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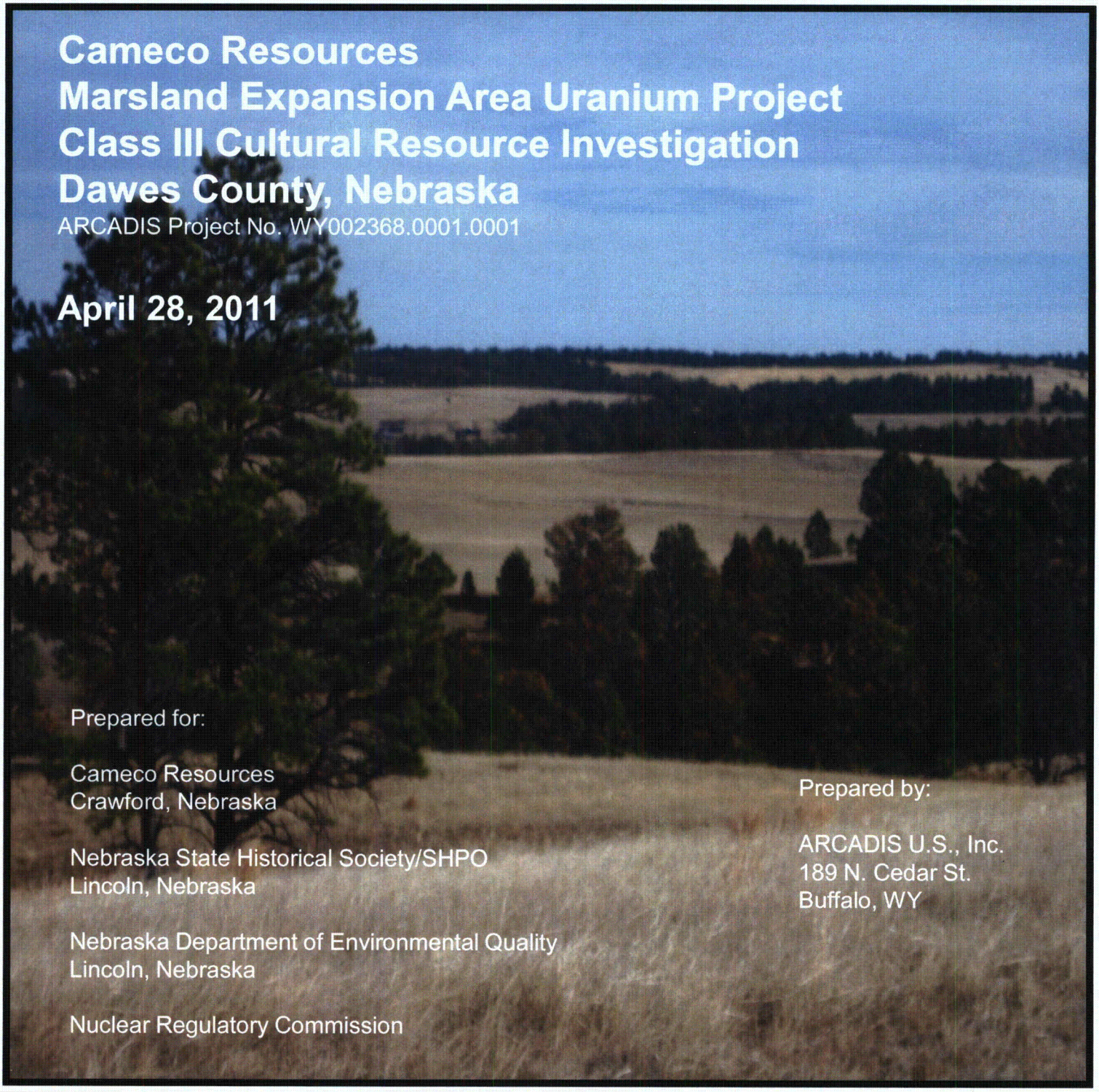
10 CFR §2.390 (b)(1)(i) Confidential Information has been redacted.



Cameco Resources
Marsland Expansion Area Uranium Project
Class III Cultural Resource Investigation
Dawes County, Nebraska

ARCADIS Project No. WY002368.0001.0001

April 28, 2011

Prepared for:

Cameco Resources
Crawford, Nebraska

Nebraska State Historical Society/SHPO
Lincoln, Nebraska

Nebraska Department of Environmental Quality
Lincoln, Nebraska

Nuclear Regulatory Commission

Prepared by:

ARCADIS U.S., Inc.
189 N. Cedar St.
Buffalo, WY

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ARCADIS

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Field Director
Project Archaeologist

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Certified Project Manager
Principal Investigator

This investigation was carried out in accordance with policies and regulations implementing Section 106 of the National Historic Preservation Act of 1966 (Public Law 89-665). The cultural resource inventory was undertaken to locate, identify, and document cultural resources that might be affected within the APE of the proposed undertaking, and to provide recommendations of eligibility to the National Register of Historic Places (NRHP) as specified in Title 36 of Codes of Federal Regulations (36 CFR 60.4). NRHP eligibility is evaluated in terms of the integrity of the resource, and: (a) its association with significant events, or patterns in history or prehistory; (b) its association with the specific contributions of individuals significant in our past; (c) its engineering, artistic, or architectural values; or (d) its information potential for important research questions in history or prehistory (National Park Service 1998). The implementing regulations of Section 106 state that, "The goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties" (36 CFR 800.1b). Therefore, the management recommendations made by ARCADIS archaeologists focus primarily on the potential of the undertaking to pose an adverse effect to historic properties, as defined in 36 CFR 800.5.

This report was prepared to conform with the Nebraska State Historical Society Format, Guidelines, and Standards for Cultural Survey Reports.

Marsland Expansion Area Uranium Project, Class III Cultural Resource Inventory

Planning and Permitting

Prepared for:
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Authors:
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Date:
April 28, 2011

II. Abstract

A. Project Type

Cameco Resources contracted ARCADIS U.S., Inc to complete a cultural resource inventory and report for the proposed Marsland Expansion Area Uranium Project in Dawes County, Nebraska. Cameco Resources is preparing a Nuclear Regulatory Commission (NRC) License Amendment Application to allow in-situ uranium mining at its Marsland Expansion Area site. A cultural survey and resulting report, then, is needed to comply with NRC NUREG-1569 Section 2.4 requirements; Nebraska Department of Environmental Quality, Title 122, Chapter 11 Sections 006.07 (determination of whether the facility is located on Indian lands, historic and/or archaeological sites); and the Nebraska State Historic Preservation Office National Historic Preservation Act Archeological Properties Section 106 Guidelines.

B. Investigation Type

ARCADIS' Buffalo office conducted the 100 percent pedestrian block inventory during the period of November 18, 2010 to February 20, 2011, covering a total of 4,500 acres.

C. Project Location

The Marsland Expansion Area Uranium Project is located in the northern Nebraska Panhandle roughly 10 to 12 miles south of Crawford, Nebraska. The region is generally characterized as Pine Ridge country, but the site itself actually lies just south of the Pine Ridge escarpment, north of the Niobrara River, and over 30 miles northwest of the famous Nebraska Sand Hills.

D. Summary of Results

ARCADIS recorded 15 newly discovered historic sites and five historic isolated finds within the project area. Newly recorded historic sites include six home/farmsteads (25DW359, 25DW360, 25DW361, 25DW365, 25DW366, 25DW370) three debris scatters (25DW357, 25DW363, 25DW369), two cisterns (25DW358, 25DW364), one corral (25DW367), one bridge (25DW362), one dugout (25DW368), and one quarry (25DW371). ARCADIS updated two previously recorded historic sites within the project area that includes two home/farmsteads (25DW00-242, 25DW00-243). ARCADIS recommends all sites in the MEAUP not eligible for listing on the NRHP, thus no further work such as monitoring construction activities is recommended. ARCADIS does recommend avoiding historic homestead site's 25DW00-242 and 25DW00-243. Due to the unknown occupancy status of homestead site 25DW00-242 and good condition of features recorded at this site, ARCADIS recommends Cameco Resources avoid all construction activities within 200 feet of the site boundary. Historic homestead site 25DW00-243 has numerous features and associated artifacts that, with further research beyond the scope of this undertaking, would reveal more complex and in-depth temporal contexts and spatial extents to provide meaningful data that would address more important research questions. ARCADIS recommends Cameco Resources avoid all construction activities within 200 feet of the 25DW00-243 site boundary. Given these results and management practices, ARCADIS recommends a finding of **no adverse affect to historic properties for construction of the proposed Cameco Resources Marsland Expansion Area Uranium Project**.

Figures

Tables

Attachments

IV. Undertaking

A. Project Description

Cameco Resources (CR) contracted ARCADIS U.S., Inc. (ARCADIS) to complete a cultural resource inventory and report for the proposed Marsland Expansion Area Uranium Project (MEAUP) in Dawes County, Nebraska (**Figures 1 through 6**). The project area can be found on the Box Butte Reservoir West 1974 (42103d2), Marsland 1983 (42103d3), Coffee Mill Butte SW 1980 (42103e2), and Belmont 1980 (42103e3) USGS 7.5' topographic quadrangles (**Figure 7**). The project area encompasses 4,500 acres within Sections 26 and 35, T30N R51W; Sections 1, 2, 12, and 13, T29N R51W; and Sections 7, 18, 19, 20, 29, and 30, T29N R50W. The surface lands and minerals within the project area are privately owned. CR is preparing a Nuclear Regulatory Commission (NRC) License Amendment Application to allow in-situ uranium mining at its Marsland Expansion Area site. A cultural survey and resulting report, then, is needed to comply with NRC NUREG-1569 Section 2.4 requirements; Nebraska Department of Environmental Quality, Title 122, Chapter 11 Sections 006.07 (determination of whether the facility is located on Indian lands, historic and/or archaeological sites); and the Nebraska State Historic Preservation Office (SHPO) National Historic Preservation Act Archeological Properties Section 106 Guidelines. The proposed undertaking consists of in-situ uranium mining and related activities for 4,500 acres at the Marsland Expansion of the Crow Butte Mine (**Table 1**).

B. Anticipated Disturbance

Table 1. Anticipated Disturbance.

"The Crow Butte operation uses the in situ recovery (ISR) mining method. ISR mining produces no waste rock or tailings and results in minimal disturbance to the surface and underground areas mined. Uranium at Crow Butte occurs in sandstone aquifers as coatings on sand grains at up to 300 meters underground. Uranium is removed using a grid of injection and production wells. The uranium is insoluble in the native groundwater. Small amounts of oxygen and bicarbonate (baking soda) are added to the injection stream to dissolve the uranium. The uranium solution, less than 1/10 of 1% uranium, is then pumped from a production well to a satellite facility where the uranium is transferred to ion exchange resin beads similar to the sand from which it was extracted. The uranium-bearing resin is then pumped to a processing plant where it is removed from the beads, precipitated and dried to become the final product, yellowcake. This is essentially a closed-loop recirculation system. Water from the production wells is reintroduced in the injection wells. Slightly less water is injected than withdrawn to ensure the fluids are confined to the ore zones intended for extraction. Monitor wells are installed to allow testing of groundwater quality above, below and around the target zones to ensure fluids do not move outside those areas (Cameco Corp. 2011)."

C. APE

ARCADIS has defined the area of potential effect (APE) as the 4,500 acres comprising the area included in the NRC License Amendment Application. According to 36 CFR 800.16(d), the area of potential effects (APE) is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The APE is influenced by the geographic area, the scale and nature of the undertaking, and the effects (physical, visual, auditory, atmospheric). In defining the APE of the current undertaking, direct physical effects on 4,500 acres is

considered. No visual, auditory, or atmospheric effects to cultural resources are known outside the application area, and therefore the final proposed APE is 4,500 acres.

Understanding that the APE is dynamic, the federal agency, in consultation with the SHPO will establish the final APE in the event minor changes are made to the project, alternate historic routes or Traditional Cultural Properties areas are discovered, socio-cultural effects are re-considered, effects on culturally sensitive natural resources emerge, or indirect or secondary effects (erosion, public use) are determined. ARCADIS has defined the APE described above based on the best information available in regards to proposed impacts of the MEAUP, and the best available data for archaeological and historic property locations at the time of the writing of this report.

D. Survey Acreage

The entire APE, 4,500 acres, was 100 percent pedestrian block inventoried for the MEAUP. ARCADIS' Buffalo, Wyoming Office conducted the survey during the period of November 18, 2010 to February 20, 2011 expending roughly 1,000 person hours.

E. Overview Photographs

Figure 1. Project overview in Section 29 T29N R50W, facing south. Photograph taken by A. Graves, on 11/18/2010.

Figure 2. Project overview in Section 26 T30N R51W, facing west. Photograph taken by A. Graves, on 11/20/2010.

Figure 3. Project overview in Section 26 T30N R51W, facing south. Photograph taken by A. Graves, on 11/20/2010.

Figure 4. Project overview in Section 35 T30N R51W, facing south. Photograph taken by N. Graves, on 12/02/2010.

Figure 5. Project overview in Section 2 T29N R51W, facing northeast. Photograph taken by A. Howder on 12/03/2010.

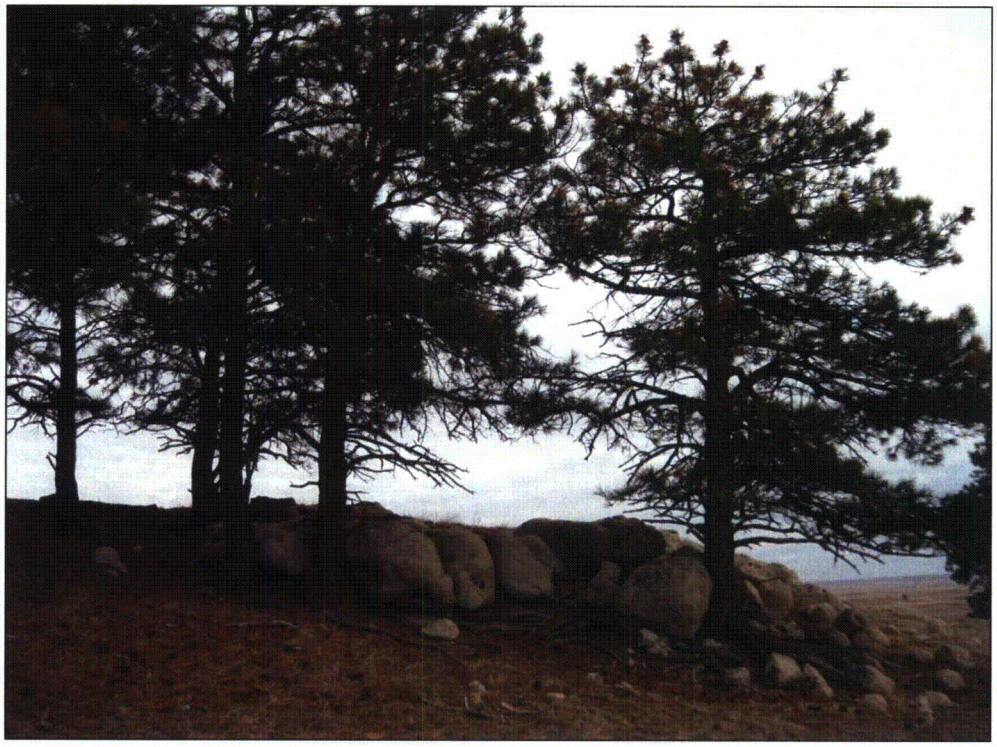

Figure 6. Project overview in Section 1 T29N R51W, facing southeast. Photograph taken by A. Howder on 12/04/2010.

F. Topographic Map

V. Environmental Setting

A. Present Environment

1. General Topographic Features

The MEAUP is located in the northern Nebraska Panhandle roughly 10 to 12 miles south of Crawford, Nebraska and five miles northeast of Marsland, Nebraska. This portion of the Nebraska Panhandle is dominated topographically by the Pine Ridge escarpment, a rugged, stony region of forested buttes and deep canyons that divides the High Plains to the south from the Missouri Plateau to the north. The project area straddles the southernmost boundary of the Pine Ridge escarpment and another distinct topographic region to the south, the Dawes Table lands. Taken together, these regions form a unique local mosaic of topography, geology, and habitat within the project area.

2. Project Area

a. Topography

The Pine Ridge escarpment covers more than one thousand square miles across far eastern Wyoming, northern Nebraska and extreme southern South Dakota (Nebraska State Historical Society 2000). It is a ridge of steeply-eroded bluffs, ravines, badlands, and low hills with biotic communities that more closely resemble those of the Black Hills region nearly 100 miles north in South Dakota (Mellor 1916, Nebraska State Historical Society 2000). The Pine Ridge is a pine-dominated western forest within the grassland-dominated High Plains (Nebraska Legacy Project). The escarpment is composed of sandstone, siltstone, and volcanic ash (Nebraska Legacy Project).

The Dawes Table is a relatively flat plain south of the Pine Ridge. As the high table landscape approaches the Niobrara, it is smoothed into rolling hills cut by broad drainages (Mellor 1916). Local deposits of dune sand are found north of the Niobrara (Mellor 1916). The soil of the Dawes Table is very uniform and residual in origin, deriving from the underlying Arikaree formation (Mellor 1916).

b. Hydrology

The main water sources of the Pine Ridge are a small system of streams, including White River, Hat Creek, and Soldier Creek, that support deciduous woodlands and meadows in their floodplains (Nebraska Legacy Project). The Dawes Table is dissected by steep, narrow tributaries that drain southward and eastward into the Niobrara River (Mellor 1916).

Surface water within the cultural study area derives principally from rain and snow. Center-pivot irrigation brings water to the surface in the central portion of the MEAUP.

c. Geology

Sedimentary strata ranging from late Cretaceous through Tertiary age was exposed throughout the project area. The Pierre Shale of Late Cretaceous age is the oldest formation in the region. The Pierre is a widespread dark gray to black marine shale, with relatively uniform composition throughout. The Pierre outcrops extensively in Dawes County north of the project area, but disturbed areas within the MEAUP

revealed these materials. The Pierre Shale is the confining bed below the Basal Chadron Sandstone member which is the host for uranium mineralization

The White River Group is Oligocene in age and consists of the Chadron and Brule Formations. The Chadron is the oldest Tertiary Formation of record in northwest Nebraska. It lies with marked unconformity on top of the Pierre Shale. Regionally, the vertical thickness of the Chadron Formation varies greatly. This is attributed to the extreme variability of the Basal Sand unit of this formation. The Chadron Formation is comprised of three distinct members: the Basal Sandstone Member, the depositional product of a large, vigorous braided stream system which occurred during early Oligocene; the Middle Chadron Member, a distinct and rapid facies change from the underlying Basal Sandstone consisting of brick red clay; and the Upper Chadron Member, a sequence of massive claystones and siltstones ranging in color from a dark blue-green to greenish-brown generally considered fluvial channel and flood plain deposits.

The Brule Formation lies conformably on top of the Chadron Formation and, combined with the Chadron, comprise the White River Group. The Brule outcrops throughout the main ore trend. It is made up almost entirely of siltstones with minor sand channels. The contact between the Upper Chadron Member and the overlying Brule Formation is a gradational one. The Brule Formation can generally be identified by its buff to medium brown color in contrast to the greens of the underlying Chadron.

The Arikaree Group overlies the Brule Formation and outcrops are present across the MEAUP. The Gering Formation is Oligocene in age (Souders 1981) and lies unconformably on the Brule Formation. The Gering is predominantly buff to brown, fine grained sandstones and siltstones. The Monroe Creek Formation is Miocene in age and overlies the Gering Formation. The Monroe Creek is lithologically similar to the Gering with buff to brown, fine grained sandstone. The unique characteristic of the Monroe Creek is the presence of large "pipy" concretions. The Harrison Formation is the youngest member of the Arikaree Group. It is described as lithologically similar to the Gering and Monroe Creek Formations, with fine grained unconsolidated buff to light gray sands, and noted for its abundance of fossil remains (Witzel 1974:55).

Quaternary alluvial and colluvial material are present in the permit area ranging in depth from 0 to 40 feet. The material consists of Oligocene/Miocene rock fragments, silt, sand and gravel.

d. Soils

Sediments in the project area consist primarily of silt loam or clay loam over fine sandy loams, with depths and stratigraphy varying, due to topography, across the project area. The predominant soil type in the northern portion of the project area consist of several Alliance silt loam soil types located across the upland high plains and hill slopes that are deep, well-drained, sediments that consist of silt loam and/or silt clay loams overlying very fine sandy loam to approximately 60 inches below surface (NRCS http://websoilsurvey.nrcs.usda.gov).

Predominant sediments spanning the northern and central portion of the project area (Sections 26 and 35 T30N R51W and Sections 1 N½, 2 N½ T29N R51W) consist of the Oglala-Canyon loam, Rosebud Canyon loam, and Canyon soil types (NRCS http://websoilsurvey.nrcs.usda.gov). The Oglala-Canyon loam soil type is located across the upland hill slopes and ridges and is derived from loamy residuum weathered from soft fine-grained sandstone. These shallow, well drained, sediments consist of loam or very fine sandy loam overlying weathered bedrock typically occurring by 14 to 24 inches below surface. The Rosebud Canyon loam soil type is located across the hill slopes and ridges and is derived from loess over weakly cemented

fine-grained sandstone. These shallow sediments consist of loam or very fine sandy loam overlying weathered bedrock typically occurring by 14 inches below surface. The Canyon soil type is located along the steep dissected drainages and are shallow, well-drained, sediments that consist of loam over very fine sandy loam overlying weathered bedrock typically occurring by 15 inches below surface.

Predominant soil types in the central portion of the project area (Sections 1 N½, 2 SE¼, 11, 12, 13 T29N R51W and Sections 7, 18 N½ T29N R50W) consist of the Bridget silt loam, several Busher loamy very fine sandy soils, and the Tassell soil types (NRCS http://websoilsurvey.nrcs.usda.gov). The Bridget silt loam soil type is located across the hill slopes above the large drainage systems and are deep, well-drained, sediments that consist of silt loam overlying very fine sandy loam to approximately 60 inches below surface. There are several Busher loamy very fine sand soil types across the upland hill slopes that consist of loamy very fine sand overlying weathered bedrock by approximately 44 inches below surface. The Tassell soil type is located across the ridges and is derived from residuum weathered from calcareous sandstone. These shallow, well-drained, sediments consist of loamy very fine sand and fine sandy loam overlying weathered bedrock by approximately 18 inches below surface.

Predominant soil types in the southern portion of the project area (Sections 18 S½, 19, 20, 29, and 30 T29N R50W) consist of the Valent and Dwyer loamy fine sands, Bankard loamy coarse sand, Vetal and Bayard, and Busher loamy very fine sands soil types (NRCS http://websoilsurvey.nrcs.usda.gov). There are two Valent and Dwyer loamy fine sands located across the agricultural lowlands and defined as eolian sand hummocks or eolian sand dunes. These deep, well-drained, sediments consist of loamy fine sand overlying fine sand or loamy sand to approximately 60 inches below surface. The Bankard loamy coarse sand soil type is located across the frequently flooded floodplains along the drainage ways characterized as sandy alluvium or sandy lowland sediments. These deep sediments consist of loamy coarse sand over stratified loamy fine sand and gravelly coarse sand to approximately 60 inches below surface. The Vetal and Bayard soils are relocated along the stream terraces and are derived from loamy alluvium over eolian deposits. These deep sediments consist of fine sandy loam over sandy loam to approximately 60 inches below surface. There are several Busher loamy very fine sands soil types located across the hill slopes above the agricultural lowlands. These moderately shallow, well-drained, sediments consist of loamy very fine sand over weathered bedrock typically occurring by 44 inches below surface.

In the northern portion of the project area (Sections 26 and 35 T30N R51W and Sections 1 N½, 2 N½ T29N R51W) there is some potential for stable intact sediments across the undulating uplands above the large heavily dissected drainage system. In all other areas of the northern project area, exposed sandstone bedrock exposed across ridge tops and along drainages suggests shallow sediment deposits. Across the undulating uplands, ARCADIS examined drainage and road cuts, animal mounds (which were numerous), and disturbance from erosion, tree harvesting, livestock and elk, and historic occupation, that did not reveal buried cultural materials. In the central portion of the project area (Sections 1 N½, 2 SE¼, 11, 12, 13 T29N R51W and Sections 7, 18 N½ T29N R50W) there is potential for stable intact sediments across the undulating uplands above the drainages. ARCADIS observed little exposed sandstone bedrock, but the occurrence of weathered sandstone gravels intermixed with loam and sand increased. Across the undulating uplands, ARCADIS examined drainage and road cuts, animal mounds (which were numerous), and disturbance from erosion, agriculture, livestock, and historic occupation, that did not reveal buried cultural materials. The greatest potential for stable intact sediment deposits occurs in the southern portion of the project area (Sections 18 S½, 19, 20, 29, and 30 T29N R50W). Across this lowland agricultural area, ARCADIS observed no exposed sandstone bedrock, and the sporadic occurrence of weathered sandstone gravels intermixed with loam and sand. ARCADIS examined cultivated fields (providing excellent visibility),

drainage and road cuts, animal mounds (which were numerous), and disturbance from erosion, agriculture, livestock, and historic occupation, that did not reveal buried cultural materials. Exposed surfaces and stratigraphic profiles were frequent throughout the project area provided many opportunities to not only observe sediments but rule out the occurrence of subsurface archaeological deposits.

e. Vegetation

The project area is located within the shortgrass prairie ecoregion of western Nebraska, the westernmost and driest part of the North American grasslands. Shortgrass prairies are typified by low annual precipitation and a single, low-lying herb layer dominated by bunch-grasses (Nebraska State Historical Society 2000). The Nebraska Panhandle is the driest part of the state and receives only about 14 inches of annual precipitation, the majority of which occurs in a 120- to 150-day growing season from April to September (Johnsgard 2001). Within the project area, the shortgrass prairie ecoregion supports a surprisingly high diversity of sub-habitats, including mixed grass prairie, western coniferous forest, and pockets of deciduous woodlands (Nebraska Legacy Project). Native vegetation of the Dawes Table region is a mosaic of short grass and mixed grass prairie. Unlike short grass prairie, the mixed grass type supports two herb layers, one within 12 inches of the ground surface and another, more open grass layer reaching upwards of 48 inches from the ground surface, and includes bunch and sod-forming grasses as well as forbs. Observed Dawes Table vegetation includes western wheat grass (Agropyron spicatum), grama grass (Bouteloua oligostachya), and buffalo grass (Bulbilis dactyloides), with yucca (Yucca glauca) present on more exposed ridges. Native vegetation of the Pine Ridge region is dominated by ponderosa pine (Pinus ponderosa) ranging from open parkland to closed forest. Beginning in the 1880s, the Pine Ridge region of Nebraska was intensively logged (Johnsgard 2001). Wildfires have also significantly impacted ponderosa pine forest distribution. Other observed Pine Ridge vegetation in the project area includes mountain mahogany (Cercocarpus spp.).

Vegetation cover ranged from sparse to moderate, consisting of primarily short grasses and mixed grass prairie with some yucca throughout the MEAUP. The northern portions of the project also consisted of cottonwoods, Ponderosa pine, and various sedges. Bare ground visibility varied from moderate to excellent throughout most of the project area averaging 70 percent, increasing to 100 percent along drainage cuts and across pastures and cultivated fields and decreasing to 50 percent on grassy areas in the southernmost sections of the project. For most of the project area, vegetation conditions were good for the discovery and documentation of cultural materials.

3. Constraints on Discovery and Preservation

Factors which may have affected the discovery and preservation of cultural resources include uranium testing locations (**Figure 8**), logging and drag scars, slash piles (**Figure 9**), fencing, general farming activities, plowing, two-track roads, fires, stock tanks, irrigation, lighting conditions, mud, snow cover, erosion (**Figure 10**), erosion control, dumps, monitoring wells (**Figure 11**), livestock, cultivation, and construction. Access to all portions of the project area by crown-and-ditch roads was very good. Overall, conditions were very good for the discovery of cultural materials and fair for the documentation of cultural materials in northwestern Nebraska.

Figure 8. Disturbance (two-track road and uranium testing) in Section 29 T29N R50W, facing north. Photograph taken by A. Graves on 11/18/2010.

Figure 9. Disturbance (slash pile center of photo) in Section 35 T30N R51W, facing south. Photograph taken by S. Rosenthal on 11/21/2010.

Figure 10. Disturbance (erosion, animal trails, cultivation) in Section 2 T29N R51W, facing south. Photograph taken by N. Graves on 12/02/2010.

Figure 11. Disturbance (monitor wells) in Section 18 T29N R50W, facing southeast. Photograph taken by A. Howder on 12/17/2010.

VI. Background Research

Background research consisted of four literature and data searches, including: a files search and architectural/structures property search conducted through the Nebraska SHPO; review of the National Register of Historic Places (NRHP) database for Dawes County, Nebraska; review of the National Historic Landmark inventory (NHL) ; review of General Land Office (GLO) Plats; and local literature review.

A. SHPO Files Searches

No previous surveys or archaeological sites were revealed by the SHPO file search. Four historic structures (DWoo-240, DWoo-241, DWoo-242, DWoo-243) were identified during the architectural/structures property search, two of which (DWoo-242, DWoo-243) were re-recorded during the current investigation, and two that (DWoo240, DWoo-241) lie outside the MEAUP. Site DWoo-240 is the Gary & Greg Oetken Ranch that dates to 1940 and is a one-story side gable house with a gable extension, clapboard siding, 1/1 wood windows, and an asphalt shingle roof. A Morton shed, two small gable front sheds, cattle sheds, grain bins, and side gable shed are also present at the site. The locale lies over 150 feet south of the MEAUP. Site DW00-241 is the P. Furman Farmstead that has an unknown date and is a one-and-a-half story gable front house with a full width open porch, cross gable dormer and 1/1 windows. A very large Gambrel roof barn features a gable roof extension, horizontal board siding, shed dormers, a ridge vent, and a hay hood. Other buildings include a modern Morton shed, grain bins, and a shed roof chicken house. The locale lies 100 feet west of the MEAUP. Information about these structures was identified during reconnaissance level surveys, and none have been evaluated for NRHP eligibility.

B. NRHP and NHL Review

Eleven sites were revealed in the NRHP online database, none of which lie within ten miles of the MEAUP. These registered sites include: James Bordeaux Trading Post (DW00-002) listed 1972/03/16; Henry Wohlers, Sr. Homestead (DW00-043) listed 2004/10/15; Chadron Commercial Historic District (DW03) listed 2007/3/27; Chadron State College Historic Buildings (DW03) listed 1983/09/08; Hotel Chadron (DW03-023) listed 2002/08/15; Dawes County Courthouse (DW03-081) listed 1990/07/05; Chadron Public Library (DW03-091) listed 1990/06/21; Crawford United States Post Office (DW04-007) listed 1992/05/11; Co-Operative Block Building (DW04-024) listed 1985/09/12; Fort Robinson and Red Cloud Agency (DW07) listed 1966/10/15; and Army Theater (DW07-147) listed 1988/07/07. The NHL review listed one landmark, the Fort Robinson and Red Cloud Agency, located 15 miles north northwest of the MEAUP.

C. Additional Sources

A search of the Online Bureau of Land Management's Public Land Patent Records revealed that the sections of interest were patented between 1891 and 1917. There are 9 patents associated with the sections, and several sections did not have patent information online. No individuals or family names were identified in the patent search that played highly significant roles in local, regional, State, or National historic development. Although, a one Private John F. Cody was granted 160 acres of Bounty Land in Section 11 T29N R51W for his military service in the Texas and New Mexico Indian War between 1850 and 1855. A review of the Nebraska State Surveyors online GLO plats of the townships did not reveal any features of interest. Aerial photographs were consulted to identify and understand the nature of linear features that became evident during survey.

D. Cultural Context

Archaeological materials from the full range of prehistoric culture periods are represented in northwestern Nebraska (Frison 1991; McIntosh 1996). However, the earliest periods, Paleoindian and the Early to Middle Plains Archaic, are represented by only a small number of sites. Important prehistoric site types in the region include rock shelters and kill and faunal processing sites. Prehistoric site densities can vary from extremely high in some settings, such as ridge tops and areas near large and reliable drainages, to nonexistent in settings that are ecologically homogenous or are distant from water. Factors affecting the variability in site density are not always readily apparent. Previous cultural inventories in the general area have identified prehistoric sites on broad ridges or hilltops and on benches and terraces near large drainages. Many of these prehistoric sites, however, are small, surficial artifact scatters lacking temporally diagnostic materials.

Culture history in northwestern Nebraska is conventionally divided into broad temporal periods (Frison 1991; Frison and Mainfort 1996; McIntosh 1996; Reher 1979; Walker 1977; Wood 1998) consisting of the Paleoindian (ca 12,000-8,000 BP), Early Plains Archaic (8,000-5,000 BP), Middle Plains Archaic (5,000-2,500 BP), Late Plains Archaic (2,800-1,500 BP), Woodland (3,000-1,000 BP), Late Prehistoric (1,800-300 BP), Protohistoric (300-200 BP), and Historic (200-50 BP).

The Paleoindian period in northwestern Nebraska includes the Clovis, Folsom, Agate Basin, Hell Gap, Alberta, Cody, and Frederick, and is primarily represented by isolated finds (Frison 1991; McIntosh 1996). The more temperate, cool, and mesic conditions of the early Paleoindian (Late Pleistocene/Early Holocene) period promoted more mosaic faunal assemblages on the northwest plains, including now extinct large mammal species such as mammoth and Bison antiquus. Paleoindian life ways are often considered to have been based on large mammal hunting by small, highly mobile bands. However, several sites suggest possible communal aggregation. Frison and Mainfort (1996:151) speculates that grasslands were already established during the Pleistocene/Holocene transition, but drying trends near the end of the Paleoindian period around 8,400 BP, known as the Altithermal, resulted in more arid conditions, expansion of prairie grasses, and the retreat of more mesic vegetation to higher elevations. With these climatic and environmental changes came diverse culture changes throughout the Paleoindian period. In the Sand Hills of northwestern Nebraska, Paleoindian projectile points have been found in the expansive valley blowouts and in the water or on banks of streams (McIntosh 1996:17). Artifacts diagnostic of the Paleoindian period include lanceolate projectile points often associated with extinct fauna. Several isolated Clovis point finds have been documented along the western and eastern extremities of the Sand Hills (McIntosh 1996:11) and isolated Plainview-Goshen, Agate Basin, Alberta, and Hell Gap, projectile point finds have been documented across the western portions of the Sand Hills. Numerous isolated Cody Complex projectile points, such as the Scottsbluff and Eden point types, have been documented across the Sand Hills (McIntosh 1996:16). Excavations at the Scottsbluff Bison Quarry (10,000-9,000 BP) in central western Nebraska located just below Signal Butte revealed a bison bone bed (Bison antiquus), one Allen projectile point, Agate Basin and Cody Complex material, and diverse radiocarbon dates (Hofman and Graham 1998:105-106). The Hudson-Meng Paleoindian bison kill site located north of the project area is a large kill site with several hundred animals probably representing separate kill events dating to the early Cody Complex, with an Alberta component as demonstrated by a radiocarbon date of 9820 RCYBP retrieved from charcoal (Frison 1991: 178; Hofman and Graham1998:110-111). More recent work by Todd and Rappson suggest the Hudson-Meng bone bed is a natural-death assemblage and the Alberta artifacts occur above the bone bed (Frison 1991: 178-179; Hofman and Graham1998:110-111). The Clary Ranch site is another Paleoindian bison kill site located along Ash Hollow Creek in Garden County, Nebraska, southeast of the

project area. Excavations at the Clary Ranch, conducted by University of Nebraska State Museum in 1979, revealed bison teeth and projectile points indicating the site dates to 8,500 BP (Koch 2000).

The Early Plains Archaic is marked by continued arid climatic conditions associated with the Altithermal. Interpretations of human adaptation to drier and warmer conditions generate expectations of decreased population densities, and movement of groups and individuals to higher elevations (mountains and foothills rather than interior basins). Drier conditions in the lowland basins correlated with decreased forage for large game and the likely shift of mammal populations to higher elevations. However, Reher (1979) notes that xeric vegetal species that would replace mesic grasslands often contain components that are edible and useful to human populations (i.e. succulents and legumes). The Altithermal and the broader trend toward late Holocene environmental conditions are associated with patterns of behavioral adaptation called the broad spectrum hunter-gatherer by Frison and Mainfort (1996:152). Changes in subsistence and life ways include a growing diversification in the kinds of resources exploited and new technologies used in their procurement and processing. Materials recovered from Early Archaic sites in the Northern High Plains show increasing numbers of vegetable or plant staples such as prickly pear, sego lily, yucca pods, and chokecherry (Frison 1991). Ground stone implements and formal thermal features are more visible in the archaeological record attesting to changes in technology. Elsewhere in the northwestern Plains, habitation structures begin to appear in the archaeological record during the Early Archaic in the form of housepits. Structural features of this age, however, are unknown in northwestern Nebraska. Stratified Early Archaic sites are unknown in northwestern Nebraska. Artifacts diagnostic of the Early Archaic period, and found in northwestern Nebraska, consist of isolated occurrences of Logan Creek projectile points, also called Hawken points, identified as the Hawken site point type. The Hawken site, located south of Sundance, Wyoming, is an arroyo trap bison kill site that produced nearly 300 hundred projectile points and dates to approximately 6,500 BP to 5,040 BP (Frison 1991:187-188; McIntosh 1996:21).

The Middle Plains Archaic is associated with the amelioration of the xeric Altithermal conditions and a trend toward our modern climate. Increasing numbers of Middle Archaic sites are often suggestive of increasing population densities. The period is nearly synonymous with the McKean Complex, a cultural taxonomic unit characterized as a widespread and highly successful cultural adaptation (Frison 1998; Kornfeld and Todd 1985; Kornfeld et. al 1995). The McKean type site is located in southeastern Wyoming along the banks of Keyhole Reservoir. McKean is a hunting and gathering manifestation distinguished by lanceolate, stemmed, and side-notched projectile point types (Frison 1998:163). Stemmed lanceolate McKean points were found at the Signal Butte site in western Nebraska in an excavation level from which radiocarbon dates placed them at 4,550 and 4,170 BP (Frison 1991:101). The number of stone circles on the Northern Plains runs into the hundreds of thousands, while most date to the Late Prehistoric period, a few are clearly Middle Archaic features (Frison 1998:154). Artifacts diagnostic of the Middle Archaic period and documented in northwestern Nebraska include the McKean, Duncan, and Hanna, projectile point types (McIntosh 1996). Several significant mortuary sites (ca 3,000 to 1,500 BP) have also been documented in western Nebraska. The Gering Burials site, located near Highway 26 east of Gering, and the Bisterfeldt Potato Cellar site, located east of Scotts Bluff National Monument, are Middle to Late Archaic mortuary sites that have revealed sophisticated burial patterns and funerary offerings (Koch 2000).

The Late Plains Archaic period is marked by the continuation of the broad spectrum hunter-gatherer adaptation accompanied by a strong reliance on large game procurement. Numerous Late Archaic bison traps and procurement sites have been documented in eastern Wyoming, including Lance Creek (Haynes 1968), Fulton (Frison 1991:102), Powder River (Frison 1968), Mavrakis-Bentzen-Roberts (Bentzen 1962), Ruby (Frison 1971), and Muddy Creek (Hughes 1981) sites. Diagnostic projectile points encountered at

these sites include triangular corner notched Pelican Lake, Yonkee, and Besant types. The Yonkee projectile point was originally considered to be diagnostic of a late variant of the Middle Archaic McKean Complex (Reher 1979), but recent faunal analysis and refined radiocarbon dates place it within the Late Archaic (Frison and Mainfort 1996:22). Elsewhere in the Northern Plains, Archaic bison kill, processing, and camp sites have been recorded, but are unknown in northwestern Nebraska (Frison 1991; Frison 1998; Kay 1998). Isolated occurrences of Pelican Lake, Kobold, and Besant, projectile points have been documented across northwestern Nebraska (McIntosh 1996:22).

The Woodland Period is defined primarily on the basis of the earliest known use of ceramic vessels (Johnson and Johnson 1989:201). During the late part of this period in the Midwest, archaeologists have discovered the first evidence of horticulture such as squash, beans, and small amounts of corn (Koch 2000). Broad spectrum hunting and gathering continued to be the major form of subsistence. During this period, the bow and arrow is introduced and there is evidence of increased ceremonial elaboration. Considering Plains Woodland components often overlie Archaic components and the material culture at these sites vary only slightly, it appears the same lifeway continued essentially unchanged from at least 5,500 to 2,000 BP (Johnson and Johnson 1989:214). Woodland pottery has been found along the Wyoming-Nebraska border and in northeastern Colorado (Frison 1991:121). In the Nebraska panhandle, Woodland peoples lived in fairly small groups, utilized open campsites, and used skin-tents and natural shelters such as Ash Hollow Cave, located in the North Platte valley, for shelter (Koch 2000).

The Late Prehistoric period saw an increased reliance on organized large game hunting. Population densities are presumed to have been very high during the Late Prehistoric period as evidenced by the proliferation of recorded archaeological sites and radiocarbon dates. Side-notched projectile points dominated this period, but small, thin, corner-notched and triangular-points continue to be used. The Avonlea projectile point type is perhaps the most common diagnostic artifact of the Northwestern High Plains during the Late Prehistoric period (Frison 1991:113). The Nebraska State Historic Society excavated a Late Prehistoric site in Chadron State Park in 1940. This excavation revealed an irregular shaped soil stain and several charred post molds of a habitation floor along with bone tools such as awls, bison scapula hoes, a fishhook, beads, and a bison rib knife handle (Koch 2000). The Nebraska State Historic Society excavated a bison hunting camp near Fort Robinson on Slaughterhouse Creek in 1985 that dates to between 500 and 400 years BP (1500-1600 AD). Archaeologist's uncovered stone-lined hearths, fragments of thin pottery, stone tools, chipped stone debris that included obsidian from Idaho, and butchered bison bone.

The Protohistoric period in northwestern Nebraska was the territory of the Sioux, Pawnee, Plains Apache, Comanche, and Crow (McIntosh 1996). The period brought with it the introduction of the horse during the middle to late eighteenth century followed by the appearance of European trade goods (Frison 1991:122). Native Americans who inhabited the area along the Nebraska-South Dakota border had the horse between 1720 and 1725 (McIntosh 1996:24). Ancestors of the Plains Apache, the Dismal River Aspect culture group, occupied the Nebraska Panhandle from 1650 through the early 1700s and had some trade relations with Europeans. Iron bits, iron and copper jingles, a copper bell, and iron awls, have been documented at Dismal River Aspect sites in eastern Nebraska (McIntosh 1996:24). Through the 1700s, Native American groups in northwestern Nebraska were semi-sedentary, farming in the spring through late summer, and gathering for communal hunts in the fall and winter (McIntosh 1996:24).

The Historic period of the area falls within the last two hundred years, and begins with transient, widely separated incursions by explorers and fur traders coming in contact with the Native Peoples of northwestern

Nebraska. Historically, the Oglala and Brulé Sioux Indian tribes occupied northwestern Nebraska. By the beginning of the 19th century, the Oglala settled in the Black Hills and the Brulé settled around the headwaters of the Upper White and Niobrara Rivers and by the 1830s, the hunting grounds of the Brulé and Oglala extended south to the Platte River Valley (Koch 2000). The fur trade in northwest Nebraska (1825 to 1850) was originally centered along the Niobrara and White rivers (Koch 1999). One of the early Euro-American traders, James Bordeaux, established a small permanent post during the winter of 1837 along Bordeaux Creek, a location verified in the 1950s by archaeologists who revisited the Bordeaux post and identified both the post and storage house from hewn-log replicas reconstructed near the Museum of the Fur Trade east of Chadron, Nebraska (Koch 2000). Between 1840 and 1890, large numbers of emigrants crossed Nebraska on their way west--first following the California gold rush and then with hopes of settling and then more chasing the Black Hills gold rush--causing many confrontations between tribal groups and Euro-Americans passing through to other areas. The Treaty of Fort Laramie in 1851 allowed the United States to establish roads and military posts in Indian Territory in exchange for annuity goods (Koch 2000). Sustained settlement in the region began in the 1880s after the passing of Pre-emption, the Homestead Act of 1862. In the years immediately leading up to the passage of the Homestead Act, there were five separate treaties in which Native American tribes gave up (or "ceded") land in Nebraska to the U.S. government, which set the stage for an explosion of European settlement (Koch 2000). Throughout this period, conflicts between native tribes and white settlers set the stage for the final confinement of Indians on reservations and opened up the northern Nebraska Panhandle to Euro-American settlement and large cattle ranching operations. By 1878, the Lakota, Brule and Oglala Sioux had been moved from their Nebraska agencies to reservations in South Dakota, ending their way of life.

In 1877, Sioux County was organized as a large territory north of Cheyenne County, and then in 1885 the Nebraska legislature divided Sioux county into four smaller counties—present day Sioux, Dawes, Box Butte, and Sheridan Counties (Louis Berger Group 2005). Dawes County was named in honor of then Nebraska Governor James W. Dawes. Meanwhile, ranchers capitalized on the suitability of the high plains for grazing cattle as ranchers in Texas began to drive their cattle north onto the Nebraskan plains to mature and fatten their herds. Ranchers that settled the area found thousands of acres of unsettled open range and good sources of water in local rivers such as the Niobrara and White Rivers. Based on the idea that cattle will not walk more than 15 miles a day for water, and the ranch being the primary watering hole for the cattle, meant a typical ranch extended out seven miles from the ranch station (Louis Berger Group 2005). These early open range ranches were little more than outposts often consisting of a temporary sod or log house, a small shelter for horses, and perhaps a small outbuilding (Louis Berger Group 2005). The arrival of the Chicago and Northwestern Railroad and Fremont, Elkhorn & Missouri Valley (FE&MV) Railroad to Chadron in August 1885 initiated a flood of settlers into Dawes County (Louis Berger Group 2005). As the ranchers feared, the arrival of the railroad brought settlers claims that quickly dissected the rangelands. Anticipating the arrival of settlers, ranchers began to protect their rangelands by fencing them in. In 1902, the Justice Department began investigating the illegal fencing of public domain and issued an edict that all illegal fences on some 800 ranches had to be removed within 60 days but took no action until 1906, when several ranchers were convicted and sent to a year in prison (Louis Berger Group 2005). After several hard winters and large cattle die-offs, Nebraskan ranchers switched from open range ranching to "ranch farming," which was a more labor intensive operation that centered on the ranch itself (Louis Berger Group 2005). Mechanization also had an impact on the make-up of the ranch with the arrival of threshers, tractors and other machinery, old barns were replaced by metal sheds and other prefabricated buildings. The early settlers who came to northwestern Nebraska typically selected home sites where they could build their dwellings. Along timber covered rivers, log and lumber houses were common, and in the few places where stone outcroppings occur, stone was quarried for numerous house and outbuilding structures. Often, people made houses out

of adobe, or built walls constructed of tightly pounded dirt formed to make solid walls. Across the Plains, early homesteaders commonly constructed temporary dugouts by digging into a hill. Dugouts were small, some no more than ten feet square, but they provided quick shelter. Dry conditions and increased competition for land made homesteading difficult in northwestern Nebraska that resulted in numerous short-lived occupations throughout the area. Nonetheless, farming and ranching remains an important element of the regional economy today.

Fort Robinson

Fort Robinson, located in northwestern Nebraska's Dawes County, is a National Register property, historically significant as it was an important stage point for early military occupation of the area. Fort Robinson once housed the famous Buffalo Soldiers and was the scene of Crazy Horse's death and the 1879 Cheyenne Outbreak that claimed the lives of 64 Cheyenne. The Fort Robinson and Red Cloud Agency, located 1.5 miles east of the Fort, were focal points of Indian-White conflict on the Northern Plains during the final years of Sioux and Cheyenne resistance (1873 to1890) (Lissandrello 1976). As the need for a military presence near the Red Cloud Indian Agency grew, Fort Robinson began in 1874 as the U.S. Army outpost known as Camp Robinson and just four years later was designated Fort Robinson. Located along the White River, near the recently established Indian reservation and new railroad line, the advantageous location allowed Fort Robinson to expand its area and military power.

Crazy Horse, military leader of the Oglala Sioux who had courageously held out against the U.S government's attempts to confine the Lakota, fought in many famous battles such as the Fetterman Massacre (1866) and the Battle of the Little Bighorn (1876), and was killed at Fort Robinson (Sandoz 1942). When Crazy Horse finally sought surrender to help his starving and exhausted people he began meeting with U.S. troops under General Crook stationed at Fort Robinson. Unfortunately, during his attempt to peacefully surrender, concerns over Crazy Horse's real intentions, due to a scout mistranslating his words, Crook ordered Lieutenant Lee (Officer of the Day), to apprehend Crazy Horse (Sandoz 1942). On September 5, 1877, Crazy Horse arrived at the Fort and Lee immediately turned him over to Captain James Kennington, in charge of the post guard, who escorted Crazy Horse to the post guardhouse. Crazy Horse soon realized he was being arrested and attempted to escape. Following a brief scuffle, Crazy Horse was bayoneted by a member of the guard and died from his wounds later that evening (Sandoz 1942).

Fort Robinson was also the scene of the 1879 Cheyenne Outbreak. The U.S. government had moved the Northern Cheyenne tribe to a reservation with their Southern Cheyenne kinsmen in Indian Territory (later Oklahoma) in 1877. Following a year of suffering from poor food and diseases, 350 Cheyenne left Indian Territory, without permission, and headed north (Steinacher and Carlson 1999). Under the leadership of chiefs Dull Knife and Little Wolf the Cheyenne endured several clashes with army troops and local civilians, but made it to Nebraska where Little Wolf and his followers continued north to join the Sioux leader Sitting Bull in Canada and Dull Knife's group went into hiding in the vast Sand Hills to try to obtain refuge with Dull Knife's friend and Sioux leader, Red Cloud (Steinacher and Carlson 1999). Unfortunately, Red Cloud and his people had already been removed to Dakota Territory and only soldiers remained near the old Red Cloud agency that was located near present-day Chadron, Nebraska. It was here that an army patrol intercepted Dull Knife and his people, and on October 24, 1878, escorted them to Fort Robinson (Steinacher and Carlson 1999). The Cheyenne remained somewhat peacefully at the Fort until pressure by Kansas officials to arrest and return some of Cheyenne warriors down south worried the Cheyenne who were very determined to not go back to the southern reservation ultimately escalated into an escape attempt (Steinacher and Carlson 1999). On January 9, 1879, the imprisoned Cheyenne used weapons they had

hidden to escape their prison barracks and a running fight ensued along the White River valley where at least twenty-six Cheyenne warriors were killed and some eighty women and children were recaptured and returned to the Fort (Steinacher and Carlson 1999). Over the next few weeks, those Cheyenne not captured were killed or taken prisoner at a camp on Antelope Creek located northwest of Fort Robinson, except for Dull Knife and some of his family who made it north to join Red Cloud's group. In all, sixty-four Indians and eleven soldiers lost their lives during the escape attempt (Steinacher and Carlson 1999).

African Americans who served in the Union Army during the Civil War were consolidated into two regiments, the Ninth and Tenth, in 1866 (Steinacher and Carlson 1999). The Ninth and Tenth regiments were collectively given the nickname "Buffalo Soldiers" by the Plains Indians because of the perceived similarity of the soldiers' curly hair to that of the buffalo (Steinacher and Carlson 1999). Fort Robinson became the Buffalo Soldiers' regimental headquarters and home while the Ninth participated in the 1890 to 1891 Wounded Knee campaign to suppress the Sioux Ghost Dance movement at Pine Ridge Agency in South Dakota (Steinacher and Carlson 1999).

After the Indian Wars, Fort Robinson served as a frontier outpost with soldiers doing everything from fixing the telegraph line to keeping the peace between ranchers and homesteaders as settlers moved into the area (Lissandrello 1976). After World War I, the Fort became the world's largest Quartermaster Remount Depot (1919), housing thousands of horses and mules that during World War II were greatly expanded (Lissandrello 1976). Also during World War II, the War Dog Reception and Training Center was activated (1942) at Fort Robinson and dogs were trained for a multitude of military duties (Lissandrello 1976). Two years later, a prisoner of war camp was erected near the site of the original Red Cloud Agency and members of Rommel's Afrika Korps, Hitler's Youth Army, and Hitler's Band, were moved to the camp and were kept busy maintaining grounds and buildings, mending fences, and working in the stables or at the K-9 training center until 1946 (Lissandrello 1976; Louis Berger Group 2005). In 1948, Fort Robinson was declared surplus and handed over to the US Department of Agriculture ending 74 years of continuous military operations (Lissandrello 1976).

History of Uranium Discovery

The Crow Butte ore body lies in what has been named the Crawford Basin (Collings and Knode 1984). H.M. DeGraw of the Nebraska Geological Survey reviewed several thousand oil and gas logs in the Nebraska Panhandle and outlined several major fluvial systems within the basal Tertiary, the Oligocene Chadron Formation. The Wyoming Fuel Company reviewed the DeGraw study, reinterpreted the logs, and developed a Chadron sandstone isopach based on widely spaced oil and gas exploration holes (Collings and Knode 1984). This study indicated an extensive fluvial sandstone system at the base of the Tertiary overlying the Cretaceous Pierre Shale. This fluvial sandstone is the Basal Sandstone Member of the Chadron Formation of Oligocene age and in the Crawford and Chadron areas, exploration holes revealed oil and gas in the sandstone. Based on this information, in the spring of 1978, Wyoming Fuel Company acquired a regional lease position from Sioux Minerals, Ltd. and Wulf Oil Corporation, of about 64,000 acres along the Chadron Formation outcrop of northwest Nebraska (Collings and Knode 1984). One year later, Wyoming Fuel Company and Ferret Exploration Company formed a joint venture and Wyoming Fuel Company, designated as project operator, undertook a regional exploration drilling program (Collings and Knode 1984). The White River Group is Oligocene in age and consists of the Chadron and Brule Formations. The Chadron is the oldest Tertiary Formation of record in northwest Nebraska and uranium mineralization, consisting of coffinite, occurs exclusively within the Basal Chadron Sandstone Member (Collings and Knode 1984). The uranium mineralized trend was determined to be approximately 12 miles long and up to 3,000 feet wide with

uranium reserves expected to exceed 30 million pounds U308, thus in 1983 uranium mining began in northwestern Nebraska (Collings and Knode 1984).

1. Known Site Density

Based on background research, ARCADIS anticipated discovering modern and historic trash debris or dumps, historic foundations and structures, and prehistoric lithic scatters or isolated finds situated sporadically across the MEAUP.

2. Known Cultural Themes

The file search revealed known cultural affiliation of previously recorded historic sites in the project area as spanning the Expansion (1890-1919) period through the Modern period (1956-present), and were primarily associated with homesteading, ranching, and farming activities and occupation.

VII. Survey Methodology

A. Extent of Survey Coverage

The block area was inventoried using pedestrian transects spaced at a maximum of 30 meter intervals. Gridded north-south or east-west oriented transects were guided by handheld Global Positioning System (GPS) devices. In all portions of the project area, special attention was given to areas of enhanced visibility, such as ant mounds, animal trails and burrows, deflated areas, disturbed areas, and cut-banks.

B. Collection Strategy

No artifacts were collected during the MEAUP cultural resource investigation. Field notes, photographs, and other project documents are on file at the ARCADIS office in Buffalo, Wyoming.

C. Site Mapping

When artifacts or features were encountered, the immediate areas were surveyed intensively to delineate the extent and distribution of associated materials. This was accomplished by covering the area with informal landform guided transects and/or more formal spaced transects (usually 2-5 meter spacing). A prehistoric site is defined as 2 or more artifacts within 30 meters of one another or the presence of a feature. A historic site is, at a minimum, defined as an item or items older than 100 years, a feature, or abandoned farm/ranch yards, school houses, trash dumps, and other structural/building/object sites.

Cultural materials were classified as sites or isolated finds, documented on appropriate Nebraska Cultural Property forms, and their locations plotted on 7.5' USGS topographic maps. To precisely map the location of the sites and isolated finds, GPS data were collected with a Trimble GeoXT or Trimble GeoXM handheld unit and differentially corrected using Trimble Pathfinder 4.0 software. Site datums were typically a GPS point.

Site plan view maps were created with Trimble GeoXT and GeoXM handheld GPS units. Data were downloaded, post-processed, and exported as ArcMap shapefiles. Site maps were then drafted in ArcMap using templates, corrected data, and USGS 7.5' base maps. Maps contain, but are not limited to, a datum, a

site boundary, artifact locations, concentration areas, feature locations, contour lines, vegetation changes, existing and proposed infrastructure, disturbances, and drainages. Environmental attributes, such as topography, vegetation, and disturbances were also mapped (when noteworthy) with the GPS unit and supplemented by underlying the appropriate 7.5' USGS Orthophoto Quads in ArcMap during the drafting process.

Site overview photographs were taken at each site location with a digital camera. In addition, all interesting historic artifacts were either drawn to scale or photographed using high resolution digital photography. Close-up and overview photos of features, disturbed areas, buildings, and any other important site attributes are also provided.

Historic artifacts were inventoried in the field using a simple tally based on descriptive and English customary measurement categories.

Features were measured, described, digitally photographed, and mapped with the GPS unit. Scaled feature plan view maps were also drawn, particularly if intact morphology could be discerned. Features were assigned an alphanumeric reference beginning with 'F' (e.g., F2).

D. Testing Strategy

Limited evaluative testing (i.e., shovel testing, auger testing) was not conducted as part of this investigation. Historic features and artifacts were present on the surface at all of the sites recorded and shovel tests would not offer additional information to aid in a NRHP determination. Locations along drainages and creeks where a higher, though still limited, probability of discovering buried prehistoric sites offered excellent bare ground visibility and bare cut-banks to observe subsurface strata.

E. Weather and Ground Conditions

Weather was cold and windy for most of the survey with a brief stint of snowfall and snow cover. Survey was not conducted when frost or snow cover exceeded 20 percent ground coverage. Other than delaying the ability to complete inventory before the 2010 year end, the weather and ground conditions did not alter field methods. Note-taking was abbreviated in the field at times do to extreme cold temperatures or during extreme wind, but daily field notes were supplemented and elaborated at each day's end.

VIII. Inventory Results

A. Cultural Resource Findings

A total of 17 sites and five isolated finds occur within the survey area. There are 15 newly discovered historic sites that include six home/farmsteads (25DW359, 25DW360, 25DW361, 25DW365, 25DW366, 25DW370) three debris scatters (25DW357, 25DW363, 25DW369), two cisterns (25DW358, 25DW364), one corral (25DW367), one bridge (25DW362), one dugout (25DW368), and one quarry (25DW371). ARCADIS updated two previously recorded historic sites that include two home/farmsteads (25DW242, 25DW243). The five historic isolated resources (2368-I004, 2368-I004, 2368-I011, 2368-I013, 2368-I019, 2368-I023) contain artifacts representing a pattern of early land utilization and ranching, dating from the Expansion period (1890-1919) through the WWII-era (1940-1946). Of the 17 total sites located within the project area, none are recommended eligible for inclusion on the NRHP, but two homestead site's

25DW242 and 25DW243, should be avoided by the proposed undertaking. Each of the sites and isolated finds are described below in relation to the proposed undertaking.

Prehistoric resources are most often evaluated for their eligibility on the NRHP under Criterion D, for their potential to yield information important to prehistory, but all four criteria are considered (as specified in Title 36 of Codes of Federal Regulations 36 CFR 60.4). No prehistoric resources were discovered.

Historic resources may be evaluated under any of the Criteria. However, in the absence of structural features, documented association with significant historic events, or the important contributions of persons significant in history, historical resources more than 50 years old are evaluated under essentially the same criteria as prehistoric resources. Historic manifestations in Nebraska are evaluated for eligibility on the NRHP paralleling the framework provided by *Section 5* of the manuscript *National Historic Preservation Act Archaeological Properties Section 106 Guidelines*, by the Nebraska SHPO, dated 2006. Isolated finds, by definition, are considered not eligible for the NRHP.

B. Site Descriptions

Newly Recorded Sites

25DW357 (2368-S001)

Site 25DW357 is a historic debris scatter located in Section 20 T29N R50W, in a pasture on the southwest slope of a large hill one mile north of River Road and 1.25 miles east of Hollibaugh Road (**Figures 12 and 15**). The site measures 260 feet by 65 feet and covers an area of 9,548 square feet. Vegetation consists of mixed grasses affording a 70 percent bare ground visibility. Sediments are composed of fine sands with caliche to an unknown depth. Impacts to the site include historic ranching and farming activities throughout the area, wind and water erosion, grazing, and possible razing. The site datum is a GPS point taken at a fencepost centrally located along the northern site boundary.

Cultural materials consist of a historic debris scatter located along an east to west trending fence line. Additional materials were observed north of the fence line, but are not located within the current project boundary and were not recorded as part of this undertaking. Materials observed include one bottle finish (**Figure 13**), three fragments of a purple dinner plate with diamond hatching and floral embossed rim design, 17 pieces of undecorated white bone china, five clear glass fragments, five whiteware fragments, two milk glass bottle base fragments from two separate bottles, one green glass fragment with a double ring finish, four aqua glass fragments, one gold-decorated china fragment with rose decoration (**Figure 14**), one clear bottle glass fragment, one aqua bottle based fragment which reads "D. NEBR. S", one red brick fragment, one machine-cut nail, one metal spring, and several pieces of scrap metal of unknown origin. Diagnostic debris materials at this site include purple or amethyst glass, aqua glass, milk glass, and green glass. During the late 19th century, some of the glass sand brought to the United States tended to produce pale green colored glass (Adkison 2002; Fike 2002). In order to make the pale green glass items clear, manganese was added during glass production. Unknown to the manufacturers, manganese reacts to ultra-violet rays and over time causes the clear glass to turn purple. Manganese was primarily imported from Germany so by World War I supplies were restricted and, by 1917; alternative methods for producing clear glass were being used (Adkison 2002; Fike 2002; IMACS 1984). Amethyst glass dates from approximately 1880 to 1917 (Fike 2002; Horn 2005; IMACS 1984). White milk glass was commonly used for medicine, cosmetic, toiletry, food and specialty containers, and dates from the 1890s to 1960 (Fike 2002; IMACS

1984). Green glass was very versatile and used for many purposes that included wine and mineral bottles and dates from the 1860s to present day (Fike 2002; IMACS 1984). Aqua glass was very versatile and used for many purposes and dated from 1800 to 1910 (Fike 2002; IMACS 1984).

This historic debris scatter represents a secondary context for artifacts commonly recorded in the area, but the National Register criteria does not dismiss resources as insignificant simply because there are numerous examples of the type. National Register eligibility for any property, including historic period archeological sites, depends on integrity and significance. Integrity for a historic period archaeological site is based on the presence of features and whether or not they can tell us something about the location. Based on the artifacts recorded, site 25DW357 is a single dump event with materials dating to from the early to mid 1900s. Historic debris site 25DW357 does not retain enough integrity to qualify for the National Register. Lack of integrity alone, however, does not automatically exclude this site as eligible for the National Register. Significance was assessed following intensive survey and a historic records search that included a files search and architectural/structures property search conducted through the Nebraska SHPO; review of the National Register of Historic Places (NRHP) database for Dawes County, Nebraska; review of the National Historic Landmark inventory (NHL); review of General Land Office (GLO) Plats; and local literature review; that revealed sustained Euro-American historic occupation in this area occurred between 1890 to present day, and no leases or purchasers were found that can be associated with an important person or persons of "significance in history" or having an uncommon ethnic affiliation. Finally, there are no features associated with site 25DW357. Therefore, site 25DW357 does not possess enough significance to qualify for the National Register. Site 25DW357 is a common historic site likely associated with historic and early modern ranching or farming activities in the region that ARCADIS recommends **not eligible for listing on the NRHP and no further work is necessary**.

Figure 12. Overview of site 25DW357, facing west. Photograph taken by Shane Rosenthal, on 11/18/2010.

Figure 13. Site 25DW357, bottle finish. Photograph taken by Shane Rosenthal, on 11/18/2010.

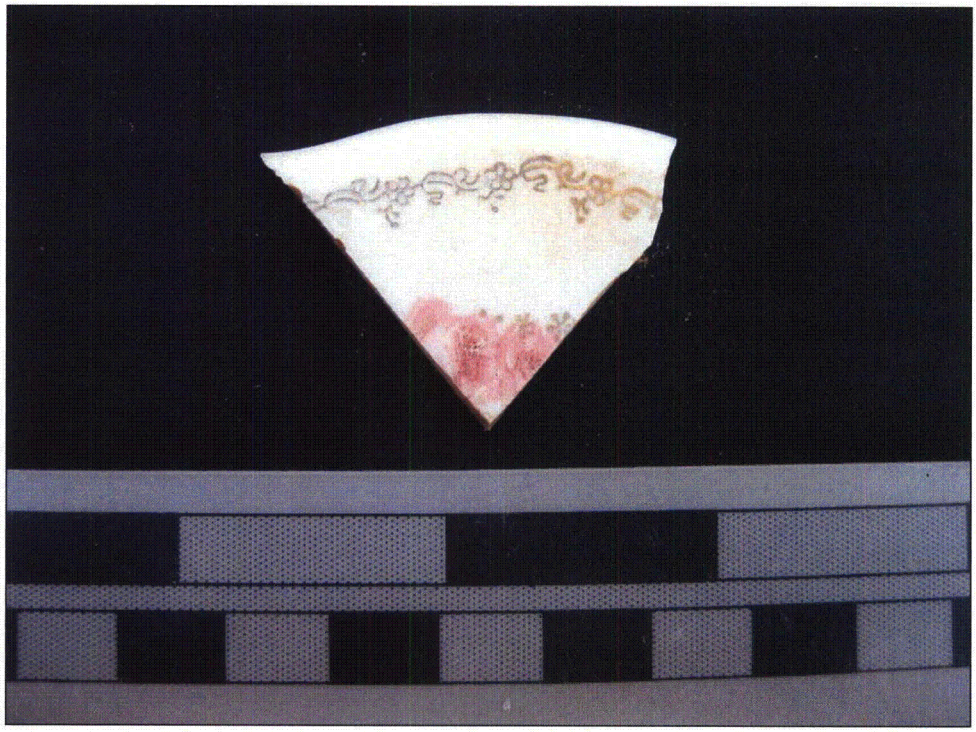

Figure 14. Site 25DW357, plate rim. Photograph taken by Shane Rosenthal, on 11/18/2010.

25DW358 (2368-S002)

Site 25DW358 is a historic cistern located in Section 19 T29N R50W, on a hilltop east of Hollibaugh Road (**Figures 16 and 19**). The site measures 78 feet by 48 feet and covers an area of 3,250 square feet. Vegetation consists of mixed grasses affording a 70 percent bare ground visibility. Sediments are composed of fine sandy loam. Impacts to the site include historic ranching and farming activities throughout the area, wind and water erosion, and grazing. The site datum is a GPS point at the southeast corner of the cistern feature.

Cultural material consists of one cistern foundation (Feature F1) located 26 feet east of one well collar (Feature F2) (**Figures 16 and 18**). Feature F1 is a poured concrete cistern that measures 16 feet north to south and 9.5 feet east to west. The foundation is constructed from a wooden-planked form with no cold seams. The walls of the feature measure approximately five inches in width. A hooked metal bar protrudes from the eastern wall, but it is unclear if this signifies concrete reinforcement or a wall anchor. The cistern walls sit flush with the ground surface and are badly deteriorated. The northeast corner has partially collapsed. A partial wall support sits on the western wall and was separately poured with cold joists. Feature F1 is located 131 feet north of a standing fence. Feature F2 is a galvanized metal culvert with a central pipe and concrete fill that is likely a well collar **(Figures 17 and 18)**.

This historic cistern consists of two features commonly recorded in the area, but the National Register criteria does not dismiss resources as insignificant simply because there are numerous examples of the type. National Register eligibility for any property, including historic period archeological sites, depends on integrity and significance. Integrity for a historic period archaeological site is based on the presence of features and whether or not they can tell us something about the location. Site 25DW358 is a single ranch cistern and intensive survey of the area did not reveal other features such as a habitation foundation. Historic cistern site 25DW358 does not retain enough integrity to qualify for the National Register. Lack of integrity alone, however, does not automatically exclude this site as eligible for the National Register. Significance was assessed following intensive survey and a historic records search that included a files search and architectural/structures property search conducted through the Nebraska SHPO; review of the National Register of Historic Places (NRHP) database for Dawes County, Nebraska; review of the National Historic Landmark inventory (NHL); review of General Land Office (GLO) Plats; and local literature review; that revealed sustained Euro-American historic occupation in this area occurred between 1890 to present day, and no leases or purchasers were found that can be associated with an important person or persons of "significance in history" or having an uncommon ethnic affiliation. Finally, the features associated with site 25DW358 lack a unique design and any other unusual physical characteristic. Therefore, site 25DW358 does not possess enough significance to qualify for the National Register. Site 25DW358 is a common historic site likely associated with historic and early modern ranching or farming activities in the region that ARCADIS recommends **not eligible for listing on the NRHP and no further work is necessary**.

Figure 16. Site 25DW358, Feature F1, cistern. Photograph taken by Shane Rosenthal, on 11/18/2010.

Figure 17. Site 25DW358, Feature F2, well collar. Photograph taken by Shane Rosenthal, on 11/18/2010.

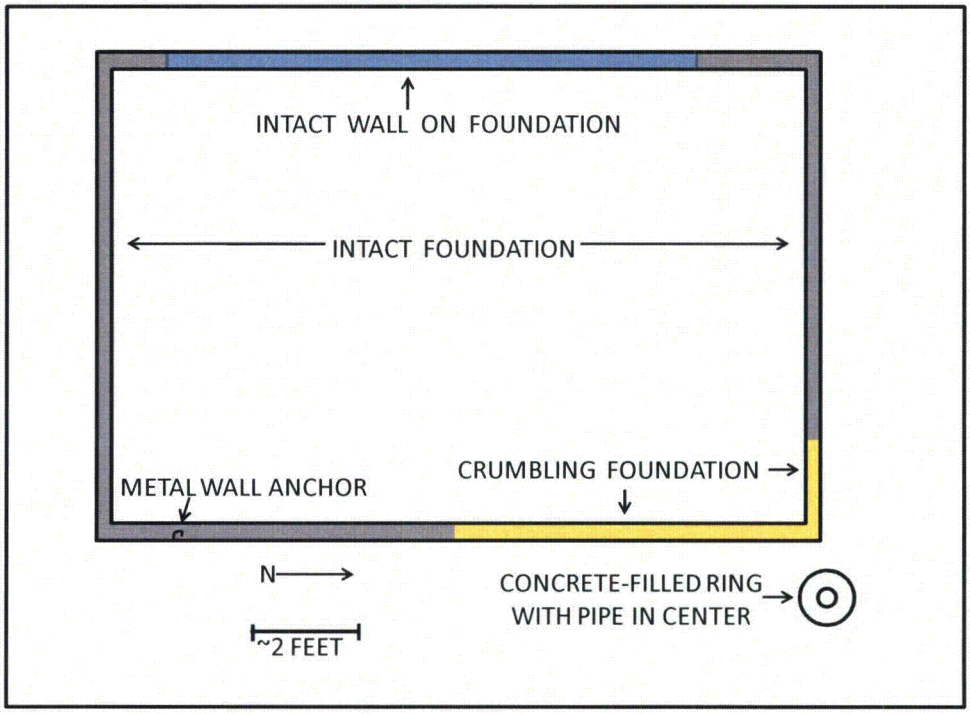

Figure 18. Site 25DW358, Feature drawing. Drawing by Ashley Howder, on 1/18/2011.

25DW359 (2368-S003)

Site 25DW359 is a historic foundation and associated dugout and debris located in Section 19 T29N R50W, ten meters east of Hollibough Road (**Figures 20 and 25**). The site measures 50 feet by 50 feet and covers an area of 2,500 square feet. Vegetation consists of mixed grasses affording a 70 percent bare ground visibility. Sediments are composed of fine sandy loam as observed along slopes, road cut, and in dugout feature. Impacts to the site include historic ranching and farming activities throughout the area, wind and water erosion, and grazing. The site datum is a GPS point taken at the southwest corner of the foundation feature.

Cultural material consists of historic debris, one foundation (Feature F1), and one dugout (Feature F2). Historic domestic debris was scattered within the foundation and surrounding area and consists of seven pieces of a metal bed frame with leaf decorations, 14 aqua glass shards, one milk glass shard, a one inch galvanized pipe and two elbow sections of pipe, one large two inch by twelve inch milled board measuring 16 feet long, 30 fired clay bricks, scattered barbed wire, and several small metal scraps of unknown use. Diagnostic debris materials at this site include aqua glass and milk glass. White milk glass was commonly used for medicine, cosmetic, toiletry, food and specialty containers, and dates from the 1890s to 1960 (Fike 2002; IMACS 1984). Aqua glass was very versatile and used for many purposes and dated from 1800 to 1910 (Fike 2002; IMACS 1984).

Feature F1 is a historic foundation composed of non-reinforced poured concrete measuring 23 feet east to west and 21 feet north to south (**Figures 21-23**). The foundation is poorly preserved, and the concrete has degraded into smaller blocks. Linear alignments of concrete blocks form the north and west walls, with no concrete alignment observed along the south portion. The east foundation concrete slabs remain largely upright. The foundation is surrounded on the north, east, and west sides by a shallow depression measuring five feet in average width. Aqua and milk glass fragments were observed along the east wall near two upright one inch and ¾ inch diameter pipes. The bed frame, a large brick scatter, barbed wire, and milled lumber fragments were observed within the depression at the southwest corner of the foundation. Additionally, concrete blocks and a large milled lumber board are scattered southeast of the southeastern foundation corner. The concrete scatter discontinues 55 feet southeast of the foundation at a cottonwood tree.

Feature F2 is a dugout feature located five feet northeast of the northeastern foundation corner of F1 and is a continuous expansion of the depression which surrounds F1 (**Figures 23 and 24**). The dugout measures 18 feet southwest to northeast, 15 feet northwest to southeast, and is approximately 3.5 feet at its deepest depth. The site's location is currently used for ranching activities, and two fence lines run 50 feet west of the foundation and 92 feet south of the foundation.

The original function of the structures recorded at site 25DW359 is unknown, though the presence of the bed frame may suggest domestic use. Dugouts are common across the Plains and often represent the only remains of early-settlement semi- subterranean sod houses. Often, more permanent homes were built near these dugouts as sturdier materials became available. However, dugout depressions may also represent the location of semi-subterranean cellars.

Historic homestead site 25DW359 was probably occupied from the early to mid-1900s. This historic homestead consists of features and debris commonly recorded in the area, but the National Register criteria does not dismiss resources as insignificant simply because there are numerous examples of the type.

National Register eligibility for any property, including historic period archeological sites, depends on integrity and significance. Integrity for a historic period archaeological site is based on the presence of features and whether or not they can tell us something about the location. Site 25DW359 is probably an early historic homestead that does not retain enough integrity to qualify for the National Register. Lack of integrity alone, however, does not automatically exclude this site as eligible for the National Register. Significance was assessed following intensive survey and a historic records search that included a files search and architectural/structures property search conducted through the Nebraska SHPO; review of the National Register of Historic Places (NRHP) database for Dawes County, Nebraska; review of the National Historic Landmark inventory (NHL); review of General Land Office (GLO) Plats; and local literature review; that revealed sustained Euro-American historic occupation in this area occurred between 1890 to present day, and no leases or purchasers were found that can be associated with an important person or persons of "significance in history" or having an uncommon ethnic affiliation. Finally, the features associated with site 25DW359 lack a unique design and any other unusual physical characteristic. Therefore, site 25DW359 does not possess enough significance to qualify for the National Register. Site 25DW359 is a common historic site likely associated with historic and early modern ranching or farming activities in the region that ARCADIS recommends **not eligible for listing on the NRHP and no further work is necessary**.

Figure 20. Site 25DW359, Site overview, facing southeast. Crew members on left at Feature 2. Crew member on right at Feature 1. Photograph taken by Shane Rosenthal, on 1/19/2011.

Figure 21. Site 25DW359, Feature F1, facing south. Photograph taken by Shane Rosenthal, on 1/19/2011.

Figure 22. Site 25DW359, Feature F1, debris scatter with concrete foundation and milled lumber, facing west. Photograph taken by Shane Rosenthal, on 1/19/2011.

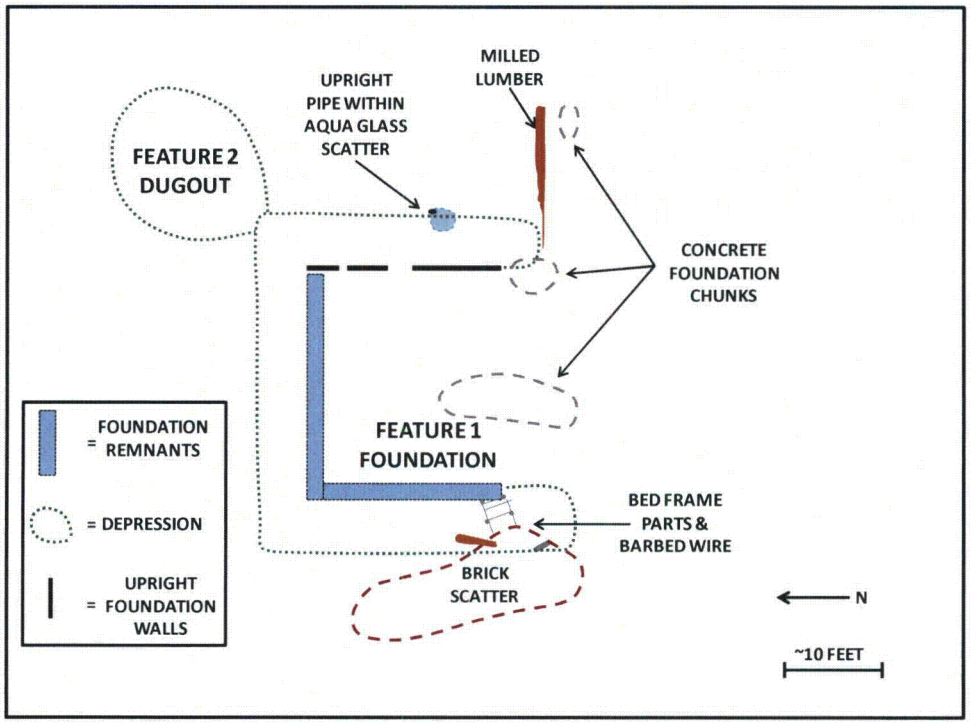

Figure 23. Site 25DW359, Feature F1 and F2 plan view drawing. Drawing by Ashley Howder, on 1/18/2011.

Figure 24. Site 25DW359, Feature F2 dugout, facing north. Photograph taken by Shane Rosenthal, on 1/19/2011.

25DW360 (2368-S005)

Site 25DW360 is a historic homestead located in Section 26 T30N R51W on the northeastern slope of a drainage cut (**Figures 26 and 46**). An ephemeral drainage runs through the site. The site measures 840 feet by 410 feet and covers an area of 261,200 square feet. Vegetation consists of ponderosa pine forest and mixed grasses affording variable visibility that averaged between 50 to 80 percent bare ground visibility. Impacts to the site include historic ranching and farming activities throughout the area, wind and water erosion, and grazing. The site datum is a GPS point taken at the SE corner of the Feature F1.

Cultural materials consist of four historic foundations (Features F1, F4, F8, and F9), two depression features (Features F5 and F7), one dugout (Feature F3), one cellar (Feature F2), one cistern (Feature F6), and an extensive historic debris scatter. Artifacts and features were observed within the drainage bottom, along the northeast slope, and across the ridge top to the north and northeast of the features. Domestic, ranching, and farming, debris is scattered across the site, and includes over 100 common red fired-clay bricks, three water pumps bearing the company stamps "Barnes MFG. Co," "Dempster Mill MFG. Co.," and "Red Jacket," a lawn mower, a bed frame, wash room items that included a bath tub, toilet, and sink, poultry cage wire, numerous barbed wire rolls, a ripper (**Figure 27**), and other assorted household goods.

Feature F1 is a house foundation composed of at least two rooms measuring 20 feet east to west and 25 feet north to south, with a single room extending west from the center of the primary rooms measuring 18 feet east to west and 10 feet north to south (**Figures 28 and 29**). The foundation walls consist of linear arrangements of sandstone stones that were locally acquired undressed sandstone boulders and cobbles. The remnants of a brick chimney are located along the south wall of the largest southeastern room, and a low dirt berm running north from the chimney divides this room into two shallow depressions. Brick scatters are concentrated within these depressions, though it is unclear if erosion or architectural elements caused these depressions. A third brick concentration is located in the western room. Few artifacts were observed within the foundation, though a three inch-diameter upright pipe was buried in the southwest corner of the west room. Another six inch-diameter pipe, scrap metal, and a "Barnes MFG. Co." water pump (**Figure 30**) were observed northwest and north of the foundation. A poured concrete sidewalk measuring four feet wide intersects the west room from the south, and continues south for 41 feet, where a cottonwood tree and the remains of a sink and toilet tank were observed (**Figures 31 and 32**). Additionally, a metal concrete-filled ring and a concrete-filled spoked wagon wheel are located to the east of the foundation, and may have been used as a well cover.

Feature F2 is a root cellar measuring nine feet by eight feet (**Figures 33 and 34**). Feature F2 is located 80 feet north of Feature F1. The cellar consists of a rough dugout, with horizontal eight inch-square hewn wooden beams laying perpendicular to large complete support poles. The ceiling is supported by vertical eight inch-square hewn wooden posts. The roof beams have been covered with soil, and access is by a south-facing door constructed of milled lumber with a clothes iron handle. The feature is estimated to have been six feet deep. A five inch-diameter terra cotta pipe remained upright in the dirt roof, and an identical pipe was observed on the south entrance slope. These pipes likely worked to provide ventilation and indicate that the structure was used as a vegetable or root cellar.

Feature F3 is a dugout feature located on the east slope of the ridge 28 feet northwest of Feature 2 (**Figure 35**). The feature measures 12 feet east to west and 18 feet north to south, with a mature cottonwood tree at the southeast edge. The depth of the feature averages four feet at the deepest. No artifacts were observed in association with the feature.

Feature F4 is a poured concrete slab foundation measuring 15 feet by 15 feet (**Figure 36**). The foundation is located 128 feet south of Feature 1. No artifacts were observed in association with this feature.

Feature F5 is a debris-filled depression located 182 feet southeast of Feature F1 (**Figures 37 and 39**). The depression measures 25 feet north to south, 16 feet east to west, and is approximately eight feet deep. Within the feature is a historic debris pile consisting of chicken wire, barbed wire, wooden poles, milled lumber, and a "Dempster Mill MFG Co." windmill motor. A water pump stamped with "Red Jacket" was observed at the south edge of the depression, and another water pump of unknown make was located within the depression.

Feature F6 is a poured concrete cistern located on the ridge top 36 feet east of Feature F5 and measures 12 feet square (**Figures 38 and 39**). A raised metal ring acts as rooftop access to the cistern's contents, with a poured concrete slab acting as a cap. Within this cap, scrap metal and bolts were used as concrete reinforcement and handles. The letters "E H" were pressed into the concrete cap (**Figure 40**). Four long, narrow windmill pipes rest along the east half of the cistern. To the northwest is a four feet square poured concrete slab with a six inch-diameter upright pipe in the center. This small slab may have been a foundation support for a windmill.

Feature F7 is a large depression located within a finger ridge of a south facing slope 300 feet southeast of Feature 8 (**Figures 41 and 42**). The depression measures approximately 40 feet northwest to southeast and 30 feet southwest to northeast. Debris, consisting mostly of fence posts, various wire bales, and corrugated sheet metal, has been placed into the depression.

Feature F8 is a foundation of five inch-wide poured concrete measuring 18 feet square (**Figures 43 and 44**). It is located 117 feet southeast of Feature 4. A metal barrel ring band and a small depression with a concentration of crumbling foundation pieces were observed within the feature, and several larger pieces of degraded foundation are located at the southwest corner of the feature. The foundation is in very poor condition.

Feature F9 is located on the western side of a two-track road 69 feet west of Feature F4. Feature F9 is a partial foundation of five inch-wide poured concrete measuring three feet long on the east wall and five feet long on the north wall (**Figure 45**). However, a shallow depression measuring 22 feet east to west and 10 feet north to south delineates the original structure's dimensions. No artifacts were observed in association with this feature.

Historic homestead site 25DW360 was probably occupied from the early to mid-1900s. This historic homestead consists of features and debris commonly recorded in the area, but the National Register criteria does not dismiss resources as insignificant simply because there are numerous examples of the type. National Register eligibility for any property, including historic period archeological sites, depends on integrity and significance. Integrity for a historic period archaeological site is based on the presence of features and whether or not they can tell us something about the location. Site 25DW360 is probably an early historic homestead that does not retain enough integrity to qualify for the National Register. Lack of integrity alone, however, does not automatically exclude this site as eligible for the National Register. Significance was assessed following intensive survey and a historic records search that included a files search and architectural/structures property search conducted through the Nebraska SHPO; review of the National Register of Historic Places (NRHP) database for Dawes County, Nebraska; review of the National Historic Landmark inventory (NHL); review of General Land Office (GLO) Plats; and local literature review;

that revealed sustained Euro-American historic occupation in this area occurred between 1890 to present day, and no leases or purchasers were found that can be associated with an important person or persons of "significance in history" or having an uncommon ethnic affiliation. Finally, due primarily to their poor condition, the features associated with site 25DW360 lack a unique design and any other unusual physical characteristic. Therefore, site 25DW360 does not possess enough significance to qualify for the National Register. Site 25DW360 is a common historic site likely associated with historic and early modern ranching or farming activities in the region that ARCADIS recommends **not eligible for listing on the NRHP and no further work is necessary**.

Figure 26. 25DW360, site overview from Feature F6, facing south. Photograph taken by Shane Rosenthal, on 11/20/2010.

Figure 27. 25DW360, ripper, facing west. Photograph taken by Shane Rosenthal, on 11/20/2010.

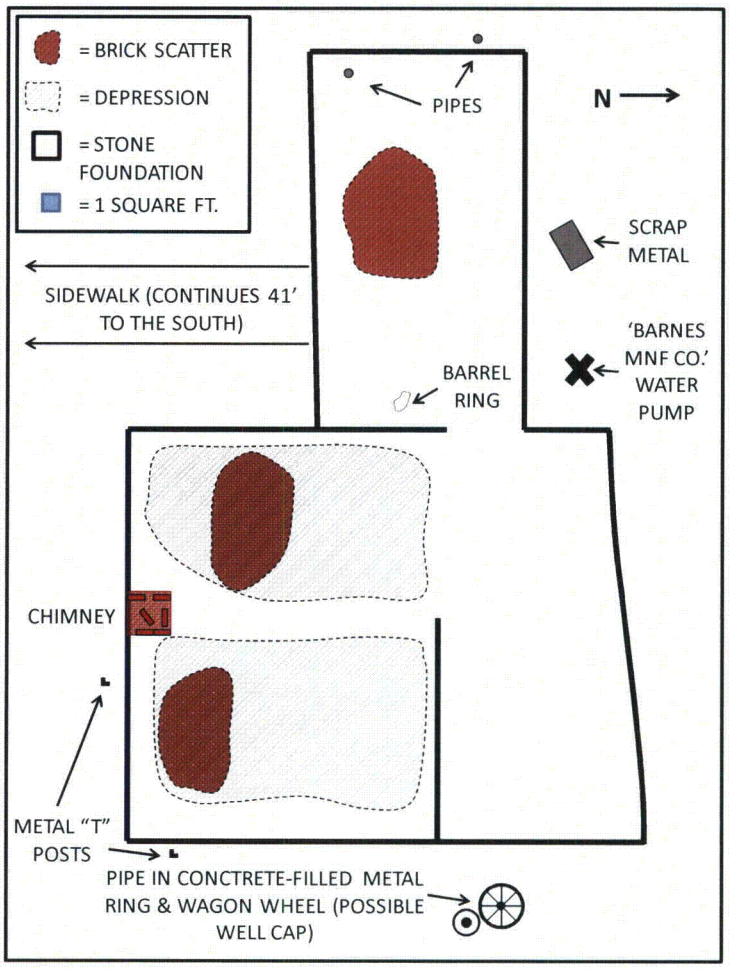

Figure 28. 25DW360, Feature F1, plan view drawing. Drawing by Ashley Howder, on 1/18/2011.

Figure 29. 25DW360, Feature F1, facing west. Photograph taken by Shane Rosenthal, on 11/20/2010.

Figure 30. 25DW360, Feature F1, north wall with water pump, facing west. Photograph taken by Shane Rosenthal, on 11/20/2010.

Figure 31. 25DW360, sidewalk from Feature F1, facing west. Photograph taken by Shane Rosenthal, on 11/20/2010.

Figure 32. 25DW360, Debris scatter at south end of sidewalk. Photograph taken by Shane Rosenthal, on 11/20/2010.

Figure 33. 25DW360 Feature F2, root cellar, facing south. Photograph taken by Shane Rosenthal, on 11/20/2010.

Figure 34. 25DW360 Feature F2, root cellar, facing south. Photograph taken by Shane Rosenthal, on 11/20/2010.

Figure 35. 25DW360 Feature F3, dugout, facing east. Photograph taken by Shane Rosenthal, on 11/20/2010.

Figure 36. 25DW360 Feature F4, concrete slab foundation, facing northeast. Photograph taken by Shane Rosenthal, on 11/20/2010.

Figure 37. 25DW360 Feature F5, dugout with cistern (Feature F6) in background, facing east. Photograph taken by Shane Rosenthal, on 11/20/2010.

Figure 38. 25DW360 Feature F6, cistern, facing north. Photograph taken by Shane Rosenthal, on 11/20/2010.

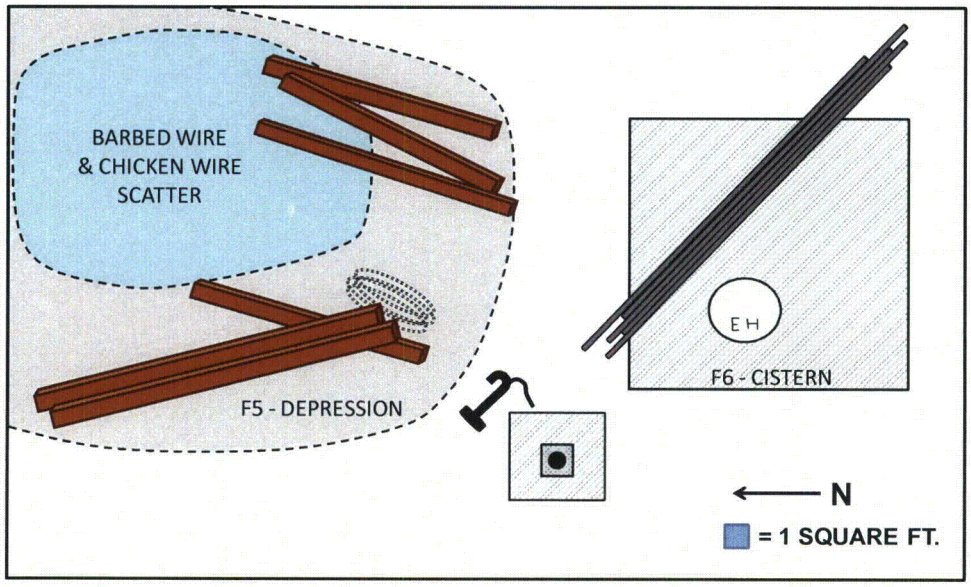

Figure 39. 25DW360 Features F5 & F6, plan view drawing. Drawing by Ashley Howder, on 1/18/2011.

Figure 40. 25DW360 Feature F6, cistern stamp "EH". Photograph taken by Shane Rosenthal, on 11/20/2010.

Figure 41. 25DW360 Feature F7, dugout, facing north. Photograph taken by Shane Rosenthal, on 11/20/2010.

Figure 42. 25DW360 Feature F7, dugout contents, facing south. Photograph taken by Shane Rosenthal, on 11/20/2010.

Figure 43. 25DW360 Feature F8, foundation, facing northwest. Photograph taken by Shane Rosenthal, on 11/20/2010.

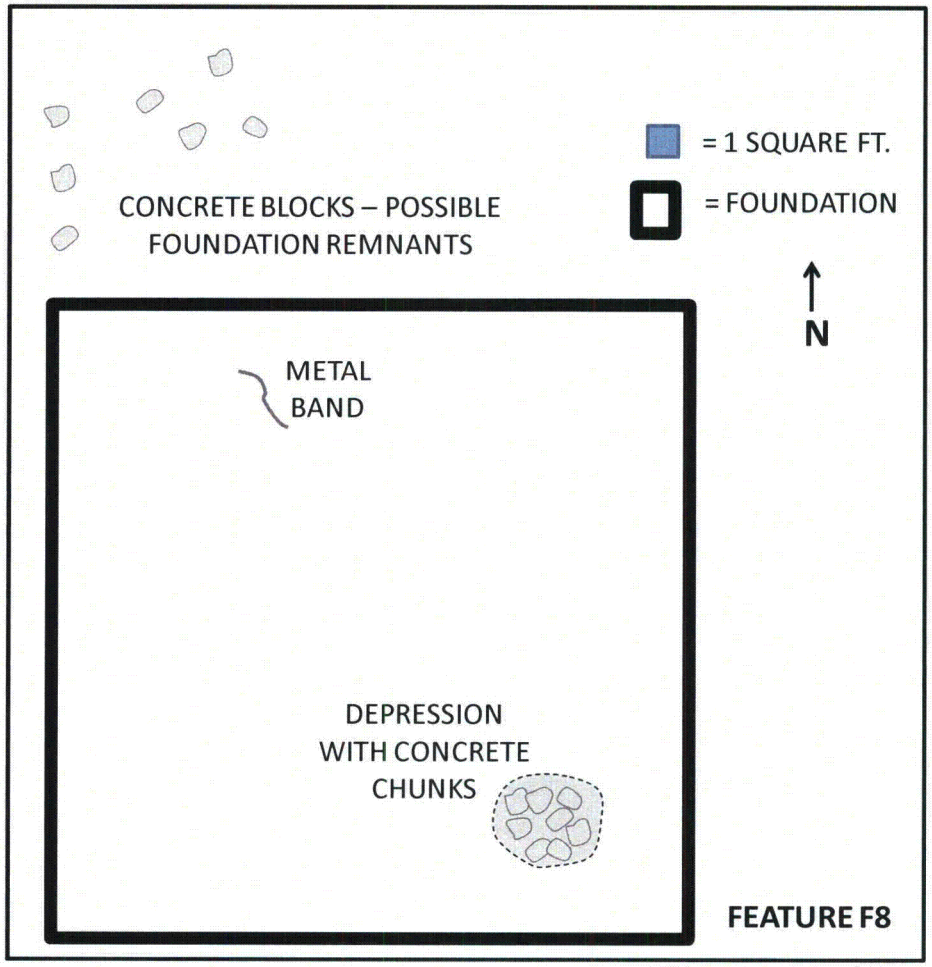

Figure 44. 25DW360 Feature F8 plan view drawing. Drawing by Ashley Howder, on 1/18/2011.

Figure 45. 25DW360 Feature F9, partial foundation, facing north. Photograph taken by Shane Rosenthal, on 11/20/2010.