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AN ARCHEOLOGICAL SURVEY OF THE
CROSS DITCH NO. 2 AND CENTRAL DITCH CLEANOUT PROJECT
POINSETT COUNTY, ARKANSAS

by

Robert A. Taylor and Carol S. Spears

FINAL REPORT

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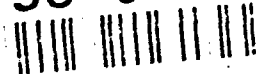
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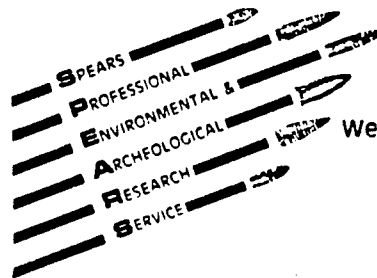
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FINAL REPORT

October 1986

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ABSTRACT

An intensive cultural resource survey with initial site testing was conducted by Spears Professional Environmental & Archeological Research Service (SPEARS) for the U. S. Army, Corps of Engineers, Memphis District. The surveyed area consisted of about 1.5 miles of ditch corridor along Cross Ditch No. 2 and Central Ditch in the St. Francis Floodway levee system of Poinsett County. One previously unrecorded site, designated as 3PO492, was found. Controlled surface collections were performed at the site and the diagnostic artifacts included: one human tooth (molar); shell, sand, and clay tempered pottery; one Nodena arrowpoint; and 2 Weems projectile points. Initial testing consisting of the excavation of one 1m x 1m unit indicated that intact deposits lay buried beneath a 15 cm plowzone and a 10 cm sterile clay band. This site had been bisected by the Cross Ditch No. 2 and artifacts removed in ditch construction were found in the plowzone and/or on the surface of fields on both sides of the ditch. Datable artifacts indicate that the site dates to the Woodland and Mississippian Periods, with evidence of the Tchula (Early Woodland), the Cherry Valley (Middle Mississippian), and the Parkin (Late Mississippian) phases represented in the assemblage. 3PO492 contains information related to lithic and ceramic technology, human biophysical remains, faunal and floral resources. The site is eligible for nomination to the National Register of Historic Places. Testing is recommended to determine subsurface boundaries and the potential construction impacts of the proposed project to characteristics which lend significance to the site.

MANAGEMENT SUMMARY

The U.S. Army Corps of Engineers, Memphis District, contracted (No. DACW66-86-M-1097) with Spears Professional Environmental and Archeological Research Service (SPEARS) for an intensive cultural resources survey of the Central Ditch and Cross Ditch No. 2 Cleanout Project in Poinsett County, Arkansas. The area surveyed consists of approximately 1.5 miles along both banks of Cross Ditch No. 2 and the left (south) bank of Central Ditch. The right-of-way extends 100 feet east and 200 feet west of Cross Ditch No. 2 and 100 feet landward from the left top bank of Central Ditch.

The intensive survey was conducted by Carol S. Spears and Robert A. Taylor, June 14-16, 1986, to determine the number, types, extent and distribution of cultural resources present and their relationship to project features. Ground surface visibility, except for a small area at the south end of Cross Ditch No. 2 and the area buried by spoil from earlier ditch excavations, was excellent. The SPEARS team walked the entire right-of-way at intervals of about 15 meters. One previously unrecorded site was assigned state site number 3PO492. Horizontal site boundaries were derived by the use of surface observation procedures including controlled surface collections, and one 1x1 meter test unit was excavated. Based on these investigations, the site was found to be eligible for nomination to the National Register of Historic Places.

Because contract specifications stated that shovel tests were not required where ground surface visibility was excellent, systematic shovel tests were not excavated. A few shovel tests were excavated near isolated finds and elsewhere to record local variations in soils. Four shovel tests were excavated along the Central Ditch right-of-way in areas represented by different surface soil textures. These shovel tests indicated that much of the sand and clay soils on the surface were recently deposited over a homogeneous clay. No cultural materials were found on the surface or in any of the shovel tests.

A single chert flake was found at each of two loci near the south end of Cross Ditch No. 2. These isolated finds may be associated with 3PO492. Shovel tests near the isolated flakes revealed no other cultural materials. Two chert fragments were also found north of 3PO492. Neither could be positively identified as prehistoric artifacts, and a shovel test excavated near their location encountered no cultural materials or anthropic soils.

Three other shovel tests were excavated on the west side of Cross Ditch No. 2. All encountered soils were interpreted to be recent alluvial deposits overlying Sharkey clay, and all were devoid of artifacts or anthropic soils. One additional shovel test was dug near the south end of Cross Ditch No. 2 in a low visibility area immediately south of Ditch No. 79. This test revealed spoil from Ditch No. 79 to a depth of 60 centimeters below the surface, overlying a homogeneous grayish brown sand which extended to a depth greater than 90 centimeters. No cultural materials were found in this shovel test.

Site 3PO492 was identified as a scatter of prehistoric cultural debris including both lithics and clay tempered ceramics. This scatter extended about 25 meters east of Cross Ditch No. 2 and continued across the entire 200 feet of the right-of-way on the west side of the ditch, including both sides of a small lateral ditch nearly parallel to Cross Ditch No. 2. The scatter corresponded to a barely discernible rise in the ground surface.

A grid was established at the site prior to initial site testing which included controlled surface collections and one 1x1 meter test unit. A galvanized metal pipe was set for datum at the western edge of the surface distribution on the east bank of the small lateral ditch. This datum is located 26.0 meters north and 5.5 meters east of a wooden stake on the west bank of the lateral ditch. This wooden stake is labelled "18 + 12 44", and probably marks the western limit of the proposed Cross Ditch No. 2 cleanout right-of-way.

The controlled surface collection was conducted in three 4 meter wide transects or rows divided into a total of 56 4x4 meter collection units, each separately catalogued. These collection units represent about 25% of the site area as determined by the surface distribution of artifacts. Artifact densities outside the transects were low and did not warrant controlled collections. In each unit, 100% of the visible cultural material was collected. Artifact densities ranged from 0 to about 100 artifacts per unit.

The surface collections indicated that all of the ceramic materials were concentrated at the north end of the artifact scatter and adjacent to the west bank of Cross Ditch No. 2. In addition, two Weems type projectile points and the enamel portion of one human tooth were found in the same area of the site as the ceramics. Because of these local distributions, a 1x1 meter test unit (Test Unit 1) was positioned in this area of the site.

Test Unit 1 was excavated in 10 centimeter levels to a depth of 50 centimeters below the surface, and one corner of the unit was further excavated to 65 centimeters below the surface. The extremely high clay content of the soil prevented screening (except for the top few centimeters), but the soil was carefully troweled and thinly shaved with a shovel. Both verbal

descriptions and horizontal plan drawings were prepared for each excavation level. Each floor plan view was photographed in both black and white and color. In addition, a vertical profile of the south wall of the unit was drawn and photographed.

The plowzone in Test Unit 1 was 15 centimeters thick and was excavated in two levels. It was a very dark brown clay loam and contained flakes removed from small gravels, clay tempered and shell tempered ceramics, and one Nodena projectile point. Beneath the plowzone was a nearly sterile layer of highly mottled clay about 10 centimeters thick. Below this nearly sterile layer was a darker clay containing charcoal and other cultural materials including both clay tempered and shell tempered ceramics and burned bone. These artifacts were concentrated at the upper surface of the darker clay at about 24 centimeters below the ground surface. Sherds were found in this darker clay to a depth of about 40 centimeters below the ground surface, but few at that depth appeared to be shell tempered. The majority of lithic artifacts, mostly small flakes, were distributed throughout the clay to a depth of about 50 centimeters below the ground surface. At that depth, the clay became a lighter color. Some flakes were found in this lighter colored clay to a depth of 65 centimeters below the surface, where the unit was terminated.

The stratigraphic profile in Test Unit 1 is interpreted to represent a buried cultural horizon--the darker clay--covered under spoil from previous construction of Cross Ditch No. 2 and the small lateral ditch. The artifacts in the plowzone and on the surface appear to be derived from the spoil of the two ditches which bisected a prehistoric site. The sterile 10 cm clay cap is probably a naturally deposited slackwater sediment.

At least two and probably three prehistoric cultural phases are represented by the artifacts recovered from 3P0492. The oldest component is identified by the Weems projectile points which have been associated with the Tchula phase of the Early Woodland Period at the McCarty Site only a few miles from the current project area. The clay tempered ceramics found at 3P0492 are probably associated with this phase also.

The Nodena point found in the plowzone in Test Unit 1 is a marker for the Late Mississippian Parkin phase. Nodena points are usually found associated with the large villages characteristic of Late Mississippian populations and the occurrence of the point at 3P0492 may indicate that the site was used as a hunting camp during the Late Mississippian period (Morse and Morse 1983:271-273). The shell tempered ceramics found at the site could be associated with the Nodena point, but, on the basis of other known sites in the area, are expected to be associated with the dispersed settlements of the Middle Mississippian Cherry Valley phase.

Because 3P0492 is a buried site with stratigraphic levels resulting from alluviation and previous deposition of ditch spoil, and because it contains significant cultural resources

including data on lithic and ceramic technologies, faunal preservation, and human remains (probably representing burials), it is eligible for nomination to the National Register of Historic Places. SPEARS recommends that additional testing be conducted at the site to gather the necessary information to complete the National Register form and to determine the potential construction impacts of the proposed project in order to devise a data recovery plan, if needed. This testing should include deep subsurface investigations on both sides of Cross Ditch No. 2 and the small lateral ditch to determine both horizontal and vertical site dimensions. Controlled excavations may also be conducted to determine the distribution of the clay tempered and shell tempered ceramics at the site and to test for possible pre-ceramic horizons. Special consideration should be given to the recovery of floral and faunal materials and to geomorphic interpretations leading to reconstructions of local paleoenvironments.

INTRODUCTION

The U.S. Army Corps of Engineers, Memphis District, contracted with Spears Professional Environmental and Archeological Research Service (SPEARS) for an intensive cultural resources survey of the Central Ditch and Cross Ditch No. 2 cleanout project in Polk County, Arkansas (No. DACW66-86-M-1097). The area investigated consisted of approximately 36 acres along both banks of Cross Ditch No. 2 and the left (south) bank of Central Ditch. The surveyed right-of-way extends 100 feet east and 200 feet west of Cross Ditch No. 2 for 4,200 feet from its junction with Ditch No. 109 to Central Ditch. The right-of-way along Central Ditch extends 100 feet landward from the left top bank to 3,000 feet east from Cross Ditch No. 2. This project is located entirely within the St. Francis Floodway levee system (Figure 1).

An intensive survey for cultural resources as defined in the Scope of Work included a comprehensive, systematic, and detailed on the ground survey of an area, of sufficient intensity to determine the number, types, extent and distribution of cultural resources present and their relationship to project features. Shovel tests were to be excavated where surface visibility was poor. Horizontal site boundaries were to be derived by surface observation procedures including controlled surface collections of at least 25% of the site area. Shovel tests were to be used to define site boundaries only where conditions were not conducive to controlled surface collections. One 1x1 meter subsurface test was required at each site unless it could be conclusively and definitely demonstrated that no significant subsurface cultural resources remained. Recommendations for additional subsurface tests to determine significance at potentially eligible sites were to be presented in the project report. For more details on the project, the Scope of Work is presented in Appendix B.

The survey and initial site testing was conducted by Carol S. Spears and Robert A. Taylor from June 13-16, 1986. Surface visibility in the project area was excellent, except for a small area at the south end of Cross Ditch No. 2 where a shovel test was excavated. The majority of the right-of-way contained spoil from earlier ditch construction. The survey team walked the entire project area in transects at intervals of about 15 m apart and one previously unrecorded site, 3PC492, was found. Initial testing including controlled collections and one test excavation was conducted at this site. One week after completion of the fieldwork, a management summary was submitted to the Memphis

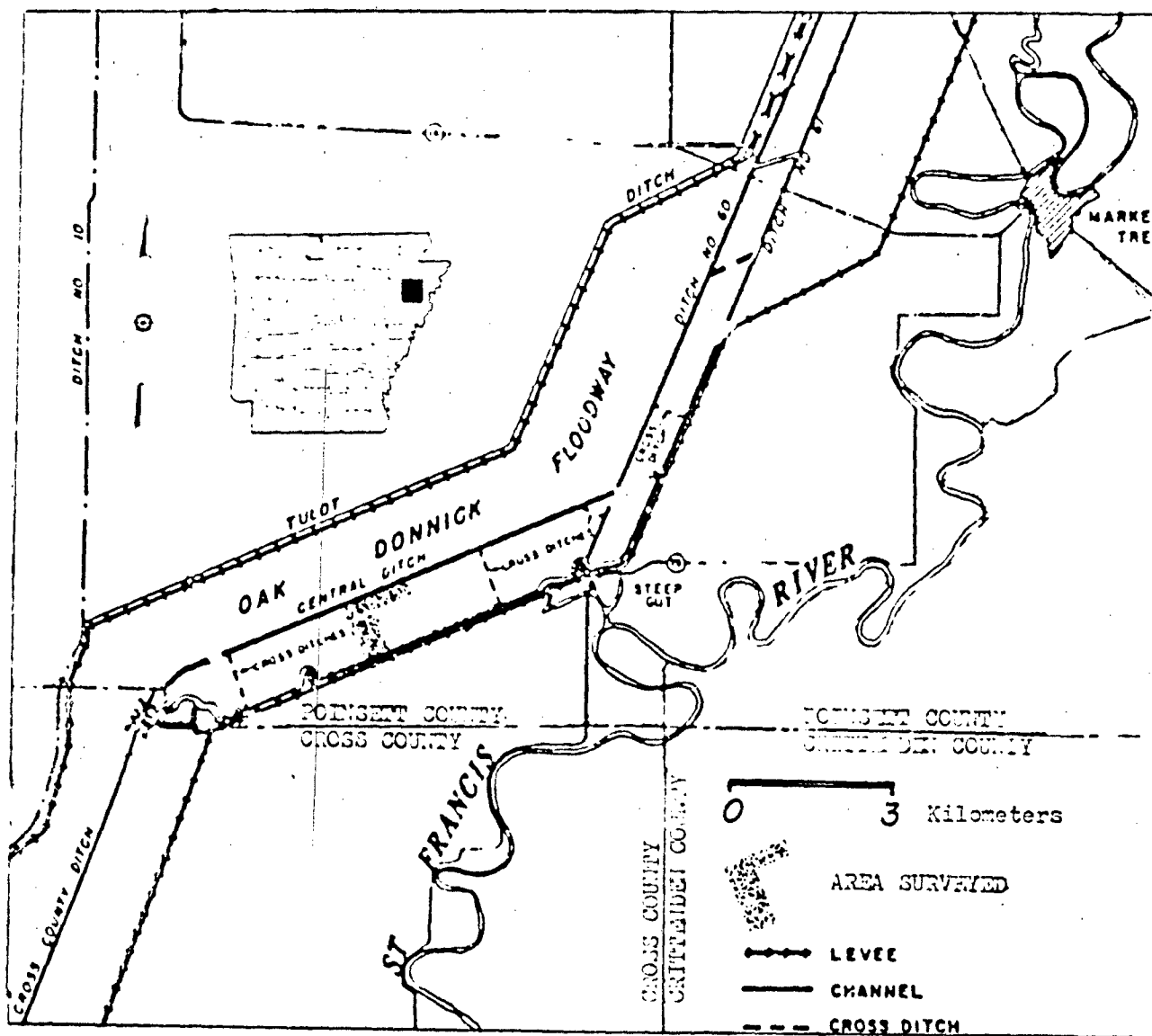


Figure 1. Area Surveyed.

Corps of Engineers. Analysis of the artifacts was accomplished by Taylor and Spears during a total of 6.5 hours between July 4-6, 1986. The majority of the report was written during the week of July 14-18, 1986. Constraints on the project were few. Rainy weather the week of June 7, 1986 inundated the land in the the floodway and fieldwork was postponed for one week. Except for the typical hot, humid summer weather and the compact clay soils which were hard to excavate and impossible to screen, the project ran fairly smoothly.

Results of the investigations indicate that 3PO492 is a buried site containing intact, stratified, cultural deposits. The site has been bisected by Cross Ditch 2 and a small lateral drainage. Ditch spoil containing cultural material has been spread over an area of the field measuring about 150 x 45 m. The plowzone is about 15 cm thick and it is underlain by a slackwater sediment which is 10 cm thick. Diagnostic artifacts collected indicate that the site dates during the Early Woodland and the Middle and Late Mississippian periods.

Initial site testing demonstrated that 3PO492 contains information on lithic and ceramic technologies, faunal remains, and human biophysical data. The site is eligible for nomination to the National Register. Further testing is recommended in order to determine the limits of the subsurface deposits. This testing should include deep backhoe trenches on both sides of Cross Ditch No. 2 and the small lateral ditch to identify both horizontal and vertical site dimensions, the amount of disturbance from previous ditch construction and the geomorphology of the landform. Testing is also necessary to supply information prerequisite to determining data recovery research domains and procedures, and/or the construction impacts of the proposed project to characteristics which lend significance to the site. The test excavations should also provide additional information on the nature of the cultural deposits, the distribution of the clay, shell, and grog tempered ceramics, and the potential for more deeply buried pre-ceramic horizons. Special consideration should be given to the recovery of floral and faunal materials, datable carbon samples, pollen, and geomorphic interpretations which could lead to reconstructions of local paleoenvironments and a better understanding of the evolution of the landforms and their subsequent cultural habitation or use.

EFFECTIVE ENVIRONMENT

Project Location and Geology

The project area is located in the St. Francis River Basin. The St. Francis River has its headwaters in the rugged hill section of southeastern Missouri and flows south to the Mississippi River about 10 miles north of Helena (Figure 2). North of Marked Tree, the river flows through the sunken lands and continues to where a levee has been constructed across the river. A siphon over the levee provides for low flows into the old channel area. Flood flows are diverted through the Oak Donnicks (also called the Steep Gut) Floodway. The project area lies in the southern part of this floodway at an elevation of 207 feet AMSL. Today as in the past, the area is frequently inundated by wide shallow bodies of water.

Tertiary deposits are exposed at scattered localities on Crowley's Ridge and underlie the recent alluvium throughout the basin. Quaternary deposits include the alluvial material which is primarily silt and clay and has a total thickness of 150 feet (United States Department of Agriculture 1974: II-6). Geologic history of the alluvial valley of the Lower Mississippi River has been summarized by Saucier (1968, 1974, 1970, 1981). Current theories suggest that the formerly braided Mississippi River changed to a meandering river. This occurred as early as 14,000 years ago in the southern portion of the Mississippi basin and only 4,000 years ago in the north (Saucier 1968:75). The earliest date this land, which is part of the braided stream surface or terrace, could have been occupied is about 12,000 B.P. (Figure 3). More precise geomorphic information is not available at this time although several ongoing studies are focusing on a better understanding of the geomorphology of the area and paleo-environmental reconstructions.

Soils

Sediments in the project area consist entirely of Sharkey soils, frequently flooded (Gray and Ferguson 1977). The Sharkey Association is composed of poorly drained, level clay soils on frequently flooded, depressed slack-water areas. They occur on broad flats and have slopes of less than one percent. Overwash of varying thickness of sands and silts occurs on top of the surface layer of silty clay loam to clay. The unit in the St. Francis Floodway is flooded for periods of a few days to several months between January and June. When dry, these soils shrink and crack, but when wet they expand and the cracks seal

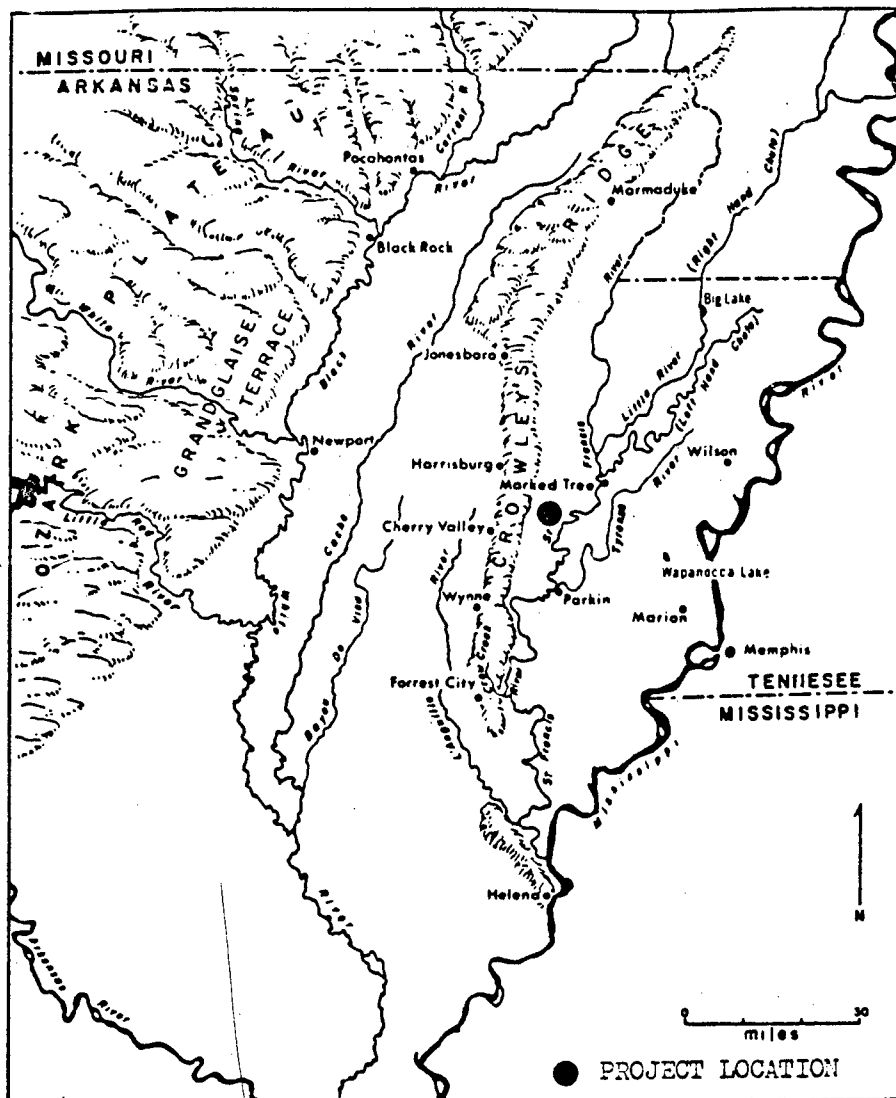


Figure 2. Project Location.

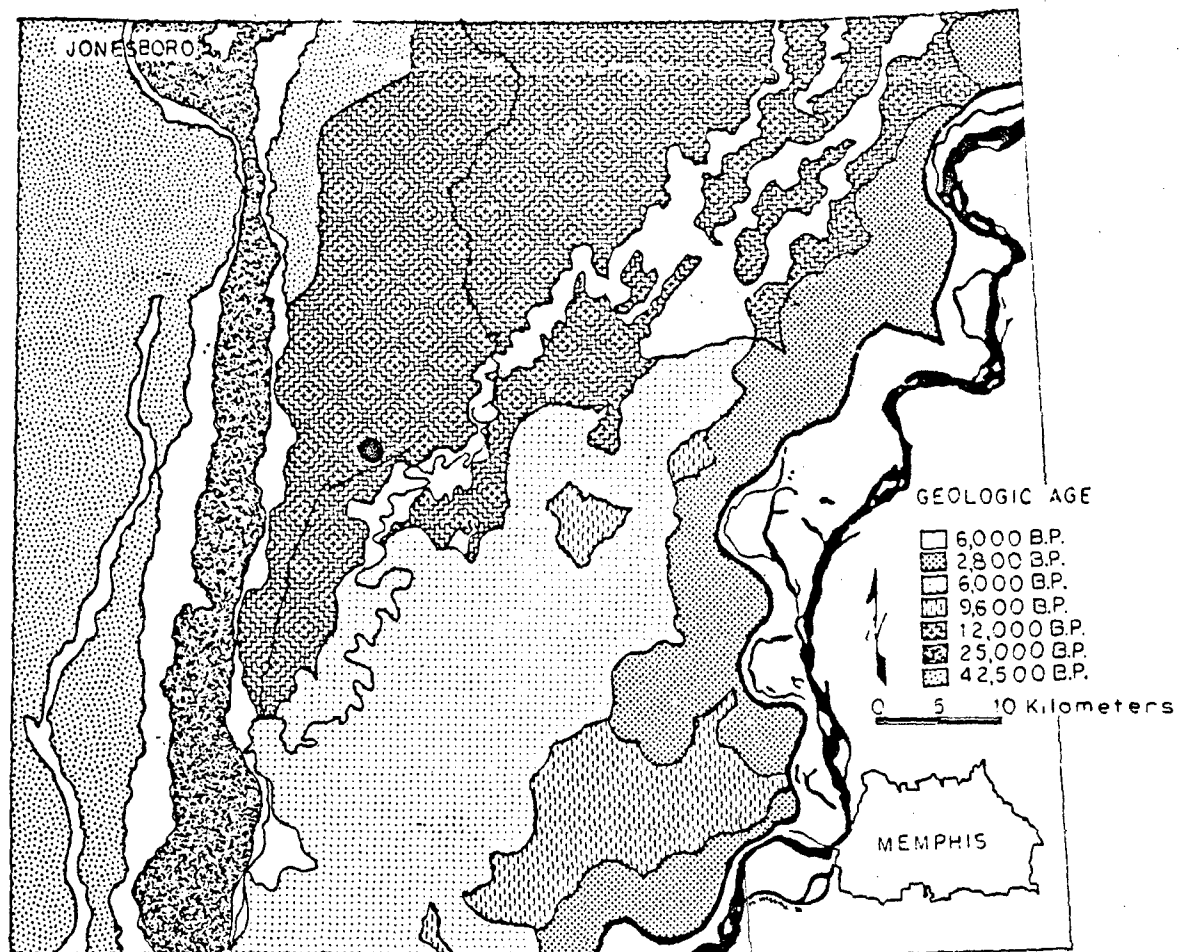


Figure 3. Earliest Dates at which Landforms became Available for Human Habitation (Adapted from Dekin et al. 1978).

when wet. They are slightly acid to mildly alkaline throughout the profile described as follows:

In a representative profile the surface is a very dark grayish-brown clay about 7 inches thick. The subsoil is dark-gray, mottled clay about 39 inches thick. The underlying material is dark-gray and gray, mottled silty clay and silty clay loam (Gray and Ferguson 1977:25).

Climate

The modern climate in the project area is mild and moist with an annual average temperature of 60 degrees F. and annual average precipitation of 50 inches. The monthly average temperatures range from 39 degrees F. in January to 81 degrees F. in July. Precipitation is chiefly in the form of rainfall and is almost evenly distributed throughout the year, with the summer and early fall months being slightly drier. The freeze-free growing season averages 218 days per year, between March 26 and October 30 (Gray and Ferguson 1977).

Prehistoric climatic conditions in the area have varied considerably since the retreat of the glaciers at the end of the Pleistocene. Pollen evidence indicates that the area became increasingly warmer and dryer until about 5000 B.C., then slowly returned to cooler, moister conditions which became essentially the same as modern conditions by 3000 B.C. This sequence is based on pollen studies at a shallow lake site in southeast Missouri (King and Allen 1977). Some variation from the modern climate has occurred periodically since 3000 B.C. These episodes may be archeologically significant, but studies to date have not tested the apparent correlation of climatic episodes and archeological events in the St. Francis basin (Morse and Morse 1983:143, 182).

Vegetation and Wildlife

The natural vegetational history has been determined by the geomorphology of the area and the climatic shifts. As the glaciers melted, pine and spruce forests were gradually replaced by deciduous forests (Delcourt et al. 1980) which in turn were replaced by grasslands as post-glacial drought conditions became intense (King and Allen 1977:321). With the return of milder conditions by 3000 B.C., the deciduous forests again became dominant. These forests contained species adapted to the swampy conditions common to the backslope drainages of the Mississippi River meander belts. Particular biotic communities common to the microenvironments within these lowland forests have been defined (Lewis 1974). A list of plant and animal species found in these communities is presented in Tables 1 and 2. With the advent of artificial drainage systems, most of the native lowland forests have been replaced by farmlands. A swamp region described in 1914 as "some small sawmill settlements and a few cultivated

fields" (Harper 1914:48) is now an almost treeless plain regularly dissected by ditches and levees. Within the present project vicinity, which was entirely forested as late as 1959 (U.S. Department of Interior 1964:Plate 6), only one square mile of forest remains. This is the Singer Forest Natural Heritage Area which is now a Wildlife Management Area of the Arkansas Game and Fish Commission.

Table 1. Common Species of Animals in the St. Francis Basin.

White tailed deer	<u>Odocoileus virginianus</u>
Black bear	<u>Ursus americanus</u>
Mountain lion	<u>Felis concolor</u>
Bobcat	<u>Lynx rufus</u>
Opossum	<u>Didelphis marsupialis</u>
Raccoon	<u>Procyon lotor</u>
Striped Skunk	<u>Mephitis mephitis</u>
Eastern cottontail rabbit	<u>Sylvilagus floridanus</u>
Swamp rabbit	<u>Sylvilagus aquaticus</u>
Red fox	<u>Vulpes fulva</u>
Gray fox	<u>Urocyon cinereoargenteus</u>
Eastern gray squirrel	<u>Sciurus carolinensis</u>
Fox squirrel	<u>Sciurus niger</u>
Muskrat	<u>Ondatra zibethicus</u>
Mink	<u>Mustela vison</u>
Otter	<u>Lutra canadensis</u>
Mouse	<u>Peromyscus leucopus</u>
Frog	<u>Rana</u> spp.
Passenger pigeons	<u>Ectopistes migratorius</u>
Ruffed grouse	<u>Bonasa umbellus</u>
Turkey	<u>Meleagris gallopavo</u>
Prairie chicken	<u>Tympanuchus cupido</u>
Carolina parakeet	<u>Cornuropsis carolinensis</u>
Ducks	spp.
Geese	spp.
Heron	<u>Florida caerulea caerulea</u>

 Table 2. Common Plant Species in the St. Francis Basin.

Elm	<u>Ulmus</u> sp.
Sweetgum	<u>Liquidambar</u> <u>Styraciflua</u>
Ash	<u>Fraxinus</u> sp.
Hackberry	<u>Celtis occidentalis</u>
Maple	<u>Acer</u> spp.
Bald Cypress	<u>Taxodium distichum</u>
Hickory	<u>Carya</u> spp.
Burr Oak	<u>Quercus macrocarpa</u>
Cottonwood	<u>Populus deltoides</u>
Persimmon	<u>Diospyros virginiana</u>
Willow	<u>Salix</u> sp.
Black Oak	<u>Quercus velutina</u>
Honey Locust	<u>Gleditsia triacanthos</u>
Black Gum	<u>Nyssa sylvatica</u>
White Oak	<u>Quercus alba</u>
Swamp Oak	<u>Quercus bicolor</u>
Pecan	<u>Carya illinoensis</u>
Red Haw	<u>Crataegus</u> sp.
Red Oak	<u>Quercus rubra</u>
Box Elder	<u>Acer Negundo</u>
Hornbeam	<u>Ostrya virginiana</u>
Black Walnut	<u>Juglans nigra</u>
Red Mulberry	<u>Morus rubra</u>
Dogwood	<u>Cornus</u> sp.
Spanish Oak	<u>Quercus falcata</u>
Overcup Oak	<u>Quercus lyrata</u>
Sycamore	<u>Platanus occidentalis</u>
Sugar Maple	<u>Acer saccharum</u>
Redbud	<u>Cercis canadensis</u>
Kentucky Coffee Tree	<u>Gymnocladus dioica</u>
Blackhaw	<u>Viburnum</u> sp.
Plum	<u>Prunus</u> sp.
Black Locust	<u>Robinia pseudo-acacia</u>
Sassafras	<u>Sassafras albidum</u>
Shellbark Hickory	<u>Carya laciniosa</u>
Post Oak	<u>Quercus stellata</u>
Wild Cherry	<u>Prunus</u> sp.

PREVIOUS RESEARCH

No previous archeological projects have been conducted in the project area. The nearest recorded site is 3PO48 which is less than one mile west of the area. Little information is available on this site.

The General Land Office Survey and old highway maps were examined prior to the fieldwork, but no historic features were observed in the vicinity of the project. The area had been frequently inundated and was not farmed until the ditches were dug in the area to drain the lowlands and the land was cleared.

Thirty nine projects within Poinsett County are listed in the files of the Office of State Archeologist. These include: early surveys of Mounds by Smith in 1881 and Eastern Arkansas by Dellinger in 1932; investigations at single sites such as Brand, Floodway Mounds, Hazel, Lace Place, Miller Mounds, Wimpsey Site, the Rivervale Site, and the McCarty Site; projects within the towns or small communities of Trumann and Payneway; in-house Corps of Engineers projects on the St. Francis Lake and in a permit area; watershed projects for the county; basin projects on the Tyronza River, St. Francis River, Cache River, and Ditch 61; and the survey and testing along a corridor from Keo to Dell.

A comprehensive overview of the region is provided in Archeology of the Central Mississippi Valley by Morse and Morse (1983). Data on the St. Francis River Basin has been collected by Dekin et al. 1978, and Keller et. al 1983.

CULTURAL HISTORY

Although people have lived in the St. Francis basin since about 9000 B.C., evidence of the earliest habitation (known as the Paleo-Indian period) is rare, consisting only of isolated finds of distinctive, fluted projectile points. These projectile points are assigned to the Crowley's Ridge phase and Sedgwick phase, each phase representing a particular distinctive point style (Morse and Morse 1983:61). No intact sites have been discovered, and there are no direct indicators of Paleo-Indian lifeways. Based on ethnographic studies of primitive societies and paleoenvironmental reconstructions, small band level societies probably depended for subsistence on a combination of hunting and fishing and collecting edible wild plants. Some intact sites of this time period (9500 to 8500 B.C.) may be preserved on late Pleistocene braided stream terraces buried by subsequent alluvium.

The next oldest prehistoric cultural period recognized in the St. Francis basin is the Dalton, or Early Archaic, period. Again, distinctive projectile points are the markers for this cultural horizon, although known sites have produced an extensive stone tool assemblage. Direct data on non-lithic tools, floral and faunal resources, and social organization are lacking, although a sophisticated band-level organization utilizing high biomass game animals, fish and wild plants is postulated. The Dalton period in northeast Arkansas is known as the L'Anguille phase, and in southeast Missouri as the Bloomfield Ridge phase; and dates from about 8500 to 7900 B.C. (Morse and Morse 1983:71).

Several other projectile point types found in northeast Arkansas have been assigned to the Early Archaic period. These types post-date the Dalton period, and Morse and Morse (1983:99-113) interpret their appearance as evidence of adaptation to a warm, dry climate beginning about 7000 B.C. This period of warm, dry climatic conditions, known as the hypsithermal, lasted from about 7000 to 3000 B.C. (Morse and Morse 1983:99). During this time, human occupation of the St. Francis basin probably became less intense, and in the period known as the Middle Archaic, the basin may have been seasonally used by populations residing outside the area.

The return of a cooler, wetter climate about 3000 B.C. corresponds to the beginning of the Late Archaic, or Poverty Point, cultural period, which lasted until about 500 B.C. (Morse and Morse 1983:115). This period is characterized by a variety of projectile point types and ground and polished stone artifacts, including atlatl weights, axes, beads, and tubular

pipes. There are also indicators of widespread trade networks represented by artifacts such as marine shells from the Gulf coast and novaculite from southwest Arkansas. One of the horizon markers for the Late Archaic period is the presence of fired clay balls known as Poverty Point objects. These presumably functioned as heating elements in earth ovens. Clay balls are not common in the St. Francis basin; but sandstone and chert can also be used in earth ovens, and fire cracked rock is common on many Late Archaic sites. Late Archaic trade networks and the numerous sites attributable to the period suggest an increase in population from the preceding periods, and these populations were probably organized at a tribal level, more complex than the earlier band level societies (Morse and Morse 1983:132).

The Woodland period of prehistoric cultural development is identified in the St. Francis basin by the presence of pottery vessels tempered with clay or sand. The Early Woodland period, dating from 500 B.C. to 0, and also called the Tchula period, is represented by non-ceramic artifacts similar to the artifacts of the preceding Late Archaic period. The addition of pottery to the tool assemblage indicates a new cooking technology; and the presence of cultivated plants in the Tchula period indicates a more sedentary settlement system than in earlier periods. However, the Late Archaic earth oven method of cooking is still used along with the Woodland cooking pots, and the cultigens found on Tchula period sites developed during the Late Archaic also. The noticeable correlation of agriculture, pottery and burial mounds suggests increased social and ceremonial organization during the Woodland period. The Tchula period is represented in the present project vicinity by one excavated site, the McCarty site (Morse 1982a), which has been assigned to the Pascola phase (Morse and Morse 1983:145-159).

The Middle Woodland period, known as the Marksville period in the central Mississippi valley and the St. Francis basin, dates from 0 to A.D. 400. This period is represented just south of the present project by the Helena phase, named after a complex of burial mounds at Helena, Arkansas, near the mouth of the St. Francis River. The phase boundaries extend up the St. Francis to near Parkin, Arkansas, but no sites are reported in the present project vicinity (Morse and Morse 1983:172-175). Known sites of the Helena phase contain the exotic artifacts typical of the Middle Woodland period, representing trade networks extending from the Gulf coast to Canada and as far west as the Rocky Mountains. Grog tempered pottery, decorated by incising, punctating, red filming and stamping, is characteristic of the Marksville period.

The Late Woodland period in the project vicinity dates from A.D. 400 to 700. The present project is on the northern boundary of the Baytown phase, identified by grog tempered ceramics decorated primarily by cordmarking. Just to the north of the present project vicinity most Late Woodland sites contain sand tempered pottery characteristic of the Dunklin phase. The two types of tempering may represent social groups organized into two

separate tribes (Morse and Morse 1983:180-199). There seems to be an increase in population during the Late Woodland period. This population is widely distributed throughout the lowlands of the St. Francis basin on small sites that probably reflect the seasonal exploitation of specific, varied environments.

About A.D. 700, the grog tempered and sand tempered ceramics of the Woodland period are replaced by shell tempered pottery. This technological innovation, along with the introduction of the bow and arrow, signals the beginning of the Mississippian cultural period. Early Mississippian populations are commonly distributed very much like the Late Woodland populations of the Baytown phase, in varied environmental zones. Archeological indicators of social organization suggest the development of incipient chiefdoms in the Early Mississippian period, with well organized villages and distribution systems. By A.D. 1000, these villages were becoming stratified politically, and were oriented around prominent civic-ceremonial centers with mounds. These mound centers served individual, independent chiefdoms recognized archeologically by significant variation in the decorated ceramics. All of these chiefdoms participated in broad exchange networks and a common ceremonial complex represented by shell ornaments, embossed copper plates, exotic lithics and human figurines. The Middle Mississippian period, which dates from A.D. 1000 to 1350, is represented in the present project area by the Cherry Valley phase (Morse and Morse 1983:241-246). By A.D. 1350, the populations in the St. Francis basin had become nucleated in large, fortified villages. These large villages indicate increasing levels of conflict among complex, powerful chiefdoms, and are the primary characteristic used to define the Late Mississippian period. One marker for this period is a distinctive arrow point which may have been developed specifically for warfare (Morse and Morse 1983:271). These chiefdoms continued to develop until their populations were decimated by diseases introduced with the earliest European explorers, and by A.D. 1673 only the Quapaw remained in any numbers in the central Mississippi valley (Morse and Morse 1983:300-301).

The earliest of the European explorers was De Soto, with his expedition of 1541. Morse and Morse (1983:305-315) have summarized a probable route of the expedition that would have taken the explorers up the St. Francis River, passing very near the present project locality. Sixteenth century European artifacts have been found at the Parkin site a few miles downstream from the present project (Klinger 1977). The area was probably not again visited by Europeans until the Marquette expedition of 1673. By 1828, the native populations had been removed by treaty from Arkansas to the Indian Territory.

Soon after the removal of the native populations, the St. Francis basin became sparsely settled by subsistence farmers who probably derived a large part of their food and some income from hunting. Because of the swampy conditions in the area, much land was undeveloped and remained available for homesteading through

the first third of the twentieth century. Timber harvesting was a major economic enterprise during this period, and was followed closely by farmsteads. These farm populations have followed the pattern set by their prehistoric predecessors in becoming increasingly nucleated and more dependent on broad exchange networks.

FIELD METHODS

Survey

Since surface visibility was excellent, most of the project right-of-way was walked in zig-zag fashion at intervals of 15 m or less. Vegetation primarily consisted of weeds and grasses. None of the areas had been prepared for cultivation this season, although they had been farmed in the past. Only one small portion of the project area was wooded and a shovel test was excavated in this vicinity. Additional shovel tests were excavated on the transects when artifacts or changes in the textures of surface sediments were observed. Because of the Sharkey clay, screening of shovel tests was not possible. However, all soil removed was closely examined for cultural material by troweling through the sediments. No cultural deposits were observed in these shovel tests, although anthropic zones may lie more deeply buried.

Controlled Surface Collections

Controlled surface collections covering about 25 per cent of the site were conducted at 3P0492. The grid was established from a permanent datum placed on the edge of a small lateral drainage. Three rows of controlled collection units which were 4 meters wide were laid out from the datum with use of a Brunton compass. Two of these transects were aligned on magnetic north and the third was positioned parallel to the Cross Ditch. Wire flags were placed every four meters along the baseline or perimeter of each collection area and a 100 meter tape was used to form the other boundary of the collection unit. All artifacts observed in each 4 x 4 m unit were collected, except for burned clay which may have formed as a result of more recent field clearing by burning.

Test Unit

One test unit was positioned in the vicinity of a cluster of sherds and the human tooth cap (molar). The 1 x 1 meter unit was laid out according to magnetic north and all depth measurements were made from a line level string attached to the southwest corner of the unit. The 15 cm plowzone was excavated in two levels. The top two centimeters were screened through 1/4 inch mesh but the sediments below that depth were too hard and plastic and screening was not possible. All other levels were excavated according to cultural or natural levels of not greater than 10 cm in thickness. Levels were shovel-skipped or troweled. The base of each level was scraped with a trowel and examined for features. Color and black and white photographs were taken of the plan view levels. The wall of the unit was scraped clean, photographed and the profile was drawn. Soil colors were recorded according to the Munsell color designations.

METHODS OF ANALYSIS

All artifacts were returned from the field to the SPEARS laboratory and checked against the Field Specimen Catalog. They were then washed, air dried and sorted. The collections include 930 artifacts, the majority of which are prehistoric lithics (776) and the remainder are ceramics (154).

Analysis was accomplished over a period of two days between July 4-7, 1986 by Project Archeologists Robert A. Taylor and Carol S. Spears. Lithics in each provenience unit were sorted by raw material and by artifact class as described in the following sections. The units and type of artifacts were counted and recorded on the Cross Ditch Analysis Form developed for this project (Figure 4). This analysis sheet included the kinds of artifacts expected on the basis of field observations. However, some of the classes of artifacts listed on the form were not recognized in the collections during the analysis. There are therefore some empty classes on the analysis sheet. Diagnostic lithic artifacts were separated out for a more detailed analysis which was accomplished by Robert A. Taylor. Ceramics were analyzed by both project archeologists.

Descriptions of other lithic categories and raw material types which follow are partly derived from several sources including The Cache River Archeological Project (Schiffer and House 1975), and Village Creek (Klinger et al. 1985).

Artifact Definitions

Immediately below are descriptions of the classes to which artifacts were assigned during analysis. Abbreviations used on the analysis sheet are presented in parentheses after the category name.

PROJECTILE POINT/KNIFE FRAGMENTS (PP/K FRAG): These are portions of bifaces other than preforms. These fragments are usually not diagnostic of a particular cultural stage, but may be indicative of a general use (if serrated, or otherwise flaked/resharpened in a diagnostic way).

BIFACE: These are artifacts which have been modified on two faces to form a working edge. They all lack hafting elements and some are late stage preforms. They are unidentifiable as to specific type.

Cross Ditch Survey

Page ____ of ____

3P0492 FSN _____ Provenience _____
 Lithics _____ Ceramics _____ Bone _____ Charcoal _____

Lithics	CRC	OC	OT	SS	O	TOTAL	BURNED
WEEMS							
NODENA							
OTHER							
PP/K FRAG							
BIFACE							
HAMMERSTONE							
SCRAPER							
UTIL BLADE/FLK							
OTHER TOOL							
CORES & FRAGS							
TESTED COBBLE							
PRIMARY DECORT							
SECOND. DECORT							
INTERIOR FLK.							
PREFORM THIN.							
BIFACIAL THIN.							
TRUE BLADE							
PRESS FLK/ABM							
FCR							
UNMOD COBBLE							
UNMOD STONE							
UNMOD ANG FRAG							
TOTAL							

Human teeth _____ Burned Bone _____ Burned Clay _____

CERAMICS

TEMPER	PLAIN	DECORATED	TOTAL
SHELL	RIM		
	BASE		
	BODY		
CLAY	RIM		
	BASE		
	BODY		
SAND	RIM		
	BASE		
	BODY		
SAND/GROG	RIM		
	BASE		
	BODY		
SAND/SHELL	RIM		
	BASE		
	BODY		
TOTAL			

Figure 4. Cross Ditch Analysis Form.

HAMMERSTONE: These are cobbles that show battering or abrasion on convex edges. Usually, the heavier the battering, the more nearly spherical the cobble will be. Fragments of cobbles that show the edge battering or characteristic interior fractures along multiple cones of force are counted in this category.

SCRAPER: These are unifaces or bifaces with at least one steep edge (straight or convex) with evidence of preparation for or use as a scraping tool. No scrapers were found at the site.

UTILIZED BLADE/FLAKE (UTIL BLADE/FLK): These are flakes or blades which show use chippage or prepared working edges. They lack flaking on the reverse face other than use chippage and, in some cases, removal of the bulb of percussion by a single secondary flake. Flakes from proveniences such as the surface and plowzone are not counted as utilized unless the secondary chipping is extensive or otherwise determined to be intentional.

CORES AND CORE FRAGMENTS (CORES & FRAGS): These are cobbles with at least three flakes removed, usually more. Most have two prepared platforms for removal of flakes and those used more extensively are completely decorticate (except perhaps on a striking platform) and have the appearance of truncated polyhedrals. Identifiable fragments, including large flakes retaining much of the striking platform, are counted in this category.

TESTED COBBLE: These are cobbles of a sufficient size to serve as cores, usually patinated cherts, which have one or two flakes removed, as if they were being tested for chippable qualities.

FLAKES OF PRIMARY DECORTICATION (PRIMARY DECORT): These are flakes of any size but often large which retain cortex on 90% or more of their obverse surface.

FLAKES OF SECONDARY DECORTICATION (SECOND. DECORT): These are flakes of any size which retain cortex on less than 90% of their obverse (dorsal) surface. Flakes with cortex only on the portion of the striking platform retained at the proximal end are not counted in this category, but are counted as interior flakes.

INTERIOR FLAKES (INTERIOR FLK.): These are flakes with no cortex, or with cortex only on the portion of the striking platform that do not have the characteristics of true blades, preform or biface thinning flakes, or pressure flakes. Interior flakes usually have a nearly right angle striking platform, or at least the striking platform is not acute and shows no bifacial flaking. This is an "other flake" category, and flakes without striking platforms or bulbs of percussion (flake fragments) are counted here. Flakes which show thermal alteration such as irregular fractures or potlids are also counted here if there is evidence that the flakes were produced by percussion before they were burned.

PREFORM THINNING FLAKES (PREFORM THIN.): These are flakes with an acute striking platform, bifacial flaking on both faces of the proximal edge, and the "lip" characteristic of soft hammer percussion. The bifacial flaking consists of broad flake scars, not apparently produced by pressure flaking and showing no use wear.

BIFACIAL THINNING FLAKES (BIFACIAL THIN.): These are flakes similar to preform thinning flakes which differ in the nature of the bifacial flake scars. At least some of the flake scars originating at the proximal edge must be the narrow, shallow scars characteristic of pressure flaking or must be the steep, short scars resulting from use. Questionable bifacial thinning flakes are counted as Preform Thinning.

TRUE BLADE: These are flakes which are at least twice as long as their maximum width. In addition they must show at least two flake scars on their obverse surface indicating the prior removal of similar long flakes. They may be either triangular or trapezoidal in transverse section. They differ from "Interior Flakes" only in their greater length-width ratio.

PRESSURE FLAKES/ABRASION MATERIAL (PRESS FLK/ABM): These are the small, thin flakes produced by application of the flaking tool to a restricted area on a thin, usually bifacial, edge. The flake expands from a narrow point of origin and usually follows a ridge produced by two earlier flake scars on its dorsal surface. There is no pronounced bulb of percussion. Very small, thin, flake fragments which were probably produced by abrading an edge prior to pressure flaking are also counted in this category.

FIRE CRACKED ROCK (FCR): These are fragments of stone of any kind which show evidence of thermal alteration, especially irregular breaks, but also including fragments with potlids and color changes and those which do not fit a more descriptive category. FCR includes some potlidded flakes on which no compression rings and no bulbs of percussion are visible. Because of thermal alteration, sorting by raw materials was difficult and no attempt was made to sort artifacts into specific chert types. All fire cracked rock identified was either "sandstone", "orthoquartzite" or "other chert".

UNMODIFIED COBBLE (UNMOD COBBLE): These are stream cobbles, with cortex, of any material from which no flakes have been removed and which do not show abrasion, polishing, pitting, or other evidence of intentional shaping.

UNMODIFIED STONE (UNMOD STONE): These are tabular pieces of stone, that show no intentional modification of any kind. They differ from the class "Unmodified Cobble" in lacking an obvious weathered patina or cortex, and differ from "Unmodified Angular Fragments" in being generally larger and having regular breaks compatible with natural exfoliation and limited weathering.

UNMODIFIED ANGULAR FRAGMENTS (UNMOD ANG FRAG): These are angular fragments of any lithic material which show no intentional shaping or use. They are mostly fragments with irregular breaks but no obvious indications of thermal alteration.

Classes of Lithic Raw Materials

The following are descriptions of the classes of raw materials used in the analysis of the lithics from the prehistoric site in the Cross Ditch Project.

These are not formal descriptions. They are based on macroscopically observed characteristics only, and are intended as a guide for the preliminary sorting appropriate to a survey and initial testing phase analysis and for planning research designs that may incorporate lithic resource studies. The abbreviations used on the Cross Ditch Analysis follow the class name.

Crowley's Ridge Chert (CRC): The chert or gravel from Crowley's Ridge is quite variable in color but is typically brown, tan, yellowish tan, gray, gray tan or cream colored. Red colors are less common and could be a result of thermal alteration. The cortex, which is usually smooth, is often darker and may be brown, reddish brown or grayish brown. Interiors are sometimes mottled, but less commonly banded.

Other Cherts (OC): These include all other cherts not typically characteristic of Crowley's Ridge Cherts. One Pitkin chert projectile point fragment was collected, in addition to several whitish cherts which are exotic and could be from quarries on the east side of the Mississippi River in Illinois. Because of the difficulty in sorting thermally altered materials, chert in the fire cracked rock class was counted as "other chert" although most of it is probably from Crowley's Ridge gravels.

Orthoquartzite (OT): This stone is whitish with clear, rounded quartz sand grains in a translucent whitish matrix. The stone is well cemented with the siliceous matrix and fractures through the quartz sand grains.

Sandstone (SS): Sandstone is composed of quartz sand grains of any size embedded in a silicate or other matrix which is softer than the quartz grains so that the stone breaks around the sand grains. Exterior colors are usually brown or reddish brown.

Other Stone (O): Any lithic material not readily identifiable as chert, orthoquartzite or sandstone is included in this class.

Ceramics

All sherds were sorted macroscopically according to temper, surface treatment, and portion of the vessel. Due to the

deteriorated condition of most of the sherds, almost all were extremely small. Most sherds had plain surfaces and contained a mixture of tempering agents. Sherds are described by tempering agents in the descriptions of diagnostic artifacts section. Sherd thickness was taken with metric calipers.

Artifact Records Curation

The artifacts and records will be curated with the Arkansas Archeological Survey at the Jonesboro Station. This includes all cultural materials, all analysis forms, all field notes and maps.

PROJECT RESULTS

Results of the Archeological Survey

Central Ditch

Along the Central Ditch portion of the area, spoil from previous ditch excavations covered most of the right-of-way to a depth of several feet. Since vegetation on the spoil bank covered about 50% of the ground surface, no shovel tests were excavated. The very low relief of the ground surface not covered by spoil provided no indications of possible historic or prehistoric site locations. Surface visibility in these areas was very good, obstructed only by sparse weeds and small areas of standing water. Four shovel tests were excavated along the Central Ditch right-of-way in areas represented by different surface soil textures. These shovel tests indicated that much of the sands and clays on the surface were recently deposited over a homogeneous clay of the Sharkey series. No cultural materials were found on the surface or in any of the shovel tests.

East Side of Cross Ditch

Along the right-of-way on the east side of Cross Ditch No. 2, ground surface visibility was excellent except for the fairly dense vegetation on the small berm (at most, 5 feet high and 4 feet wide) from ditch construction. Surface visibility on the berm ranged from poor to good (50% or better). The tops and slopes of the spoil pile were examined for cultural material but none was found. This berm is noticeably absent from the southern end of Cross Ditch No. 2 and the spoil may be spread over the adjacent fields.

A single chert flake was found at each of two loci near the south end of Cross Ditch No. 2. At the southernmost loci, north of and adjacent to a small natural drainage, one secondary decortication flake was found. A shovel test in the vicinity exposed Sharkey clay with burning and flood debris at 10 centimeters below the surface. This shovel test measured 30 cm in diameter at the top surface and was 30 cm deep. The entire area was examined for artifacts, but no additional material was found. At the second locus, one interior flake was found. Likewise, the entire area was examined, but no additional artifacts were found. A shovel test in the area disclosed 15 centimeters of plowzone consisting of homogeneous dark brown clay loam overlying, with a distinct break, a gray clay with manganese staining and charcoal. These two isolated finds may represent artifacts which have been redeposited from the vicinity of their original context or they may represent the periphery or

edge of 3PO492 found to the northwest.

A light scatter of lithic debris was found at a third locus, designated as site 1A in the field and subsequently assigned state site number 3PO492. Most of the artifacts were found on the slope or edge of Cross Ditch No. 2, yet the density of cultural material was not high enough for controlled collections. A grab sample of 4 artifacts was collected. These included: 1 biface fragment (described in the following section), 2 interior flakes, and 1 fire cracked rock. Two of the flakes were composed of a white chert material of non-local origin. Positive identification of these exotic cherts has yet to be made, but they may come from quarries on the east side of the Mississippi River. The scatter of artifacts in this vicinity extended to 25 meters east of Cross Ditch No. 2, but was more concentrated within 5-10 meters along the ditch. Overall, the artifact density on the west side of the cross ditch is much higher than on the east side and may indicate that the center of the site is positioned west of the ditch.

West side of Cross Ditch

On the west side of Cross Ditch No. 2, a scatter of prehistoric cultural debris, including both lithics and clay tempered ceramics, was found directly across the ditch from 3PO492. This scatter continued across the entire 200 feet of the right-of-way on the west side of Cross Ditch No. 2, including both sides of a small lateral drainage. The scatter corresponds to a barely discernible north-south trending rise. Boundaries of 3PO492 were extended to include these artifacts on the west side of Cross Ditch No. 2. Two lithics were collected from outside the major surface concentration. Both of these artifacts, one fire-cracked rock and one unidentified projectile fragment composed of Pitkin-like chert, were found between the field road and the cross ditch south of 3PO492. These artifacts, like the two flakes found on the east side of the ditch, may have been redeposited during ditch construction, or they may indicate the site periphery.

North of 3PO492 and within the right-of-way west of the ditch, two chert fragments were found. Neither was identified as a prehistoric artifact. A shovel test was excavated in this vicinity, about 50 meters west of Cross Ditch No. 2 and 430 meters south of Central Ditch. This shovel test exposed a 15 centimeter thick plowzone of very dark grayish brown sandy loam overlying a mottled gray and strong brown Sharkey clay. No cultural materials or anthropic soils were found in the shovel test, and no other materials were found on the surface, although surface visibility was excellent.

Three other shovel tests were excavated on the west side of Cross Ditch No. 2. All were dug through soils interpreted to be recent alluvial deposits overlying Sharkey clay, and all were devoid of artifacts or anthropic soils. One additional shovel test was positioned near the south end of Cross Ditch No. 2 in a

low visibility area immediately south of Ditch No. 79. This test revealed spoil from Ditch No. 79 to a depth of 60 centimeters below the surface, overlying a homogeneous grayish brown sand which extended to a depth greater than 80 centimeters. No cultural materials were found in this shovel test.

Initial Site Testing at 3PO492

Initial site testing conducted at 3PO492 included controlled surface collections of about 25% of the surface distribution followed by the excavation of one 1 x 1 m test unit (Figure 5). To establish the grid, a galvanized metal pipe was set at the western edge of the surface distribution on the east bank of the small lateral drainage ditch. The pipe became point zero north and zero east on the grid.

Controlled Surface Collections

The controlled surface collections were made in three 4 meter wide rows divided into 4x4 meter collection units, each separately catalogued. These transects were labelled Rows A, B, and C (Figure 5). Rows B and C were aligned along magnetic north. Row A was oriented parallel to Cross Ditch No. 2, slightly west of north. The 4x4 meter collection units in Row A extended 40 meters northwestward from grid point 0 North, 42.75 East (on the eastern edge of the row and at the west bank of Cross Ditch No. 2) and 28 meters southeastward along the ditch. Seventeen units were collected in Row A. Row B extended 16 meters north of grid point 0 North and 60 meters south and was located between 24 and 28 meters east of 0 North, 0 East. Nineteen units were collected in Row B. Row C extended 20 meters north of 0 North and 60 meters south and was located between 12 and 16 meters east of 0 North, 0 East. Twenty-one units were collected in Row C. In each unit, 100% of the visible cultural materials was collected. These collection units totaled about 25% of the site area, as determined by the surface distribution of artifacts. A total of 684 artifacts was collected in the 57 units. Most of these (497, or 73%) were collected in Row A, positioned on the slope of the bank of the cross ditch. The artifacts collected are summarized in Tables 3 and 4.

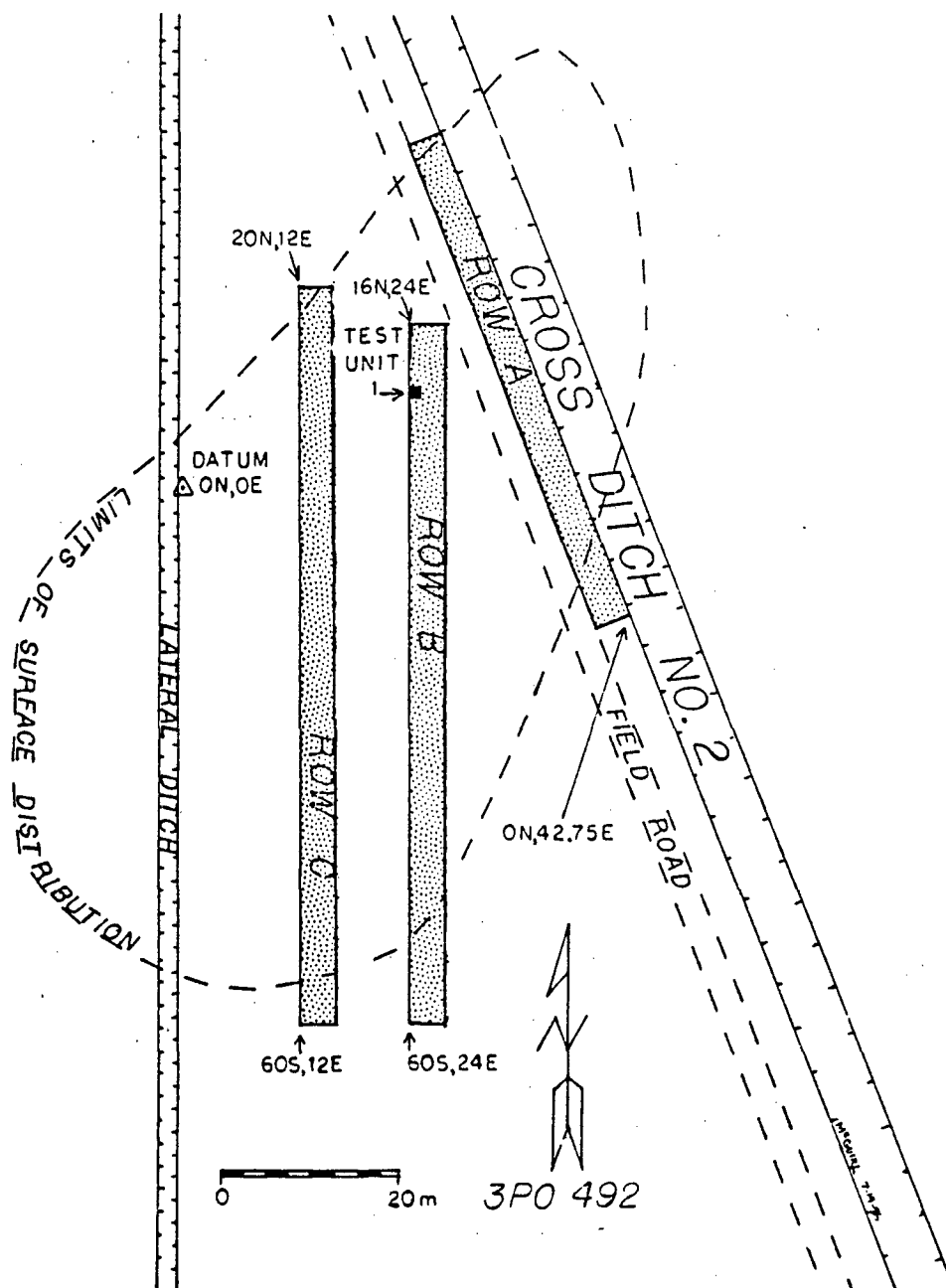


Figure 5. Site Map, 3PO492.

Table 3. Artifacts Collected in Row A, 3PO492.

Abbreviations used: P=Projectile Point, B=Biface, AB=Abrader, CO=Core or core fragment, PD=Primary Decortication Flake, SD=Secondary Decortication Flake, IFK=Interior Flake, PT=Preform Thinning, BT=Bifacial Thinning, ST=Shell Tempered Sherd, CT=Clay Tempered Sherd, SAT=Sand Tempered Sherd, SG=Sand/Grog Tempered Sherd, SS=Sand/Shell Tempered Sherd, FCR=Fire-Cracked Rock, UM=Unmodified Cobble, Stone or Angular Fragment.

Unit	P	B	AB	CO	PD	SD	IFK	PT	BT	ST	CT	SAT	SG	SS	FCR	UM	TOTAL
10N				1			1								2		4
9N															13		13
8N			1	2	1	4	3								18	2	31
7N					1	3	11	3							44	5	67
6N	1	1			2	11	12			1					55	10	93
5N			1	1	1	6	20			5	2	2		2	32	22	94
4N					4	10	19			2	4	3	4	1	38	18	103
3N						2	10		1		1			1	15	1	31
2N						5	3			6	1				13	1	29
1N						2	2								6		10
1S				1													1
2S															1		1
3S				1			1								3	1	6
4S															2		2
5S															3	2	5
6S					2										2		4
7S								1						1	1		3
TOTAL	1	1	2	6	11	42	72	3	2	14	8	5	4	5	248	62	497

Table 4. Artifacts Collected in Row B, 3PO492.

Abbreviations used: AB=Abrader, CO=Core or core fragment, PD=Primary Decortication Flake, SD=Secondary Decortication Flake, IFK=Interior Flake, PT=Preform Thinning, BT=Bifacial Thinning, ST=Shell Tempered Sherd, CT=Clay Tempered Sherd, SAT=Sand Tempered Sherd, SG=Sand/Grog Tempered Sherd, SS=Sand/Shell Tempered Sherd, FCR=Fire-Cracked Rock, UM=Unmodified Cobble, Stone or Angular Fragment.

Unit	AB	CO	PD	SD	IFK	PT	BT	ST	CT	SAT	SG	SS	FCR	UM	TOTAL
4N												2	3		5
3N	1	2		1	2			2	3	2	4		5		22
2N		1		1				1	2	1	1		5	1	13
1N			1		1					1			4		7
1S					1			1	1				4	1	8
2S			1	1	1	1		1		1					6
3S				1									1		2
4S													3		3
5S					1								2		3
6S													1	2	3
7S			1										3		4
8S		1					1						2	7	11
9S					3								7	1	11
10S					1								1		2
11S													2		2
12S				1	1										2
13S													1		1
14S													3		3
15S															0
TOTAL	1	4	3	5	11	1	1	5	6	5	5	2	47	12	108

Table 5. Artifacts Collected in Row C, 3PO492.

Abbreviations used: HC=Hoe Chip, H=Hammerstone, CO=Core or core fragment, SD=Secondary Decortication Flake, IFL=Interior Flake, BT=Bifacial Thinning, SAT=Sand Tempered Sherd, FCR=Fire-Cracked Rock, UM=Unmodified Cobble, Stone or Angular Fragment.

Unit	HC	H	CO	SD	IFK	BT	SAT	FCR	UM	TOTAL
6N										0
5N										0
4N								1		1
3N								2		2
2N										0
1N								2		2
1S								1		1
2S								2		2
3S										0
4S								3		3
5S										0
6S							1	2		3
7S								5	1	6
8S				1				8	1	10
9S					1	1		4	2	8
10S								3	1	4
11S					1			4	1	6
12S	1							4	1	6
13S		1		1	1			5	2	10
14S				2	1			4	2	9
15S			1	1	2			1		5
TOTAL	1	1	1	5	6	1	1	51	11	78

The surface collections indicated that all ceramic material was concentrated at the north end of the artifact scatter and adjacent to the west bank of Cross Ditch No. 2. In addition, two Weems type projectile points and the enamel portions of one human tooth were found in the same area of the site as the ceramics. Because of these local distributions, a 1x1 meter test unit (Test Unit 1) was positioned in this vicinity. The southwest corner of Test Unit 1 was 8 m north and 24 m east of datum.

Grab Sample Surface Collections

The west side of the small lateral which also bisects 3PO492 was examined for cultural materials. A light scattering of lithics was evident on the surface. The artifact density was not high enough to warrant controlled surface collections. The area was walked in random fashion by the SPEARS team and all artifacts were flagged. This distribution was measured and is shown in outline on Figure 5. No ceramics and no temporally diagnostic lithics were observed. Only two bifaces were collected. One is an early stage of reduction and the other a late stage and both are Crowley's Ridge gravels. These artifacts are described in a following section.

Test Unit 1

Test Unit 1 was excavated in 10 centimeter levels to a depth of 50 centimeters below the surface, and one corner of the unit was further excavated to 65 centimeters below the surface. The extremely high clay content of the soil prevented screening except for the top two centimeters. All soil was carefully troweled or shaved with a shovel in thin layers. Both descriptions and horizontal plan drawings were prepared for each excavation level. Each level was photographed in both black and white and color. In addition, a vertical profile of the south wall of the unit was drawn (Figure 6) and photographed. Prior to backfilling, aluminum cans were placed in the base of the unit to facilitate relocation of the unit.

The plowzone in Test Unit 1 was 15 centimeters thick and was excavated in two levels. It was a very dark brown clay loam and contained flakes that had been removed from small cobbles of Crowley's Ridge gravels, clay tempered and shell tempered ceramics, and one Nodena projectile point (Figure 7a). No plowscars were evident at the base of the plowzone. Beneath the plowzone was a nearly sterile layer about 10 centimeters thick of gray clay highly mottled with strong brown.

Below the nearly sterile layer was a darker clay containing charcoal and other cultural materials including both clay tempered and shell tempered ceramics and burned bone. These artifacts were concentrated at the upper surface of the darker clay from 23 to 24 centimeters below the ground surface. Most of the ceramics were lying horizontally with a few in a vertical position. Small flecks of burned bone and charcoal were also observed. Sherds were found in this darker clay to a depth of about 40 centimeters below the ground surface, but few at 40 cm were shell tempered.

Lithic artifacts, mostly small flakes, were distributed throughout the mottled clay to a depth of about 50 centimeters below the ground surface. Three utilized flakes found between 40-50 cm below the surface, and are described in a following section. Manganese concretions were present in low frequencies and no bone or charcoal was observed.

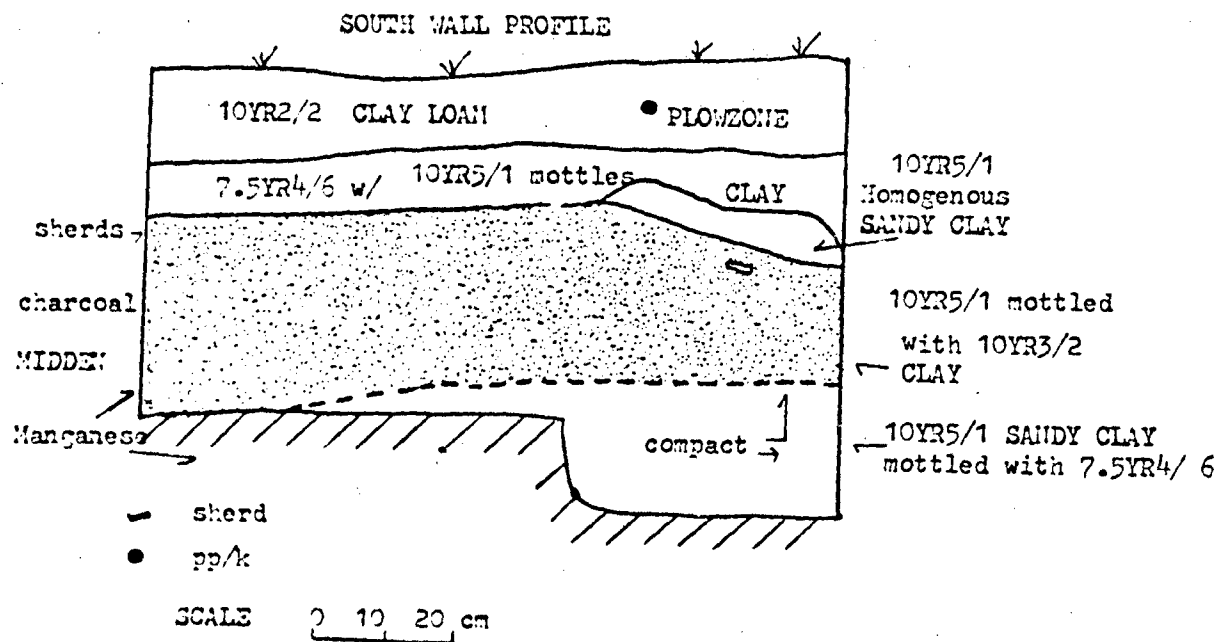


Figure 6. South Wall Profile of Test Unit 1, 3PO492.

At 51 cm, the clay became a lighter color, nearly identical to the sterile layer below the plowzone. From 51-65 cm, only the southwest quarter of the unit was excavated. Only lithic artifacts were found in this lighter colored clay to a depth of at least 65 centimeters below the surface. One flake, which had been utilized, is described in a following section of the report. The unit was terminated at 65 cm because it was obvious from the investigation that sufficient information had been collected to document that the site was eligible for nomination to the National Register and would require further testing to determine subsurface boundaries. All artifacts collected in Test Unit 1 are listed in Table 6.

Table 6. Artifacts Collected in Test Unit 1, 3P0492.

Abbreviations used: P=Projectile Point, UT=Utilized Flake, TC=Tested Cobble, CO=Core or core fragment, PD=Primary Decortication Flake, SD=Secondary Decortication Flake, IFK=Interior Flake, ST=Shell Tempered Sherd, CT=Clay Tempered Sherd, SAT=Sand Tempered Sherd, SS=Sand/Shell Tempered Sherd, SC=Shell/Clay, FCR=Fire-Cracked Rock, UM=Unmodified Cobble, Stone or Angular Fragment, B=Bone.

Level	P	UT	TC	CO	PD	SD	IFK	ST	CT	SAT	SS	SC	FCR	UM	B	TOTAL
0-10	1			1			3	1	1	1	1	4	4	3		20
10-15			1			1			8	3				7	1	21
15-24						1	3	21	27	1	2			4	4	63
24-31					1	3	2		8	14				11	4	43
31-40		3			1	6	7				2			22	4	45
40-50		1				2								20	4	27
51-65						1	1							10	2	14
TOTAL	1	4	1	1	2	14	16	22	44	19	5	4	78	22		233

The distribution of the ceramics shows that the deposits are stratified. Most of the shell tempered wares are found in the disturbed plowzone and the upper 2 cm of the intact cultural zone. Below this level (24 cm bs), the sherds are clay or sand tempered, and only a couple are sand/shell tempered.

The stratigraphic profile in Test Unit 1 is interpreted to represent a buried cultural horizon--the darker clay--covered with spoil from previous excavations of Cross Ditch No. 2 and the small lateral ditch. In addition, a 10 cm clay cap covers the intact deposits. These sediments were probably deposited prior to ditch construction and under slackwater conditions. The artifacts in the plowzone and on the surface appear to be derived from a mixture of cultural zones redeposited during ditch construction. The artifacts have been dispersed on the surface due to agricultural activities. The cultural materials collected

on the slope of the cross ditch in Row A have probably only recently eroded out of the intact cultural level. This may explain the higher density of material in this area of the site. Because there is a higher density of material on the west side of the ditch than the east side of the ditch or on either side of the lateral, it is possible that the main occupation or central portion of the site lies in this vicinity.

Three prehistoric cultural phases are represented by the artifacts recovered from 3PO492. The oldest component is identified by the Weems projectile points which have been associated with the Late Archaic or the Tchula phase of the Early Woodland period. Weems points were found at the McCarty Site, a Tchula phase site located only a few miles from the current project area. The clay and sand tempered ceramics found at 3PO492 are probably associated with this phase also. The fire cracked rock found in the lower levels of the test unit suggest that an even earlier stratified component may be present at the site.

The Nodena point found in the plowzone in Test Unit 1 is a marker for the Late Mississippian Parkin phase. Nodena points are usually found associated with the large villages characteristic of Late Mississippian populations and the occurrence of the point 3PO492 may indicate that the site was used as a hunting camp during the Late Mississippian period. The shell tempered ceramics found at 3PO492 could be associated with the Nodena point, but, on the basis of other known sites in the area, are expected to be associated with the dispersed settlements of the Middle Mississippian Cherry Valley phase. Few habitation sites of this period have been identified.

DIAGNOSTIC ARTIFACTS

Lithics

Few diagnostic lithic artifacts were found during the initial site testing at 3PO492. These include three projectile points, one biface fragment, two preforms and four utilized interior flakes. These artifacts are described below.

One of the identifiable projectile points is a Nodena arrow point assigned field specimen number (FSN) 52-6 and shown in Figure 7a. This point was found in the south wall profile of Test Unit 1, in the plowzone, at about 10 cm below the surface. It is made from a gray chert that is reddish near the base of the point, which is broken. The reddish color and the break may be the result of thermal alteration, but there is no pot lidding. The point is 34 mm long, 12 mm wide, and 4 mm thick.

The other two projectile points are both Weems points (Figure 7b-c). They were recovered in Row A of the controlled surface collections within one meter of each other, although one (FSN 6-1) was collected in Unit 6 North and the other (FSN 7-1) was collected in Unit 7 North. FSN 6-1 is lightly banded tan and brown Crowley's Ridge chert. Cortex retained at one corner of the base is brown. The stem is slightly expanded and the base is slightly convex. One shoulder is prominent and the other is weak. Blade edges are slightly convex. It is 48 mm long, 25 mm wide, and 10 mm thick. The stem is 15 mm long, 21 mm wide at the base, and 18 mm wide at the stem/blade juncture.

The second Weems point (FSN 7-1) is tan Crowley's Ridge chert with some local red color at the base. The stem is expanded and the base is slightly convex. A hinged flake removed during thinning forms a lobe at the base. One shoulder is barbed and the other is very weak, perhaps from resharpening since that blade edge is slightly convex and the other is straight. The distal tip is dulled and smoothed from use. It is 49 mm long, 28 mm wide, and 9 mm thick. The stem is 15 mm long, 24 mm wide at the base, and 21 mm wide at the stem/blade juncture.

The biface fragment (FSN 59-1) was one of only two artifacts collected on the west side of the lateral ditch bordering 3PO492. It is mottled tan and cream colored Crowley's Ridge chert. Two transverse breaks have removed any features which would be diagnostic of cultural affiliation. It is 9 mm thick and no other meaningful measurements were possible.

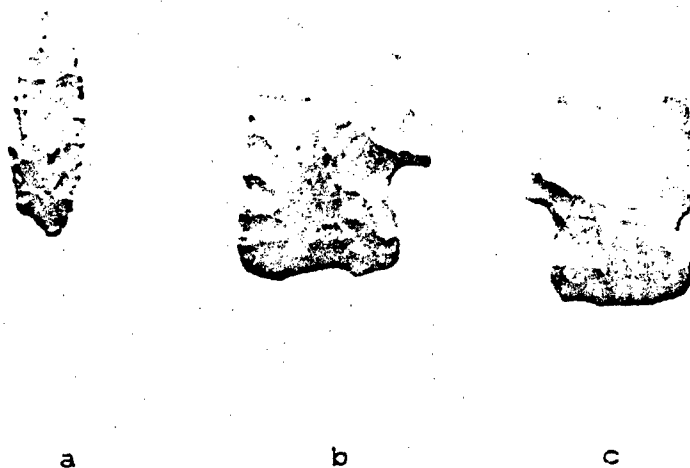


Figure 7. Projectile Points Collected at 3PO492 (a= Nodena, FSN 52-6; b-c= Weems, FSN 7-1 and FSN 6-1).

One of the two preforms from the site was also collected on the west side of the lateral ditch. This early stage preform (FSN 59-2) is banded tan and gray Crowley's Ridge chert. It retains a brown cortex on much of one face and a on small portion of the opposite face. This appears to be a preform abandoned during a very early stage of manufacture. Flakes have been struck from both faces of one edge but from only one face of the opposite edge. A transverse break at a flaw in the stone near the base probably caused the artifact to be discarded. It is 61 mm long, 35 mm wide, and 13 mm thick.

The second preform (FSN 6-2) was found near one of the Weems points in Controlled Collection Unit 6 North (Row A). It is red Crowley's Ridge chert. It is probably an aborted preform, perhaps for a Weems point. It exhibits only percussion flaking and has stacked flakes along one lateral edge at the thickest part of the blade. Flakes from the opposite edge hinged out without removing a thick dorsal ridge. It is 64 mm long, 30 mm wide, and 13 mm thick.

Three of the utilized interior flakes (all assigned FSN 56-2) were found in Level 5 of Test Unit 1 at 31 to 40 cm below the surface. The largest of these flakes is Crowley's Ridge chert. It is broadly and diffusely banded tan, yellowish tan and red. One lateral edge exhibits fine chippage on the dorsal surface from the proximal end of the flake to near the distal end. The opposite lateral edge shows similar chippage only near the distal end. The proximal and distal ends show no use, and the bulb of percussion was apparently lost when the flake was detached. It is 38 mm long, 23 mm wide, and 5 mm thick.

The second largest flake is also Crowley's Ridge chert. It is a light tan color. This flake has fine chippage on the dorsal surface of all edges except at the striking platform. The bulb of percussion has been partly removed by two small flakes on the ventral surface. One lateral edge has broken, perhaps during use, and produced a concavity that shows no use wear. It is 23 mm long, 13 mm wide, and 4 mm thick.

The third flake is a gray chert with tiny, darker gray mottles that may be thermally altered. This is actually two fragments that fit together to form the distal end of a flake. The proximal end of the flake is missing and may have broken during heating. One lateral edge of this flake fragment shows very fine chippage on the dorsal surface. The fragments together are 13 mm long, 11 mm wide, and 2 mm thick.

A fourth utilized flake (FSN 57-1) was found in Level 6 of Test Unit 1 at 40 to 50 cm below the surface. This interior flake is brown Crowley's Ridge chert. The flake was removed from an acute striking platform and is very broad relative to its length. It is 18 mm long, 35 mm wide, and 5 mm thick. The use chippage is restricted to the acute edge of the striking platform. At one end of the platform the use chippage is on the dorsal surface, and at the other end the chippage is on the

ventral surface. The chippage on the dorsal surface is slightly polished.

Ceramics

A total of 154 sherds were collected during the initial site testing. All of the sherds collected on the surface of the site were small (less than 3 cm in length) and had eroded surfaces. The sherds in the Test Unit were also eroded, but on the whole were much larger in size (greater than 3 cm in length). However, they were extremely fragile and crumbled when removed from the clayey matrix. For example, one large shell & sand tempered sherd (FSN 54-5) found at 24 cm bs in Test Unit 1 broke into 12 pieces upon exposure. Identification of the tempering agents was difficult and they were not sorted with a high degree of confidence. Descriptions of the classes of tempering agents follows.

SHELL TEMPERED: All sherds in this class are plain and eroded. The shell has leached out and the sherds do not react with dilute hydrochloric acid. They are identified by the presence of shallow pits on the surface and thin, plate-like holes in cross section of the core. These pits and holes represent shell fragments of a size (2 to 3 mm) consistent with the type Mississippi Plain. Surface color is predominantly gray, with some tending to buff; and the core color differs little from the surface. With one exception noted below, all sherds in this class are body sherds.

SHELL AND SAND TEMPERED: Sherds in this class differ from the preceding class of shell tempered sherds in having a coarse, gritty feel and having visible inclusions of sand grains in the paste. None of the sherds in this class were as thin as the thinnest shell tempered sherds, but all were within the range of the shell tempered class (see below).

SHELL AND CLAY TEMPERED: Sherds in this class differ from the class of shell tempered sherds in that they have visible inclusions of clay particles along with the leached platelets in the paste. They are within the range of thickness of the shell tempered class although none are as thin as the thinnest shell tempered sherds.

CLAY (GROG) TEMPERED: These sherds have visible inclusions of clay particles in the paste. They lack the plate-like pits and holes characteristic of leached shell. Some grit, especially crushed hematite, is visible in the paste but may be accidental inclusions. A few sherds, including the rim sherd described below, also contain small white particles which may be crushed bone.

SAND TEMPERED: These sherds are identified by their sandy feel, the absence of visible inclusions of clay particles, and the absence of the thin, plate-like holes and pits which would indicate leached shell tempering. Surface and interior colors

are predominantly buff. All sherds in this class are body sherds.

SAND AND GROG TEMPERED: These sherds have the sandy feel of sand tempered sherds, but also have visible inclusions of clay particles. They lack the leached pits of the shell tempered classes. They are the thickest class of sherds in the sample.

The count and percentage of the different combinations of tempering agents found in sherds collected at 3PO492 are presented in Table 7.

Table 7. Count and Percent of Sherds by Temper Collected at 3PO492.

	Count	percent
Shell Tempered	41	27
Shell & Sand	12	8
Shell & Clay	4	3
SUBTOTAL	57	38
Clay Tempered	58	38
Sand Tempered	30	19
Sand & Grog	9	6
SUBTOTAL	39	25
TOTAL	154	101

All of the sherds except three had plain or eroded surfaces. The surface of one sand tempered sherd (FSN 23-2) was eroded but almost circular punctated depressions (4 mm in diameter) were evident. Another decorated sherd (FSN 20-7) may be smoothed over cordmarking, but positive identification was not possible due to the eroded surface. This sherd was sand and grog tempered and was the thickest in the sample (11 mm). One clay tempered sherd (FSN 54-2) had blackened interior and exterior surfaces with an irregularly distributed reddish brown coloration which may be remnants of a red slip. The core is black. The tempering consists of finely crushed clay and small white inclusions in the paste appear to be bone. There was no reaction with dilute hydrochloric acid. This was the only rim sherd collected. The rim is direct, without thickening, and the lip is rounded. The sherd is small, with little curvature and has a uniform thickness of 5 mm. It appears to be from a shallow bowl.

All the ceramics were body sherds except for the one rim noted above and a shell tempered sherd fragment (FSN 5-1) which

could be a portion of a lug or foot or the base of a cylinder type vessel. Two clay and 1 sand tempered body sherds had adequate curvatures to suggest that they were from bowls.

The thickness of the sherds varied by tempering agent. The ranges of thickness and the mean or average of those specimens which could be measured in millimeters are presented in Table 8.

Table 8. Thickness of sherds collected by temper, 3PO492.

	No.	Range	Mean
Shell Tempered	27	3-6	4.7
Shell & Sand	5	4-5	4.6
Shell & Clay	2	4-5	4.5
Clay Tempered	32	4-8	6.0
Sand Tempered	17	4-8	5.8
Sand & Grog	6	5-11	7.7

The use of multiple tempering agents in various proportions created the overlapping classes described above. These combinations are typical of both Tchula period and Early to Middle Mississippian ceramics. At the McCarty site, 85 percent of the Tchula period pottery was sand tempered or sand and grog tempered. Morse reports:

The two major pastes at McCarty overlap to a considerable degree. Most of the sand and grog-tempered pottery may simply be variations of a paste which emphasizes both sand and grog. (Morse 1982a:10)

This supports the assignment of the sand and clay tempered ceramics at 3PO492 to the Tchula period, even without diagnostic decorated types. Later Woodland ceramics also contain both sand and grog temper, but in Marksville period ceramics the sand "usually is very minimal and fine, although grog fragments obviously contain sand" (Morse and Morse 1983:162); and in the Baytown period "no clay or grog is typically included in the sand-tempered paste, which is almost the consistency of sandpaper" (Morse and Morse 1983:182).

Overlapping tempering agents also occur in the 3PO492 ceramics containing shell. At the Hoecake site in southeast Missouri, sherds in a single component were grog, grog and shell, and shell tempered; and nearer 3PO492, at Banks Mound 3, there were both grog tempered and shell tempered sherds (Morse and Morse 1983:216, 239-241). Near the mouth of the St. Francis

River, the Barrett site contained a ceramic complex similar to the ceramics at 3PO492:

The "Barrett complex" ceramics at the Barrett site appear to be comprised of three wares: a rather coarse shell tempered ware, a coarse grog and shell tempered ware, and a fine grog tempered ware. As might be suspected, these wares tend to intergrade, reflecting varying proportions of the three recognized tempering materials, and samples could not always be sorted with a high degree of precision. (House and House 1985:14)

In addition, many of the sherds at the Barrett site were quite thin, with some in the 3 to 5 mm range (House and House 1985:14). These ceramics have been assigned a tentative date of A. D. 1100, which is compatible with dates obtained for the Cherry Valley phase in the vicinity of 3PO492 (Morse and Morse 1983:243).

POTENTIAL ARCHEOLOGICAL SIGNIFICANCE OF 3PO492

As shown, the results of the initial testing at 3PO492 indicate that buried, intact stratified deposits remain at the site. Diagnostic artifacts found during this project date the components of the site to the Early Woodland, Middle and Late Mississippian periods.

Based on the identification of Weems projectile points and sand and clay tempered ceramics representing a Tchula period Pascola phase occupation at 3PO492, several of the study units defined in the State Plan for northeast Arkansas (Morse 1982b:) become pertinent to assessing the significance of the site. Only two of the sherds found in the limited investigations at 3PO492 are decorated, and both are small and eroded beyond identification to specific type. However, it is likely that diagnostic ceramics are preserved at the site. Their identification is crucial to explaining the lack of recorded Tchula period sites in northeast Arkansas. The possibility exists that these sherds may instead represent Marksville or Baytown period sites (Morse 1982b:NE6, NE10).

The thin, undecorated, shell tempered sherds at 3PO492 are consistent with expected assemblages at sites of the Middle Mississippian Cherry Valley phase (Morse and Morse 1983:238-246). One of a group of five Cherry Valley phase mounds was salvaged within the St. Francis Floodway a few miles north of 3PO492. The base of this mound was almost two feet below the modern ground surface, and Dan F. Morse (personal communication) expects that the small farmsteads associated with the mound group are dispersed, and buried, throughout the modern floodway. Site 3PO492 fits this hypothesis well, especially if further testing confirms the assignment of the ceramic assemblage to the Cherry Valley phase.

The Nodena arrow point found at 3PO492 is a marker for the Late Mississippian cultural period, represented in the project area by the Parkin phase. Morse has presented the hypothesis that "Nodena points were specifically developed for warfare" (Morse 1982b:NE11), but Morse and Morse have suggested elsewhere (Morse and Morse 1983:271-273) that the Nodena point was effectively employed in hunting and occurs as isolated finds at sites identified as hunting camps. Site 3PO492 may be a Parkin phase hunting camp. If it is a hunting camp, it contributes to resolving the question of where Mississippian hunting camps were located (Morse 1982b:NE14). If it is not a hunting camp, and if the Nodena point is associated with the shell tempered ceramics at the site, it is contrary evidence for the hypothesis that

Late Mississippian populations were nucleated in large villages and that "large areas of northeast Arkansas were unoccupied" during that cultural period (Morse 1982b:NE14).

Regardless of cultural affiliation, many pertinent research questions remain unanswered in northeast Arkansas. Basic artifact assemblages, raw material sources and technologies, and artifact use-life are all in need of further investigation (Morse 1982b:NE9). The almost exclusive use of Crowley's Ridge chert at 3PO492, the evidence of lithic reduction processes, and, probably, the reconstruction of ceramic assemblages, can contribute to these needed investigations.

Burned animal bone and charcoal at the site may also contribute data on subsistence and paleoenvironments (Morse 1982b:NE11-NE12, NE17). Preliminary soil analyses for pH and Phosphate were performed by the Soils Testing Lab at the University of Arkansas. Results of these tests are shown in Table 9.

Table 9. Results of pH and Phosphate tests from undisturbed levels in Test Unit 1, 3PO492.

	Ph	Phosphate (ppm)
15-24	5.2	63.5
24-31	5.2	60.0
31-40	5.3	56.0
40-50	5.3	52.0
50-65	5.2	54.5

Due to the high acidity, the potential for pollen to be preserved in the sediments is good, however, the potential for bone preservation is poor. The phosphate readings are overall high (personal communication with Dr. Wayne Sabbe). But given the nature of high organics in slackwater deposits and the fact that the area has not been in cultivation long, it is not surprising. The slight increase in the lower levels is curious, but its significance is not known. Additional testing should resolve whether this is an indication of deeper buried cultural horizons.

Determining the spatial and functional relationships of 3PO492 to other sites of each represented cultural horizon would also contribute to significant research study units. The stratigraphic sequence may help answer the questions about factors which determined prehistoric site locations. The intact cultural zone at the site can probably contribute as well to questions about site function and internal organization and daily activities of the inhabitants (Morse 1982b:NE12, NE14).

The human molar recovered at 3PO492 indicates that questions about prehistoric human biology can also be addressed with data from this site. Burials and other factors may lead to inferences about the demography of this particular site, including the number of occupants, their physical characteristics, and their diet (Morse 1982b:NE16).

Recent sediments in the project area overlie older sediments of various, undetermined age. The association of cultural horizons at 3PO492 with some of these older sediments would help to date those land forms and aid in investigating local processes of land surface formation (Morse 1982b:NE17). In addition, these dated sediments can contribute to the broader geomorphological investigations currently being undertaken throughout the St. Francis basin. Morse has presented the hypothesis that sites of the Early Mississippian period and older are "buried in alluvial deposits in both the western and eastern lowlands" (Morse 1982b:NE18). Site 3PO492 seems to support this hypothesis and further tests at the site could lead to confirmation.

The State Plan for future research further suggests that "The relationship of the Barnes and Baytown traditions should be studied throughout much of the region" (Morse 1982b:NE19). Since 3PO492 contains both sand tempered and clay tempered ceramics and lies within the area of overlap between the two traditions (Morse and Morse 1983:180, 182) it may contribute significantly to the study suggested in the State Plan.

RECOMMENDATIONS

As stated in the Scope of Work (Appendix B:9), additional subsurface test units may be required at a site. The number and distribution are to be determined and the details of the rationale to be presented in the report. Several data gathering techniques may be required in order to relate the site to the data recovery research domains and procedures, and to determine the potential construction impacts of the proposed project. Additional work may include radiocarbon dating, flotation, excavation of cultural features, etc.

Initial site testing at 3PO492 has shown that the site contains intact, stratified deposits and is eligible for nomination to the National Register. The significance of the deposits has been discussed in the preceding section. The testing program should involve a combination of subsurface techniques including controlled columns, backhoe trenches, bank profiles and excavation units. In addition, specialized samples such as carbon 14, pollen and floral samples are recommended. The rationale for these procedures is presented in the following discussion.

During initial site testing, three rows of collection units were positioned across areas of the site with the highest surface density. Row A contained twice as many artifacts as either of the other rows. This higher density is attributed to the relationship of Cross Ditch No. 2 and the vertical stratigraphy at the site. Collection units in Rows B and C sampled only artifacts contained in the plowzone which is spoil from ditch construction. Row A, on the cut bank of Cross Ditch No. 2, sampled part of the buried cultural horizon exposed in the sloping bank of the ditch. This interpretation further suggests that the surface distribution of artifacts, except along the cut banks of Cross Ditch No. 2, does not reflect the horizontal boundaries of the site. At the time these field investigations were conducted, the high water level in Cross Ditch No. 2 prevented measurement of the extent of the buried cultural horizon along the bank of the ditch. If testing is conducted during the drier months of the year and the water levels in the Cross Ditch are extremely low, then a stepped bank profile in the ditch should indicate the location of the cultural horizons in this vicinity.

Because the surface distribution of artifacts is almost certainly an unreliable indicator of the extent of the site, subsurface tests must be employed to define the horizontal site boundaries. In addition, the vertical limits of the site within the recent alluvium, particularly if a pre-ceramic horizon is present, may lie more deeply buried. A series of short, deep

backhoe trenches along the periphery of the observable surface distribution of artifacts is recommended to verify that the upper levels are redeposited from ditch spoil and to collect useful geomorphic data. These backhoe trenches should indicate in which direction the actual site boundaries are located, and if necessary, additional backhoe trenches could be excavated. Alternatively, a few controlled columns (shovel tests dug in 10 m levels) could be extended out from each backhoe trench in either direction. These shovel tests should be excavated as controlled excavation units of sufficient size (50 x 50 cm or greater) to allow sampling of the buried cultural horizon. These procedures would preserve the integrity of the site better than long backhoe trenches and would at the same time provide stratigraphically controlled samples of the cultural horizon(s).

SPEARS recommends that a minimum of four backhoe trenches be excavated. One of these trenches should be east of and perpendicular to Cross Ditch No. 2 at a distance of about 20 meters east of the ditch. A second trench should be excavated west of and perpendicular to the small lateral ditch at a distance of about 20 meters west of the ditch. The third and fourth trenches should be located between Cross Ditch No. 2 and the lateral ditch. One of these should be located near the north end of SPEARS' controlled collection transect Row C, and the other should be located near the south end of Row B. These two trenches should be oriented perpendicular to the observable surface contours (i.e., slightly west of north and approximately parallel to Cross Ditch No. 2). It is possible that these observable contours represent an old natural levee or other feature associated with an abandoned and filled channel. Trenches perpendicular to such a feature would allow for more meaningful geomorphic interpretations than would other orientations.

In addition to these four trenches, other trenches may be required to define the site boundaries. The location of these additional trenches cannot be determined in advance of the excavation of the four recommended backhoe trenches, and the need for and location of such additional trenches should be determined in the field by the project director, perhaps in consultation with a geomorphologist. All trenches should be only long enough to measure the dip of stratigraphic units, probably about four meters. They should be deep enough to ensure that deeply buried cultural horizons will be detected if any are present. SPEARS recommends that a geomorphologist be employed to evaluate the depositional history of the sediments in the trenches and to interpret their significance in terms of archeological potential. Sediment samples collected during initial testing have shown that the pH was strongly acid for the entire depth of Test Unit 1. Acidic soils provide good environments for preserving pollen. Therefore, it is further recommended that at least 2 pollen columns be taken from the site. The results of these samples should compliment other geomorphic investigations currently being undertaken elsewhere in the St. Francis basin.

Information on the nature and context of the site may be investigated through a series of controlled excavation units which are distributed over the entire site. One test unit could be positioned in the center as defined by the backhoe trenches and controlled columns. The actual position of the other units could be determined from the results of the backhoe trenches and shovel tests. These units should be dispersed in order to investigate whether there are spatially distinct temporal units at the site. Datable artifacts collected during initial testing indicate utilization of the landform in the Early Woodland, Middle and Late Mississippian periods. The areal extent and site function during these periods is not known.

Controlled excavations will test the potential for information-bearing zones as discussed in the significance section. A more refined evaluation of the data base should indicate whether the site has the potential of containing information important to defining the distribution of Tchula and Cherry Valley sites, the nature of buried sites in the floodway, the nature of the Parkin phase and the distribution of Late Mississippian hunting camps, and information on the distribution of Barnes and Baytown ceramics, since the site lies in an area where the two traditions are known to overlap. In addition to these temporally important issues, the test excavations will also provide an indication of the feature potential at the site, artifact assemblage and densities which may be related to site function, raw material sources and technologies, artifact use-life, lithic reduction processes and reconstruction of the ceramic assemblage.

The potential of subsistence information can be tested through floral, faunal and pollen analyses. For this reason, water flotation should be accomplished on a sample of sediments from cultural bearing zones and/or features in order to determine the potential for floral remains at the site. Specialized analyses such as carbon dating or other dating techniques, and floral and faunal identification may be necessary if good samples are obtained from the deposits. This information will be useful not only to the interpretation of the site specific subsistence but to the reconstruction of the paleoenvironment in the region. It would also be helpful in dating landforms and in predicting locations of prehistoric utilization in similar environments.

Testing may help to define the extent and condition of human remains at the site. Human osteological specimens contain information on population density, diet, disease, trauma and other biophysical and demographic indicators. If burials with good preservation are encountered during testing, it is recommended that they be protected until they can be properly excavated and then analyzed by a physical anthropologist. If a cemetery site is found, serious consideration should be given to preserving the site.

The exact number of subsurface units is actually dependent upon the information gained in the initial backhoe and shovel

tests. The investigation conducted should be sufficient to collect the information needed to complete the National Register form, but should not proceed past the point where it is needlessly destructive to the cultural deposits. For this reason, the exact number of subsurface tests cannot be accurately estimated. However, a minimum of four backhoe trenches and a maximum of eight are recommended. Bank profiles can be substituted for some of these trenches. Between four and eight controlled columns and not more than five excavation units (1m x 1m) are recommended. Due to the clayey sediments at the site, the hand excavation of controlled columns and test units will require much time and energy expenditure. Based upon the results of the testing program, the National Register form can be completed and a mitigation plan, if necessary, can be developed.

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APPENDIX A: Project Personnel

Carol S. Spears has been involved in southeastern archeology for 15 years. She received her M. A. degree in anthropology with specializations in southeastern prehistory and cultural resource management from the University of Arkansas. Since that time she has participated in projects in Arkansas, Missouri, Illinois, North Carolina and Yugoslavia. From 1977-1980 she was an archeologist for the State of North Carolina and directed both their public education and National Register programs. From 1980-1985 she worked as a consultant for several private and state agencies and conducted numerous projects. In January 1986, she established Spears Professional Environmental & Archeological Research Service (SPEARS) which provides quality archeological research for a reasonable cost to federal, state and private agencies in Arkansas.

Robert A. Taylor has ten years experience in the archeology of Arkansas and Texas. He has served as Project Archeologist for the Arkansas Archeological Survey, Texas A & M University Research Foundation, and SPEARS, and he has authored reports for each of these agencies. He received his M. A. degree in anthropology from the University of Arkansas and has special interests in site formation processes, the philosophy of science and archeological theory.

APPENDIX B

SCOPE OF WORK

Cultural Resource Literature Search and Intensive Survey Central Ditch and Cross Ditch No. 2, Poinsett County, Arkansas

1. GENERAL.

1.1 The Contractor shall conduct a background and literature search, an intensive survey investigation, and initial site testing at Central Ditch and Cross Ditch No. 2, Poinsett County, Arkansas. Reports of this investigation shall be submitted. These tasks are in partial fulfillment of the Memphis District's obligations under the National Historic Preservation Act of 1966 (P.L. 89- 665), as amended; the National Environmental Policy Act of 1969 (P.L. 91- 190); Executive Order 11593, "Protection and Enhancement of Cultural Environment," 13 May 1971 (36 F.R. 3921); Preservation of Historic and Archaeological Data, 1974 (P.L. 93-291), as amended; and the Advisory Council on Historic Preservation, "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800).

1.2. Personnel Standards.

a. The Contractor shall utilize a systematic, interdisciplinary approach to conduct the study. Specialized knowledge and skills will be used during the course of the study to include expertise in archeology, history, architecture, geology and other disciplines as required to adequately locate and evaluate cultural resources as required in this Scope of Work.

Techniques and methodologies used for the study shall be representative of the state of current professional knowledge and development.

b. The following minimal experiential and academic standards shall apply to personnel involved in investigations described in this Scope of Work:

(1) Archeological Project Directors or Principal Investigator(s) (PI). Individuals in charge of an archeological project or research investigation contract, in addition to meeting the appropriate standards for archeologist, must have a publication record that demonstrates extensive experience in successful field project formulation, execution and technical monograph reporting. It is mandatory that at least one individual acting as Principal Investigator or Project Director under this contract have prior experience as Principal Investigator or Project Director in cultural resources or archeological research in the Arkansas Region. Extensive prior research experience as Principal Investigator or Project Director in immediately adjacent areas of Tennessee, Missouri and Mississippi will also satisfy this requirement. The Contracting Officer may require suitable professional references to obtain estimates regarding the adequacy of prior work.

(2) Archeologist. The minimum formal qualifications for individuals practicing archeology as a profession are a B.A. or B.S. degree from an accredited college or university, followed by a minimum of two years of

successful graduate study with concentration in anthropology and specialization in archeology and at least two summer field schools or their equivalent under the supervision of archeologists of recognized competence. A Master's thesis or its equivalent in research and publication is highly recommended, as is the M.A. degree.

(3) Architectural Historian. The minimum professional qualifications in architectural history are a graduate degree in architectural history, historic preservation, or closely related fields, with course work in American architectural history; or a bachelor's degree in architectural history, historic preservation, or closely related field plus one of the following:

(a) At least two years full-time experience in research, writing, or teaching in American history or restoration architecture with an academic institution, historical organization or agency, museum, or other professional institution; or

(b) Substantial contribution through research and publication to the body of scholarly knowledge in the field of American architectural history.

(4) Other Professional Personnel. All non-archeological personnel utilized for their special knowledge and expertise must have a B.A. or B.S. degree from an accredited college or university, followed by a minimum of one year of successful graduate study with concentration in appropriate study.

(5) Other Supervisory Personnel. Persons in any archeological supervisory position must hold a B.A., B.S. or M.A. degree with a concentration in archeology and a minimum of two years of field and laboratory experience in tasks similar to those to be performed under this purchase order.

(6) Crew Members and Lab Workers. All crew members and lab workers must have prior experience compatible with the tasks to be performed under this contract. An academic background in archeology/anthropology is highly recommended.

c. All operations shall be conducted under the supervision of qualified professionals in the discipline appropriate to the data that is to be discovered, described or analyzed. Vitae of personnel involved in project activities may be required by the Contracting Officer at anytime during the period of service of this contract.

1.3. The Contractor shall designate in writing the name of the Principal Investigator(s). Participation time of the Principal Investigator(s) shall average a minimum of 50 hours per month during the period of service of this contract. In the event of controversy or court challenge, the Principal Investigator shall be available to testify with respect to report findings. The additional services and expenses would be at Government expense, per paragraph 1.9 below.

1.4. The Contractor shall keep standard field records which may be

reviewed by the Contracting Officer. These records shall include field notes, appropriate state site survey forms and any other cultural resource forms and/or records, field maps and photographs necessary to successfully implement requirements of this Scope of Work.

1.5. To conduct the field investigation, the Contractor will obtain all necessary permits, licenses, and approvals from all local, state and Federal authorities. Should it become necessary in the performance of the work and services of the Contractor to secure the right of ingress and egress to perform any of the work required herein on properties not owned or controlled by the Government, the Contractor shall secure the consent of the owner, his representative, or agent, prior to effecting entry or performing work on such property.

1.6. Innovative approaches to data location, collection, description and analysis, consistent with other provisions of this contract and the cultural resources requirements of the Government, are encouraged.

1.7. No mechanical power equipment shall be utilized in any cultural resource activity without specific permission of the Contracting Officer.

1.8. The Contractor shall furnish expert personnel to attend conferences and furnish testimony in any judicial proceedings involving the archeological and historical study, evaluation, analysis and report. When required, arrangements for these services and payment therefor will be made by representatives of either the Corps of Engineers or the Department of Justice.

1.9. The Contractor, prior to the acceptance of the final report, shall not release any sketch, photograph, report or other material of any nature obtained or prepared under this contract without specific written approval of the Contracting Officer.

1.10. The extent and character of the work to be accomplished by the Contractor shall be subject to the general supervision, direction, control and approval of the Contracting Officer. The Contracting Officer may have a representative of the Government present during any or all phases of the described cultural resource project.

1.11. The Contractor shall obtain Corps of Engineers Safety Manual (EM385-1-1) and comply with all appropriate provisions. Particular attention is directed to safety requirements relating to the deep excavation of soils.

1.12. There will be two categories of meetings between Contractor and Contracting Officer: (1) scheduled formal conferences to review contract performance, and (2) informal, unscheduled meetings for clarification, assistance, coordination and discussion. The initial meeting may be held prior to the beginning of field work. Category (1) meetings will be scheduled by the Contracting Officer and will be held at the most convenient location, to be chosen by the Contracting Officer. This may sometimes be on the project site, but generally will be at the office of the Contracting Officer.

2. STUDY AREA.

The study area consists of approximately 36 acres located near Marked Tree, Poinsett County, Arkansas. The work will begin at the junction of Cross Ditch No. 2 and Ditch No. 109 running northwest to the junction with Central Ditch, then northwest along the left bank of Central Ditch. The right-of-way will be 100 feet east and 200 feet west of Cross Ditch No. 2 channel centerline extending approximately 4,200 feet from Central Ditch through the borrow area; and, from left top bank to 100 feet south of the landside embankment toe along Central Ditch from its junction with Cross Ditch No. 2 extending 3,000 feet east. See attached blue lines. The project can be located on the Princedale, Arkansas, 15 minute quadrangle map, T10N, R5E, Section 28 SW 1/4 of the SE 1/4, NE 1/4 of the SW 1/4, and SE 1/4 of the NW 1/4.

3. DEFINITIONS.

3.1. "Cultural Resources" are defined to include any buildings, site, district, structure, object, data, or other material relating to the history, architecture, archeology, or culture of an area.

3.2. "Background and Literature Search" is defined as a comprehensive examination of existing literature and records for the purpose of inferring the potential presence and character of cultural resources in the study area. The examination may also serve as collateral information to field data in evaluating the eligibility of cultural resources for inclusion in the National Register of Historic Places or in ameliorating losses of significant data in such resources.

3.3. "Intensive Survey" is defined as a comprehensive, systematic, and detailed on-the-ground survey of an area, of sufficient intensity to determine the number, types, extent and distribution of cultural resources present and their relationship to project features.

3.4. "Mitigation" is defined as the amelioration of losses of significant prehistoric, historic, or architectural resources which will be accomplished through preplanned actions to avoid, preserve, protect, or minimize adverse effect upon such resources or to recover a representative sample of the data they contain by implementation of scientific research and other professional techniques and procedures. Mitigation of losses of cultural resources but is not limited to, such measures as: (1) recovery and preservation of an adequate sample of archeological data to allow for analysis and published interpretation of the cultural and environmental conditions prevailing at the time(s) the area was utilized by man; (2) recording, through architectural quality photographs and/or measured drawings of buildings, structures, districts, sites and objects and deposition of such documentation in the Library of Congress as a part of the National Architectural and Engineering Record; (3) relocation of buildings, structures and objects; (4) modification of plans or authorized projects to provide for preservation of resources in place; (5) reduction or elimination of impacts by engineering solutions to avoid mechanical effects of wave wash, scour, sedimentation and related processes and the effects of saturation.

3.5. "Reconnaissance" is defined as an on-the-ground examination of selected portions of the study area, and related analysis adequate to assess the general nature of resources in the overall study area and the probable impact on resources of alternate plans under consideration. Normally reconnaissance will involve the intensive examination of not more than 15 percent of the total proposed impact area.

3.6. "Significance" is attributable to those cultural resources of historical, architectural, or archeological value when such properties are included in or have been determined by the Secretary of the Interior to be eligible for inclusion in the National Register of Historic Places after evaluation against the criteria contained in 36 CFR 63.

3.7. "Testing" is defined as the systematic removal of the scientific, prehistoric, historic, and/or archeological data that provide an archeological or architectural property with its research or data value. Testing may include controlled surface survey, shovel testing, profiling, and limited subsurface test excavations of the properties to be affected for purposes of research planning, the development of specific plans for research activities and excavation, preparation of notes and records, and other forms of physical removal of data and the analysis of such data and material, preparation of reports on such data and material and dissemination of reports and other products of the research. Subsurface testing shall not proceed to the level of mitigation.

3.8. "Analysis" is the systematic examination of material data, environmental data, ethnographic data, written records, or other data which may be prerequisite to adequately evaluating those qualities of cultural loci which contribute to their significance.

4. GENERAL PERFORMANCE SPECIFICATIONS.

4.1. Research Design.

Survey and testing will be conducted within the framework of a regional research design for prehistoric and historic resources, which should consider problems of settlement and subsistence and the relationship between the environment and various cultural systems. The research design shall appear in the report of investigations. In view of the relative sparsity of existing information on many classes of cultural resources data, it is not expected that this research design will contain highly refined models. On the contrary, it is expected that the design will be modified and refined as data are accumulated.

4.2 Background and Literature Search.

a. This task shall include an examination of the historic and prehistoric environmental setting and cultural background of the study area and shall be of sufficient magnitude to achieve a detailed understanding of the overall cultural and environmental context of the study area. It is axiomatic that the background and literature search shall normally precede the initiation of all other fieldwork.

b. Information and data for the literature search shall be obtained, as appropriate, from the following sources. (1) Scholarly reports - books, journals, theses, dissertations and unpublished papers; (2) official Records - Federal, state, county and local levels, property deeds, public works and other regulatory department records and maps; (3) Libraries and Museums - both regional and local libraries, historical societies, universities, and museums; (4) Other repositories - such as private collections, papers, photographs, etc.; (5) Archeological site files at local universities, the State Historic Preservation office, the office of the State Archeologist; (6) Consultation with qualified professionals familiar with the cultural resources in the area, as well as consultation with professionals in associated areas such as history, sedimentology, geomorphology, agronomy, and ethnology.

c. The Contractor shall include as an appendix to the draft and final reports written evidence of all consultation and any subsequent response(s), including the dates of such consultation and communications.

d. The background and literature search shall be performed in such a manner as to facilitate the construction of predictive statements (to be included in the study report) concerning the probable quantity, character, and distribution of cultural resources within the project area. In addition, information obtained in the background and literature search should be of such scope and detail as to serve as an adequate data base for subsequent field work and analysis in the study area undertaken for the purpose of discerning the character, distribution and significance of specific identified cultural resources.

e. In order to accomplish the objectives described in paragraph 4.2.d, it will be necessary to attempt to establish a relationship between landforms and the patterns of their utilization by successive groups of human inhabitants. This task should involve defining and describing various zones of the study area with specific reference to such variables as past topography, potential food resources, soils, geology, and river channel history.

4.3. Intensive Survey.

a. Intensive Survey shall include the on-the-ground examination of the project areas described in paragraph 2.

b. Unless excellent ground visibility and other conditions conducive to the observation of cultural evidence occurs, shovel test pits, or comparable subsurface excavation units, shall be installed at intervals no greater than 30 meters throughout the study area. Note that auger samples, probes, and coring tools will not be considered comparable subsurface units. Shovel test pits shall be minimally 30 x 30 centimeters in size and extend to a minimum depth of 50 centimeters. Unit fill material shall be screened using 1/4" mesh hardware cloth. Additional shovel test pits shall be excavated in areas judged by the Principal Investigator to display a high potential for the presence of cultural resources. If, during the course of intensive survey activities, areas are encountered in which disturbance or other factors clearly and decisively preclude the possible presence of significant cultural

resources, the Contractor shall carefully examine and document the nature and extent of the factors and then proceed with survey activities in the remainder of the study area. Documentation and justification of such action shall appear in the survey report. The location of all shovel test units and surface observations shall be recorded.

c. When cultural remains are encountered, horizontal site boundaries shall be derived by the use of surface observation procedures (including controlled surface collection procedures described in Paragraph 4.4.a below) in such a manner as to allow precise location of site boundaries on Government project drawings and 7.5 minute U.S.G.S. quad maps when available. Methods used to establish site boundaries shall be discussed in the survey report together with the probable accuracy of the boundaries. The Contractor shall establish a datum at the discovered cultural loci which shall be precisely related to the site boundaries as well as to a permanent reference point (in terms of azimuth and distance) by means of a transit level. If possible, the permanent reference point used shall appear on Government blue-line (project) drawings and/or 7.5 minute U.S.G.S. quad maps. If no permanent landmark is available, a permanent datum shall be established in a secure location for use as a reference point. The permanent datum shall be precisely plotted and shown on U.S.G.S. quad maps and project drawings. All descriptions of site location shall refer to the location of the primary site datum.

d. All standing buildings and structures (excluding vehicular bridges) shall be recorded and described. For a building to be considered "standing" it must retain four walls and at least a skeletal roof structure. A building or structure found in the field to be partially or totally collapsed will be considered an archeological site. In these cases, data concerning construction materials and techniques and floor plan, if discernible, must be collected. The Contractor shall supply preliminary information concerning the suitability of a structure or building for relocation and restoration (structural soundness for example).

4.4. Surface Collection and Subsurface Testing Activities.

a. Initial Site Surface Collection and Subsurface Testing.

(1) Surface collection of the site area shall be accomplished in order to obtain data representative of total site surface content. Both historic and prehistoric items shall be collected. The Contractor shall carefully note and record descriptions of surface conditions of the site including ground cover and the suitability of soil surfaces for detecting cultural items (ex: recent rainfall, standing water or mud). If ground surfaces are not highly conducive to surface collection, screened shovel tests units shall be used to augment surface collection procedures. It should be noted, however, that such units should be substituted for total surface collection only where the presence of ground cover requires such techniques.

(2) Care should be taken to avoid bias in collecting certain classes of data or artifact types to the exclusion of others (ex: debitage or faunal remains) so as to insure that collections accurately reflect both the full range and the relative proportions of data classes present (ex: the

proportion of debitage to implements or types of implements to each other). The selective collection of limited classes of artifacts (such as chronologically diagnostic artifacts is unacceptable). Such a collecting strategy shall require the total collection of quadrat or other sample units in sufficient quantities and adequate distribution to reasonably assure that sample data are representative of such discrete site subareas as may exist. Since the number and placement of such sample units will depend, in part, on the subjective evaluation of intrasite variability, and the amount of ground cover, the Contractor shall describe the rationale for the number and distribution of collection units. In the event that the Contractor utilizes systematic sampling procedures in obtaining representative surface samples, care should be taken to avoid periodicity in recovered data. No individual sample unit type used in surface data collection shall exceed 36 square meters in area. Unless a smaller fraction is approved by the Contracting Officer, surface collected areas shall constitute no less than 25 percent of the total site areas. Detailed results of controlled surface collections shall be graphically depicted in plan view in the report of investigations.

(3) The Contractor shall undertake (in addition and subsequent to sample surface collecting) a general site collection in order to increase the sample size of certain classes of data which the Principal Investigator may deem prerequisite to an adequate site-specific and intersite evaluation of data.

(4) As an alternative to surface collecting procedures discussed above, where surface visibility is excellent, the Contractor may collect all visible artifacts. If such a procedure is undertaken, the precise proveniences of all individual artifacts shall be related to the primary site datum by means of a transit level.

(5) Unless it can be conclusively and definitely demonstrated that no significant subsurface cultural resources occur at a site, the Contractor shall install in each appropriate site a minimum of one 1 X 1 meter subsurface test unit to determine the presence and general nature of a subsurface deposits.

(6) Subsurface test units (other than shovel cut units) shall be excavated in levels no greater than 10 centimeters. Where cultural zonation or plow disturbance is present, however, excavated materials shall be removed by zones (and in 10 cm. levels within zones where possible). Subsurface test units shall extend to a depth of at least 20 centimeters below artifact bearing soils. A portion of each test unit, measured from one corner (of a minimum 30 x 30 centimeters), shall be excavated to a depth of 40 centimeters below artifact bearing soils. All excavated material (including plow zone material) shall be screened using a maximum of 1/4" mesh hardware cloth. Representative profile drawings shall be made of excavated units. Subsequent to preparation of profile drawings for each test unit, the unit shall be backfilled and compacted to provide reasonable pedestrian safety.

(7) Stringent horizontal spatial control of testing shall be maintained by relating the location of all collection and test units to the primary site datum either by means of a grid system (including those used in controlled surface collection) or by azimuth and distance.

(8) Other types of subsurface units may, at the Contractor's option, be utilized in addition to those units required by this Scope of Work.

(9) Cultural Resource Recording and Numbering. For each archeological site or architectural property recorded during the survey, the Contractor shall complete and submit the standard Arkansas archeological site or architectural property survey form, respectively. The Contractor shall be responsible for reproducing or obtaining a sufficient quantity of these forms to meet the needs of the project. The Contractor shall be responsible for coordinating with the appropriate state agency to obtain state site-file numbers for each archeological site and architectural property recorded. Authorized state numbers shall be used in the draft and final reports.

b. Additional Investigations.

(1) Additional subsurface test units may be required at many loci. The proposed number and distribution of such test units shall be determined by the Principal Investigator on a site specific basis. This determination shall be made based on such variables as site size and potential intrasite variability, including physiographic and geomorphological characteristics of the loci which may suggest variability in the presence or distribution of subsurface cultural deposits. The Contractor shall detail the rationale(s) for the placement and numbers of such test units in the management summary and report of field activities. Additional reporting requirements, examination of background literature and examination of standing buildings and structures may also be required at some sites. The exact nature of additional examination, the schedule, and the price of the work shall be negotiated with the Contracting Officer, and if an agreement is reached, a Change Order shall be issued prior to conduct of the work. Additional investigations will provide a data base of sufficient nature to allow a determination of site eligibility to the National Register of Historic Places.

(2) In order to accurately relate a site to research domains, (i.e. assess significance or insignificance), a variety of data gathering techniques may be required to insure recovery of the various types of data which may be present at the site. These techniques may include but not be limited to radiocarbon dating, flotation and excavation of cultural features. When appropriate, these types of data gathering activities should be integral elements of the testing strategy.

4.5. Laboratory Processing, Analysis, and Preservation.

All cultural materials recovered will be cleaned and stored in deterioration resistant containers suitable for long term curation. Diagnostic artifacts, defined below, will be labeled and catalogued individually. A diagnostic artifact is defined herein as any object which contributes individually to the needs of analysis required by the research design. All other artifacts recovered must minimally be placed in labeled, deterioration resistant containers, and the items catalogued. The Contractor shall describe and analyze all cultural materials recovered in accordance with current professional standards. Artifactural and non-artifactual analysis shall be of an adequate level and nature to fulfill the requirements

of this Scope of Work. All recovered cultural items shall be cataloged in a manner consistent with Arkansas state requirements. The Contractor shall consult with appropriate state officials as soon as possible following the conclusion of field work in order to obtain information (ex: accession numbers) prerequisite to such cataloging procedures.

4.6. Curation.

Efforts to insure the permanent curation of properly catalogued cultural resources materials in an appropriate institution shall be considered an integral part of the requirements of this Scope of Work. The Contractor shall pay all cost of the preparation and permanent curation of records and artifacts. Recovered materials and data pertaining thereto shall be curated within the state if possible. This arrangement shall be confirmed by the Contractor and the Arkansas State Historic Preservation Officer, subject to the approval of the Contracting Officer, prior to the acceptance of the final report.

5. GENERAL REPORT REQUIREMENTS.

5.1. The primary purpose of the cultural resources report is to serve as planning tool which aids the Government in meeting its obligations to preserve and protect our cultural heritage. The report shall be in the form of a comprehensive, scholarly document that not only fulfills mandated legal requirements but also serves as a scientific reference for future cultural resources studies. As such, the report's content must be not only descriptive but also analytic in nature.

5.2. Upon completion of all field investigation and research, the Contractor shall prepare a report detailing the work accomplished, the results and recommendations for each project area. Copies of the draft and final reports of investigations shall be submitted in a form suitable for publication and be prepared in a format reflecting contemporary organizational and illustrative standards for current professional archeological journals. The final report shall be typed on standard size 8-1/2" x 11" bond paper with pages numbered and with page margins one inch at top, bottom, and sides. Photographs, plans, maps, drawings and text shall be clean and clear.

5.3. The report shall include, but not necessarily be limited to, the following sections and items:

a. Title Page. The title page shall provide the following information; the type of task undertaken, the cultural resources which were assessed (archeological, historical, architectural); the project name and location (county and state), the date of the report; the Contractor's name; the contract number; the name of the author(s) and/or the Principal Investigator; and the agency for which the report is being prepared. If a report has been authored by someone other than the contract Principal Investigator, the Principal Investigator must at least prepare a foreword describing the overall research context of the report, the significance of the work, and any other related background circumstances relating to the manner in which the work was undertaken.

b. Abstract. An abstract suitable for publication in an abstract journal shall be prepared and shall consist of a brief, quotable summary useful for informing the technically-oriented professional public of what the author considers to be the contributions of the investigation to knowledge.

c. Table of Contents.

d. Introduction. This section shall include the purpose of the report, a description of the proposed project, a map of the general area, a project map, and the dates during which the task was conducted. The introduction shall also contain the name of the institution where recovered materials will be curated.

e. Environmental Context. This section shall contain, but not be limited to, a discussion of probable past floral and faunal characteristics of the project area. Since data in this section will be used in the evaluation of specific cultural resource significance, it is imperative that the quantity and quality of environmental data be sufficient to allow subsequent detailed analysis of the relationship between past cultural activities and environmental variables.

f. Previous Research. This section shall describe previous research which may be useful in deriving or interpreting relevant background research data, problem domains, or research questions and in providing a context in which to examine the probability of occurrence and significance of cultural resources in the study area.

g. Literature Search and Personal Interviews. This section shall discuss the results of the literature search, including specific data sources, and personal interviews conducted during the course of investigations.

h. Survey, Testing and Analytical Methods. This section shall contain an explicit discussion of the research design, and shall demonstrate how environmental data, previous research data, the literature search and personal interviews have been utilized in constructing the strategy. Specific research domains and questions as well as methodological strategies employed to address those questions should be included where possible.

i. Survey, Testing and Analytical Results. This section shall discuss archeological, architectural, and historical resources surveyed, tested and analyzed, the nature and results of analysis and the scientific importance or significance of the work. Quantified listings and descriptions of artifacts and their proveniences shall be included in this section or added to the report as an appendix. Inventoried sites shall include a site number.

j. Recommendations.

(1) This section shall contain assessments of the eligibility of specific cultural properties in the study area for inclusion in the National Register of Historic Places.

(2) Significance shall be discussed explicitly in terms of previous regional and local research and relevant problem domains. Statements concerning significance shall contain a detailed, well-reasoned argument for the property's research potential in contributing to the understanding of cultural patterns, processes or activities important to the history or prehistory of the Locality, Region or nation, or other criteria of significance. Conclusions concerning insignificance, likewise, shall be fully documented and contain detailed and well-reasoned arguments as to why the property fails to display adequate research potential or other characteristics adequate to meet National Register criteria of significance. For example, conclusions concerning significance or insignificance relating solely to the lack of contextual integrity due to plow disturbance or the lack of subsurface deposits will be considered inadequate. Where appropriate, due consideration should be given to the data potential of such variables as site functional characteristics, horizontal intersite or intrasite spatial patterning of data and the importance of the site as a representative systemic element in cultural patterning. The Contractor should be guided, in this regard, by Archeological Property Nominations by Tom King (Published in 11593, Vol. 1, No. 2). All report conclusions and recommendations shall be logically and explicitly derived from data discussed in the report.

(3) The significance or insignificance of cultural resources can be determined adequately only within the context of the most recent available local and regional data base. Consequently, the evaluation of specific individual cultural loci examined during the course of contract activities shall relate those resources not only to previously known cultural data but also to a synthesized corpus of data including that generated in the present study.

(4) The Contractor shall provide appropriate alternative mitigation measures for significant resources which will be adversely impacted. Data will be provided to support the need for mitigation, and the relative merits of each mitigation design will be discussed. Preservation of significant cultural resources is nearly always considered preferable to recovery of data through excavation. When a significant site can be preserved for a cost reasonably comparable to, or less than the cost required to recover the data, full consideration shall be given to this course of action.

k. References (American Antiquity style).

1. Appendices (Maps, correspondence, etc). A copy of this Scope of Work shall be included as an appendix to the report of investigations.

5.4. The above items do not necessarily have to be discrete sections; however, they should be readily discernible to the reader.

5.5. In order to prevent potential damage to cultural resources, no information shall appear in the body of the report which would reveal precise resource location. All maps which indicate or imply precise site locations shall be included in reports as a readily removable appendix (ex: envelope).

5.6. No logo or other such organizational designation shall appear in any part of the report (including tables or figures) other than the title page.

5.7. Unless specifically excluded by the Contracting Officer, all reports shall utilize permanent site numbers assigned by the state of Tennessee.

5.8. All appropriate information (including typologies and other classificatory units) not generated in these contract activities shall be suitably referenced.

5.9. Reports shall contain site specific maps. Site maps shall indicate site datum(s), location of data collection units (including shovel cuts, subsurface test units, and surface collection units), site boundaries in relation to proposed project activities, site grid systems (where appropriate), and such other items as the Contractor may deem appropriate to the purposes of this contract.

5.10. Information shall be presented in textual, tabular, and graphic forms, whichever are most appropriate, effective and advantageous to communicate necessary information. All tables, figures and maps appearing in the report shall be of publishable quality.

5.11. Any abbreviated phrases used in the text shall be spelled out when the phrase first occurs in the text. For example use "State Historic Preservation Officer (SHPO)" in the initial reference and thereafter "SHPO" may be used.

5.12. The first time the common name of a biological species is used it should be followed by the scientific name.

5.13. In addition to street addresses or property names, sites shall be located on the Universal Transverse Mercator (UTM) grid.

5.14. All measurements should be metric.

5.15. As appropriate, diagnostic and/or unique artifacts, cultural resources or their contexts shall be shown by drawings or photographs.

5.16. Black and white photographs are preferred except when color changes are important for understanding the data being presented. No instant type photographs shall be used.

5.17. Negatives of all black and white photographs and/or color slides of all plates included in the final report shall be submitted to the Contracting Officer.

6. SUBMITTALS.

6.1. An extensive management summary shall be submitted, in accordance with the schedule in paragraph 7.1, to the Contracting Officer within 14 days of the completion of survey and initial testing. The management summary shall describe survey and initial testing methods and the data yielded by those methods. Where survey data, initial testing data and other sources of data are adequate, the Contractor shall evaluate cultural resources identified

resources identified during survey activities in terms of eligibility for inclusion in the National Register of Historic Places. The evaluation shall be consistent with requirements in paragraph 5.3.j. of this Scope of Work. Where inadequate data exist for such an evaluation, the Contractor shall recommend specific additional studies, as described in paragraph 4.4.b of this Scope of Work, necessary to obtain adequate data for such National Register evaluation. The management summary shall include project maps showing boundaries of discovered cultural resources relative to project rights-of-way. The management summary shall also contain recommendations, based on geomorphic and other data, concerning the need for deep cultural resources testing and the type, numbers and locations of needed deep test units.

6.2. The Contractor shall submit 4 copies of the draft report and one unbound original and 25 bound copies of the final report which include appropriate revisions in response to the Contracting Officer's comments.

6.3. The Contractor shall submit under separate cover 4 copies of appropriate 15' quadrangle maps (7.5' when available) or other site drawings which show exact boundaries of all cultural resources within the project area and their relationship to project features, and single copies of all forms, records and photographs described in paragraph 1.5. If cultural resources are not found, separate topographic maps need not be submitted.

6.4. The Contractor shall submit to the Contracting Officer completed National Register forms including photographs, maps, and drawings in accordance with the National Register Program, if any sites inventoried during the survey are found to meet the criteria of eligibility for nomination and for determination of significance. The completed National Register forms shall be submitted with the final report.

6.5. At any time during the period of service of this contract and upon the written request of the Contracting Officer, the Contractor shall submit, within 30 calendar days, any portion or all field records described in paragraph 1.5. without additional cost to the Government.

6.6. When cultural resources are located during intensive survey activities, the Contractor shall supply the appropriate State Historic Preservation Office and the Contracting Officer with completed site forms, survey report summary sheets, maps or other forms as appropriate. Blank forms may be obtained from the State Historic Preservation Office. Copies of such completed forms and maps shall be submitted to the Contracting Officer within 30 calendar days of the end of field work.

6.7. The Contractor shall prepare and submit with the final report, a site card for each identified resource or aggregate resource. These site cards do not replace state approved prehistoric, historic, or architectural forms or Contractor designed forms. These 5 X 8 inch cards shall be color-coded. White cards shall be used for prehistoric sites, blue cards for historic sites, green for architectural sites, and yellow cards for potentially significant sites. Sites fitting two or more categories shall have two or more appropriate cards. This site card shall contain the following information, to the degree permitted by the type of study authorized:

- a. Site number
- b. Site name
- c. Location: section, township, and UTM coordinates (for procedures in determining UTM coordinates, refer to How to Complete National Register Forms, National Register Program, Volume 2.)
- d. County and state
- e. Quad maps
- f. Date of record
- g. Description of site
- h. Condition of site
- i. Test excavation results
- j. Typical artifacts
- k. Chronological position (if known)
- l. Relation to project
- m. Previous studies and present contract number
- n. Additional remarks

6.8. Documentation. The Contractor shall submit detailed monthly progress reports to the Contracting Officer by the 7th day of every month for the duration of the contract. These reports will contain an accurate account of all field work, laboratory procedures and results in sufficient detail to allow monitoring of project progress. Two different 35mm color slides illustrating aspects of the investigation will be submitted with each monthly report.

7. SCHEDULE.

7.1. The Contractor shall, unless delayed due to causes beyond his control and without his fault or negligence, complete all work and services under this contract within the following time limitations.

<u>Activity</u>	<u>Completion Time (In days beginning with acknowledged date of receipt of notice to proceed)</u>
Survey/Initial Testing	10
Submittal of Draft Report of Investigations	45

7.2. The Contractor shall make any required corrections after review by the Contracting Officer. The Contracting Officer may defer Government review comments pending receipt of review comments from the State Historic Preservation Officer or other reviewing agencies. More than one series of draft report corrections may be required. In the event that the Government review period (30 days) is exceeded and upon request of the Contractor, the contract period will be extended automatically on a calendar day for day basis. Such extension shall be granted at no additional cost to the Government.

7.3. The Contractor shall, unless delayed due to causes beyond his control and without his fault or negligence, complete all work and services under this purchase order within 85 days after receipt of notice to proceed.

8. METHOD OF PAYMENT.

8.1. Upon satisfactory completion of work by the Contractor in accordance with the provisions of this purchase order, and its acceptance by the Contracting Officer, the Contractor will be paid the amount of money indicated in Block 25 of the purchase order.

8.2. If the Contractor's work is found to be unsatisfactory and if it is determined that fault or negligence on the part of the Contractor or his employees has caused the unsatisfactory condition the Contractor will be liable for all costs in connection with correcting the unsatisfactory work. The work may be performed by Government forces or Contractor forces at the direction of the Contracting Officer. In any event, the Contractor will be held responsible for all costs required for correction of the unsatisfactory work, including payments for services, automotive expenses, equipment rental, supervision, and any other costs in connection therewith, where such unsatisfactory work as deemed by the Contracting Officer to be the results of carelessness, incompetent performance or negligence by the Contractor's employees. The Contractor will not be held liable for any work or type of work not covered by this purchase order.

8.3. Prior to settlement upon termination of the purchase order, and as a condition precedent thereto, the Contractor shall execute and deliver to the Contracting Officer a release of all claims against the Government arising under or by virtue of the purchase order, other than such claims, if any, as may be specifically excepted by the Contractor from the operation of the release in stated amounts to be set forth therein.

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