. It has a wide convex distal edge and slightly convex to straight, expanding lateral edges. The proximal end or striking platform has been completely bifacially reduced to a fairly sharp edge. Ventral reduction has removed the entire striking platform and most of the bulb of percussion. Otherwise, the ventral face is smooth. The dorsal face is almost completely flaked with the exception of original calcareous smooth cortex extending from the central portion to an area near the left lateral edge (platform down). The sharp edges have a fairly low-angle bevel of about 30 degrees and exhibit no obvious edge rounding from use. In cross section the ventral surface is very slightly concave, as is common of most scrapers and unifacial tools in this region. Although technologically it is considered a scraper, functionally it probably was used as a knife. It was collected at the

Figure 2: Biface location on high rock outcropping.

request of the landowner and is in his possession.

AGE

The object is not temporally or ethnically distinctive, and its absolute age and cultural affiliation are unknown. It is in country historically used primarily by the Crow, Blackfoot, Sioux, and Shoshone, although prior ethnic composition of the region is unknown. From its physical nature and general form we believe it to date from the terminal Archaic or Late Prehistoric period, perhaps A.D. 200-1200. There appears to be no way to date this isolated tool more precisely.

DISCUSSION

Various kinds of sites and features throughout the Plains, from southern Canada to northern Mexico, are associated with geographic promontories, ridge crests, tops of cliffs, and other such locations -- sometimes seemingly inconsequential promontories, such as the one here -- with extensive views. The important consideration seems to be that the location is high, with an extensive vista overlooking lower country in at least a wide angle.

VISION QUESTS

On the Northern Plains the best known, or most publicized, of the high, exposed sites on points have been vision quest locations (Conner 1982; Dormaar and Reeves 1993; Fredlund 1969). In some cases vision quest stone structures are arranged in such a way the participant was sitting. In others, and very common, the usually U-shaped low structure is elongated, and the participant was able to lie down (Greer and Greer 2001). In some the small U-shaped alignment is adjacent to a high cliff in such a position that the participant lies with the upper part of his body extending out over the cliff as if to produce the sensation of flying.

Some of the most dramatic of these sites are on the northwest side of the Big Horn Mountains of northwestern Wyoming and the western side of the Pryor Mountains of southern Montana. Sites are on cliff edges hundreds of feet high and overlook extensive country. Sites in similar positions are known at least throughout mountain areas of the Northwest.

CAIRNS-CACHES

Small cairns or rock piles occasionally cover a small cache. One of the best known of these is the Susan Janes Cache in the Big Bend country of southwest Texas (Janes 1930). The cache contained at least 124 arrowpoints, plus other items, buried

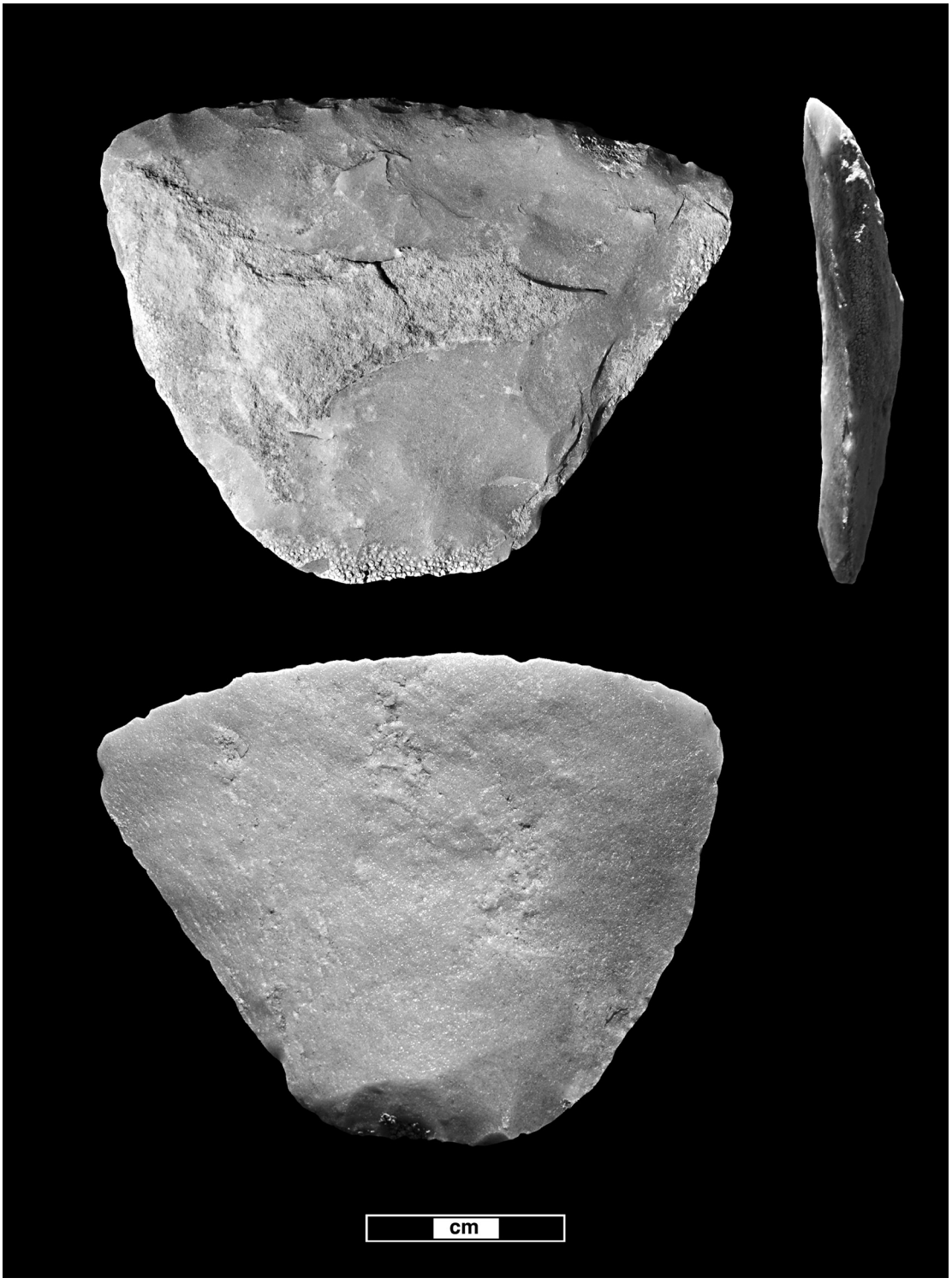

Figure 3: 20-Mile Biface (dorsal, edge, ventral views).

beneath a small rock pile on a high, pointed promontory. Similar sites are known in other parts of the Big Bend of Texas (Cloud 2002) and adjacent parts of northern Coahuila (Mallouf 1987).

Very few Native American affiliated rock piles have been investigated on the Northern Plains. The few that have been professionally dismantled or excavated, plus others found by local persons, mostly contained human burials, if anything (Larson and Longenecker 1979; Longenecker 1979; Reher

1987). Far more contain no discernable items, and it is assumed that if there had been associated items, such as ritual offerings, those items would have been perishable in nature. Indeed, such offerings are common today in similar settings and consist mostly of colored cloth, pieces clothing, tobacco, flowers, plant parts, and other items that would not survive.

An example of a site like this is the Lone Hill Site (32DU13) in western North Dakota (Winham et al. 1988:I 82-32). A low rockpile on the crest of a prominent hill overlooking the Missouri River valley contains profuse offerings. The site was used at least until the early 1900s, although extended time depth is not known.

Steinbring and Buchner (1997) have described use of prominent, isolated rocks or boulder erratics in much the same way in upland areas of southwestern Saskatchewan and adjacent parts of the southern Canadian Plains. The rocks contain petroglyphs and sometimes pictographs, and excavations show a very long time depth, with use from at least from Archaic to historic times.

OFFERINGS

In some places, small personal offerings consist of or contain coins or unusual small rocks. Objects — either natural or altered — of stone, bone, or shell would likely be prehistoric counterparts for modern coins, almost certainly left in small numbers that might or might not draw the attention of later archeologists or collectors. Small smooth pebbles left as offerings, as we have seen in parts of Mexico, the Great Basin, and the Plains, might not be recognized today as manuports or intentional additions to the location at all.

A major problem in recognizing sites of this kind, now in almost any area, is the intensity of inspection of the countryside by people with an interest in picking up artifacts and other unusual objects of historical interest or curiosity. In the case of northeastern Wyoming, the area has been intensively covered for generations by herders, who spent months at a time on horseback and on foot, examining every inch of ground, and particularly every promontory from which they could get a good view of their livestock and surrounding country. It is well known that herders collected individual artifacts, assemblages of artifacts, exposed caches, and items associated with human burials, and some of the largest artifact collections in Wyoming are from sheepherders. We have also heard stories of herders who would keep those objects in saddlebags and quart jars for use as exchange goods, or money, to purchase food and drinks. We commonly find discarded, usually broken artifacts in herder camps, where the items had been picked up at some presumably distant site, brought back to camp as a curio, and then discarded as interest waned.

EXPOSURE AND RECOGNITION

Although this particular site is not considered unique, it is unusual to find or recognize sites of this category because the area has been inspected to varying degrees by ranchers, herders, hunters, surveyors, collectors, and any number of people who commonly pick up artifacts. It is not surprising, then, that relatively few good artifacts are found today on the surface. What makes this individual find even more important is that it is probably one of the few remaining objects of its kind over a vast area of the northern Plains. It almost alone appears to represent a pervasive practice across the Plains, probably a long tradition, as has been shown on the southern Plains and northern Mexico where there has been more publication on this site type than has been the case in the north.

FINAL REMARKS

If the interpretation of depositional circumstance is correct — the context and intent of discard — then this single object represents an aspect of a belief system, the ideological component of culture so often lacking in archeological materialism. Its importance lies in its representation of a practice or process seldom recognized, mostly indiscernible, in an archeological context in this region. It, like rock art and burials, is one more glimpse into the character of the people who came before.

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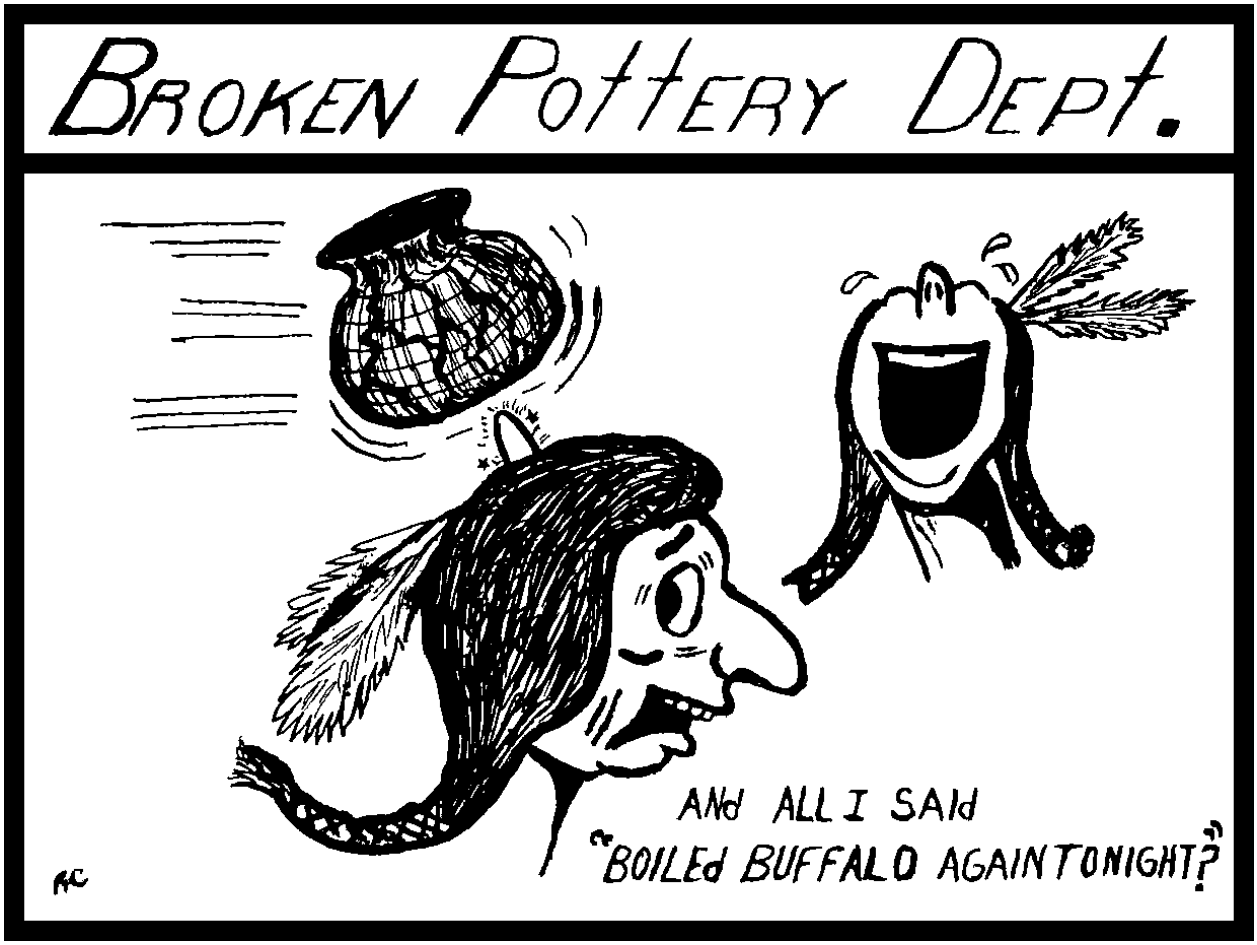

DATA RECOVERY AND MAPPING IN THE FINLEY SITE AREA, 1987

by

Mark E. Miller and George C. Frison

ABSTRACT

During the fall of 1987, an archaeological crew from the University of Wyoming and Wyoming State Archaeologist's Office conducted salvage recovery at a vandalized bonebed locality near the original Finley (48SW5) Paleoindian site in Sweetwater County. Efforts focused (1) on obtaining a bison skeletal sample disturbed earlier, (2) on documenting the site area for the Wyoming SHPO Cultural Records, and (3) on a small testing program to investigate whether intact Cody age archaeological deposits might still be buried at the site. Twenty-two years have passed since these investigations, and the Finley site is now being prepared for nomination to the National Register of Historic Places. This report on the 1987 site work is provided here to give a better background of what was accomplished at the site.

INTRODUCTION

This report details results of archaeological investigations at and near the Finley site (48SW5) during the fall of 1987. Research at the Finley site has a long history, but several unresolved problems still remain concerning prehistoric use of the area. The 1987 study focused on salvaging faunal remains from a vandalized area and attempting to recover sufficient data to begin dealing with some of these lingering questions.

Wyoming witnessed great interest in the study of several Paleoindian localities from the 1940s through the mid-1960s, including the Agate Basin site (Frison and Stanford 1982), Finley (Moss et al. 1951), Horner (Frison and Todd 1987), and Hell Gap (Irwin-Williams et al. 1973). This attention was precipitated by at least two important events. First was the discovery of artifacts in direct association with bones of extinct bison near Folsom, New Mexico in 1926, which established a much greater antiquity for man in the New World than previously believed. Wyoming became important geographically in Paleoindian studies, because it was positioned between the Rocky Mountains and High Plains in direct line of at least one projected migration route for Early Man entering the New World via the Bering Land Bridge. Second, the dust bowl era of the 1930s dramatically increased eolian erosion in the western states, exposing long buried ancient surfaces. Increased site visibility attracted many collectors who prized Paleoindian artifacts and particularly the aesthetic quality of projectile points (Frison 1987).

The Finley site (48SW5) is a Cody Complex locality along the western edge of the Killpecker dune field in the Green River Basin of Sweetwater County, Wyoming, and several miles southeast of the small town of Eden whose name was taken by investigators to designate the projectile point type first found in primary geological context at the Finley site (Figure 1). Eden is one of the variants of the Cody Complex formerly known as "Yuma" (Wormington 1957:124-137).

Orion M. Finley, a local collector, supposedly discovered the Finley site in the spring of 1940 (Howard et at. 1941:70). However, Moss and others (1951:14) list the discovery date as the spring of 1939, and this latter date is mentioned in some of the more recent literature (Haspel and Frison 1987:475). Even so, the 1940 date was published by the principal investigators after the first field season, and it seems consistent with the sequence of events that followed site discovery.

Finley's detection of surface artifacts was

Figure 1: Vandalized area at the Finley Site (48SW5) in the Killpecker Dune Field.

followed by his exploratory digging with Harold J. Cook of Agate, Nebraska, and their joint effort produced enough evidence to generate institutional interest in the locality. Systematic investigations were undertaken in August and September of 1940 by Linton Satterthwaite, Jr., and Charles Bache from the University Museum in Philadelphia, Pennsylvania. Edgar B. Howard, noted Early Man expert and Research Associate at the University Museum, was unable to participate in the initial investigations but became involved in the write-up and a subsequent field season. In 1940, Satterthwaite and Bache established a grid system at an area designated Station A, which had produced the first discoveries by Finley and Cook. Station A is equivalent to the area identified as the Finley Site in the publications of the 1940s and 1950s (Satterthwaite 1957:3).

Successful investigations in 1940 prompted a return to the site in 1941 with fieldwork sponsored jointly by the University Museum of Philadelphia and the Nebraska State Museum (Howard 1943:224). Excavations were expanded in an area designated Section M at Station A (see Howard 1943:Fig.l6). In addition to auger testing in the site vicinity, at least 79 square meters were excavated in and adjoining Section M during the two field seasons. Further work planned for the site was interrupted by the bombing of Pearl Harbor at the outbreak of World War II and the untimely death in 1943 of Dr. E. B. Howard (Mason 1943), eliminating any real chance of maintaining continuity in the direction of future site investigations. Howard's records of the 1941 season apparently were turned over to his family at the time of his death, so they were not used in a subsequent report on the artifacts from the site (Satterthwaite 1957:2). The Station A locality (Figure 2A) was visible in 1987 as a vandalized depression covered with highly fragmented, decalcified bone and piles of later pot hunters' back dirt.

Despite problems restricting further investigations at the Finley site, several publications were completed on various aspects of the research, such as the excavations, artifact analysis, description of bison skeletal remains, geological investigations, and some paleoenvironmental research (Howard et

al. 1941; Howard 1943; Hack 1943; Schultz 1943; Moss et al. 1951; Satterthwaite 1957). Even though several methodological advances have taken place since their field investigations were performed, the published record by primary investigators is more complete than for some other Paleoindian sites excavated during the same era (see Frison and Todd 1987).

After the Nebraska State Museum excavated along the margins of the site in August 1942 to recover additional faunal remains (Schultz and Frankforter 1951:121), no further formal excavations were undertaken for nearly three decades. Geological investigations did continue, however. Moss was supported in 1946 by a fellowship from Harvard University and spent the summer of 1947 conducting fieldwork under a Viking Fund grant (Moss et al. 1951:14). Ahlbrandt (1973, 1974) later conducted dissertation research on dunes in the Finley site area. This geological research demonstrated the presence of three sand units; the lower, middle, and upper sands (Moss et al. 1951:36-42). The lower sand contains iron and manganese staining; the middle unit is pink, clayey sand containing the Cody Complex artifacts and bison bone; and the upper unit is a gray to yellow, medium sand.

In the early l970s, Dr. George C. Frison of the University of Wyoming and Wyoming State Archaeologist discovered a vandalized area in the dune field about 180 meters northeast of Station A, which may be the same location described by Satterthwaite (1957:4-5) as Station B. Testing in the 1970s deter-

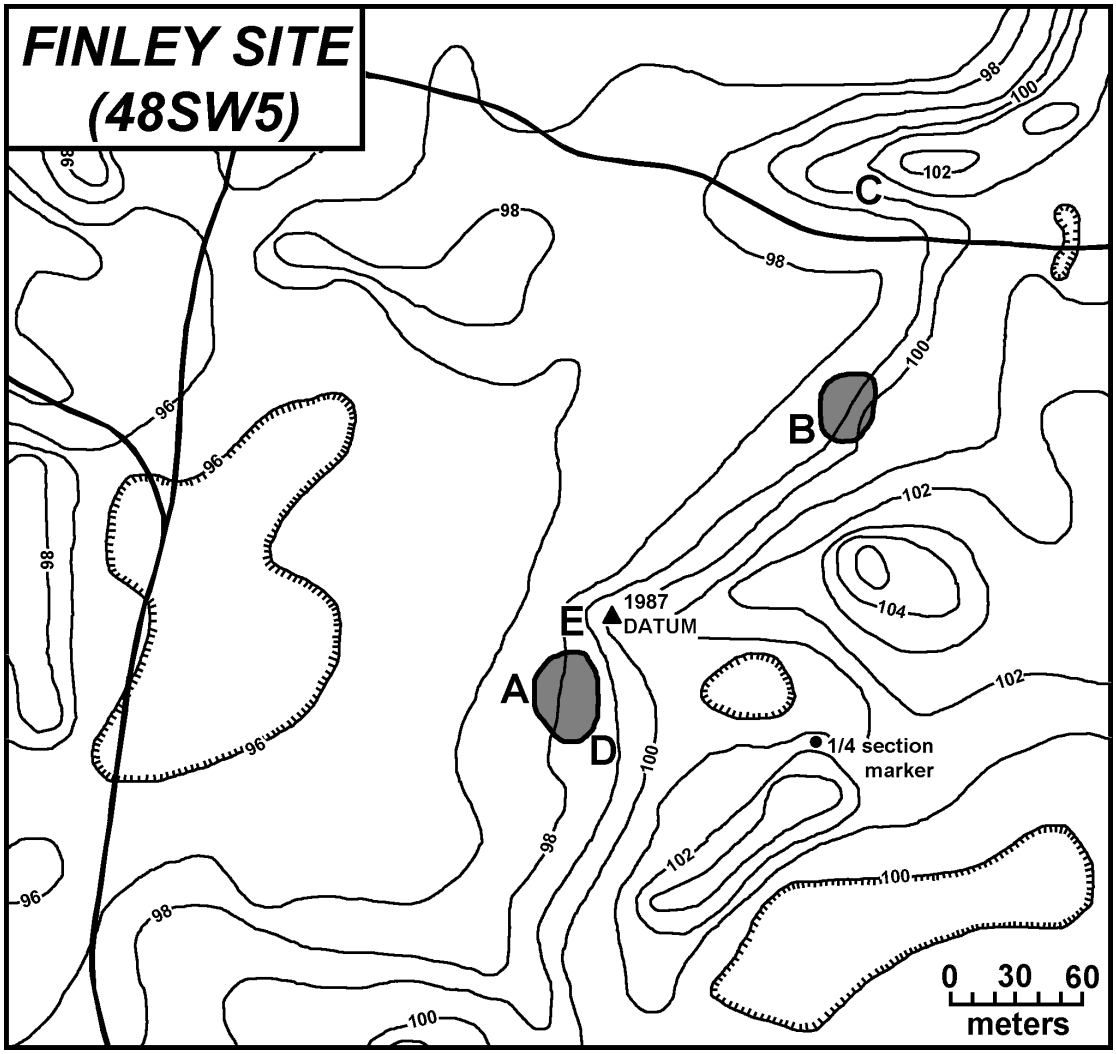

Figure 2: Contour map of the Finley site and surrounding area, illustrating the spatial relationship among several localities: (A) Station A, (B) the vandalized area northeast of Station A, (C) Test Unit 1, (D) Test Unit 2, and (E) Test Unit 3.

mined the presence of redeposited bison bone in a large looted area. Frison recovered a bone sample from the disturbed context and brought it back to the University for analysis (Frison 1978:183-184). This vandalized area (Figure 2B) is described in more detail below.

Preliminary analysis of the faunal remains indicated the locality may have been a bison kill/butchery area, or a series of kills. The bison represented were predominantly adult males taken during the late fall to early winter (Frison 1978:185, 294; Todd and Hofman 1978:69; Haspel and Frison 1987; Todd and Hofman 1987). Four radiocarbon dates were obtained (Table 1), and at least one (RL-574) is from bone. The presence of additional redeposited bone in this area and the threat of periodic vandalism prompted our return to the site in 1987 to recover more evidence.

The 1987 field research was designed to achieve two objectives: (1) to recover as much redeposited bone and artifacts as possible from the vandalized areas of the site and curate the materials at the University of Wyoming Archaeological Repository (UWAR), and (2) to test areas of the site to determine if undisturbed archaeological deposits might remain. More details on project goals are presented in Miller (1987).

FIELD METHODOLOGY

Fieldwork at the Finley site was performed from September 16-22, 1987 by a five member crew from the University of Wyoming and Wyoming State Archaeologist's office, with volunteer assistance from members of the Wyoming Archaeological Society and staff from Western Wyoming College, the Bureau of Land Management, and the University. A permanent site datum was set on a prominent dune ridge between the University Museum of Philadelphia's Station A and the vandalized area investigated by Frison in the early 1970s (Figure 2). This datum is an aluminum cap set in concrete and stamped with its provenience information, representing North 1000 meters, East 1000 meters in a grid oriented to magnetic north. It was assigned an arbitrary elevation of 100 meters. All mapping points from the 1987 investigations were tied into this datum.

A pedestrian transect survey was not conducted because it would have taken all available time and crew to complete. 1987 investigations focused instead on areas that had produced subsurface remains of the Cody Complex occupation at the site. Five locations were evaluated (Figure 2): (A) Station A of the original University Museum investigations, (B) the vandalized area investigated by Frison in the early 1970s, (C) 1987 Test Unit No. l, (D) 1987 Test Unit No. 2, and (E) 1987 Test Unit No. 3. These three individual units were placed to provide widely spaced exposures of site stratigraphy and to determine if intact cultural deposits were still present. We hoped to demonstrate whether or not a continuous level could be traced along the western margin of the stabilized dune system encasing the Finley site. Each unit was dug by shovel scraping in arbitrary levels, because no cultural stratigraphy was noted. Sediment was dry screened (1/8 inch mesh), and all dispersed bone and lithic materials found were collected.

Excavations at the vandalized area were conducted with a front end loader and backhoe due to the size of the area and disturbed context of the remains. Each load of pot hunters' back dirt was dumped into a large screen (8' by 3') fitted with 1/4 inch mesh built specifically for this operation. All bone and lithic materials retained on this screen were collected.

AREA DESCRIPTIONS

UNIVERSITY MUSEUM OF PHILADELPHIA'S STATION A

This is the area where approximately 79 square

Table 1: Radiocarbon dates from the Finley site (48SW5).

Uncalibrated Radiocarbon Age	Lab Number	Source
8,950 ± 220 years: 7000 B.C.	RL-574	(Frison 1978:23)
9,026 ± 118 years: 7076 B.C.	SMU-250	(Frison 1978:23)
9,333 ± 107 years: 7383 B.C.	SMU-276	(Craigie 1985:49)
9,154 ± 80 years: 7204 B.C.	SMU-277	(Craigie 1985:49)

meters were excavated during the 1940 and 1941 seasons at the site (Figure 2A). The exact limits of the grid system could not be determined due to subsequent disturbance. Fragmentary remains of a few wooden stakes were found lying on the ground in this area that may have been originally used to designate corners, but later became dislodged and scattered across the ground.

Station A sits at the exposed, western edge of the stabilized dune field facing the prevailing wind. Cultural deposits were not very deep (ca. 60 cm), and the overburden was relatively coarse, eolian sand. Since the sand could be easily removed, vandals were able to loot the site with minimal effort.

Station A has undergone so much disturbance it resembles a bomb crater with areal dimensions much greater than the original 79 square meters. Earlier digging has been buried by back dirt from subsequent vandalism, and the area is strewn with decalcified bone fragments. At one point, someone cut a narrow trench about 30 cm deep through the vandalized area, probably with the back blade of a tractor, although the trench looks as if it only turned over redeposited back dirt and missed any intact deposits.

Most of the vandalism appears to have been excavation into the unit walls left by the University Museum and Nebraska State Museum crews from the early 1940s. Vandals began where investigators left off and dug into the dune deposits, following the bonebed until they ran out of cultural material. This disturbance expanded the total area north, east and south. The western limits of the excavation are covered by back dirt and the scatter of heavily weathered bone fragments (Figure 2B).

One crew at Station A dry screened piles of back dirt through 1/4 inch mesh to recover any missed items. This produced one flake and several bone fragments. Backfill cleaned away from eight meters of the southern and southeastern margins of the old excavation block exposed intact sediments adjacent to where the vandals had terminated their digging. The exposed profile contained the pink, clayey sand of the original Finley site component and several excavation scars where digging implements had carved into the deposits when the area was potted. Profile cleaning produced only one *in situ* bison bone (left in place), a proximal sesamoid embedded in the upper portion of the pink clayey sand in the same stratigraphic position that produced the bulk of the Cody materials in 1940-1941. It quickly became apparent the cultural level, if any remained, could not be easily traced by following these walls, so backhoe trenching will be required in the future. Consequently, our excavation was backfilled and no further work was conducted in the disturbed portion of Station A.

TEST UNIT NO 2

A test unit was dug in eolian deposits about three meters south of the vandalized portion of Station A once we discovered the cultural level was indistinct along the margins of the old excavation (Figure 2D). Earlier investigators suggested the subsurface distribution of bones and artifacts extended into this area (Howard 1943:Figure 18).

Test Unit 2 was a one by one meter square where the crew shovel-scraped 12 separate arbitrary levels in 10 cm increments before ending in the hard, compacted manganese and iron oxide staining of the lower sand (Figure 3). No cultural materials were found in place, but the highest density of screened material was in the upper portion of the middle sand in the same stratigraphic position as the cultural level excavated during the 1940s just a few meters to the north. Small bone fragments and retouch flakes were recovered, which would be expected in peripheral areas of kill sites. No intact cultural level was found.

The stratigraphy is similar to that discussed by Moss et al. (1951), and several strata are present. Eckerle's field notes describe these (Eckerle personal communication 1987; Miller 1987) and the bottom two units probably correspond with the "lower sand" at the Finley site (see Moss et al. 1951). The middle two units comprise what was considered the "middle sand" in earlier investigations, and the upper three units collectively form the "upper sand" noted in earlier investigations.

THE VANDALIZED AREA

This is the area Frison investigated in the early 1970s and tentatively classified as the kill site (Frison 1978:184) (Figure 2B). On the surface, the area resembles the present condition of Station A. Unsystematic excavations at this locality may have taken place shortly after the University Museum completed work at Station A. Although the total limits of vandalism here have not been determined, looters easily may have destroyed several hundred

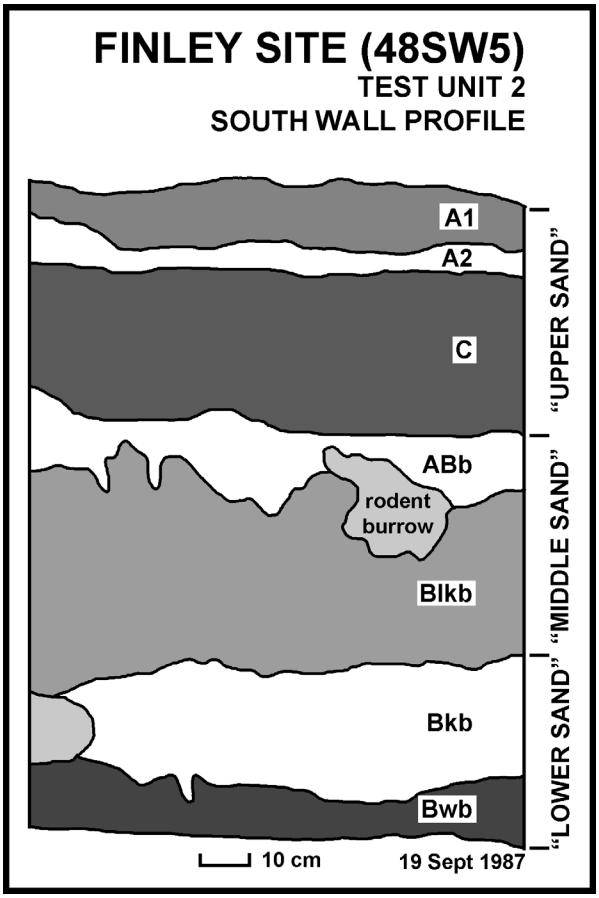

Figure 3: South wall profile of Test Unit 2 near Station A at the Finley site. The upper, middle and lower sands correspond to the strata described by Moss et al. 1951. Soil units are described in Miller (1987)provided by William P. Eckerle, a graduate student from the University of Wyoming.

square meters of site.

Only small artifact fragments and flakes were recovered with the redeposited bone pile during our investigations, suggesting looters probably had screened their back dirt through 1/4 inch mesh. This was confirmed when a profile across the vandalized area showed individual screen dumps. When their digging ceased, they dumped the bone and back dirt back into the hole, covering their handiwork. This left a distinctive, cratered surface littered with small, decalcified and highly weathered bone, which enabled identification of the area as a possible site in the early 1970s. This location also exhibits a bladed trench like that mentioned in the discussion of Station A, but it does not seem to have cut into intact deposits.

During the 1970s investigations, Frison (1978:184) noted the occurrence of a few articulated skeletal units somewhat deeper than the redeposited bone and surrounded by hard sand cemented by caliche. This led investigators to anticipate the presence of intact deposits beneath the back dirt. One additional articulation was recovered in 1987, but nothing was found in definite, primary context. The 1987 bone sample exhibited many of the characteristics noted in the 1970s collection, such as shovel scrapes, probe holes, and dry bone breaks (see Haspel and Frison 1987:489). In many cases, shovel scrapes were found on the downward surface of the bone indicating elements had been dug out, removed, and then replaced when the hole was backfilled.

The crew noted a shallow, circular depression containing the distal portion of a bison humerus and a few other bone fragments, which may have been a posthole from the remnant of a corral or pound used in bison procurement. However, the area was so badly disturbed no positive determination could be made. Other possible holes and surface irregularities were observed, but none were well preserved.

TEST UNIT NO I

This test was a hand excavated trench three meters long north to south and one meter wide east to west (Figure 2C), located on the south slope of a stabilized dune ridge just north of a two track road that crosses the site. Collectors reportedly had found Cody age artifacts in the road cut below an exposure on the dune slope of the pink, clayey sand (George C. Frison, personal communication, 1987). The purpose of this test was to place a unit upslope from the exposed pink horizon, excavate through it, and attempt to find buried cultural material (Figure 4).

A single flake was found in place and screened materials were recovered from every arbitrary level. Nine separate strata were noted in the exposed profile (Table 2). Each was described based on field notes taken by Jim Miller of Western Wyoming College (Jim Miller, personal communication, 1987; Miller 1987). The deepest unit and an auger probe were described by William P. Eckerle, a graduate student from the University of Wyoming. The deepest three units probably correspond to the "lower sand" for the Finley area. Units III and IV may be part of the "middle sand." The upper four units may be grouped as the "upper sand" for the Finley site

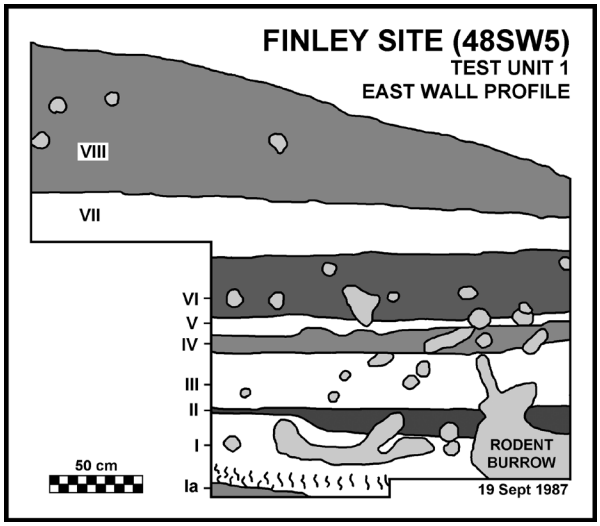

Figure 4: East wall profile of Test Unit 1 at the Finley site. Depositional/soil units are numbered from the bottom to the top sequentially from Ia to VIII. Descriptions of each stratum were provided by Jim Miller of Western Wyoming College and William P. Eckerle, a graduate student from the University of Wyoming.

area.

TEST UNIT NO 3

During plane table mapping, investigators noticed numerous small bone fragments eroding from the dune along a uniform contour across the western edge of the dune between Station A and the vandalized area. These fragments were well beyond the northern limits of scattered bone remaining from excavations at Station A, and were thought to perhaps represent a separate activity area or new site locality. Investigators moved upslope a couple of meters from the thin bone distribution and set a one by one meter unit to determine if an intact cultural level was buried in this area (Figure 2E).

The crew shovel-scraped and troweled six arbitrary levels, each 10 cm thick. The unit ended 56 cm below surface at the northeast corner (upslope). The ending elevation for the floor of the test unit was several centimeters below the contour level that produced the surface exposure of small bone fragments. One bison distal metapodial fragment was point provenienced, and screened materials including bone fragments and small flakes were collected for each arbitrary level.

No profile was made of this unit due to its shallow extent. However, the highest density of screened materials did come from the upper portion of pink, clayey sand; as in the case of Test Unit No. 1 and the University Museum excavations. An intact cultural level could not be located, but the distribution of small items at this locality may suggest more cultural material remains in place beneath the stabilized

Table 2. Level descriptions for stratigraphy in Test Unit 1 at the Finley site, taken from discussions with and field notes of William Eckerle and Jim Miller, 1987.

LEVEL	MUNSELL COLOR	DESCRIPTION
VIII	5 Y 7/2	Includes yellowish-gray quartz, chert, feldspar; is poorly to very poorly sorted with rounded to subrounded, medium to fine sand; calcareous.
VII	10 YR 7/4	Includes grayish-orange quartz, chert, feldspar; is poorly sorted with rounded, medium to fine sand; calcareous.
VI	10 YR 7/4	Includes greyish-orange quartz, chert, feldspar; is moderately to poorly sorted with rounded to subrounded, fine to medium sand; calcareous.
V	10 YR 7/4	Includes grayish-orange quartz, chert, feldspar; is very poorly sorted with rounded to subrounded coarse to fine sand; calcareous.
IV	10 YR 7/4	Includes grayish-orange quartz, chert, feldspar; is very poorly sorted with rounded to subrounded fine to very fine sand; estimated 15 percent clay and silt; very calcareous.
III	5 YR 7/2	Includes grayish-orange, pink moderately sorted fine sand to silt; estimated 20 percent silts and clays; very calcareous.
II	10 YR 6/2	Includes pale yellowish-brown quartz, chert, feldspar; is moderately to poorly sorted with rounded to subrounded, medium to very fine sand; calcareous.
I	5 YR 7/2	Includes yellowish-gray quartz, chert, feldspar; is moderately sorted to moderately well-sorted, with rounded to subrounded to almost subangular fine to very fine sand; calcareous.
Ia	-------	Includes very heavy carbonates (Bkb2) and iron concretions (Bwb3). Auger probe exposed iron concretions (Bwb4) at 1.10 m below the bottom of Test Unit No. 1 and hit water at 2.20 m below the unit floor.

dune slope.

1987 FAUNAL REMAINS

A total of 1,055 bone elements and fragments were reported by Schultz and Frankforter (1951:121) from the 1940s excavations at the Finley site, yielding an MNI of 48 based on 190 left, second phalanges. Individual bison bones primarily were from lower limbs and no evidence of articulations was present at Station A. In 1987, skeletal remains from these early investigations were accessioned at the Nebraska State Museum in Lincoln.

Schultz and Frankforter (1951:121) considered the Finley site fauna to be an extinct species of bison, possibly *Bison occidentalis*, a classification made without benefit of horn cores or major skull portions. One skull was recovered in the early 1970s from the vandalized area northeast of Station A where the remains also were identified as being from an extinct species of bison (Frison 1978). Wilson (1974:94) published the measurements from the partial cranium and contended the extinct species was more likely *B. bison antiquus,* perhaps with some characteristics of *B. bison occidentalis.*

The 1987 investigation recovered one horn core tip from a mature bull and a partial skull from a young cow, in addition to numerous other cranial fragments identified by Dr. Danny N. Walker. Unfortunately, even with the 1987 investigations, there still is not a large sample of Finley site crania.

Several back dirt piles from collectors at Station A (University Museum of Philadelphia area) were screened. A 1/4 inch dry screen mesh was used and the effort recovered 1.7 kg of fragmented bone which was brought back to the University of Wyoming for curation and future analysis. In addition several highly weathered bone fragments on the surface were recognized as portions of vertebrae, rib blades and possible long bone fragments. No surface bones were collected, but they do suggest other portions of the skeleton besides lower limbs were represented at Station A.

By far, most of the bone recovered in 1987 was from the vandalized area northeast of Station A where the front end loader was used to remove looters' back dirt. The total disturbed area may have been as much as 30 meters north to south by 15 meters east to west, but the actual dimensions may never be known. Bone was recovered in about half of this area. Due to time limits and other constraints, the crew focused attention on the central portion believed to contain the highest bone density. Enough bone elements and fragments were recovered in 1987 to fill about 65 boxes, each measuring 18" X 12" X 12", (1.5 cubic feet) of bone (ca. 0.0425 cubic meters). Sixty-five full boxes contain enough bone to cover 97.5 cubic feet (ca. 2.78 cubic meters), which equates to a bonebed covering about 300 square feet (27.87 square meters) with a bone layer four inches (10.16 cm) thick.

The sample consists of whole and fragmentary elements from both the axial and appendicular skeleton. Bone weathering and modification by collectors is similar to that observed on the 1970s sample (Haspel and Frison 1987). Frison (1978) noted articulations in this area, and the 1987 crew recovered one more example, a three vertebrae articulation from the last thoracic (#14) through the first and second lumbar. Anterior and posterior epiphyses are unfused, indicating the animal was not fully skeletally mature. Lumbar vertebrae have interlocking articular surfaces so they tend to hold together fairly well. Consequently, the unit could have been dislodged from its primary context by collectors without causing disarticulation and dispersal of individual vertebrae.

Preliminary identifications by Dr. Danny N. Walker indicate some non-bison species exist in the collection. A distal tibia and tooth fragment from pronghorn *Antilocapra americana,* and a femur and mandible fragment of cottontail rabbit (*Sylvilagus* sp.) were recovered from the disturbed bonebed area.

Bone fragments were also recovered from each of the three test units excavated in 1987 (Table 3). Generally, these are small and undiagnostic, representing fragments recovered from 1/8 mesh dry screening. They are not all from bison, but the postulated site function argues most bone fragments probably are. Walker's preliminary identifications of non-bison elements from these tabulations list the possible presence of Red-backed vole (*Clethrionomys* sp.), pocket gopher (*Thomomys* sp.), and an unidentified small rodent. Rodent burrows are plentiful in and around each test unit, and this may explain the frequent occurrence of small mammals. However, some may not be intrusive and eventually may provide clues to past environmental conditions.

The highest bone densities in Test Unit No. 2 (levels 4-6) and Test Unit No. 3 (levels 2-4) generally correspond with the upper portion of the pink, clayey sand that encased the bonebed excavated in the 1940s at Station A. A high density of small bone fragments at this level in Test Unit No. 2 could be a function of dispersal from the main site area. Test Unit No. 3 is further from Station A and may represent bone dispersal from a separate as yet undiscovered bonebed or from the extreme northern margins of the Station A activity area.

Even though excavations passed through the pink, clayey sand in Test Unit No. 1, a zone of high bone density was not encountered. The most fragments found in any single arbitrary level were 20. At this depth the crew was digging a 1 X 2 meter unit (twice the size of the other tests) through the lower portion of pink, clayey sand into the next stratum. This could mean bone dispersal correlates with the pink, clayey sand, but density per unit area decreases with increasing distance from the major kill or butchery localities.

LITHICS

Reports of previous investigations detail the analysis of chipped stone artifacts recovered in the early years of research. This section only discusses lithics found during the 1987 season at the Finley site. Steve Creasman and Jim Miller of Western Wyoming College assisted with the classification of raw material types, and WWC has a comparative collection of source materials from the Green River Basin helpful in this analysis. Even so, the following classification must be considered tentative because it is based only on macroscopic analysis.

STATION A

A single, non-utilized tertiary chert flake (catalog no. SW5-2) was collected from the collectors' back dirt at Station A. It is a light brown, stromatolitic chert, probably from the Bridger Formation. Laminations in the material resemble calcareous algae. This is a regionally available raw material occuring frequently in sites in the Green River Basin.

SURFACE FINDS

Four items were found on the surface during transit and alidade mapping of the site area. Their relationship to any buried materials is unknown. Two are quartzite biface fragments, one of which (SW5-3) consists of the lateral edge and end of a biface that appears to have been radially fractured (see Frison and Bradley 1980). The bifacially flaked edges appear to be ground but interflake ridges are not as smooth, a pattern to be expected if the modification had been the result of wind abrasion. The other biface (SW5-5) may be the proximal end of a preform. Its edges also are polished or abraded smooth. Ground edges are smoother than broken edges on both of these specimens, suggesting either the polish was intentional preparation on a completed tool or the breaks post-date wind polish.

One core (SW5-4) of Bridger Formation, stromatolitic chert whose cortex resembles the windblown exterior of a lag cobble also was found. One hafted end scraper (SW5-6) of brown, Bridger Formation chert whose cortex remnants indicate the tool was made from a lag pebble also was collected (Figure 5I) .

Table 3: Bone and shell from 1987 test units (TU) by arbitrary level.

LEVEL	TU 1 BONE	TU 1 SHELL	TU 2 BONE	TU 2 SHELL	TU 3 BONE	TU 3 SHELL	TOTALS
1	0	0	12	0	54	0	66
2	3	3	24	0	313	0	343
3	15	5	17	0	252	0	289
4	4	2	150	0	293	0	449
5	0	0	369	0	39	0	408
6	3	1	103	0	28	0	135
7	0	0	7	0	---	---	7
8	20	0	4	0	---	---	24
9	8	0	3	0	---	---	11
10	---	---	0	0	---	---	0
11	---	---	0	0	---	---	0
12	---	---	4	0	---	---	4
Totals	53	11	693	0	979	0	1,736

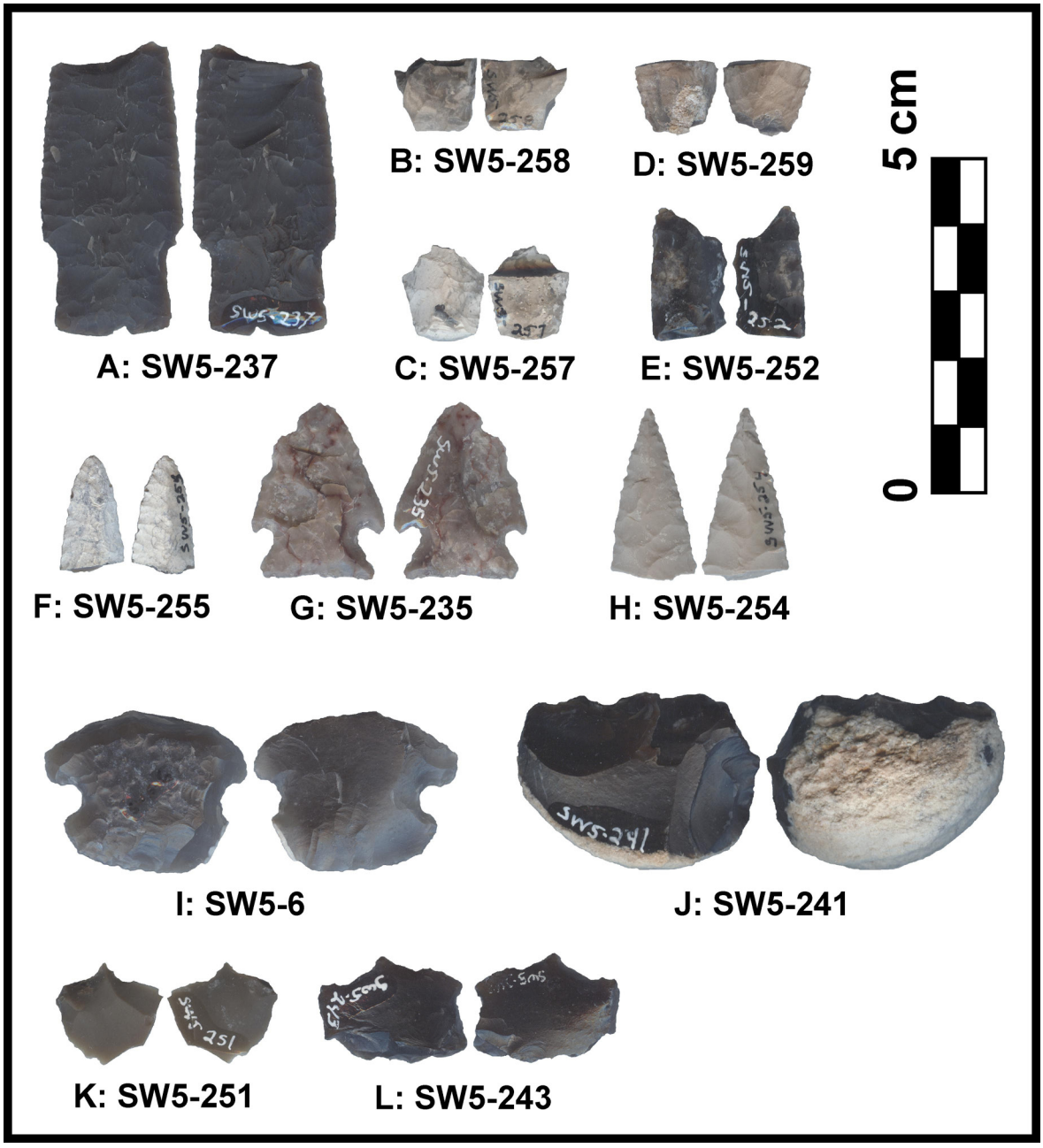

Figure 5: Selected artifacts from the 1987 investigations in the Finley site area. Artifacts A-H and J-L are from the vandalized area northeast of Station A. Artifact I was a surface find during contour mapping of the site area.

VANDALIZED AREA NORTHEAST OF STATION A

Most lithic items collected in 1987 were discovered during backhoe and screening operations in the vandalized area 180 meters northeast of Station A. Two of these items (SW5-7, 5W5-8) are fragments of grinding slabs that may or may not be associated with the Paleoindian occupation. The first piece is heavily ground on both surfaces and probably had a well-defined basin shape when the slab was whole. It is similar to many such items recovered in Archaic assemblages on the Northwestern Plains, although an earlier context cannot be ruled out. Archaic age artifacts were mixed with the skeletal remains of bison and Cody Complex materials in this area, which complicates the artifact analysis.

The remaining lithic items are either chipped stone artifacts or debitage. Six chert flakes show

what probably are utilization scars on at least one edge each. Use-wear analysis is complicated because the flakes have undergone dramatic disturbance since their original discard; edges easily could have become modified during site looting, backhoe recovery, or screening operations.

Four chert flakes have retouch along at least one edge. One of these actually may be a biface fragment, but it is too small for positive identification.

Three chert flakes have been shaped into gravers, two of which are illustrated (Figure 5K-L). One graver (Figure 5L) has multiple retouched spurs along its margin and quite likely was associated with Paleoindian occupation of the site. One fragment of a chert biface has pot lidding, which suggests either purposeful or accidental thermal alteration.

A single Scottsbluff Type I (see Wormington 1957:267) projectile point was found in the vandalized area (Figure 5A). The transverse flaking pattern has produced a biconvex cross-section. The distal end has been broken away by an impact fracture probably induced during operation of the kill site. A small flake has been taken out of the basal edge most likely by impact with a shovel or other instrument when the area was dug. The artifact is made from brown, Bridger Formation chert. It is the largest chipped stone artifact recovered from the vandalized area, again suggesting the looters were screening the sediments and carefully trying to recover all large items.

Six other biface fragments appear to be portions of Cody Complex projectile points. All are probably made from cherts available in the Green River Basin and all indicate either bend or impact fracturing. Two may be fragments of stemmed bases (e.g., Figure 5B, ground on each of the two remaining bifacially flaked edges). Three fragments (Figure 5C-E) are midsections of collaterally flaked bifaces, probably from Eden projectile points. One distal tip (Figure 5F) also may be from a collaterally flaked Eden. Like the midsections, it exhibits a somewhat diamond-shaped cross-section. Heavy patina on this particular fragment obscures some flake scar morphology. None of these fragments refit to each other, so it is presently believed they represent separate projectile points.

One corner-notched, possible Late Plains Archaic, projectile point also was found in the vandals' back dirt (Figure 5G). It is made from what appears to be a locally available chert. The tip was broken away on impact and the item has been thermally altered. Crazing and pot lidding are evident. A biface tip (Figure 5H) of gray chert also may be from a post-Paleoindian projectile point. The flaking pattern is not characteristic of Cody Complex technology. One chert lag pebble has been shaped into a pebble core tool (Figure 5J).

A total of 401 flakes were collected during back dirt screening (Table 4), including platform bearing remnants and shatter. Flakes are tabulated according to the amount of dorsal cortex remaining and raw material used. Primary flakes are considered to exhibit between 100-26 percent cortex, secondary flakes from 25-1 percent, and tertiary flakes have less than one percent cortex remaining. Cortex classification was complicated by the presence of precortical material on some specimens and the small size of most flakes.

Much of the debitage exhibits pinkish-white carbonate encrustations that obscure cortex remnants, making classification difficult. Similar encrustations were noted on the Cody Complex artifacts from the area, and this may indicate the Paleoindian assemblages can be distinguished from later materials on the basis of carbonate accumulation. Carbonates probably derived from the same depositional and soil unit that contained the Cody age material at Station A to the southwest.

Bridger Formation cherts occur in shades of brown and range from opaque to translucent (some scholars might classify translucent materials as chalcedony, but this term is not used in the present study). About 30 percent of these flakes are stromatolitic; others are banded, but most are simply opaque, dark brown chert. A few are gray and appear to be thermally altered, suggesting a color change may accompany heat treatment. Three of the opaque brown pieces refit to form a single flake that probably broke from shovel impact.

Green River Formation cherts are characterized by ostracods, are generally opaque and range from light to dark brown. Some investigators contend this material turns black when heat treated (Steve Creasman, personal communication 1987), and in fact, several black specimens exhibit crazing and pot lidding.

Dendritic chert ranges from light brown to gray. Two of these flakes are red and may have been

Table 4: Debitage from vandalized area northeast of Station A.

RAW MATERIAL	PRIMARY	SECONDARY	TERTIARY	TOTALS
Bridger Fm. Cherts	14	19	199	232
Green River Fm. Cherts	7	1	43	51
Dendritic Chert	7	3	35	45
Other Cherts	7	8	18	33
Quartzite	2	4	28	34
Siltstone?	0	0	3	3
Obsidian?	0	0	3	3
Totals	37	35	329	401

thermally altered.

Thirty-three flakes have been classified as other cherts. They range from brown to black and easily may group with an existing class once microscopic analysis has been conducted. These could also be local materials.

Quartzites are variable in texture and color. They may be white, gray, brown or green, and range from fine to relatively coarse grained. The most probable source for these is the Pleistocene lag gravels throughout the Green River Basin.

Three flakes are made from what appears to be a siltstone. They are light gray in color and seem poorly silicified.

Three other flakes are classified as possibly obsidian. However, these do not appear to be from the typically high quality Yellowstone Park material at Obsidian Cliff, unless they are a poor grade of that source. Alternatively, they may be a relatively good grade of ignimbrite or possibly non-volcanic glass.

Although Paleoindian and Archaic artifacts are mixed in the back dirt, the frequency of carbonate encrustations on flakes and antiquity of the skeletal remains suggest most of the debitage is of Cody age. Cortex generally resembles the windblown surfaces of lag pebbles, suggesting inhabitants used nearby, secondary sources ultimately derived from formations in and around the Green River Basin. While cortex bearing flakes are far less frequent than tertiary specimens, their presence does indicate some lag pebble reduction was taking place.

The dominance of tertiary flakes is not unexpected. The primary function of the site area seems to have been bison procurement and processing, so finished tools are expected to predominate over stock, raw material. These flakes have not been analyzed for platform attributes or the pattern of dorsal flake scars, but some general observations are possible. Many have well prepared, faceted platforms and some larger flakes exhibit a concavo-convex longitudinal profile characteristic of biface reduction flakes. The lack of cortex on these suggests they may be from later stages of manufacture. Many of the smaller flakes probably are from tool resharpening and maintenance.

Locally available cherts far outnumber quartzites or other raw materials. This preference is not entirely clear, but one would expect the tool assemblage would follow a similar pattern if indeed many of these are sharpening flakes.

DEBITAGE FROM THE 1987 TEST UNITS

Debitage from the 1987 test units also was classified according to the same raw material groups used for the vandalized area (Table 5). In general, flakes from the test units were only a few millimeters in maximum dimension and represent the assemblage retained on a 1/8 inch mesh screen. The levels with the highest flake density also are the levels with the highest bone fragment density. These correspond with the upper portion of the pink, clayey sand where Cody age deposits were found at Station A, and from which the bone in the vandalized area is believed to have originated.

Once again, locally available cherts predominate. These flakes are almost exclusively tertiary, so no attempt was made to classify according to percent cortex.

A single artifact was recovered from these test units. One small, gray quartzite biface fragment was found in arbitrary level 9 in Test Unit No. 1. It is not particularly diagnostic, but may be from a bifacial core or early stage preform.

CONCLUSIONS

The 1987 investigations in the Finley site area

Table 5: Debitage from 1987 test units at the Finley site.

LEVEL	TU 1 RAW MATERIALS*							TU 2 RAW MATERIALS							TU 3 RAW MATERIALS							TOTAL
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	
1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2	1	4	0	0	0	0	9
2	11	2	1	0	0	0	0	0	0	0	0	0	0	0	7	7	1	0	0	0	0	29
3	11	5	7	0	0	0	0	0	0	0	0	0	0	0	8	1	4	0	2	0	0	38
4	3	0	2	0	2	0	1	0	1	0	0	0	0	0	4	3	3	0	1	1	0	21
5	0	0	0	0	0	0	0	4	1	1	0	3	0	0	1	0	0	0	0	0	0	10
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
9	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	25	7	16	0	2	0	1	4	3	1	0	3	0	0	23	12	12	0	3	1	0	113

* Raw material classification: 1 – Bridger Fm. chert, 2 – Green River Fm. chert, 3 – other chert, 4 – dendritic chert, 5 – quartzite (one flake is of quartz crystal), 6 – siltstone, 7 – obsidian.

accomplished several goals. A site form and documentation for the state's cultural records database were completed and a permanent site datum was tied into a USGS reference point. A relatively detailed topographical map was prepared illustrating the general contour of the stabilized dunes and the spatial relationship between all known localities at the site. A large bone sample was salvaged from the vandalized area northeast of Station A that eventually should add significant new evidence for the study of Paleoindian hunting and the evolution of *Bison*. Although the lithic collection is small, it is still the largest sample of debitage presently known from the site, and it illustrates a real prevalence of locally available chert. The artifact assemblage strongly suggests a Cody Complex association for bison procurement activities at the vandalized area. Archaic and historic mixing is present, but most of the lithics probably are Paleoindian in age. Finally, the three test units help further establish the broad spatial continuity of site stratigraphy and the presence of subsurface bone fragments and flakes.

Studies of the depositional history and soil formation in the Finley site area are not complete. Better dating resolution is needed for the sequence of events related to site structure and dune formation. It is not known whether the stratum containing the bonebed(s) at Finley was deflated down to the cultural level following occupation, or if it represents good, post-occupational soil formation, or both. The stages of bone weathering should help resolve this, but the remains have undergone such disturbance that patterns will be difficult to diagnose.

No skeletal or artifact refits have been made between items at Station A and the vandalized area to the northeast. However, artifact typology, bone condition, stratigraphy, context, and absolute age of dated specimens all argue the two localities are related culturally, functionally, and temporally.

No discoveries in 1987 change Frison's (1978) model that considers the Finley site to be a sand dune trap similar to the Casper site (Frison 1974). His contention remains plausible that the vandalized area northeast of Station A was the kill area and Station A itself was a specialized processing area. The discovery of a possible post hole at the vandalized area suggests an artificial structure may have been built to help confine the animals in the kill area. Similar subterranean features were noted at the Horner site, another Cody Complex bison procurement/processing locality (Frison and Todd 1987).

Similarity between the Finley site and the Horner site is also noted in that widely spaced bonebeds occur at each. Perhaps Cody age hunters were efficient at taking advantage of widely spaced areas within specific bison habitats. If the topography was not entirely suited for procurement, the hunters were capable of manufacturing corral or pound confinements to supplement the topographic limitations on

herd control.

The Finley site certainly is significant enough to warrant nomination to the National Register and that effort is underway in 2009 (John Laughlin, personal communication, 2009). However, investigators still have not determined if intact activity areas remain at the site. Testing in 1987 was insufficient to evaluate whether or not undisturbed site components exist.

ACKNOWLEDGEMENTS

This report was first prepared in December 1987 for the United States Bureau of Land Management in Rock Springs as part of Cooperative Agreement No. WY910-CA7-111, Task Order No. 2. It details the efforts of the Office of Wyoming State Archaeologist and the University of Wyoming, Department of Anthropology to recover archaeological fauna and artifacts from a heavily vandalized area near the original Finley site excavations. We acknowledge support of these agencies. Recent efforts have been directed toward preparation of a National Register nomination for the Finley site (48SW5) (Laughlin personal communication March 2009), so it is particularly timely to present this research for broader review than it received in 1987.

The work could not have been accomplished without of the help of several people. First of all, the strong research commitment and enthusiastic encouragement from Dr. George C. Frison through all phases of the Finley site study was integral to any success. His involvement as a co-Principal Investigator provided expert direction and maintained continuity between the present investigations and those of the early 1970s.

The field crew drawn from the ranks of the Department of Anthropology and the Office of the Wyoming State Archaeologist deserves particular thanks. These individuals were Dr. Danny N. Walker, Howard Haspel, and Dale Wedel. Marcel Kornfeld, Eric E. Ingbar, and William P. Eckerle also donated their time and expertise during portions of the fieldwork. June Frison cooked several meals and kept the crew in good spirits through proper nutrition. Her positive contribution to life in field camps over the decades cannot be measured and will never be equaled.

Several staff members from Archaeological Services at Western Wyoming College, under the direction of Steve Creasman, also volunteered part of their weekend to help us complete our study. Steve Creasman, Jim Miller, Scotty McKern, Lynn Harrell, and several others contributed many hours to the project. We did not have time to write every name down as people came to help, so regret not being able to mention each particular volunteer. However, it is this kind of generous effort that promotes cooperation between different research programs and ensures the survival and vitality of Wyoming archaeology.

William P. Eckerle and Jim Miller provided invaluable assistance in the description and classification of site sediments. Their skills in geoarchaeology were greatly appreciated.

Many members of the Rock Springs chapter of the Wyoming Archaeological Society also pitched in during fieldwork. Joe Bozovich, in particular, was on site every day. His interest in and knowledge of the regional archaeology was a delight to the crew and an education for us all. Between Western Wyoming College (WWC) and the Wyoming Archaeological Society (WAS), at least 100 volunteer hours were provided to the project. People were coming and going throughout the session, and their volunteer effort was integral to our success. We could not have finished without their assistance.

John Hay owned property adjacent to the site and leased the federal land. He and his ranch manager at the time, Harold Anderson, eagerly supported our investigations and provided the necessary access to the site. Their interest in the study, and their knowledge of the history of land use in the area, were enthusiastically received.

Our brief 1987 study actually began as a proposal to the Bureau of Land Management in November 1985. After a seemingly endless cycle of paperwork and correspondence, including research permits, fieldwork authorizations, permit stipulations, budget revisions, task order preparations, schedule postponements, and personnel changes, we finally made it to the field. When everything seemed hopeless, BLM archaeologist Russ Tanner was there with words of encouragement. We would not have been able to complete this project without his support and hard work. He deserves special recognition for his commitment to balancing archaeological research in his resource area with the regulatory requirements of the Bureau of Land Management.

Funding for this project was a cooperative

venture. Support came from the Bureau of Land Management, University of Wyoming, and Wyoming Recreation Commission (now the Department of State Parks and Cultural Resources). We are grateful to all. The original report is presented here it its entirety with only minor editing to enhance its readability. No new research or updates since 1987 have been attempted. Finnally we acknowledge the input provided by the reviews of this manuscript. Any errors or omissions are the sole responsibility of the author.

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HISTORIC RESOURCE EVALUATION AND ASSESSMENT OF POTENTIAL EFFECTS FOR THE BUREAU OF LAND MANAGEMENT SPRING VALLEY ORPHANED OIL WELL PLUGGING PROJECT IN UINTA COUNTY, WYOMING

by
Russel L. Tanner

INTRODUCTION

On June 16, and July 14-15, 2004 Lynn Harrell and Ed Jess of the Bureau of Land Management (BLM) Kemmerer Field Office, and Russel Tanner of the BLM Wyoming State Office, conducted field recording, mapping and assessment of relevant portions of the historic Spring Valley Oil Well Field in Uinta County, Wyoming. The project included about 20 acres of new inventory, and assessment of resources covering about 165 acres (Figure 1). Intermittently throughout the following year historical records research and analysis and report writing were conducted by Tanner.

The term "*Spring Valley Oil Field*" is a somewhat generic term applied to wells drilled in this area. Indeed, the Wyoming Geological Association lists over 100 wells drilled in at least 18 separate sections spread across two townships titled Spring Valley Field. Several of the earliest of these wells are the subject of this study. The term Spring Valley Oil Field seems then to have been applied to many wells, some of the earliest of which were operated by the Spring Valley Oil Company (see Kerns and Traut 1972).

PROJECT DESCRIPTION

The proposed Spring Valley Oil Field orphaned well plugging project will essentially involve completion of the final stage in the life of an oil development, e.g., plugging of the well bore and abandoning the facility for the production of hydrocarbon resources. Normally wells are plugged soon after they are no longer deemed economically viable by their owners. However, in this case, several oil wells on BLM administered lands were abandoned without being properly plugged to prevent pollution of surface water and other adverse environmental consequences which might result from a well bore being left open. The wells were "orphaned" with no party being responsible for their upkeep and maintenance through to the final plugging and abandonment phase of their life. This case of abandonment occurred long before there were laws and regulations requiring wells to be plugged, and indeed before the establishment of the Bureau of Land Management as a federal agency in 1946.

The situation resulting in these six wells and others in the region being "orphaned" is apparently the result of ownership disputes concerning the various early oil placer claims filed in the area. This situation seems to have been an issue at least as long ago as 1928 when General Land Office examiner Wiley G. Brown was ordered to investigate the ownership of oil wells in the greater Spring Valley area (Brown 1928). Examiner Brown's conclusion was the issue should be resolved through the local courts which apparently never happened (Brown 1928:10).

The purpose of the proposed Federal undertaking described here (Figure 2) was to remedy this situation by properly plugging the open well bores. Plugging the wells is a relatively simple task since all the wells are shallow (less than 1,000 feet deep). To accomplish the task, it is necessary to drive a cement truck across existing upgraded roads to the open well bores and pumping concrete down the borehole. Besides the cement truck, another truck hauling hose and other equipment and a vacuum truck to clean up any spilled or overflowing fluids

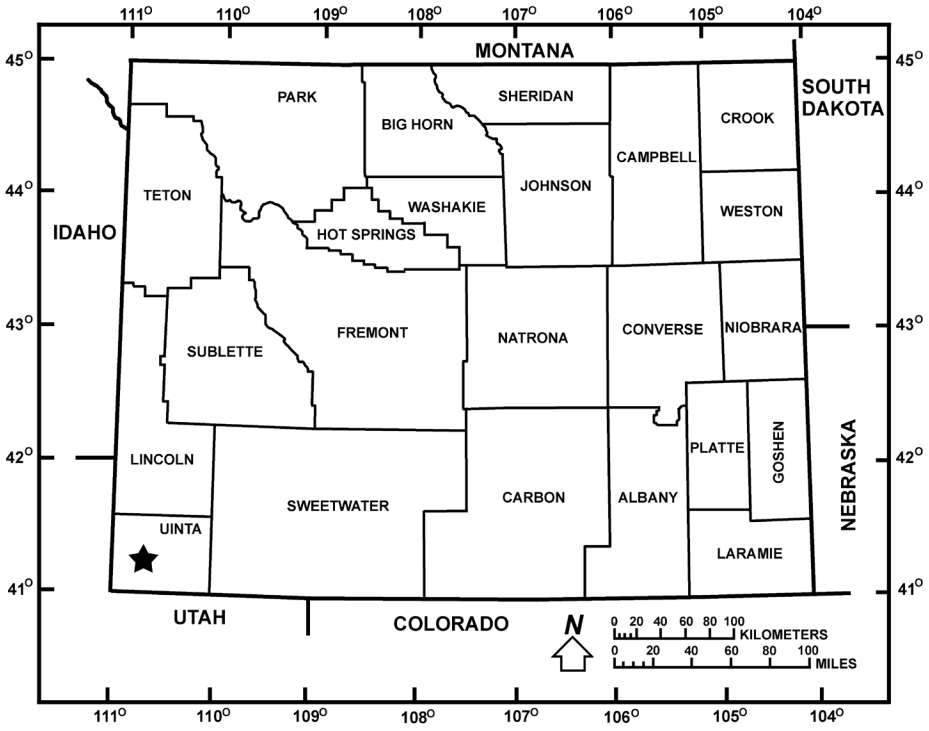


Figure 1: Project location map.

escaping the well bore during the process of plugging is present during the plugging operation. Near each well, a shallow pit about a meter square will be hand dug to capture any fluids escaping from the well as concrete is pumped into the bore.

The plugging operation is conducted by a crew working briefly (ca. four hours) in an area about four meters square around each of the six well bores. A few additional acres were inventoried along the existing roads where it was anticipated trucks might need to exceed the existing disturbed ground surface. All work and truck traffic was within areas studied during this inventory and assessment. In addition to two or three workers contracted to plug the well, a BLM petroleum engineering technician and a BLM archaeologist were present during the well plugging operation to insure the project is conducted according to the plan developed by BLM. Monitoring by a BLM archaeologist insured no adverse effects occurred to the historic Spring Valley Oil Field or artifacts or features associated with it.

Given this scenario, the Area of Potential Effect (APE) for the project was about 120 acres situated generally in the center of the north one-half of the section. There were an additional 35 acres in the north 1/2 of the SW 1/4, and about 10 acres in the NE

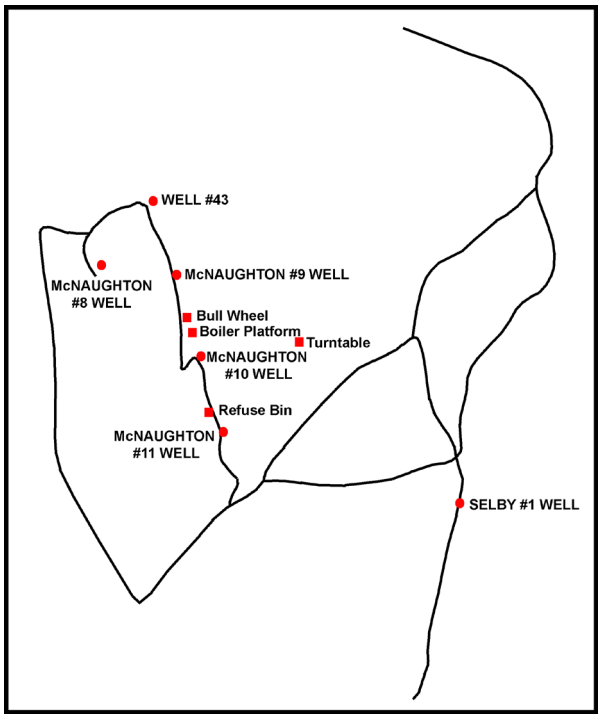


fIGURE 2: Wells, Roads and Features within the Area of Potential Effect (APE). (to scale, but scale not noted.

1/4 of the SE 1/4. This approximately 165 acre area was the focus of the investigation and was incorporated in the more precisely described boundary for historical site 48UT2551 in the Wyoming Cultural Resources Database.

New inventory was conducted on about 20 acres of the APE in anticipation of additional truck traffic in two areas where corners of existing roads were too tight to allow modern vehicles to turn without traveling over undisturbed ground. Otherwise, no new surface disturbance was authorized by the BLM, and all Areas of Potential Effect were previously disturbed by construction of the original wells and access roads, all of which were examined for historic properties during our documentation.

ENVIRONMENTAL SETTING

The proposed undertaking is located in the Overthrust Belt physiographic region. The Spring Valley Oil Field is located in a small valley or bowl at the head of an unnamed ephemeral drainage on the east aspect of a ridge system typical of the parallel ridges characterizing the Overthrust Belt geological province. The drainage on which Spring Valley is situated is a tributary of Muddy Creek which in turn flows into the Black's Fork, nearly 40 miles east. The Black's Fork River is a major tributary of the vast Green River drainage system of the American West.

The area is characterized by buff to reddish colored sandy silt derived from decomposition of the Wasatch Formation bedrock. Ridge tops east of the project area are Frontier Formation. The soil regime also has some small areas of aeolian sand developed in shadows along the lee side of low ridges and some areas of early-development loamy soil in and around clusters of juniper trees, especially northeast and southwest of the project area. Besides junipers, the vegetation in the area is characterized primarily by a sagebrush and low grass community, particularly western wheatgrass. In some places, serviceberry and mountain mahogany are found in association with the juniper community.

The historic oil well field has been present in the area since the early 20th Century and has virtually become part of the natural setting of the area. Specifically, the area is covered with a scattering of varying densities of historic artifacts and features. Furthermore, oil and natural gas production are ongoing modern activities in the vicinity and have left a heavy imprint on the environmental setting of the area. This being the case, it is not anticipated the undertaking is likely to result in the discovery any previously unknown historic properties of any kind.

BACKGROUND RESEARCH

It should be noted the investigators had visited the Spring Valley Oil Field on reconnaissance studies before the formal inventory so the team was already familiar with the resources involved at the site. In November of 2003, before initiating field work, background research was conducted on the Spring Valley Oil Field, including examination of correspondence, lease records, well logs and other BLM records and a Masters of Arts thesis titled "A History of the Oil Fields of Evanston, Wyoming: Patterns Involved in the Development of an Oil Province in the Rocky Mountain West," by Walter R. Jones; and the Wyoming State Historic Preservation Office "Oil Industry: Historic and Historic Archeological Context" by Rheba Massey.

Before the initial formal field visit, Harrell and Jess reviewed BLM base maps for previous cultural resources studies in the general area and copied site forms for known sites in the area. A similar query was conducted through the Wyoming Cultural Records Office (WYCRO). These two file searches revealed three previous cultural resource inventories had been conducted within or near the project area.

The first was a linear survey conducted by the Office of the Wyoming State Archaeologist (OWSA) in 1984 for the Wyoming Department of Transportation relative to maintenance work along Interstate Highway 80. That study resulted in the recording of site 48UT979, a scattering of refuse from prehistoric stone tool making. The site was determined to be not eligible for the National Register of Historic Places (NRHP) and was likely destroyed by the subsequent highway construction.

Archaeological Services of Western Wyoming College (AS-WWC) conducted an inventory in 1989 for the Bald Knob Cell Tower and access route. During this inventory, site 48UT980, a historic coal mine, was recorded and determined to be not eligible for the NRHP. This site was not affected by the undertaking described here and remains intact nearly a quarter mile away from the proposed project area.

A third inventory was conducted in 1989 by the BLM for the Rex Porter water pipeline associated

with livestock watering operations. This study did not result in the location of any cultural resource properties.

Also of interest was the recordation of site 48UT1184, first in 1986 by Nickens and Associates for the Wiltel Fiber Optic cable route; then in 1999, by TRC Mariah Associates for the Pioneer Pipeline finished petroleum products line from Sinclair, Wyoming to Croyden, Utah.

Site 48UT1184 is an historic oil well field first referred to as the Byrnes Draw field by Nickens and recommended eligible for the NRHP under Criterion A, C and D. Cursory investigation during this study of the Spring Valley Oil Field did not reveal any historic field known as Byrnes Draw. Indeed, available information, especially Kerns and Traut (1972), seems to indicate the field recorded as 48UT1184 is, in fact, part of the large area generally referred to as the Spring Valley Oil Field. As stated above, the term Spring Valley Oil Field has, over many years, been generically applied to petroleum production over a broad area covering some 20 or more square miles in this general vicinity. This present project is more finely focused both geographically and historically to deal with several of the oldest wells drilled in the area.

While it might have been possible to record this entire area as the Spring Valley Oil Field, such an undertaking would have taken years to complete and was thought far beyond the scope of work appropriate to facilitate the plugging of the six "orphan" oil wells considered in this study.

SPRING VALLEY OIL FIELD HISTORIC OVERVIEW

Shallow deposits of oil have been known in the Evanston, Wyoming area since 1847, when Mormon pioneers discovered an "oil spring" or seep near the Bear River south of present day Evanston (Bagley 2001:224). This "oil spring" known as Brigham Young's oil well (48UT1174) is listed on the National Register of Historic Places (Massey:1992:56), and is located about 12 miles southwest of Spring Valley (Kimball 1988:94). From this 1847 discovery, interest in mineral resources in the region grew. However it was coal, and not oil, which spurred the initial interest in mineral development in the Spring Valley area.

The Coal Mining Community of Spring Valley

Much of the impetus for constructing the Transcontinental Railroad along the central Rocky Mountain corridor had to do with availability of coal vital to steam locomotives (Klein 1987:56, 78). By 1900, the railroad company had begun to exploit coal seams near a railroad siding which came to be called Spring Valley. Between 1900 and 1905, 492,974 tons of coal were mined at Spring Valley (Union Pacific 1940:15). The coal mining community of Spring Valley was located about three miles southwest of the present project area.

An Evanston newspaper ran a special edition hailing the prosperity brought by coal mining in Uinta County. In this edition Spring Valley was described as:

> [Spring Valley is]…among the new towns which is (sic) now commanding attention is the new coal camp or town of Spring Valley, located on the line of the Union Pacific Railway, eighteen miles east of Evanston. The camp was located and established by the Union Pacific Coal Company. It is a promising town. Already the company has erected eighty–five miners' homes—fifteen of which are built of brick—built and stocked a large company store and erected a fine three-room school house. Spring Valley has a population of over 800 which will be increased this year. They employ something over 225 miners at present. The mines are well equipped with the latest and best improved machinery.
>
> … In addition to the coal industries it is in a promising oil field and is near the Union Pacific well where was found the free illuminating oil that has created no little excitement among oil promoters. It promises to make an oil (sic) as well as a coal town. (*The Wyoming Press*, Special Edition, May 3, 1902, Evanston, Wyoming. No page numbers)

Unfortunately, for the community and approximately 800 residents, coal mining in the area was short lived by 1905,

> …a mine and village that was endowed with high hopes, only to pass out in less than six years from causes seldom experienced in the annals of coal mining—the entrance of oil and gas into the lower workings of the mine. Here a mine was driven into an oil field, which

> status applies to it to this day, the scene of much prospecting. Here a town was built, with comfortable homes, sidewalks, trees, a public school and Episcopal and Mormon churches . (Union Pacific 1940:126)

Petroleum Replaces Coal

The first oil well drilled in the Spring Valley area was completed in 1904 (Kerns and Traut 1972:15). However, most wells during this early era were completed in 1909. According to Kerns and Traut's list, 22 wells were drilled in the project area's section before 1950. Data indicate most were drilled in 1909 (n=11), two each in 1915 and 1937, one each in 1902, 1904, 1918, 1920, 1927, 1935 and 1936.

There seems to be some discrepancy between events of these early years in the petroleum industry and the information reported by Kerns and Traut. This may be from a lack of precision in early oil production records before production became an issue of taxation and royalty documentation. In this case, these wells are likely those described in Evanston newspaper accounts as having been drilled in 1908. The newspaper accounts, being based on actual field visits by the reporter, are thought reflect the more accurate information.

This replacement of coal by oil in the aspirations of Evanston businessmen, if not truly in the regional economic importance, is evident in newspaper accounts of the time. *The Wyoming Press*, a conservative Evanston newspaper reported in 1908:

> The most encouraging news of the week is from the Spring Valley oil field, where another paying oil well was brought in a few days ago. General Manager H. E. Pearson was in the city Thursday and is authority for the statement, of which none can doubt, as Mr. Pearson is a conservative and careful gentlemen … by steady development and fair test, the Uinta county oil fields are rapidly coming into their own and well No. 8 is one of the strongest evidences and testimonials of this fact.
>
> The International [Consolidated Company] property is on Sec. 12 15-118, about twenty miles from Evanston and four miles from Spring Valley, being among the best in the field. The company have (sic) finished eight producing wells this season, and will continue others until they have completed twenty, which have been staked off on a line which has proven a rich oil belt. The wells are shallow, averaging from 100 to 700 feet, and not a dry hole. This appears to be a very successful method of drilling and is encouraging to all interested.
>
> The company deserves credit for their efforts and are here permanently, having in addition to their present equipment more machinery enroute (sic), including the latest and most improved bolted derrick made, which is manufactured by the Parkersburg Rig and Reel C. of West Va. This derrick is good for 3,000 feet and is installed for sinking deeper holes. When this arrives, a second drilling crew will be set at work. The company will also keep their Star portable rig in the job, drilling wells nine and ten. The eight wells now finished are on the pump and paying, the oil being delivered to the refinery.
>
> The company is making many noticeable and substantial improvements on their property, having just completed a tool house, four bunk houses, and a blacksmith shop. They are installing two 1,000 barrel tanks—one for oil and the other for water; also two 30-horse power boilers to be located at a central point for pumping of the twenty wells and to supply water for the camp and drilling purposes. Twenty men are now employed at the camp and five others are only waiting until the new machinery arrives. They have two cars of casing and oil well machinery enroute (sic) from the east and mean business. Arrangements have been made for building of a pipe line from the storage tanks to the refinery, which will be completed and in operation by Nov. first. And we must not overlook the fact that they have a new Chinese cook from Salt Lake at the camp, who thoroughly understands the art of dishing up the "chop suey."
>
> We are also informed that the new field manager, X. Whitney, is proving to be a very competent and skilled workman, under whose direction and management well No. 8 was drilled and is now on the pump pouring forth daily an abundance of "the oil which makes Wyoming famous."
>
> The International Consolidated Company has done more to successfully develop this field than any other concern which ever came in, and we wish them the success they merit. (*The Wyoming Press*, September 19, 1908).

By 1909, the International Consolidated Company had sold out to the Pittsburg-Salt Lake Oil

Company, but local enthusiasm for oil production had hardly subsided. The Evanston newspapers continued to report on investments in machinery, drilling of wells and other aspects of petroleum production. *The Wyoming Press* reported:

> The Pittsburg-Salt Lake Oil Co. has issued $250,000.00 of 6 per cent 20 year gold coupon bonds, as appears from a Deed of Trust filed in the office of the recorder of deeds.
>
> From inquiry at the company's office we learn that the company contemplates considerable improvements in the Spring Valley field this season.
>
> It is the intention to provide further extensions of the pipe line system already built to take care of the production as fast as it comes in, not only for the companies that are now drilling but also for those that are coming into the field this season. We are informed by the company that many inquiries have been made by parties contemplating commencing operations in the field as to whether the crude production would be properly taken care of and the company is doing all that it can to encourage new companies to come into the field. The company also intends to commence drilling operations on its own account on a large scale, and in the anticipation of the increase in production, will add new stalls to the refinery and more storage for crude and refined products.
>
> Besides its contemplated improvements in the Spring Valley field, the company intends to increase its paint factory and build a roofing factory in Salt Lake City, and to build a 100 ton refined asphalt refinery on its properties in eastern Utah. (*The Wyoming Press,* January 9, 1909).

Historian Walter R. Jones investigated oil development in the Evanston area in considerable detail in his 1988 Master's thesis. He found the small company and individual petroleum explorer had the greatest impact on the development of southwestern Wyoming's oil industry 1901 until 1929. (Jones 1988:1)

> Historically, the American petroleum hunters have proven themselves to be persistent individuals. Once they entered a region, they show a reluctance to abandon it; a trait that has had particular significance for the Evanston oil fields which took more than one hundred years to bring to fruition. This persistence in the Evanston fields has special importance: the long period of time it took to find large quantities of oil in and around Evanston, Wyoming provides the researcher with an excellent case study of the patterns that tied the West's petroleum developments to the industry at large. (Jones 1988:5)

Jones documents the early significance placed on the Evanston area's petroleum potential by quoting University of Wyoming geology professor Wilbur Knight who called "the oil fever in Wyoming a 'wildfire,' and pointed to its origin as a place called Spring Valley, a newly created railroad depot and coal-mining community three and one-half miles east of Carter Oil Spring. [an oil spring in the area of the Brigham Young oil well]." (Jones 1988:30)

L. E. Nebergall made the first discovery of petroleum at Spring Valley, and "[B]y August, 1901 Evanstonians had noticed a number of surveyors, drillers, and other "new faces … of the oil variety in the region Valley." (Jones 1988:46)

In April 1903, the Oil Well Supply Company established a warehouse at Spring Valley and then in October 1903 purchased Nebergall and Ellis's venture. E.C. Dorn moved to Spring Valley to manage the company's outlet (Jones 1988:57)

The Jager Oil Company was the first firm to start operations in 1902 when drillers Gus Smith and George A. Perry started boring a hole northeast of Spring Valley in May. By August, drillers had encountered a "great oil strike" at a depth of 950 feet and were producing ten barrels of petroleum a day. (Jones 1988:61)

According to Jones's research:

> Under the direction of D. H. McMillan, the Pittsburg-Salt Lake Oil Company became the most active venture at Spring Valley from 1905 to 1910. Within weeks of his firm's taking over the Atlantic and Pacific Company's operations in late December 1904, McMillan began to use steam to melt paraffin that had clogged several of the company's oil wells. In the first of these wells, McMillan soon pumped four and one-half barrels of oil in one twenty-four hour test. Within a month of this test, he had a second well on the pump for one-hundred barrels a day. By mid-1905 he had shipped five

> tank cars full of oil to a refinery in Florence, Colorado; the first major shipment of oil out of Uinta County, Wyoming. In 1907 the Pittsburg-Salt Lake Oil Company excited Evanston's oil community by hitting a pool of petroleum that shot a spray of oil fifty feet above the top of the derrick. By October 1909 the enterprise had started to drill wells numbered nine and ten. (Jones 1988:72-73)

From early Twentieth Century newspaper accounts, Jones documents *Wyoming Press* editor George Ewer, Jr. touring Spring Valley with Manager H.E. Pearson, International Consolidated, Spring, 1908]

> … Manager Pearson showed Ewer the firm's five pumping wells (each spaced three hundred feet apart), ... He also examined a power plant that was being installed to operate as many as twenty wells and toured International Consolidated's oilfield camp, which consisted of four bunk houses, a company office, a cook house, barns (horses being essential to Spring Valley's oilmen), a tool house, a blacksmith shop, telephone connections to Evanston, a freshly completed team road, a water well for camp use, and natural gas from one of the company's wells for cooking and heating.
>
> In all, Ewer was impressed. He had met many of the company's twenty-five employees, including drillers, pumpers, teamsters, and camp cook. He noted that the company's wells were within two miles of the Union Pacific Railroad, that the average depth of the producing wells was between three hundred and seven hundred feet, and that well number four was pumping forty barrels of oil a day. In December, 1908 Pearson again hosted a tour ... International Consolidated was working on nine more wells, had finished one of its 1,000 barrel tanks, and had put into use its central power plant that boasted two thirty-two horsepower engines. They had also tapped a nearby vein of coal to provide fuel for both the power plant and the camp. (Jones 1988:75-76)

It appears the five wells mentioned above might be the McNaughton #8-11 wells and Well #43, however Kern and Traut (1972:14-15) do not list any wells having been drilled in the section by that early date. It seems likely this listing is erroneous since all other evidence seems to indicate these would be the wells in a J. E. Stimson's photograph (Figure 3). It seems possible, given other irregularities with location of oil placer claims in the area documented by an investigation by Wiley G. Brown of the General Land Office in 1928, wells reported by Kern and Traut were actually drilled some years earlier.

After a relatively brief ten year "heyday," oil production at Spring Valley slacked off considerably, and by 1917 Wyoming State Geologist L. W. Trumbull noted the growing dimensions of Wyoming's petroleum industry and remarked Spring Valley's oil development was "of interest from a historical standpoint rather than from its economic or prospective value." (Jones 1988:92)

By World War II when the United States Geological Survey prepared estimates of future petroleum reserves, it was estimated Spring Valley had produced about 56,000 barrels of oil, and only about 8,000 barrels remained as recoverable reserves. (letter from USGS Supervisor C. A. Hartman, May 8, 1942).

In 1968, the petroleum industry officially declared the Spring Valley field to be abandoned (Jones 1988:104). A recent check of the Wyoming Oil and Gas Conservation Commission website indicates the "greater" Spring Valley petroleum field was discovered in 1900 and throughout its operation produced 296,341 barrels of oil and 822 million cubic feet of natural gas. Much of the natural gas has been produced since 1980 when gas production became the focus of petroleum operations in southwest Wyoming.

SPRING VALLEY SITE DESCRIPTION

On initial viewing, the Spring Valley field area looks like a seemingly random scattering of old petroleum industry equipment, including several well bore casing pipes and residential debris situated on the tops and edges of several interfluvial ridges and intervening broad shallow valleys. When inspected more closely, it becomes apparent there is considerable more artifactual debris located in many of the somewhat dense thickets of mountain shrub vegetation. There also seems to be several apparent patterns of relationship between the various artifact concentrations and the readily apparent relict industrial features.

The following is a characterization of the pat-

Figure 3: J. E. Stimson photograph of Spring Creek Oil Field, showing various wells in operation. See text for discussion of picture and features visible.

tern of artifacts associated with each of the wells proposed for plugging during this project. Following this description, a functional discussion of the five wells as a part of the Spring Valley oil field as a system is presented. While the well patterns are descriptive and based on results of formal mapping, the discussion of the functional aspects of the oil field operation over time is much more speculative and based on inference from the archaeological pattern to the historical record of equipment installed at the field over the years.

The four wells known by the McNaughton appellations are named after Gary McNaughton, the Kemmerer BLM Field Office geologist, who first worked on the orphaned well project. McNaughton #8, #9, #10, and #11 are thought, based on historical evidence, to have all been drilled between 1905 and 1911. Little evidence concerning the well called simply Well #43 could be found. However, its location relative to the four McNaughton wells would seem to indicate it is the fifth well visible in the historic Stimson photographs taken in about 1908 (Figure 3).

The first five wells discussed, McNaughton #8, Well #43, then McNaughton #9, #10 and #11, seem to be associated to some degree with the historical records and photograph discussed in the historic overview. The final well, Selby #1, does not seem associated with this information or the conjectural industrial archaeology patterning.

McNaughton #8

The McNaughton #8 well (Figure 4) is situated on an east slope, just below the crest of a north-south trending ridge overlooking the rest of the well field

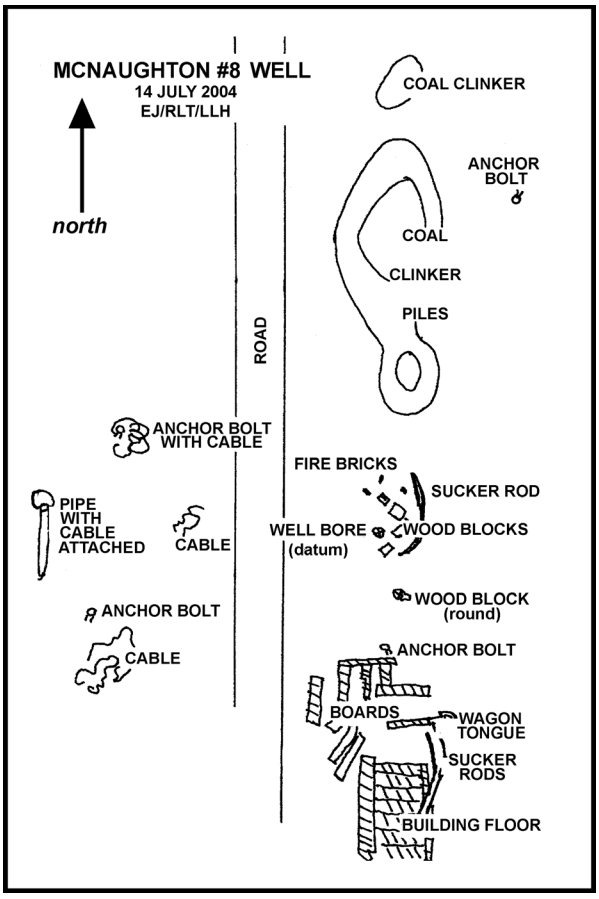


Figure 4: Detail sketch map, McNaughton #8 well, 2994.

to the south and east. The access road approaches the well location from the north on a spur road off the main route which wraps around to the northwest and continues southerly along the crest of the ridge (Figure 2).

The well bore is situated about five meters east of the access road which runs relatively straight and nearly due north at this point. North of the well bore, which served as the map datum, there are two piles of "clinker" and ash from coal burning. These clinker piles are likely the residue from a coal fired steam boiler operation associated with the initial drilling of the well. They may also represent a storage area for ash from several other boiler sites as well. Although it is speculative, it seems logical the actual boiler apparatus would have been moved from location to location as wells were drilled. Eventually, it may have been advantageous to store the ash and clinker from several boiler episodes at this single location.

Within a few meters of the well bore, there are several fire bricks which might also have been associated with a steam boiler. There are also a number of wood blocks which likely had many different uses, the most common of which might have been to support items while tasks such as welding, or pipefitting were performed. A length of steel rod known as a "sucker rod" is also near the well bore. Sucker rods are used in suction pumping operations.

At distances from five to 15 meters from the well bore there are "anchor bolts" driven into the ground. Anchor bolts are steel rods about one and one-half inches in diameter with a loop, or "eye" in the above-ground end. These bolts would have held cable used to support the drill rig while the well was initially drilled. Anchor bolts are often left in place around a well to facilitate support of rig apparatus later when the well bore needs to be cleaned or other maintenance tasks performed. Several meters of stray cable are located around the well and especially near some of the anchor bolts.

South of the well bore about five meters, there are several milled lumber boards and larger planks. All of the boards have been nailed and most have round carpenter nails still in them. Two meters south of the first cluster of boards, there is another group of several boards still nailed to a plank framework. These assemblages of boards and planks appear to be the remains of a building, or buildings similar to those shown in the Stimson photograph (Figure 3). At the McNaughton #8 location, these seem to be the structure used to shelter the well bore during drilling when men would have been continually working in the area within a few meters of the bore. Following drilling, the shelter may have been moved to another well and reassembled, or perhaps abandoned off to the side of the well bore as seems the case here.

Most, if not all, artifacts and features associated with the McNaughton #8 well seem to be associated with operations of the well from its initial drilling until possibly about 1920. Both industrial and residential artifacts are observed at the location. Residential artifacts include an enameled teapot (Figure 5) and several sanitary food storage cans. Several fragments of a "blue on white" glazed white paste ceramic bowl (Figure 6) with the marking "JAPAN" on the base were noted. This marking would likely make it a post-1905 import from Japan. Industrial artifacts include several large gasoline or kerosene

Figure 5: Teapot, typical of domestic artifacts found within the Spring Creek Oil Field.

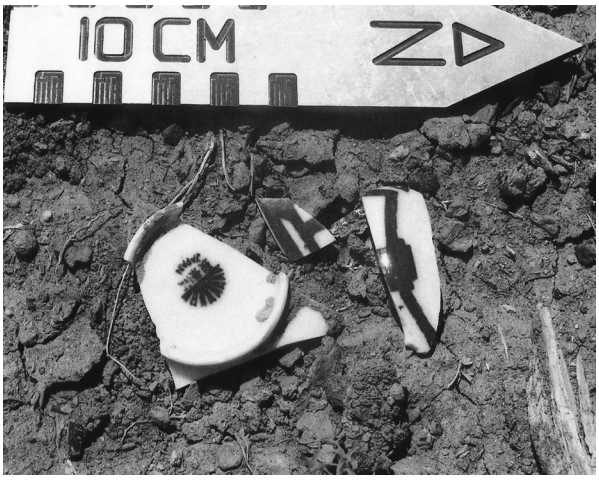


Figure 6: Japanese ceramic sherds found near McNaughton #8 Well.

cans, carbon rod and zinc plate battery fragments, nails, bolts and pipe fittings.

Well #43

The well called simply #43 (Figure 7) is situated northeast of the McNaughton #8 well. Well #43 is situated east of the point where the access road turns south along a bench below the crest of the ridge along which the McNaughton #8 well is located. This southerly route of the access road also passes the other three McNaughton wells.

The well bore is a large pipe surrounded by an area about four square meters which has been leveled to facilitate drilling operations. Again, the well bore was used as datum for mapping the site. Within two meters immediately south from the well bore is a very rusty hand wrench (Figure 8). A two meter length of two-inch pipe and several four-inch pipe fittings are scattered several meters northeast of the well bore together with several sheets of galvanized sheet metal roofing material. There is an anchor bolt about three meters south of the well.

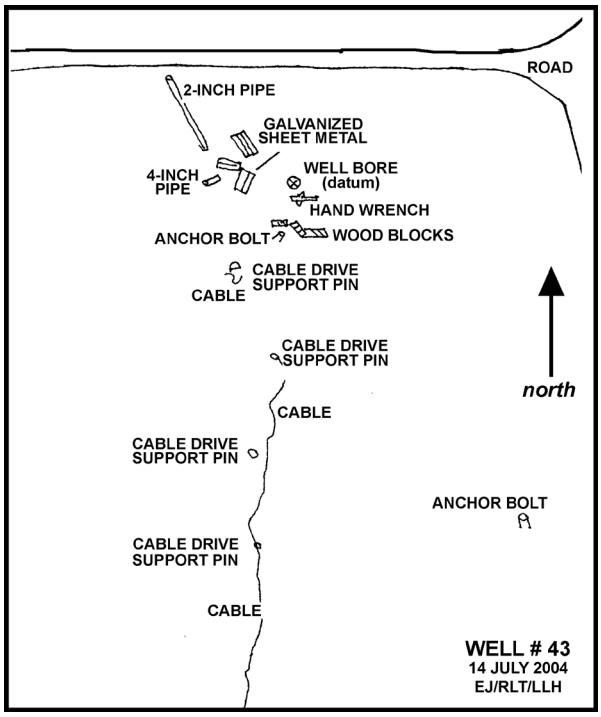


Figure 7: Detail sketch map, Well #43.

About nine meters south of the well bore is a cable drive support pin. Three more pins are in a line with cable laying on the ground under them for about 50 meters. These cable support pins are steel rod or pipe with a fitting on top where an eye was likely attached to support cable coming from the what may have been the "central point for pumping" mentioned above from the September 19, 1908 issue of *The Wyoming Press* (see above description of improvements at Spring Valley observed on a tour of the well field.)

The #43 well appears to have been connected to some kind of central pumping apparatus not fully understood at this time. This apparatus is alluded to in the above cited newspaper account. Understanding this central production facility is one of several interesting technical questions which could

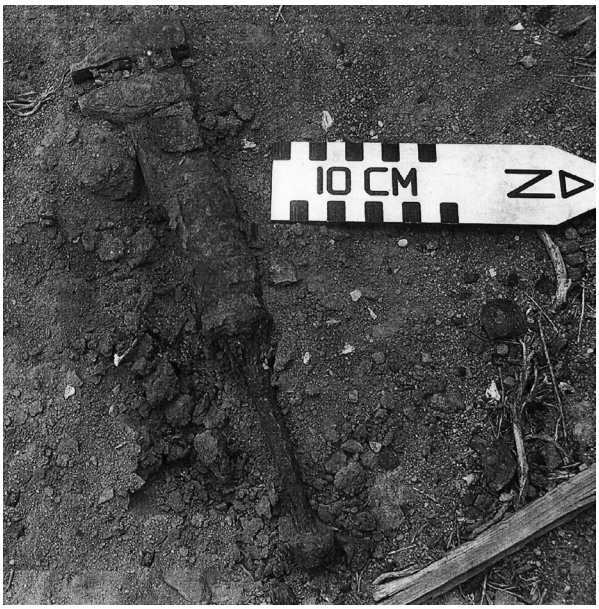


Figure 8: Hand wrench found ndear Well #43.

be studied at Spring Valley.

McNaughton #9

The McNaughton #9 (Figure 9) well is located along a relatively level bench about sixty feet below the crest of the interfluvial ridge along which the McNaughton #8 well is situated. The #9 well could be the third well in the line of three with the smoke stack at the end in the Stimson photo (Figure 3). There is only a sparse scattering of artifacts around this well. Items mapped include pieces of sheet metal, boards, cable, a kerosene can and four anchor bolts as well as a scattering of carpenter's nails. The well is situated only about two meters from the access road.

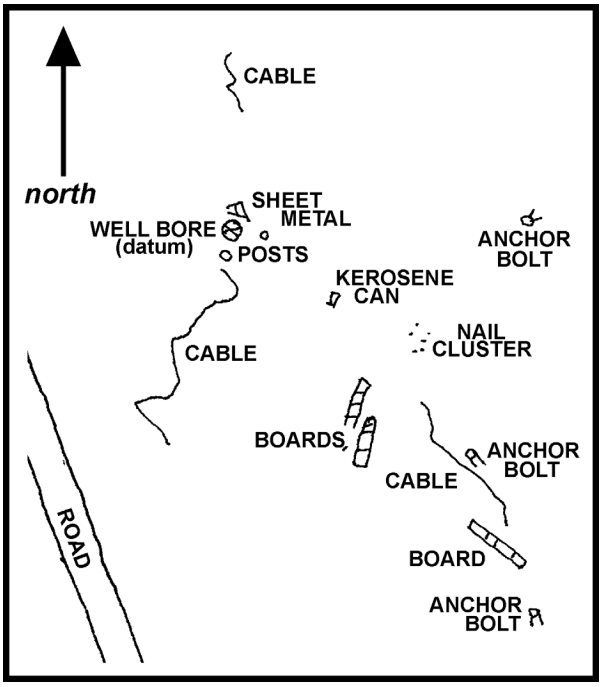


Figure 9: Detail sketch map of McNaughton #9 well.

Outside the radius around the closely mapped well, there is an apparent row of cable supports headed down slope and east (Figure 10). These are part of the conjectural pumping apparatus described above.

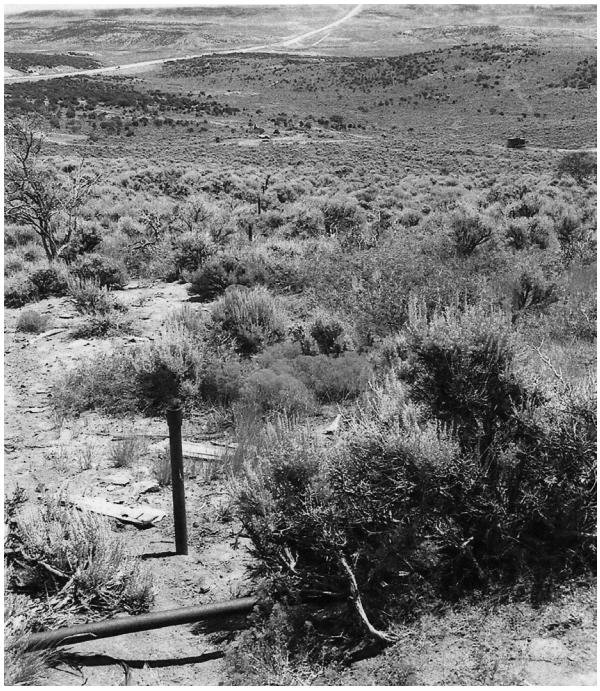


Figure 10: Row of cable supports connecting the McNaughton #9 well to the turntable for the central pumping facility.

McNaughton #10

Unlike the other wells, the well bore at McNaughton #10 (Figure 11) has a surrounding platform made of large wood planks (Figure 12). A few meters east of the mapped area, a row of cable support pins can be seen aligned in the direction of the central pumping facility turn-table. The first of these pins is visible (Figure 12) just behind the well bore which is the large circular pipe protruding from the plank platform. A similar array of cable supports was seen (Figure 10) in association with the McNaughton #9 well.

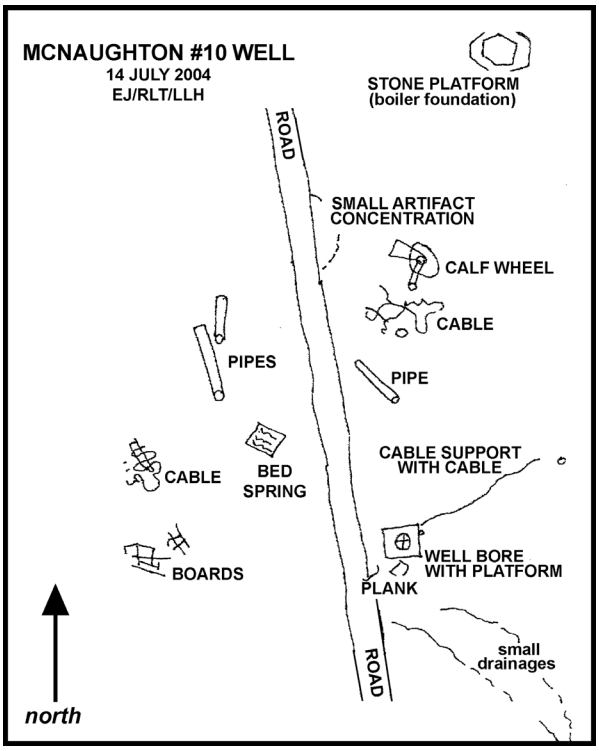


Figure 11: Detail sketch map of McNaughton #10 well.

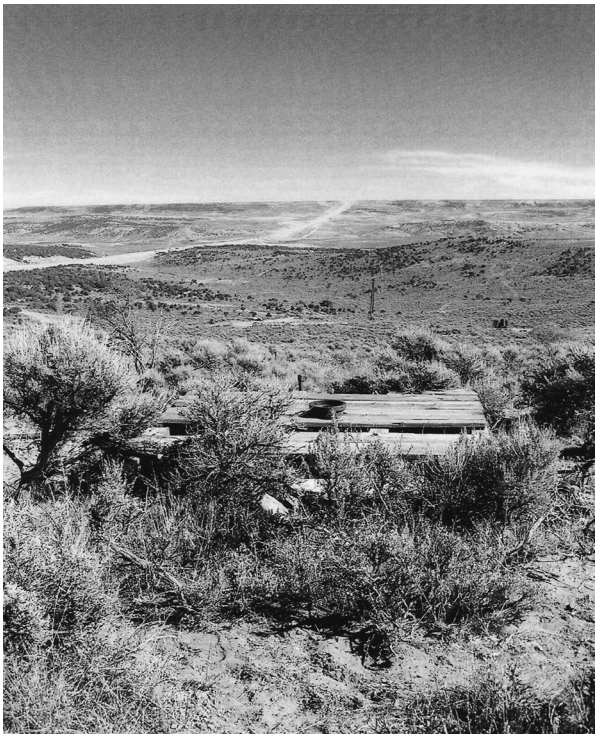


Figure 12: View east overlooking the McNaughton #10 well platform showing the open bore hole.

In the vicinity of the McNaughton #10 well, there are a number of pieces of two and four-inch pipe, pieces of cable and wood planks. Approximately 30 meters north of the well bore is a round wooden and steel assemblage known as a calf well which would have been used in the drilling operation.

About 50 meters north is a large stone platform (Figure 13), probably the support for a steam boiler. Behind this platform is a large circular wood apparatus, known as a bull wheel, which may have been used to drive a cable or other mechanism involved in well pumping. It is also conceivable this wheel, and the boiler platform, are instead the remains of some aspects of the initial well drilling unrelated to the central power facility. These issues are not fully understood without more extensive research into well production technology.

McNaughton #11

The well bore, which also serves as the mapping datum, is about three meters east of the access road. The McNaughton #11 (Figure 14) well does not appear to have been drilled from a prepared platform.

About 12-meters east of the well bore, there is a low depression one to two meters across surrounding a four-inch diameter pipe embedded in the ground. This pipe may be the water well mentioned in early newspaper accounts of spring 1908, cited in the historic overview above.

There are four anchor bolts remaining in the ground at various points around the McNaughton #11 well. These may indicate this well was one which produced oil for an extended period of time. Within 50-meters surrounding the well, there are pieces of pipe and pipe fittings (Figure 15), wooden boards and cable, as well as other small industrial artifacts such as nails, nuts and bolts.

In the area around McNaughton #11, there are artifacts associated with domestic activities including food cans and jars of various sizes, crockery shards and a terra cotta flower pot. Many of these items were noted in association with an apparent storage bin comprised of steel fence posts and a wire mesh fence about one by two meters size which seems to have served as a "trash bin." Domestic artifacts generally cluster along the west side of the road where apparent residential structures can be seen in the Stimson photograph (Figure 3).

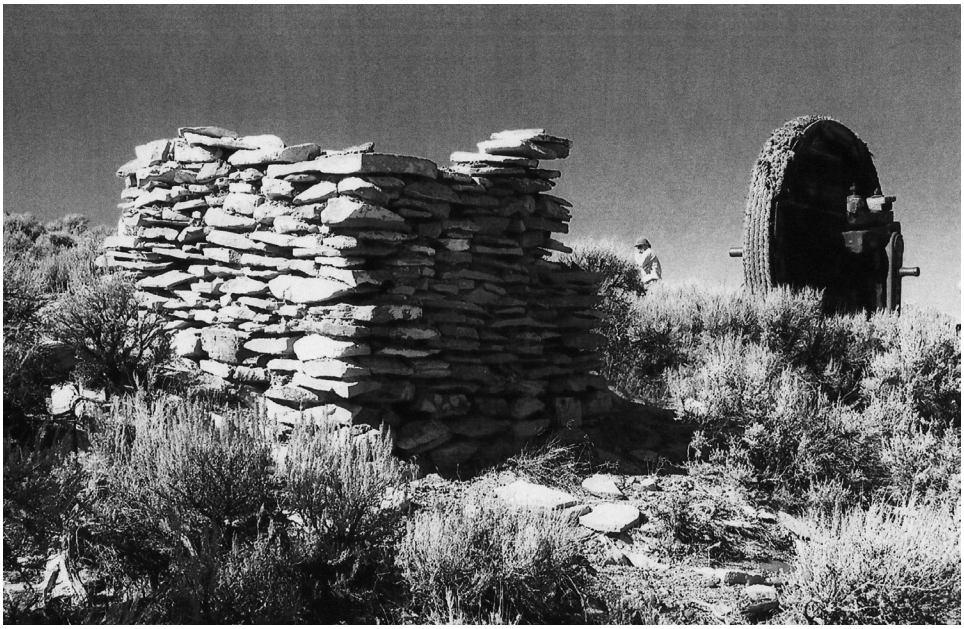


Figure 13: Stone platform possibly to support a steam boiler with a bull wheel shown in the background between the McNaughton #9 and #10 wells.

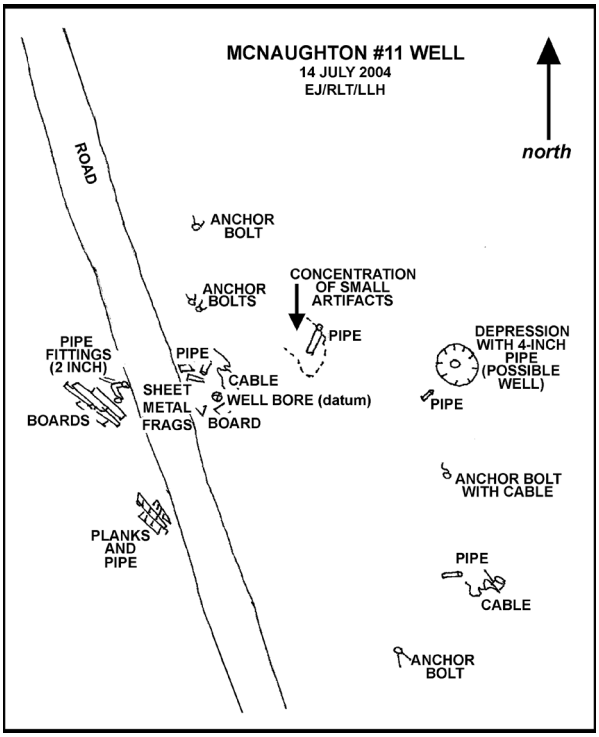


Figure 14: Detail sketch map of McNaughton #11 well.

Selby #1

The Selby #1 well (Figure 16) is situated east of a southerly extension of the access road (Figure 2). The mapping datum for this well location was set on the west side of the access road from the well bore.

The well was drilled from a platform constructed by fill material piled alongside the road and over the west side of a small drainage. Part of the fill is a buried condensate storage tank. The only artifacts in the area around the Selby #1 well are a two-inch length of pipe about three meters long, a one meter long timber plank, and an automobile hub cap which likely had no association with the well at all.

HISTORICAL CONCLUSIONS

Historical research and field inventory indicate five of the six orphan wells are historic and associated with some of the earliest and most successful petroleum production events in southwestern Wyoming. It seems these five wells (excluding Selby #1) were part of the most historic aspect of petroleum development in the greater Spring Valley area. These wells were among the earliest drilled and they can be traced with some degree of surety to historical photographs and documentary records.

The Selby #1 well was not part of this historic period having been drilled probably in the 1950s long after the historic period. This assumption is based on examination of artifacts associated with well drilling technology, discussion with petroleum engineers and the fact Selby #1 is not listed in Kern and Traut's tabulation. Little could be learned by historic research beyond the fact it seems to have been

Figure 15: Pipe, pipe fitting and boards near the McNaughton #11 well are typical of the industrial artifacts found in the Spring Valley Oil Field.

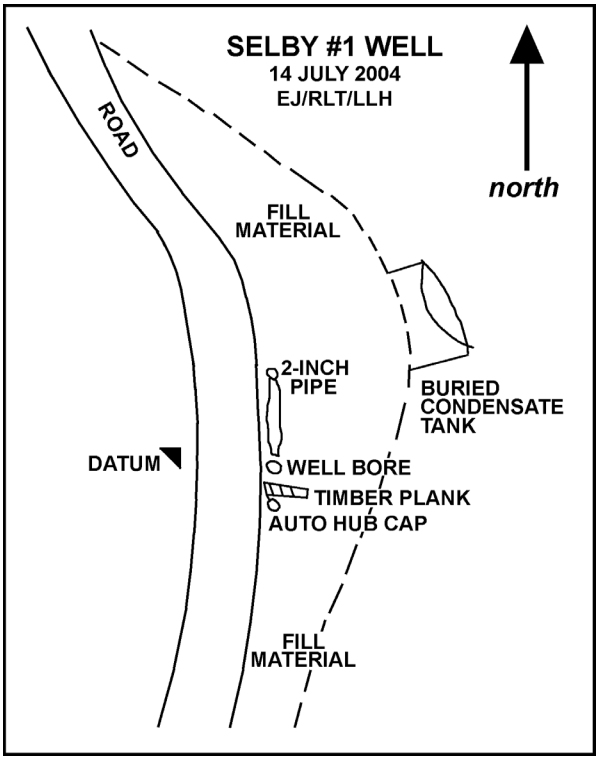


Figure 16: Detail sketch map of Selby #1 well.

drilled post-1950 and was of little consequence, possible not even producing sufficient oil to be deemed an economically productive well.

It is apparent the four McNaughton wells and Well #43 are the five wells in the J. E. Stimson photograph (Figure 3). The photograph appears to have been taken from an interfluvial ridge west of the wells, while looking northeasterly. The field of view of the photograph shows the highest ridge system along the horizon north of Well #43. This ridge is just north of Interstate 80. The northeasterly angle of the field of view also shows Bigelow Bench on the extreme easterly horizon behind what we are calling the McNaughton #11 well. The road shown in the photograph between the closest two wells would be the road in the well-specific maps, by which the wells are still accessed today.

It is the association between historic records, photographs and "on-the-ground" evidence in the form of historic features and artifacts which makes this portion of the greater Spring Valley Oil Field especially of interest in historical terms. The Stimson photograph (Figure 3) clearly shows four working cable tool derricks with the smoke stack from the boiler, and perhaps the top of the derrick of a fifth well all in a roughly "Y" shaped configuration on the landscape. The only place within the greater Spring Valley field where maps indicate this configuration is this project area. Thus, it is believed these five

wells are those shown in Stimson's historic photograph (Figure 3). Furthermore, the photo shows the full range of industrial and residential features described in the historic record gleaned from newspaper accounts and other sources and particularly well documented in Walter Jones' thesis.

NATIONAL REGISTER OF HISTORIC PLACES (NRHP) EVALUATION

According to guidance from the Keeper of the National Register of historic Places for a property to qualify for the National Register it must meet one of the National Register Criteria for Evaluation by:

* Being associated with an important historic context; and
* Retaining historic integrity of those features necessary to convey its significance.

Criterion A. (Properties) that are associated with events that have made a significant contribution to the broad patterns of our history….

Although the Spring Valley Oil Field was quite important in Wyoming and in the Rocky Mountain region at a point in time (e.g., circa 1900 to about 1930), it is not believed the field can be said to have contributed significantly to *the broad patterns of our history.* Rather, in terms of broad patterns, the Spring Valley Oil Field turned out to be a rather minor example of oil production when compared to many other fields in the region and nation. For instance, by comparison to the contemporaneous Salt Creek Oil Field in Natrona County, the number of wells drilled in the entire Spring Valley was about 100, while over 3000 wells were drilled at Salt Creek. Most importantly, while Spring Valley produced slightly fewer than 300,000 barrels of oil (Wyoming Oil and Gas Conservation Commission Webpage), the Salt Creek Field produced over 35 *million* barrels in a single year (1923) (Rosenberg 2003:8). While Spring Valley employed 20 to 40 men at any given time, "the overall field population [at Salt Creek] reached 9,500 people, all dependent on oil for their living" (Rosenberg 2003:9), and over the duration of its existence "over 50,000 people were tied economically in some way to the Salt Creek Oil Field by 1929" (Rosenberg 2003:10). Furthermore, there are many other oil fields similar to Spring Valley in Wyoming including Oregon Basin, Lance Creek, Buffalo Basin and others.

At this point, issues of integrity also become applicable. Integrity, according to the Keeper's guidance, should be defined by whether or not the property retains the identity for which it is significant. (NPS 1990:45) This is particularly relevant with regard to Spring Valley where, until the summer of 2004, a wooden derrick still stood on private land near the Spring Valley project area (Figure 17). This rig was lowered in order for the private owners to clean the well bore and otherwise service the rig. When the rig was lowered the main support timber split and the rig is no longer serviceable or safe to set up on this still functioning oil well. Unfortunately, this recent development further diminished the integrity of setting of the site, especially pursuant to eligibility Criterion A.

The unavoidable conclusion then must be the Spring Valley Oil Field does not rise to the level of significance to qualify for the National Register under Criteria A. Furthermore, Spring Valley is not one of those early fields mentioned in the historic overviews and chronology presented in the Wyoming State Historic Preservation Office oil industry context (Massey 1992). This is not to diminish

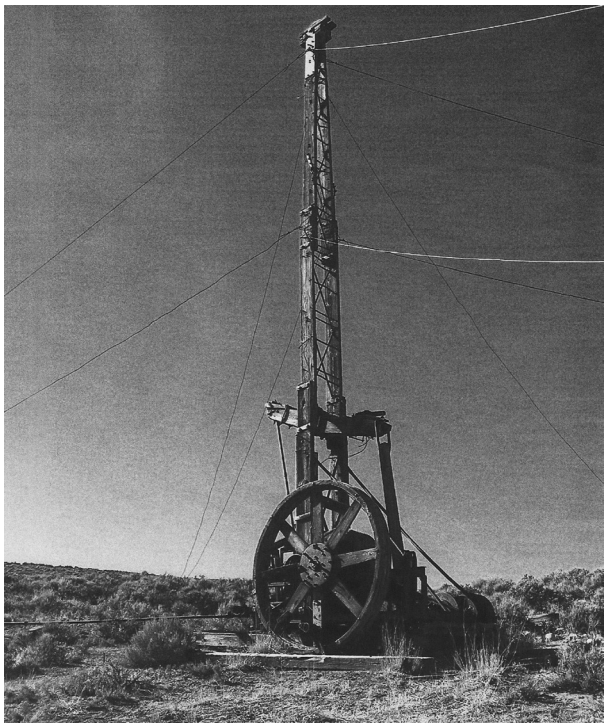


Figure 17: A wood drill rig on private land within the Spring Valley Oil Field was damaged in 2004 and is no longer part of the historic oilfield setting.

the local importance of Spring Valley so much as it is to put these issues into statewide perspective to make reasonable decisions relative to issues of significance.

Criterion B. (Properties) that are associated with the lives of persons significant in our past…. (NPS 1990:2)

None of the nationally or even regionally significant persons in petroleum industry history are known to have been associated with the Spring Valley Oil Field. The most prominent petroleum industry persons nationally would be men like John D. Rockefeller and Harry Sinclair (Johnson and Gardner 1992:4; Metz 1992:17). The most prominent persons in the early Wyoming petroleum were probably Cy Iba (Metz 1992:14), and perhaps Mark P. Shannon (Metz 1992:17). While it is likely most wealthy people in the Rocky Mountains invested in the region's petroleum prospects, none associated with Spring Valley are known to have become significant by their association with that field. Thus, the Spring Valley Oil Field does not qualify for the NRHP under Criterion B.

Criterion C. (Properties) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction…. (NPS 1990:2)

This criterion generally is associated with prominent architects and artists and architectural or artistic features; although at times important engineering sites could also qualify for inclusion in the Register under Criterion C. There are no indications in the historical or petroleum industry records of any aspects of the operations at Spring Valley being unique in any way. Rather, Spring Valley seems to have been a typical well field of the period. Therefore, Spring Valley does not qualify for the NRHP under Criterion C.

Criterion D. (Properties) that have yielded, or may be likely to yield, information important in prehistory or history. (NPS 1990:2)

Criterion D is appropriate because of the apparent association between historic documentation and archaeological features and artifacts. The Stimson photographs (Figure 3) show the early stages of operation, especially cable tool well drilling (the entire Stimson collection includes at least six photographs from Spring Valley). The historical record indicates a second phase of operations characterized by the change to a steam powered turntable cable drive apparatus (Figure 18) described in literature including newspaper and technical report accounts. Apparently this central apparatus would have driven a cable mechanism, evidenced by the rows of cable supports observed at several places in the site, to pump oil from the wells to storage tanks from which it was eventually pumped to the refinery. An evolution in technology is present at Spring Valley as recommended in the SHPO's "Oil Industry: Historic and Historic Archeological Context" (Massey 1992:23, 39 and 41-49). This historic archaeological information can be applied to comprehensive oil industry records concerning changes in production technology over time (e.g., Brantly 1971), to better understand oil production in the Rocky Mountains.

Many theoretical issues in archaeology involve the study and documentation of systems of industrial operations. Indeed, a relatively new field of specialization known as industrial archaeology has evolved in the past 30 years. One of the important aspects of both prehistoric and historic archaeology is the analysis of the interaction of people involved within a system or systems, e.g., systems theory.

A special slant historical archaeology brings to this study is the recognition of industrial systems as concrete subjects which can be studied by looking at the physical traces (artifacts and features) of systems and how human behavior is affected both by being a part of the *system*, and in many cases, by a response to influences from external systems. At Spring Valley, we have several aspects or subsystems represented, including the road system and the cable drive system (Figure 19). These systems can be analyzed as they relate to behavioral components such as residential occupation of the site and relationships among differing ethnic groups. Did the Chinese cook really dish up *chop suey* for the Anglo workforce as inferred by the newspaper account (*The Wyoming Press* 1908)? The historical record and photographs indicate workers lived at the site in close proximity to the industrial operations, so questions about worker safety and economic

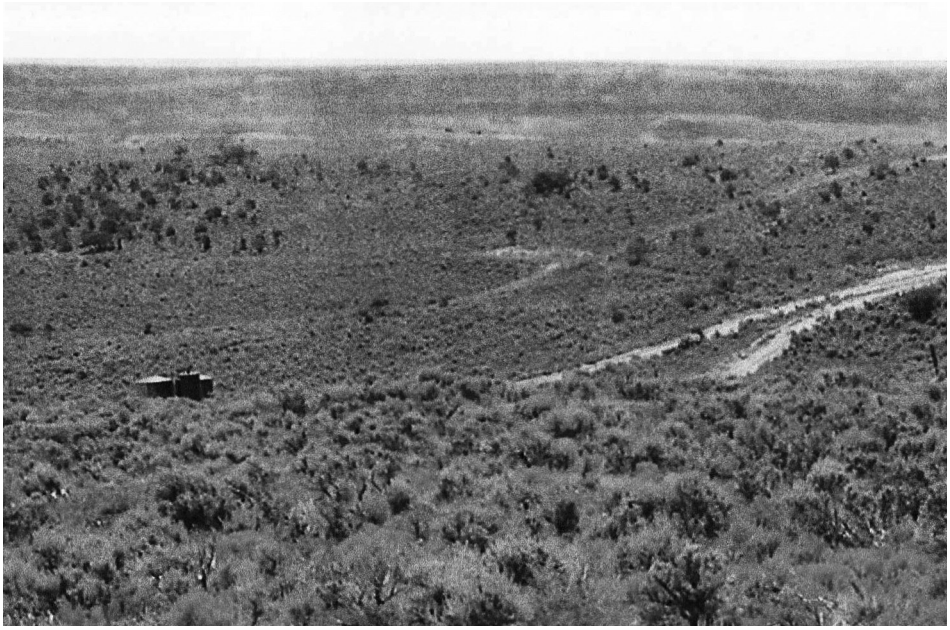
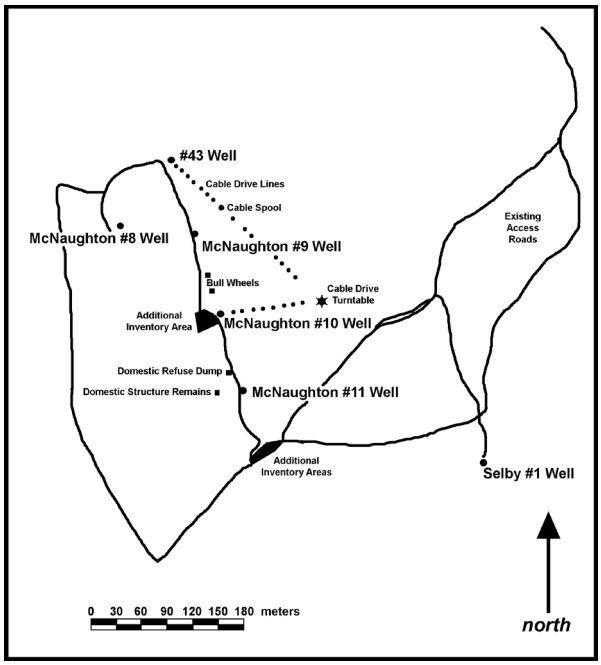


Figure 18: The turntable mechanism used in the cable drive pumping system in the Spring Valley Oil Field.

status can be studied. The archaeological record at Spring Valley might yield information about special engineering issues including the documentation of the conjectural pumping system.

Spring Valley might also provide the opportunity to study social issues beyond those internal within the region, such as comparison of oil field workers to railroad workers and coal miners. A. D. Gardner and others have examined ethnic issues at the Evanston Chinatown, and at other railroad and mining communities such as Hampton and Almy.



Fiogure 19: Schematic Map of the Spring Valley Oil Field showing some of the systems and features in the site which could be further studied.

In summary, while Spring Valley may not qualify for inclusion in the National Register of Historic Places under Criteria A, B or C for both significance and integrity reasons, the oil field certainly qualifies under Criterion D. Spring Valley offers a array of artifacts and features with sufficient integrity of location, design, association and materials to allow study of the interactions of various components. These include the opportunity to look into the systematics of the site from which we can learn many things about both lifeways, and industrial technology (e.g., what Massey calls *technocentrism*) (Massey 1992:41) in the early Twentieth Century petroleum industry. These are precisely the issues outlined for consideration by Massey in the Wyoming State Historic Preservation Office historic oil industry context (Massey 1992:41-49). The wealth of supporting historical records, illuminating historical photographs and archaeological evidence afford scholars the opportunity to answer relevant research questions.

ISSUES OF INTEGRITY

> *Integrity is the ability of a property to convey its significance. To be listed in the National Register of Historic Places, a property must not only be shown to be significant under the National Register criteria, but it also must have integrity The evaluation of integrity is sometimes a subjective judgment, but it must always be grounded in an understanding of a property's physical features and how they relate to its significance.* (NPS 1990:44*)*

Location is the place where the historic property was constructed or the place where the historic event occurred. (NPS 1990:44)

The Spring Valley Oil Field retains integrity of location because the essential physical features remain in place where they were originally constructed and can be associated with historic records and photographs.

Design is the combination of elements that create the form, plan, space, structure, and style of a property. (NPS 1990:44)

The Spring Valley field retains the design elements of use of space and structure sufficiently so that the configuration of well locations and other features can be studied relative to Criterion D. The site offers a systematic array of artifacts and features sufficiently in place to allow further study of the working interactions of various components.

Setting is the physical environment of a historic property. (NPS 1990:45)

Setting refers to the character of the place in which the property played its historic role. Although, most of the structures at Spring Valley are now in the form of relict archaeological features, the character of the place remains intact. These artifacts and features are especially relevant to eligibility under Criterion D. The site offers a systematic array of artifacts and features sufficiently in place to allow further study of the working interactions of various components.

Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property. (NPS 1990:45)

The integrity of materials at the Spring Valley Oil Field is exceedingly good. All physical elements are still generally in place. The degree of integrity of materials can easily be associated with the historical records and photographs. The site offers a systematic array of artifacts and features sufficiently in place to allow further study of the working interactions of various components.

Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory. (NPS 1990:45)

Although somewhat diminished by subsequent activities, most also associated with petroleum production, much of the integrity of workmanship remains in place. Integrity of workmanship usually refers to artistic or architectural elements but can also "be expressed in vernacular methods of construction" (NPS 1990:45) which are exemplified at Spring Valley. The site offers a systematic array of artifacts and features sufficiently in place to allow further study of the working interactions of various components.

Feeling is a property's expression of the aesthetic or historic sense of a particular period of time. (NPS 1990:45)

Spring Valley retains some of the feeling it would have had during its most historic period of operation. This is especially the case because there are still producing oil wells within sight of the historic features comprising the essential physical features of its historic nature.

Association is the direct link between an important historic event or person and a historic property. (NPS 1990:45)

For the purposes of Criterion D, the association between historic photographs and records and the extant features at Spring Valley remains readily apparent. Furthermore, many of the issues of scientific importance relevant for consideration under Criterion D are present and may be examined, compared and contrasted with historic accounts. The site offers a systematic array of artifacts and features sufficiently in place to allow further study of the working interactions of various components.

EVALUATION OF POTENTIAL EFFECTS

Discussion among BLM petroleum engineers, surface protection specialists and cultural resources staff indicates the six well bores could be easily be plugged by driving a cement truck, accompanied by two one-ton equipment trucks, to the well locations using existing upgraded roads in the well field. Once on location, a shallow hole approximately one-meter square would be dug to capture any fluids escaping from the well bore as it is pumped full of concrete. All well bores can be accessed without causing any damage to historic well field features and artifacts which comprise the National Register qualities of the site. Therefore, the proposed undertaking will have no adverse effect on any National Register qualities of the historic Spring Valley Oil Field. The stipulation for the plugging operation to be monitored by a BLM archaeologist will insure the operation takes place according to this plan, without adverse effects on the property. Furthermore, this process of plugging is simply the final phase in the life of an oil well. Thus, plugging can be viewed as the long delayed end of this historic era.

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BOOK REVIEWS

Hell Gap; A Stratified Paleoindian Campsite at the Edge of the Rockies, edited by Mary Lou Larson, Marcel Kornfeld and George C. Frison. The University of Utah Press, Salt Lake City, Utah. 444 pp., Preface, figures, tables, acknowledgements, appendices, contributors, index. $60.00 (cloth, ISBN 978-0-87480-943-5)

One of George Frison's parting thoughts in his 1991 edition of *Prehistoric Hunters of the High Plains* was the need for more and better data to address relationships among the Paleoindian Clovis, Goshen, and Folsom complexes. Radiocarbon dates from the then recently investigated Mill Iron site in southeast Montana only added to the confusion surrounding these relationships. Frison believed the best bet for their resolution lay in a reinvestigation of Hell Gap, a stratified Paleoindian site in southeast Wyoming. First studied from 1959 through 1966, Hell Gap yielded substantial collections and records but only a few summary publications. Thanks to Frison and a cadre of professionals in various disciplines, dedicated students and volunteers, and the staff archaeologists at the University of Wyoming, previous work at this remarkable site has been reexamined and the results published in this much-anticipated volume.

With 20 contributors and as many chapters organized into three parts, this volume has something for everyone. Like a good buffet, there are appetizers, gourmet entrees and irresistible desserts. Excellent editing by Larson, Kornfeld and Frison produced a menu that is easy to follow and ensures the selections are compatible. It is suitable for professionals and students as well as old-timers like me who haven't followed Paleoindian studies closely for some years. Two chapters and three appendices are devoted to the site's discovery and investigation, providing a solid historical background and context for the dizzying detail to come. Geochronology, paleoenvironment and climate change are the primary topics in six chapters and four appendices while two more chapters and part of a third are devoted to Zooarchaeology. Those interested in stone tool technology, typology and a variety of lithic studies will find much to engage them in eight chapters and three appendices. An excellent chapter on site formation and technological organization helps us understand the complex stratigraphy at Hell Gap. The final chapter effectively integrates conclusions from the diverse technical studies into a framework based on stratigraphy, chronology and paleoenvironment. However, be forewarned, you can't simply read the conclusion in this book and expect to leave the table sated; every chapter offers an interesting new flavor or texture and must be fully digested.

Many contributors provide background information to help us understand the methods, techniques and vocabulary used in a specific study. For example, we learn how soils studies can elucidate environmental changes at archaeological sites and how soil micromorphology can provide a line of evidence for buried surfaces, hearths and other cultural activity. Different approaches to stone tool microwear analysis are described as nested within one another for best outcomes. Several contributors highlight methodological issues that must be confronted if a faunal assemblage is to reveal Paleoindian hunting practices and on-site processing activities. Even if you already understand the inner workings and hidden mechanisms of all the disciplines represented in this volume, you won't want to miss the occasional theoretical and methodological debates like those surrounding the interpretation of phytolith assemblages or the environmental interpretation of sodium deposits. You will also want to learn how these authors made sense of 50-year-old data and collections (some of them unprocessed and in original field bags). Simply gathering the data from the many places it had been scattered required a tremendous effort.

All of the volume's contributors clearly understood the challenges of sorting out masses of data collected a half century ago by several investigators. For the most part, confusion resulting from different systems of field reporting was successfully

resolved. Problems involving original collection protocols, lost or unprovenienced items, improperly treated field specimens and confused stratigraphy were resolved to the extent possible or disclosed as having no resolution. Contributors expended a great deal of effort to ensure associations among field specimens and their stratigraphic context was sound. Their efforts included additional fieldwork at the localities examined in the 60s as well as application of methods and techniques to enhance confidence in the associations among artifacts (e.g., lithic refits and minimal analytical nodule analysis). Given the amount of data and the site's complexity, it's no wonder the reexamination of Hell Gap was a 15-year effort by many dedicated professionals and volunteers. This massive undertaking has yielded significant new insights into technological organization, subsistence and the environment between 11,000 BP and 7500 BP and provided the information necessary to ensure future investigations are even more fruitful.

For me, the *pieces de resistance* in this volume is the history of archaeological investigations at Hell Gap. Keenly interested in Paleoindian archaeology, I was well aware of this site when I walked into Henry Irwin's office for the first time as a graduate student in 1970. Henry and I discussed my teaching assistant's duties while I gawked at rows of labeled boxes on shelves located just below the ceiling. He paused to tell me the containers were filled with artifacts from Hell Gap and chatted about his work as one of the principal investigators there and at other Paleoindian sites. As detailed in the present volume, Henry, the other early Hell Gap investigators and their students were working at Paleoindian sites over much of the West with very little funding. I'm amazed at the amount of work accomplished by so few with so little during this period. If the 50s and 60s were the golden age of plains Paleoindian studies, the renaissance began the following decade when Frison and others successfully garnered funding and expanded interdisciplinary studies at many sites. This generation not only included veterans of the 60s but also a rapidly expanding group of students with talent, energy and enthusiasm; many of them are now in the vanguard of Paleoindian research. Implicit in the Hell Gap volume is the contrast between the archaeology of the 60s and that employed in the site's reinvestigation. The book clearly demonstrates the evolution of archaeology, its ancillary disciplines and related technologies during the last half century.

Ironically, the issue that sparked Frison's interest in returning to Hell Gap has yet to be resolved; Clovis, Goshen and Folsom relationships are as confused as they were in the early 90s. The good news is that much of the site is still intact, including the witness block in the locality that yielded Goshen and Folsom materials. Equally important, the site's protection is guaranteed as is its availability for future research. Thanks to Frison's leadership, the site was acquired from generous landowners with the help of WAS members, the Wyoming Archaeological Foundation and George C. Frison Institute. These individuals and organizations must be credited with conserving and helping reveal the secrets of one of the most important archaeological properties in the western hemisphere, the only stratified site with continuous deposits containing all Paleoindian complexes with the possible exception of Clovis.

I'm reserving a place in my library for future volumes that report the results of post-60s studies at Hell Gap. This world-class site might yet shed some light on those Clovis, Goshen and Folsom relationships. If you are at all interested in Paleoindian studies, you'll want the current volume on your bookshelf. With apologies for overworking the gastronomic metaphor, I wish you *bon appetite.*

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Great Falls, Montana 59404

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In the spring of 1960, the Wyoming Archaeological Society (WAS) inaugurated an award program for Anthropology students at the University of Wyoming. Dr. George Duke Humphrey, President of the University at the time, wrote the society a letter praising them for providing the first support offered at the University for work in the field of Anthropology (*The Wyoming Archaeologist*, Volume III, No. IV, April 1960, page 11). The WAS support became known as the William Mulloy scholarship, and in the ensuing years it has benefitted scores of students, bringing a total of over $14,000 to its recipients. Currently, it is provided each year to a deserving undergraduate major.

Traditionally, the WAS awards committee gives $500 to the undergraduate of their choice. However, next year, 2010, will be the 50th anniversary of the William Mulloy scholarship program. The committee would like to offer members of WAS and former recipients of the Mulloy funding to contribute toward a special scholarship for the 50th anniversary recipient. We hope to provide at least $1,000 in support if not more, and WAS can cover $500 of that amount. If we receive more than $500 in contributions, we may increase the 2010 scholarship even more, and use the funding reserves for offering $1,000 per award in future years until the contributions run out. Please consider this opportunity to support our students and recognize the enduring legacy of Dr. William Mulloy in Wyoming Archaeology by contributing to the **William Mulloy Undergraduate Scholarship**.

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