May 14, 1994

Docket No. 50-483

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Ms. Charlene Dwinn Vaughn
Advisory Council on Historical Preservation
1100 Pennsylvania Avenue N.W. Room 809
Washington, D.C 20004

Dear Ms. Vaughn:

SUBJECT: EVALUATION OF THE EFFECTS OF MAINTENANCE AND OPERATION ON CULTURAL RESOURCES AT THE CALLAWAY NUCLEAR PLANT (TAC NO. M83007)

The purpose of this letter is to inform the Advisory Council of Historical Preservation of the results of the Nuclear Regulatory Commission's (NRC) evaluation (Enclosure 1) on the effects of the operation and maintenance of the Callaway Nuclear Plant on cultural resources within the site boundary.

The NRC, in consultation with the Missouri State Historic Preservation Officer (MSHPO), has concluded that the operation and maintenance of the Callaway Plant will have no effect on the cultural resources located within the site boundary. The cultural resources are described in the current Cultural Resources Management Plan for the Callaway Plant (Enclosure 2). The evaluation has been forwarded to the MSHPO for concurrence. Upon receipt of the MSHPO's concurrence, the NRC will forward it to the Advisory Council on Historical Preservation.

Sincerely,

Original signed by

L. Raynard Wharton, Callaway Project Manager
Project Directorate III-3
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Enclosure:
1. NRC Evaluation of Callaway Nuclear Plant
2. Callaway Plant Cultural Resources Management Plan

| LA:PDIII-3 | PM:PDIII-3 | D:PDIII-3 | OGC |
|---|---|---|---|
| MRushbrook | LRWharton | JHannon | |
| 05/10/94 | 05/10/94 | 05/11/94 | 05/12/94 |

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DF01

ENCLOSURE 1

# EVALUATION OF EFFECTS ON CULTURAL RESOURCES FROM THE OPERATION AND MAINTENANCE OF THE CALLAWAY NUCLEAR PLANT

By letter dated February 21, 1992, Union Electric Company (UE) submitted a request to modify its environmental protection plan in the area governing management of historic cultural resources. As the licensing Federal agency, the Nuclear Regulatory Commission (NRC) is required by Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, to consider the effects of their actions (which includes projects, activities, or programs licensed or assisted by an agency) on historic properties. The evaluation was done pursuant to 36 CFR 800.

## BACKGROUND

At the time the NRC issued the operating license for the Callaway Nuclear Plant, UE had not completed all of the necessary steps to ensure protection of the cultural resources surrounding the plant. Therefore, the NRC included Sections 2.3 and 4.3, "Cultural Resources," into Appendix B, Environmental Protection Plan (Non-radiological), of the Callaway operating license. Section 2.3 states that there is a need to protect the cultural resources which are located in the area of potential environmental impact related to maintenance and operation of the plant, and Section 4.3 describes a series of requirements that UE needed to complete to ensure the protection of these cultural resources. Section 4.3 required UE to complete the following:

1. To (1) prepare, in consultation with the State Historic Preservation Officer (SHPO), the potential eligibility of the sites determined to be in the area of potential environmental impact, for inclusion in the National Register of Historic Places, and (2) provide this information to the NRC.

2. To provide the NRC with necessary information to complete a determination of effect from operation and maintenance of the plant on the sites determined to be in the area of potential environmental impact.

UE had performed, prior to licensing Callaway Nuclear Plant, a Phase I cultural resources survey and assessment on approximately 5848 acres of residual lands which surround the Callaway Nuclear Plant. The objective of the Phase I survey and assessment was to locate, evaluate, and identify potentially significant cultural resources. One hundred twenty-nine sites were identified and evaluated during the Phase I survey; 79 prehistoric archeological sites, 29 historical archaeological sites, and 21 architectural sites. Of the 129 sites, 23 prehistoric archeological sites and 2 historic archeological sites were considered individually significant and potentially eligible for nomination to the National Register of Historic Places. However, only three of the 25 sites potentially eligible for the National Register (23CY20, 23CY352, and 23CY359) were in the area of potential environmental impact from the operation and maintenance of the plant. Sites 23CY352 and 23CY359 are located within transmission line rights-of-way and 23CY20 in the

area of the railroad spur. All three sites are prehistoric archeological sites. Enclosure 2 contains a detailed description of the three sites.

A Phase II evaluation on the three sites was conducted to further evaluate National Register eligibility. The Phase II evaluation determined that the three sites were eligible for inclusion into the National Register, and National Register forms were completed for the three sites and sent to the Missouri SHPO. An affirmative opinion from the SHPO regarding the potential eligibility of the three sites for inclusion in the National Register was obtained on April 2, 1990.

UE provided to the NRC the information requested in Section 4.3 in a letter dated March 26, 1985. Section 4.3 also states that upon completion of these activities the NRC would, in consultation with the SHPO, determine the effect of plant operation and maintenance on the cultural resources in the area of potential impact. The licensee has complied with the requirements in Section 4.3. The completion of the NRC's evaluation of effect will complete all the requirements in Section 4.3.

EVALUATION

Pursuant to 36 CFR 800, the NRC has considered the effects of the operation and maintenance of the Callaway Nuclear Plant on historical sites within the area of potential impact. Federal Regulation 36 CFR 800.9 provides agencies with criteria to determine whether or not an undertaking has an effect on a historical site. When applying the criteria set forth in 36 CFR 800.9, there are three possible findings:

1. No effect: There is no effect of any kind (that is, neither harmful nor beneficial) on these historic properties.

2. No adverse effect: There could be an effect, but the effect would not be harmful to those characteristics that qualified the property @&2for inclusion into the National Register.

3. Adverse effect: There could be an effect, and that effect could diminish the integrity of such characteristics.

Effect of Plant Operation and Maintenance

By letter dated March 26, 1985, UE provided the NRC with an assessment of the effects of plant operation and maintenance on sites 23CY20, 23CY352, and 23CY359. UE describes the maintenance and operation in the vicinity of the three sites to be the following:

1. The railroad spur is no longer in use and has been abandoned in place. Therefore, no further operation and maintenance activities will take place in 23CY20. UE also stated that Site 23CY20 has been fenced and any activity within the fence, including vehicular traffic (other than routine grass maintenance) is prohibited.

2. Activities associated with maintenance and repair operations on transmission facilities will no longer be those associated with vehicular movements, when required, along access roads and rights-of-way. No earthmoving work is required. Herbicides will be applied, as necessary, to maintain rights-of-way and trees will be trimmed to maintain the required clearance. Vegetation growth will be controlled on a periodic basis using a standard farm tractor with a bush hog in tow. Vegetation is normally cut above the ground surface with no plowing or excavation required. No other maintenance activities are anticipated.

Along with the above description of operation and maintenance activities, UE also presented a cultural resource management plan that not only protects the three sites within the area of potential environmental impact but also protects all twenty-five sites determined to be eligible for nomination to the National Register. "The Cultural Resource Management Plan for Residual Lands at Union Electric Company Callaway Plant" (Enclosure 2) contains the details of the plan. UE has committed to the NRC by letter dated March 29, 1994, that they will maintain the plan and inform the SHPO of any changes to the plan or any changes to the site.

CONCLUSION

After review of UE's submittal and consultation with the SHPO by telephone conference March 21, 1994, the NRC has determined that the operation and maintenance activities do not constitute any effect on historic properties within the site boundary. The NRC is forwarding our finding of no effect to Michael Weichman of the Missouri SHPO office for concurrence. Upon receipt, the NRC will forward the SHPO's concurrence to the Advisory Council on Historical Preservation. This finding of no effect concludes the NRC's obligations under Section 106 of NHPA.

ENCLOSURE 2

# A Cultural Resources Managment Plan for Residual Lands at the Union Electric Company Callaway Plant Callaway County, Missouri

Prepared for

Union Electric Company

By

American Resources Group, Ltd.
Carbondale, Illinois

Principal Investigator and Author
Michael J. McNerney

Cultural Resources Management
Report No. 52

March 1992

ABSTRACT

A cultural resources management plan based on a Phase I cultural resources survey and assessment (Ray et al. 1983) on 5,848 acres of residual lands and Phase II testing at sites 23CY20, 23CY352, and 23CY359 (Traver 1985) at the Union Electric Company's Callaway Plant, located in Callaway County, Missouri, is presented.

One hundred twenty nine cultural resources sites were identified and evaluated during the Phase I survey and assessment: 79 prehistoric archaeological sites, 29 historic archaeological sites, and 21 architectural sites. Twenty three prehistoric archaeological sites are recommended as potentially eligible for nomination to the National Register of Historic Places, and two historic sites are recommended as potentially eligible. None of the historic architectural resources is considered eligible for nomination to the National Register of Historic Places. The remaining prehistoric and historic archaeological sites are not considered eligible for nomination to the National Register of Historic Places; however, the sites will be protected from subplow zone disturbance by this management plan.

## ACKNOWLEDGMENTS

The entire staff at American Resources Group, Ltd., would like to thank the personnel of Union Electric Company Environmental Services Department, Nuclear Engineering Department, and Real Estate Department for their cooperation and assistance throughout the project. Special thanks to Mr. David J. Wambold for his patience, perseverance, and good-natured cooperation. Additionally, we would like to thank our professional consultants during this project: Dr. Dale R. Henning, consulting archaeologist, and Dr. George Fraunfelter, consulting geologist/geomorphologist.

TABLE OF CONTENTS



List of Figures



List of Maps



List of Tables

# A CULTURAL RESOURCES MANAGEMENT PLAN FOR RESIDUAL LANDS AT THE UNION ELECTRIC COMPANY CALLAWAY PLANT CALLAWAY COUNTY, MISSOURI

## Introduction

This management plan, the Phase I cultural resources survey (Ray et al. 1983) and Phase II testing at three sites (Traver 1985) upon which it is based represents Union Electric Company's compliance with the National Historic Preservation Act of 1966 as amended (P.L. 89-665 and 96-515), Archaeological and Historical Preservation Act of 1974 as amended, and Executive Order 11593 (Protection and Enhancement of the Cultural Environment). Completion of the Phase I survey and accompanying management plan also provides documentation evidencing United States Nuclear Regulatory Commission compliance with the Advisory Council on Historic Preservation regulations, 36 CFR 800 (Protection of Historic and Cultural Properties), and other applicable federal and state regulations.

A Phase I cultural resources survey and assessment of approximately 5,848 acres (2,366 ha) was conducted on residual lands which surround the Union Electric Company Callaway Plant located in central Missouri 10 mi east of Fulton, Missouri (Ray et al. 1983). The primary objective of the Phase I survey and assessment was to locate, evaluate, and identify potentially significant cultural resources; and the primary purpose of the management plan is to provide guidance for the preservation of potentially significant cultural resources. The Missouri Department of

Conservation manages the residual lands under a lease agreement with the property owner, Union Electric Company. A management plan currently in effect (Missouri Department of Conservation 1976) recommends that the highest management priority is to maintain a diverse, high-quality natural environment which will provide recreational activities such as fishing, controlled hunting, nature study, and other compatible activities the Company may wish to incorporate. The cultural resources management plan will supplement the existing land use management plan and will be used by the Company and the Missouri Department of Conservation as a planning tool. Implementation and coordination of this plan is the responsibility of Union Electric Company's Radiological Engineering and Environmental Services departments.

Prior to the construction of the plant and related facilities, Union Electric Company met federal legislative and regulatory requirements by funding cultural resources surveys in direct impact zones. During the period 1975 through 1979, Evans (1975, 1979) and Evans and Ives (n.d., 1973, 1978, 1979a, 1979b) wrote seven assessment reports. Also, direct impact zones were surveyed in conjunction with this project (McNerney 1982; Tucker and Morin 1981a, 1981b). This management plan includes the results of all surveys done on plant property.

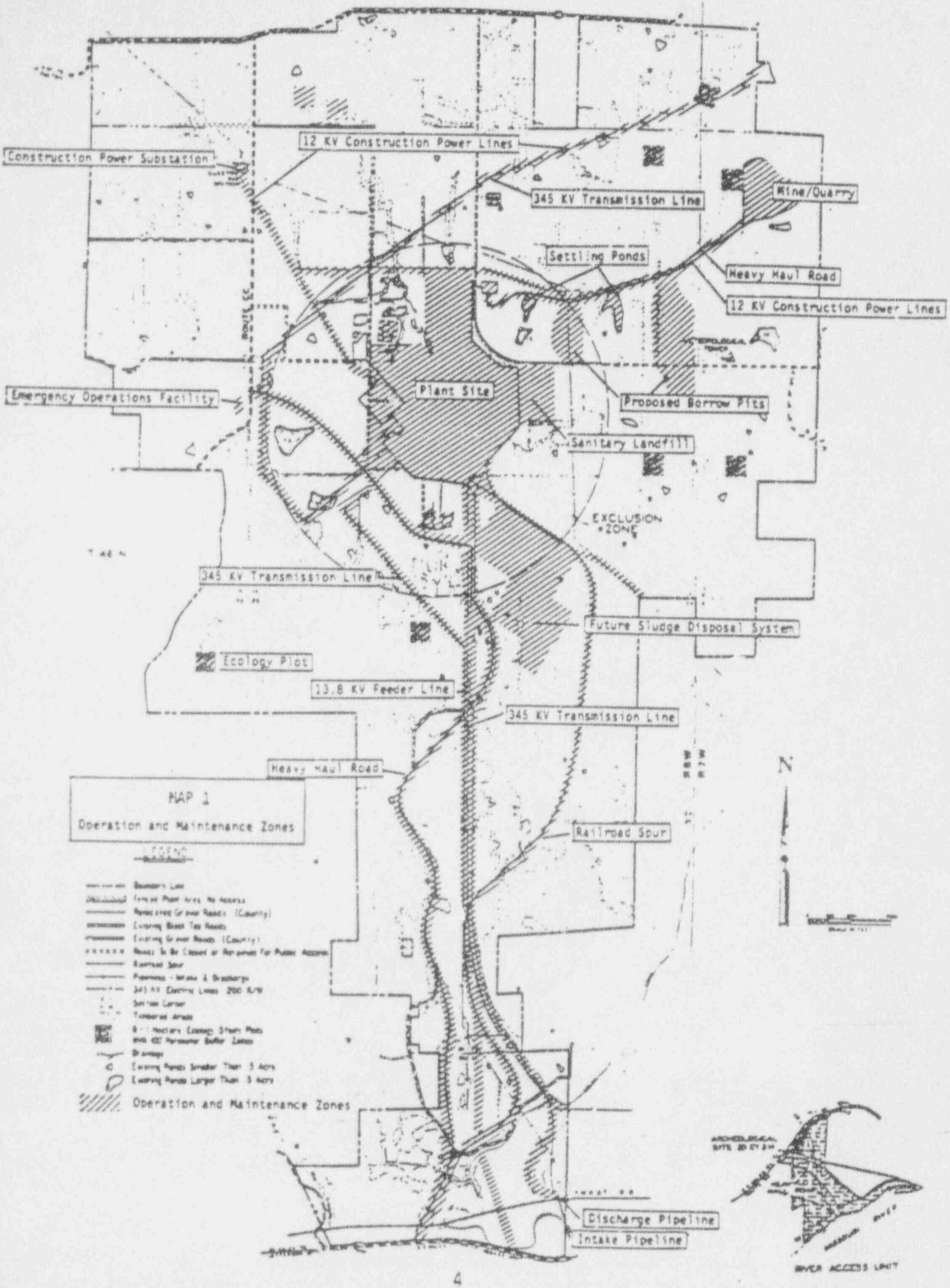
This cultural resources management plan consists of two parts. The first includes background information such as the legal authority for the study, previous cultural resources studies prepared for the plant and related construction activities, current land use, concepts and definitions of cultural resources management, summary of potentially

significant cultural resources identified during the Phase I survey, and a discussion of direct and indirect adverse impacts. The second part of the report provides a discussion of the National Register nomination process and guidance for implementation of the management plan.

Current and Future Land Use

There are two general types of land use at the Callaway Plant site, operation and maintenance areas and wildlife management areas (residual lands). Activities associated with each of the two areas are different and thus require different cultural resources management approaches.

Operation and maintenance zones include electrical transmission lines, heavy haul road, settling ponds, railroad spur, quarry, waterlines (underground), emergency operations facility, meteorological tower, landfill area, borrow pits, and ecology plots (Map 1). Activities in these areas would include inspection, repair, maintenance, monitoring, and, in the case of the borrow pits, earthmoving. Cultural resources surveys and assessments have been completed and reviewed by the MSHPO at all of these operation and maintenance locations (Evans 1975, 1979; Evans and Ives n.d., 1973, 1978, 1979a, 1979b; McNerney 1982; Tucker and Morin 1981a, 1981b). These assessments were carried out ahead of construction and, with the exception of site 23CY20, did not impact significant cultural resources. Excavations were carried out to mitigate the impacts of railroad construction at site 23CY20 (Evans 1975; Evans and Ives 1979a). Therefore, with regard to future cultural resources management decisions within operation and maintenance zones, consideration must be given to the fact that (1) all areas have received


Construction Power Substation
12 KV Construction Power Lines
345 KV Transmission Line
Mine/Quarry
Settling Ponds
Heavy Haul Road
12 KV Construction Power Lines
Emergency Operations Facility
Plant Site
Proposed Borrow Pits
Sanitary Landfill
EXCLUSION ZONE
345 KV Transmission Line
Future Sludge Disposal System
Ecology Plot
13.8 KV Feeder Line
345 KV Transmission Line
Heavy Haul Road
Railroad Spur
N
MAP 1
Operation and Maintenance Zones
Operation and Maintenance Zones
Discharge Pipeline
Intake Pipeline
RIVER ACCESS UNIT

survey and assessment, (2) all areas have been impacted by previous construction activity, and (3) all cultural resources sites which are within the operation and maintenance zones (23CY20, 23CY352, and 23CY359) will be protected by this management plan.

The residual lands at the Callaway Nuclear Power Plant site are being managed to enhance wildlife habitat and provide fishing, hunting, and outdoor recreational opportunities for any individual, group, or organization wishing to make use of these privileges. Land use patterns, either planned or existing, which support and facilitate this management plan include forest habitat (5,251 acres), fishing ponds (10 ponds over one-half acre), crop lands (2,480 acres crop and pasture), access roads, hiking and equestrian trails, parking lots, and picnicing areas. The acreages may change slightly from year to year depending on agricultural, recreational, and wildlife management practices. A visitor's interpretive center also has been proposed (Missouri Department of Conservation 1976). Potentially significant cultural resources within wildlife management and agricultural zones will be protected by this management plan.

Cultural Resources Management

Cultural resources constitute a fragile, limited nonrenewable portion of the total environment. Because they are the physical legacy of various stages of past human lifeways, they are illustrative of man's cultural development. Cultural resources include prehistoric and historic archaeological resources and historic architectural resources. These resources are represented by sites, buildings, districts, and objects (Executive Order Counseling Notes Revised 8/1/74).

Cultural resources management is tied inextricably to a body of federal legislation. The Antiquities Act was passed in 1906 in recognition that cultural resources (archaeological sites only at that time) required protection from destruction. The Historic Sites Act of 1935 provided for the preservation of historic American sites, buildings, objects, and antiquities of national significance. More recently, the passage of the National Historic Preservation Act (1966), the National Environmental Policy Act (1969), the Archaeological and Historic Preservation Act (1974), and the Archaeological Resources Act (1979) have expanded greatly the role of the federal government in the area of cultural resources management. Central to this legislation and cultural resources management are the concepts of preservation either through data recovery prior to destruction or protection through avoidance.

Assessing the nature of cultural resources requires special techniques and methods, which may be thought of as "cultural resource management" (King et al. 1977:8). These authors describe the many dimensions of cultural resources management in an entire volume. While many nonspecialists are required to evaluate reports and to make decisions about cultural resources, these persons often do not have the time nor the inclination to review the growing body of literature on the subject. For the present purposes, a brief review of the idea in the form of a working definition will be useful.

> Cultural resources management seeks to have control (in action and use) and to have responsibility for sites, structures, objects, and districts which are historically, architecturally, archaeologically, or culturally significant. Implementation of such control or responsibility may include inventory, assessment, recovery, research, protection,

> preservation, and enhancement, depending upon individual resources and circumstances (McNerney 1978:93).

This definition emphasizes the control of and responsibility for cultural resources, a situation with which many landowning agencies and corporations find themselves confronted today. The primary practitioners of the discipline are anthropologists and archaeologists (requiring a variety of supporting specialists in the physical and natural sciences), historians, and architectural historians. Other disciplines rapidly becoming involved administratively in cultural resources management include land managers, planners, environmental planners, engineers, ecologists, real estate developers, and recreation managers. At the present time, the agencies which will be primarily involved in the management of cultural resources on the residual lands will be Union Electric Company, Missouri Department of Conservation, the Nuclear Regulatory Commission, and the Missouri Office of Historic Preservation. Using the above definition, the management process may be briefly outlined.

The first step of the management process involves inventory and assessment: the review of previously recorded resources, the location and inventory of unrecorded resources on the landscape, the assessment of the significance of the resources, and the assessment of potential adverse impacts which may threaten the resources. These are the major considerations ordinarily addressed in a Phase I survey and assessment. A central issue during this phase and throughout the management process is the determination of significance. The evaluation of significance includes the collection and analysis of artifacts from archaeological

sites, shovel tests or soil probings to determine the vertical and horizontal limits of the site, and the evaluation of architectural sites for historic significance.

Next, a conclusion regarding the significance of the site is offered by the investigator. This conclusion is based on the evaluation of the results of the survey and the National Register of Historic Places criteria for significance. The National Register is an authoritative guide to be used by federal, state, and local governments, private groups, and citizens to identify the Nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment. The National Register was designed to be and is administered as a planning tool. The criteria are:

> The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> (1) That are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (2) That are associated with the lives of persons significant in our past; or
>
> (3) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> (4) That have yielded, or may be likely to yield, information important in prehistory or history (Federal Register 1976:1595).

In 1987 a Master Plan for Archaeological Resource Protection in Missouri (Weston and Weichman, editors, 1987) was published. The Study Units, Cultural Units, and Research Questions presented in this document

should also be considered in preparing research designs and evaluating the significance of the cultural resources at the Callaway plant should any resources be impacted which would require Phase II testing in the future.

The investigator's conclusion regarding the eligibility of a particular property for nomination to the National Register is revieved by the State Historic Preservation Officer in consultation with the agencies involved. The State Historic Preservation Officer (SHPO) is a state official appointed by the governor whose job it is to insure that the cultural resources of the state are not destroyed arbitrarily and to make recommendations to protect such resources. It is the SHPO who helps make certain that the legal responsibilities specified in the National Historic Preservation Act of 1966 are fulfilled. If the SHPO and the concerned agencies agree that the properties do not meet any of the criteria for listing in the National Register, the matter goes no further and the properties may be altered. If the agencies and the SHPO agree that the properties are eligible, or if they cannot agree, or if some question exists regarding the eligibility of the nominated properties, final determination of eligibility rests with the Office of Archaeology and Historic Preservation, a multicomponent office within the National Park Service, the core unit of which is the National Register of Historic Places (King et al. 1977:88). If the properties do not meet any of the criteria, no further action is required. If the property is determined eligible, then appropriate preservation measures are developed by the responsible agencies.

Following the indentification and assessment phase of the cultural resources management process, land use limitations are offered which are designed to protect and preserve the resource. As indicated earlier, cultural resources are fragile, limited, nonrenewable portions of the

natural and cultural environment; any direct land altering activities (ie. roads, reservoirs) or indirect impacts (ie. increased public use of an area containing sites) may threaten the preservation of the site. These potential impacts or adverse effects are evaluated, and appropriate mitigative alternatives are offered. Mitigation may include avoidance, data recovery through excavation, or other means of preservation.

The foregoing provides a brief outline of the cultural resources management process including: a definition of cultural resources, a summary definition of cultural resources management, a discussion of significance, and key concepts of cultural resources management. These concepts will serve as a framework within which to develop a cultural resources management plan for the residual lands.

## Summary of Cultural Resources

One hundred twenty nine sites (Map 2, Table 1) were identified and evaluated during the Phase I survey and assessment; 79 prehistoric archaeological sites, 29 historic archaeological sites, and 21 architectural sites. For more specific information regarding individual sites and related research information, the reader is referred to the Phase I cultural resources report (Ray et al. 1983).

### Prehistoric Resources

Of the 79 prehistoric sites, cultural affiliation could not be determined for 62 sites (78.5%) due to the absence of culturally diagnostic artifacts. Forty two (53.2%) of the sites recorded produced 10 waste flakes or less. Cultural affiliation was established for 17 (21.5%) sites.

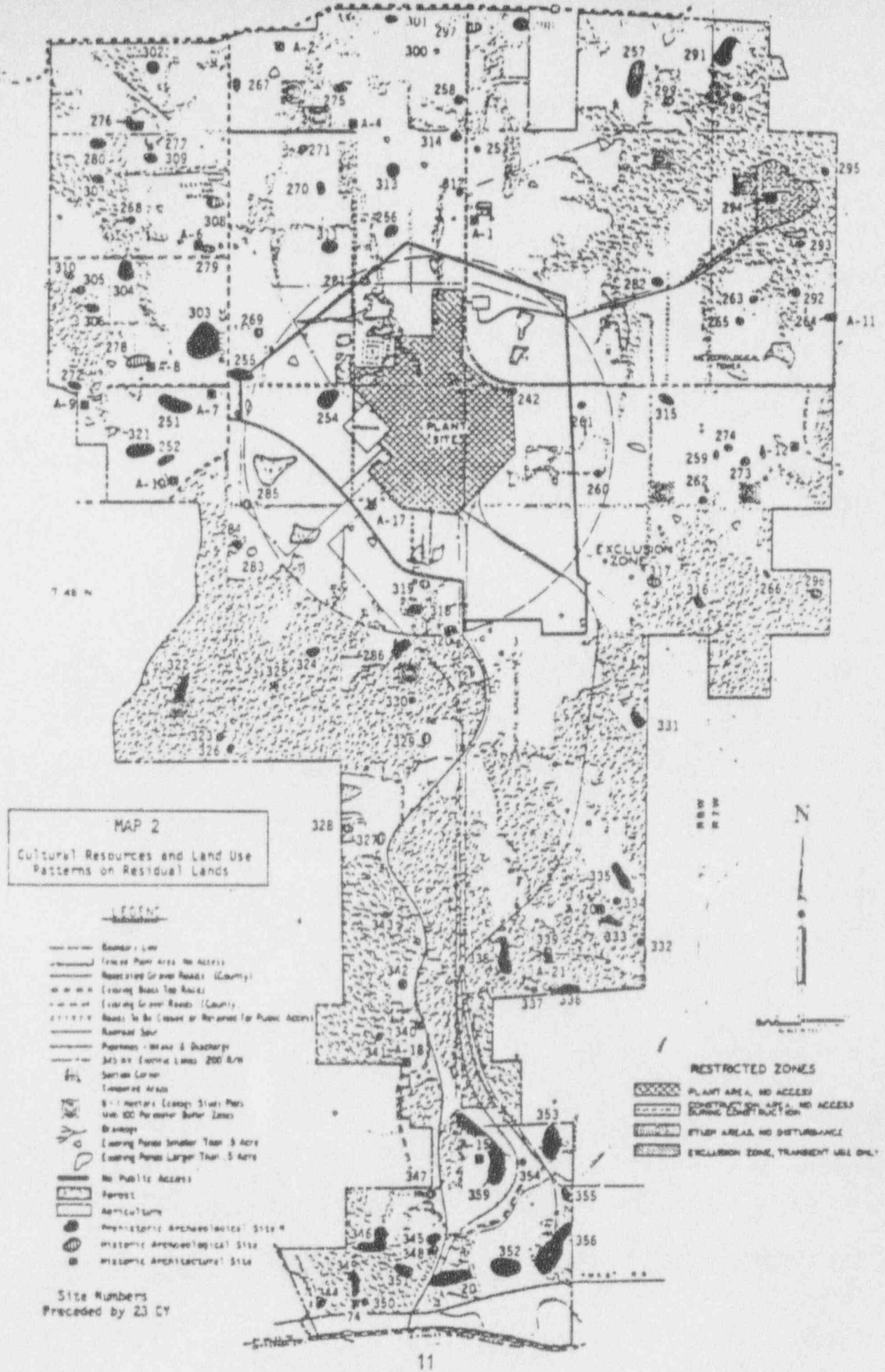

PLANT SITE
EXCLUSION ZONE
MAP 2
Cultural Resources and Land Use Patterns on Residual Lands
Site Numbers Preceded by 23 CY
RESTRICTED ZONES
N

Table 1

Prehistoric and Historic Archaeological Sites located on Residual Lands
Union Electric Company, Callaway Nuclear Power Plant Site

| Site No 23CY- | Sec | Approx Size (Acres) | Cultural Affiliation | Site Type/Activity | Present Land Use | Ground Cover | Land Use Limitations+ | NRHP Potential** |
|---|---|---|---|---|---|---|---|---|
| | | | | LEVEL UPLAND PRAIRIE (n=41) | | | | |
| 242* | 13 | - | Prehistoric | /Knapping | Agri Exclusion zone | Weeds | Subplow zone disturbance | Not eligible |
| 251 | 15 | 39.0 | Prehistoric | /Knapping | Agri | Crop stubble | Subplow zone disturbance | Not eligible |
| 252* | 15 | 8.0 | Prehistoric | /Knapping | Agri | Grass | Subplow zone disturbance | Not eligible |
| 253* | 12 | .15 | Prehistoric | /Knapping | Agri | Weeds | Subplow zone disturbance | Not eligible |
| 254 | 14 | 19.5 | Prehistoric | Camp /Knapping | Agri | Cultivated Crop stubble | Subplow zone disturbance | Not eligible |
| 255 | 11 | 12.1 | Prehistoric | Camp /Knapping | Agri | Cultivated Crop stubble | Subplow zone disturbance | Not eligible |
| 256* | 11 | 5.9 | Middle-Late Archaic | Camp /Knapping | Agri | Cultivated Crop stubble | Subplow zone disturbance | Not eligible |
| 257 | 1 | 14.8 | Prehistoric/ Historic | H/Camp /Knapping Fabricating Processing | Agri | Cultivated Crop stubble | Limited Agri | Eligible |
| 258* | 2 | 1.0 | Prehistoric | /Knapping | Agri | Cultivated Crop stubble | Subplow zone disturbance | Not eligible |
| 259 | 18 | .1 | Historic | Cemetery/Burial | Cemetery | Weeds, brush | Avoid | Not eligible |

Legend: Sec - Section Number
N - Nonhabitation Type (outbuildings)
D - Discard (dump)
U - Unable to Evaluate
H - Habitation
* - Site with fewer than 10 Artifacts

+Limited Agriculture-see page 38
Avoid-see page 39

**Noneligible designations are based on the results of the Phase I survey. There is the remote possibility that these sites may be eligible and are protected by the recommendations in this management plan.

Table 1 (cont.)

| Site No 23CY- | Sec | Approx Size (Acres) | Cultural Affiliation | Site Type/Activity | Present Land Use | Ground Cover | Land Use Limitations+ | NRHP Potential** |
|---|---|---|---|---|---|---|---|---|
| 260* | 13 | - | Prehistoric | /Knapping | Agri | Grass | Subplow zone disturbance | Not eligible |
| 261 | 13 | 1 | Historic | H | Nonagri | Forest, brush | Avoid | Eligible |
| 267 | 2 | 8.2 | Paleo | Camp /Knapping | Agri | Crop stubble | Limited agri fall plow for surface collection | Eligible |
| 269 | 11 | .5 | Historic | H | Nonagri | Forest, brush | Subplow zone disturbance | Not eligible |
| 270 | 11 | 17.25 | Prehistoric | Camp /Knapping | Agri | Cultivated Crop stubble | Subplow zone disturbance | Not eligible |
| 271 | 11 | 1 | Historic | H | Nonagri | Forest, brush | Subplow zone disturbance | Not eligible |
| 273 | 18 | 1 | Historic | H | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 274* | 18 | 2.4 | Prehistoric | /Knapping | Agri | Crop stubble | Subplow zone disturbance | Not eligible |
| 275* | 2 | 2.5 | Prehistoric | /Knapping | Agri | Crop stubble | Subplow zone disturbance | Not eligible |
| 276 | 3 | 2.5 | Historic | H, N | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 277 | 10 | .9 | Historic | Holland Cemetery/Burial | Cemetery | Brush | Avoid | Not eligible |
| 278 | 10 | 1 | Historic | H | Agri | Grass | Subplow zone disturbance | Not eligible |
| 279 | 10 | 1 | Historic | H | Nonagri | Weeds, brush | Subplow zone disturbance | Not eligible |
| 281* | 11 | .1 | Prehistoric | /Knapping | Agri | Crop stubble | Subplow zone disturbance | Not eligible |
| 285 | 14 | 1 | Historic | H | Agri | Grass | Subplow zone disturbance | Not eligible |
| 297 | 1 | .3 | Historic | U | Nonagri | Forest | Subplow zone disturbance | Not eligible |

Table 1 (cont.)

| Site No 23CY- | Sec | Approx Size (Acres) | Cultural Affiliation | Site Type/Activity | Present Land Use | Ground Cover | Land Use Limitations* | NRHP Potential** |
|---|---|---|---|---|---|---|---|---|
| 298 | 1 | 3.4 | Prehistoric | /Knapping | Agri | Crop stubble | Subplow zone disturbance | Not eligible |
| 300 | 2 | 1 | Historic | H | Agri | Crop stubble | Subplow zone disturbance | Not eligible |
| 301* | 2 | .6 | Prehistoric | /Knapping | Agri | Crop stubble | Subplow zone disturbance | Not eligible |
| 302 | 3 | .5 | Prehistoric | Camp /Knapping | Agri | Cultivated | Subplow zone disturbance | Not eligible |
| 303 | 10 | 14.8 | Early Archaic | Camp /Knapping Food processing | Agri | Crop stubble | Limited Agri | Eligible |
| 308* | 10 | 10.25 | Prehistoric | /Knapping | Agri | Crop stubble | Subplow zone disturbance | Not eligible |
| 309 | 10 | 13.6 | Late Archaic | Camp /Knapping Hunting, butchering | Agri | Crop stubble | Limited Agri | Eligible |
| 311 | 11 | 23.9 | Prehistoric | Camp /Knapping | Agri | Crop stubble | Subplow zone disturbance | Not eligible |
| 312 | 11 | 1 | Historic | H | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 313 | 11 | 62 | Prehistoric | Camp /Knapping | Agri | Crop stubble | Subplow zone disturbance | Not eligible |
| 314 | 11 | .25 | Prehistoric | Camp /Knapping (feature) | Agri | Crop stubble | Limited Agri | Eligible |
| 315* | 13 | .7 | Prehistoric | /Knapping | Agri | Crop stubble | Subplow zone disturbance | Not eligible |
| 319 | 14 | 1 | Historic | H | Agri | Crop stubble | Subplow zone disturbance | Not eligible |
| 321 | 15 | 10.5 | Prehistoric | Camp /Knapping Food processing | Agri | Crop stubble | Limited Agri | Eligible |

Table 1 (cont.)

| Site No 23CY- | Sec | Approx Size (Acres) | Cultural Affiliation | Site Type/Activity | Present Land Use | Ground Cover | Land Use Limitations+ | NRHP Potential** |
|---|---|---|---|---|---|---|---|---|
| | | | | PRAIRIE/FOREST EDGE (n=34) | | | | |
| 262 | 13 | 1 | Historic | D | Agri | Grass | Subplow zone disturbance | Not eligible |
| 263 | 7 | 1.4 | Prehistoric | /Knapping | Agri | Grass | Subplow zone disturbance | Not eligible |
| 264* | 7 | 2.8 | Prehistoric | /Knapping | Agri | Grass | Subplow zone disturbance | Not eligible |
| 265 | 7 | 1.3 | Prehistoric | /Knapping | Agri | Grass | Subplow zone disturbance | Not eligible |
| 266* | 18 | .1 | Prehistoric | /Knapping | Agri | Cultivated | Subplow zone disturbance | Not eligible |
| 268 | 10 | 1.7 | Prehistoric | /Knapping | Agri | Grass | Subplow zone disturbance | Not eligible |
| 272* | 15 | .75 | Prehistoric | /Knapping | Agri | Grass | Subplow zone disturbance | Not eligible |
| 280* | 10 | .1 | Prehistoric | /Knapping | Nonagri | Brush | Subplow zone disturbance | Not eligible |
| 282 | 12 | 1.5 | Prehistoric | /Knapping | Agri | Crop stubble | Subplow zone disturbance | Not eligible |
| 283 | 14 | .5 | Historic | Law Cemetery/Burial | Cemetery | Forest, grass | Avoid | Not eligible |
| 284* | 14 | .3 | Prehistoric | /Knapping | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 286 | 23 | 8 | Prehistoric | /Knapping | Nonagri | Brush<br>Crop stubble | Subplow zone disturbance | Not eligible |
| 290* | 6 | .75 | Prehistoric | /Knapping | Nonagri | Brush | Subplow zone disturbance | Not eligible |
| 291 | 6 | 6 | Prehistoric | Camp /Knapping<br>Fabricating<br>Processing | Agri | Crop stubble | Limited Agri | Eligible |

Table 1 (cont.)

| Site No 23CY- | Sec | Approx Size (Acres) | Cultural Affiliation | Site Type/Activity | Present Land Use | Ground Cover | Land Use Limitations* | NRHP Potential** |
|---|---|---|---|---|---|---|---|---|
| 292* | 7 | 1 | Prehistoric | /Knapping | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 293* | 7 | .11 | Prehistoric | /Knapping | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 294* | 7 | 12.4 | Prehistoric | /Knapping | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 295* | 7 | .15 | Prehistoric | /Chert procurement Knapping | Nonagri | Nothing | Subplow zone disturbance | Not eligible |
| 299 | 1 | .1 | Historic | U | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 304 | 10 | 3.2 | Late Woodland/ Mississippian | Camp /Knapping Hunting Food processing Fabricating | Agri | Crop stubble | Limited agri | Eligible |
| 305 | 10 | .25 | Historic | U | Nonagri | Forest, brush | Subplow zone disturbance | Not eligible |
| 306* | 10 | 1.5 | Prehistoric | /Knapping | Nonagri | Brush, grass | Subplow zone disturbance | Not eligible |
| 307* | 10 | 1.2 | Prehistoric | /Knapping | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 310* | 10 | .3 | Prehistoric | /Knapping | Agri | Crop stubble | Subplow zone disturbance | Not eligible |
| 316* | 13 | .1 | Prehistoric | /Knapping | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 317 | 13 | .25 | Historic | U | Agri | Grass | Subplow zone disturbance | Not eligible |
| 318* | 14 | 5.6 | Prehistoric | /Knapping | Agri | Crop stubble | Subplow zone disturbance | Not eligible |
| 320* | 14 | 1.5 | Prehistoric | /Knapping | Agri | Crop stubble | Subplow zone disturbance | Not eligible |

Table 1 (cont.)

| Site No 23CY- | Sec | Approx Size (Acres) | Cultural Affiliation | Site Type/Activity | | Present Land Use | Ground Cover | Land Use Limitations+ | NRHP Potential** |
|---|---|---|---|---|---|---|---|---|---|
| 324* | 23 | .05 | Prehistoric | | /Knapping | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 325* | 23 | .05 | Prehistoric | | /Knapping | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 327 | 23 | .2 | Historic | H | | Nonagri | Brush | Subplow zone disturbance | Not eligible |
| 328 | 23 | 1 | Late Archaic/ Early Woodland | Camp | /Knapping (biface manufacture) Cutting, butchering | Agri | Crop stubble | Limited Agri | Eligible |
| 329 | 23 | .5 | Historic | H | | Agri | Grass | Maintain present use | Not eligible |
| 330* | 23 | .2 | Prehistoric | | /Knapping | Nonagri | Brush | Maintain present use | Not eligible |
| | | | | DISSECTED UPLAND OAK-HICKORY FOREST (n=17) | | | | | |
| 296 | 18 | .25 | Historic | H | | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 322 | 22 | 4.5 | Late Woodland/ Mississippian | Camp | /Knapping Hunting | Nonagri | Weeds | Limited Agri | Eligible |
| 323* | 22 | .15 | Prehistoric | | /Knapping | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 326* | 23 | .5 | Prehistoric | | /Knapping | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 331* | 24 | .3 | Prehistoric | | /Knapping | Agri | Grass | Subplow zone disturbance | Not eligible |
| 332* | 25 | .1 | Prehistoric | | /Knapping | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 333 | 25 | 2 | Historic | H | | Nonagri | Forest, grass | Subplow zone disturbance | Not eligible |

Table 1 (cont.)

| Site No 23CY- | Sec | Approx Size (Acres) | Cultural Affiliation | Site Type/Activity | Present Land Use | Ground Cover | Land Use Limitations+ | NRHP Potential** |
|---|---|---|---|---|---|---|---|---|
| 334 | 25 | 1.1 | Prehistoric | Chert source /Chert procurement Knapping | Nonagri | Forest | Avoid | Eligible |
| 335 | 24/25 | 18.5 | Prehistoric | /Knapping | Agri | Grass | Subplow zone disturbance | Not eligible |
| 336 | 25 | 5.75 | Prehistoric | /Knapping | Agri | Grass | Subplow zone disturbance | Not eligible |
| 337 | 25 | - | Historic | /Rock pile | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 338* | .25 | 2.4 | Prehistoric | /Knapping | Agri | Grass | Subplow zone disturbance | Not eligible |
| 339 | 25 | .25 | Historic | H | Nonagri | Forest | Avoid | Eligible |
| 340* | 26 | .1 | Prehistoric | /Knapping | Nonagri | Grass | Subplow zone disturbance | Not eligible |
| 341* | 26 | .1 | Prehistoric | /Knapping | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 342 | 26 | .1 | Historic | H | Nonagri | Weeds | Subplow zone disturbance | Not eligible |
| 343* | 26 | .1 | Prehistoric | /Knapping | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| | | | | DISSECTED UPLAND/BOTTOMLAND FOREST EDGE (n=16) | | | | |
| 20 | 35 | 7.4 | Middle?/ Late Woodland | /Knapping | Nonagri | Weeds | Avoid | Eligible/NR form submitted to MSHPO |
| 74 | 35 | .1 | Middle?/ Late Woodland | Mound/Burial? | Nonagri | Forest | Avoid | Eligible |
| 214 | 31 | .1 | Prehistoric | /Knapping | Nonagri | Forest | Subplow zone disturbance | Not eligible |
| 344* | 35 | 1 | Prehistoric | /Knapping | Nonagri | Brush | Subplow zone disturbance | Not eligible |

Table 1 (cont.)

| Site No 23CY- | Sec | Approx Size (Acres) | Cultural Affiliation | Site Type/Activity | Present Land Use | Ground Cover | Land Use Limitations* | NRHP Potential** |
|---|---|---|---|---|---|---|---|---|
| 345 | 35 | 1.25 | Middle Archaic? | Camp /Knapping<br>Drilling | Agri | Grass | Limited Agri | Eligible |
| 346 | 35 | 10 | Dalton | Camp /Knapping<br>Hunting, butchering | Agri | Grass | Limited Agri | Eligible |
| 347 | 35 | 1 | Historic | H | Nonagri | Brush | Subplow zone disturbance | Not eligible |
| 348 | 35 | .61 | Historic | H | Agri | Grass | Subplow zone disturbance | Not eligible |
| 349 | 35 | 2.5 | Prehistoric | Camp /Knapping<br>Food processing | Nonagri | Forest, brush | Avoid | Eligible |
| 350 | 35 | .1 | Late Woodland | Mound/Burial | Nonagri | Forest | Avoid | Eligible |
| 351 | 35 | 5 | Prehistoric | Camp /Knapping<br>Food processing | Agri | Grass | Limited Agri | Eligible |
| 352 | 36 | 6.2 | Late Woodland | /Knapping<br>Food processing<br>Hematite processing<br>Pottery making<br>Groundstone manufacture | Agri | Crop stubble | Limited Agri | Eligible/NR form submitted to MSHPO |
| 353 | 36 | 8.4 | Middle-Late Archaic<br>Late Woodland | Camp /Knapping<br>Food processing | Agri | Crop stubble | Limited Agri | Eligible |
| 354 | 36 | .25 | Prehistoric | Camp /Knapping | Nonagri | Brush | Subplow zone disturbance | Not eligible |
| 355* | 36 | 1.6 | Prehistoric | /Knapping | Agri | Cultivated | Subplow zone disturbance | Not eligible |

Table 1 (cont.)

| Site No 23CY- | Sec | Approx Size (Acres) | Cultural Affiliation | Site Type/Activity | Present Land Use | Ground Cover | Land Use Limitations+ | NRHP Potential** |
|---|---|---|---|---|---|---|---|---|
| 356 | 36 | 11 | Middle-Late Archaic<br>Late Woodland | Mound/Knapping<br>Camp Food processing<br>Burial<br>Hunting<br>Drilling | Agri | Weeds | Limited agri | Eligible |
| 359 | 25/26/36 | 30 | Early Archaic<br>Late Archaic<br>Middle? and Late Woodland | Camp /Knapping<br>Cemetery Food processing<br>Hunting | Cemetery | Grass, forest | Avoid<br>Limited Agri | Eligible /NR forms submitted to MSHPO |

The more intensively occupied sites which exhibit a more diversified range of prehistoric activities occupy the ridge tops and lower terraces where the dissected uplands meet the Missouri River floodplain. In this zone, site types range from burial mounds (23CY74) to possible villages (23CY356).

Less intensive prehistoric occupations utilized the upland forest zone and the prairie zone in the northern half of the project area. Sites in the prairie and prairie forest edge, currently in agricultural production, are characterized by widely and sparsely distributed scatters of waste chert flakes. Occasionally, clusters of flakes and tool fragments mark a location where more time was spent manufacturing or maintaining stone tools.

The most common artifacts recovered at all sites were chipped stone tools and the waste flakes from their manufacture. This is true on many prehistoric archaeological sites, but it is especially common in the study area where quality chert resources are plentiful.

## Historic Resources

Twenty nine historic components were recorded in the study area. Of these, 19 are determined to be habitation sites based on foundation remains and artifact scatters consisting of ceramics, building materials, and other domestic artifacts. The remaining 10 sites consist of 1 nonhabitation site (outbuilding), 1 dump area, 3 cemeteries, and 4 sites which were unable to be evaluated due to an insufficient amount of artifactural material and historical documentation. Sixteen of the 29 historic components are located within nonagricultural areas.

Safety regulations required early demolition and bulldozing at 15 sites. This activity has effected the archaeological integrity at sites

23CY269, -271, -278, -279, -285, -297, -300, -319, -327, -329, -347, -348, -273, -276, and -342.

Historical documentation and archaeological evidence indicate that the historic occupation period for 19 of 29 sites ranged from 1840 to 1975 with the majority of them, 14 (74%), clustering between 1870 to 1900. Ten sites were not assigned to a chronological period due to an insufficient amount of archaeological material and historical documentation.

### Architectural Resources

Twenty one architectural sites were recorded within the project area. They vary from sites with a single structure or ruin to farmsteads with a house and several outbuildings and associated structures. Only one site (21) dates exclusively to the nineteenth century, while the rest exhibit construction sequences spanning the nineteenth and twentieth centuries or are restricted exclusively to the twentieth century.

Of the 71 structures associated with these sites, 10 are houses or foundations, 59 are outbuildings or related structures, 1 is a bridge, and 1 is a telephone substation. Barns and sheds are the most common structures (14 each), while animal shelters number among the least common. Overall, the configuration of existing structure and ruins is typical of rural Missouri and the rural Midwest.

## Evaluation of Site Significance

### Prehistoric Sites

Conclusions regarding site significance are a major objective of all cultural resources surveys and assessments, and are fully discussed

in the Phase I and Phase II reports. The National Register of Historic Places (NRHP) criteria for significance was applied to each of the sites recorded and has been presented previously. Those sites which appear to be potentially eligible for nomination to the NRHP are summarized in the following section. For site specific information or additional background information, the reader is referred to the Phase I report (Ray et al. 1983). While the NRHP criteria are useful for many historic and historic archiectural sites (e.g., a president's birthplace or a battlefield), they often are too general to establish clearly the potential significance of a prehistoric archaeological site or to justify Phase II investigations at these sites (cf. Comptroller General 1981:23-32). The Comptroller General's report notes that "it is impractical for [the Department of the] Interior to design all-encompassing criteria by which archaeological sites can be centrally evaluated for state and local significance" (1981:25-26). Thus, significance is established through a process of recommendations to the MSHPO by recognized professional archaeologists which are then subject to review and evaluation by the MSHPO. In order to initiate and facilitate this process, eight working criteria were employed by American Resources Group, Ltd., to evaluate potential NRHP eligibility of each of the prehistoric archaeological sites recorded on the residual lands. For the purposes of this evaluation, a site was considered potentially eligible for the National Register of Historic Places if it exhibited one or more of the following attributes:

1. site appeared to offer the potential to answer specific local or regional research problems.

2. site exhibited culturally diagnostic artifacts suggesting successive occupations through time, but artifact densities were light
3. organic staining was present, suggesting an intensive occupation, but the site did not produce culturally diagnostic artifacts.
4. site occupied a unique or poorly understood microenvironmental zone.
5. site represented a cultural period which has received little research attention.
6. artifact densities were medium to heavy, suggesting an intensive occupation, but no culturally diagnostic artifacts were recovered.
7. evidence suggested that the site may represent a poorly understood segment of a particular settlement system.
8. site contained cultural material (animal bone) or artifacts (metate) which suggested it may contain specific subsistence data.

These eight working criteria are supplemental to the National Register criteria. Specifically, the eight criteria are linked to the National Register criteria which relate to archaeological sites: "(d) that have yielded or may be likely to yield, information important in prehistory or history" (Federal Register 1986:31115). These provide the field investigator and the reviewer with specific guidelines with which to evaluate archaeological resources, justify recommendations of additional research or no further research, and to make statements of

significance and recommendations of potential National Register eligibility.

The rationale for considering a prehistoric site nonsignificant and thus potentially noneligible for nomination to the National Register of Historic Places is based on the following interrelated factors:

1. Site failed to meet any of the eight criteria.

2. Site produced very few artifacts suggesting a highly transient occupation. Of the 41 prehistoric sites considered potentially nonsignificant, 27 produced 5 or fewer waste flakes (35%), and 14 produced 10 waste flakes or fewer (18%) and no other evidence of prehistoric occupation. Small sites producing nothing more than a few waste flakes and lacking culturally diagnostic artifacts offer little research potential or new data beyond site location information. Further, such sites are numerous in areas of abundant chert resources such as the project area.

3. Items 1 and 2 above, combined with the fact that the 23 prehistoric sites considered potentially significant constitute a sample of the known cultural and environmental diversity represented in the project area, provide the basis for recommendations of nonsignificance.

Architectural sites were evaluated and considered significant or nonsignificant using the criteria of the National Register of Historic Places.

Historic archaeological sites were considered nonsignificant based on the criteria of the National Register of Historic Places, integrity, temporal considerations, and the availability of published sources of historic documentation other than the archaeological record.

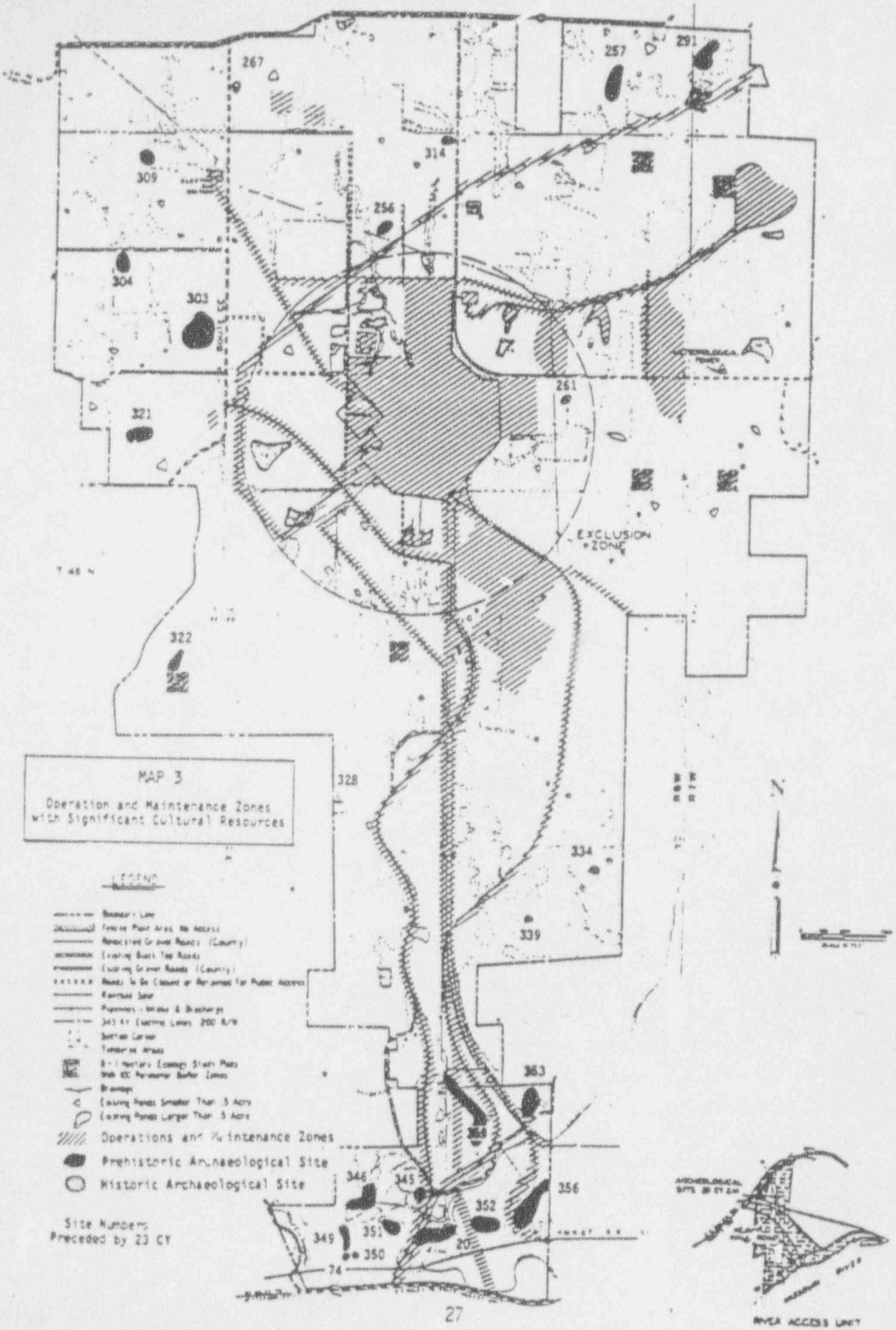
Evaluating all sites using these criteria and NRHP criteria, 23 sites are considered individually significant and potentially eligible for nomination to the National Register of Historic Places (Map 3). A brief summary of each site is provided below. For more detailed discussions of these sites potentially eligible for nomination to the NRHP, the reader is referred to the Phase I cultural resources survey and assessment report (Ray et al. 1983) and the Phase II investigations at 23CY20, 23CY352, 23CY359 (Traver 1985).

23CY20

The site is a village or residential base camp and may be associated with either or both the large earthen mound (23CY74) and low rock mound (23CY350) located on top of the adjacent ridge system or the mound group (23CY356) on the opposite ridge 700 m to the east. Similar pottery sherds suggest 23CY20 is at least contemporaneous, if not affiliated with, 23CY352, another village site located on a similar terrace 500 m east of the site.

An analysis of the chert sample from 23CY20 indicates an unexpected selection for locally occurring Burlington chert, probably procured entirely from stream deposited sources, and supplemented by Jefferson City chert, another locally occurring chert. The preference for Burlington chert may be due to its susceptibility and responsiveness to heat treatment. Over 50% of the Burlington artifacts at the site had been heat altered.

Based on reported materials from the site, Evans and Ives (1973:10) suggested the site is a multicomponent occupation, spanning 10,000 years including a Middle Woodland component. However, the pottery recovered


MAP 3
Operation and Maintenance Zones with Significant Cultural Resources
LEGEND
Operations and Maintenance Zones
Prehistoric Archaeological Site
Historic Archaeological Site
Site Numbers Preceded by 23 CY
EXCLUSION ZONE
267
257
291
314
309
256
304
303
261
321
322
328
334
339
363
346
345
356
352
349
351
350
74
N
RIVER ACCESS UNIT

from the site, a Scallorn arrow point, and other possible Woodland artifacts (Evans and Ives 1979a:19) indicate that the major occupation was probably Late Woodland (1500-1000 B.P.). The site's topographic setting indicates a high potential for buried cultural horizons (Map 2). Phase II testing conducted in 1985 varified the NRHP significance of this site (Traver 1985).

23CY74

The site is apparently a burial mound and is probably representative of the Boone Phase in central Missouri. The setting high on a bluff overlooking the Missouri River Valley is consistent with the location of Boone Phase mounds (Denny 1964:137), and the mounds are sometimes constructed entirely of earth (Chapman 1980:112). This probable mortuary site may be associated with the village site (23CY20) located on a terrace 600 m to the east. The Boone Phase is largely confined within the Lower Missouri Valley Locality II (Chapman 1980:121; Denny 1964:154), and it is firmly affiliated with the Late Woodland period (Chapman 1980:112; Denny 1964:158) which ranges from 1500-1000 B.P.

23CY256

The site is a small field camp and knapping station. The Big Sandy Notched point suggests a data range from 7000-5000 B.P. (Chapman 1975:242). Thus, the site is affiliated with the Middle Archaic period.

23CY257

The site is a field camp and knapping station with little evidence of long-term habitation. The high percentage (84.6%) of flakes greater than 2 $cm^2$ suggests an initial lithic reduction station, and the almost

exclusive use of Burlington chert indicates procurement of nearby chert resources. The tool types suggest fabricating and processing activities.

Site 23CY257 was revisited in May of 1982. A surface inspection of the main portion of the site revealed a moderate scatter of predominantly large secondary decortication flakes concentrated at the head of a ravine. Also located were three large bifaces, one large preform, one mano, and a probable platform preparation abrader; only the preform and the platform preparation abrader were collected. It was noted that many of the secondary decortication flakes and one of the large bifaces were knapped from stream deposited chert. The high percentage of secondary decortication flakes, the relatively high number of bifaces (6 total) for a small field camp, the preform, and the platform preparation abrader all suggest the site was used primarily for initial reduction and biface manufacture. The fact that the majority of artifacts with cortex surfaces was knapped from stream deposited nodules suggests that most of the chert probably was procured from the nearby ravine and transported to the top of the ridge for reduction. The large preform, which was not heat treated, exhibits several attributes that are suggestive of an Etley Stemmed projectile point/knife (Chapman 1975:246) including the large form (14 cm in length), blade shape, and the preliminary shaping of the hafting element. Because of this Etley-like projectile point/knife, a Late Archaic affiliation has been assigned to the site. The probable platform preparation (or antler flaker abrader) is a sandstone slab, 12 x 18 cm, and exhibits two parallel, slightly sinuous grooves on one surface.

23CY267

The site is a small field camp and knapping station with no evidence of substantial habitation. Analysis of the chert sample from 23CY267 indicates an almost exclusive use of local Burlington chert, mostly procured from stream deposits; however, the two Jefferson City flakes indicate transportation of that chert from at least 1.5 km distant. A fluted Clovis projectile point indicates a Paleo-Indian occupation ca. 12,000 B.P.

23CY291

The site is a small field camp with three discrete knapping stations. The relatively high percentage (63.4%) of flakes greater than 2 $cm^2$ indicates initial reduction lithic workshops. The artifactual data also indicate an almost exclusive use of local Burlington chert, procured from both stream deposited and residual sources; however, the Jefferson City flake indicates transportation of that chert from approximately 1.8 km distant. The tool types suggest fabricating and processing activities. Cultural affiliation is unknown.

23CY303

The site is a small field camp and knapping station. The projectile point base and serrated biface midsection suggest activities related to hunting and butchering, and the pitter/hammer/grinding stone indicates plant processing activities. The Rice Lanceolate component suggested by the point base and serrated midsection is affiliated with the Early Archaic period (9000-7000 B.P.) and possibly continues into the Middle Archaic (Chapman 1975:253).

23CY304

The site appears to be a seasonal field camp and knapping station. The high percentage (69.7%) of flakes greater than 2 $cm^2$ indicates initial lithic reduction; two secondary decortication flakes actually had diameters of 16 cm. Other activities suggested by the tool types include hunting and butchering, fabricating and processing, and plant food preparation.

Analysis of the chert sample from 23CY304 indicates a predominant utilization of Burlington chert, mostly procured from the nearby creek bed. A small triangular arrow point recovered at the site is affiliated with the Late Woodland/Mississippi period which ranges from 1200-500 B.P. in the study area.

23CY309

The site appears to represent a seasonal or reoccupied field camp and knapping station. Analysis of the chert sample from 23CY309 indicates a predominant use of local Burlington chert, mostly procured from stream deposited sources. Activities other than flint knapping suggested by the tool types include hunting and butchering.

The Etley Stemmed projectile point/knife is affiliated with the Late Archaic period (5000-3000 B.P.) and is a diagnostic artifact of the Booth assemblage and Cuivre River ceremonial complex in northeast Missouri (Chapman 1975:246).

23CY314

The site is probably a small field camp and knapping station with one and possibly two features visible on the surface. The feature(s) may be a simple fire hearth(s) or possibly chert heat treatment pit(s). The

heat-altered chert was exclusively Burlington chert probably procured from the nearby creek. Cultural affiliation is unknown.

23CY321

The site is a small field camp and knapping station with evidence of plant food processing activities. Based on available data, chert procurement was predominantly from the closer Burlington sources. However, one-third of the artifacts were made from Jefferson City chert located at least twice as far away. Cultural affiliation is unknown.

23CY322

The site is a small field camp and knapping station with no evidence of substantial habitation. The relatively high percentage of secondary decortication flakes and flakes in general with dimensions greater than 2 $cm^2$ (61.3%) indicates initial lithic reduction. A triangular arrow point suggests the site was also used as a hunting camp during the Late Woodland/Mississippian period ca. 1200-500 B.P.

Analysis of the limited chert sample from 23CY322 indicates a preference for Burlington chert. Both stream deposited and residual chert sources were utilized.

23CY328

The site is a small field camp and knapping station lacking evidence of permanent habitation. The artifactual evidence indicates bifacial tool manufacturing, probably for cutting and butchering purposes. A corner-notched, hafted tool is probably affiliated with the Late Archaic/Early Woodland transition period, which ranges from 4000-2500 B.P. in the study area.

23CY334

The site is a chert procurement and primary reduction knapping station with no evidence of habitation. The presence of 53 cores, the near absence of worked/utilized artifacts, the fact that 67.5% of the flakes recovered were decortication flakes, and that 85.9% were greater than 2 $cm^2$ are all consistent with what would be expected at an initial reduction lithic workshop. Quarrying was unnecessary at the site since the residual chert readily outcrops on the southwest exposure of the ridge. Thermal pretreatment was also unnecessary due to the inherent fine-grained nature of the chert. The artifactual evidence supports a nearly exclusive use of this residual Jefferson City chert source. Cultural affiliation is unknown.

23CY345

The site is a small field camp and knapping station. The hafted drill indicates activities such as stone, bone and/or wood boring, and the chert analysis indicates a heavy reliance on Burlington and, thus, stream deposited chert resources. Suggested cultural affiliation for the site based on the hafted drill is Middle Archaic (7000-5000 B.P.).

23CY346

The site is probably a seasonal camp and knapping station. A chert analysis of the artifacts from 23CY346 indicates a selection for and predominant utilization of Burlington chert, probably procured entirely from stream deposited sources, over readily available residual/ redeposited Jefferson City chert. The fact that 74% of the flakes collected were less than 2 $cm^2$ suggests primary reduction at the chert sources (creek beds) and tertiary reduction of finishing/resharpening on the site. Activities other than flint knapping suggested by tool types

include hunting and butchering. The three Callaway chert flakes, all found in one shovel test, indicate some use, although minimal, of this scarce chert known to occur 6.5 km away.

A Dalton point recovered at the site represents the transitional period between Paleo-Indian and Archaic times or Late Paleo/Early Archaic period, ca. 10,600-9000 B.P. (Chapman 1975:96; Goodyear 1982). Dalton points have been found in situ in the earliest levels of nearby Arnold Research Cave and Graham Cave (Chapman 1975:245).

23CY349

The site is probably a reoccupied camp and knapping station with evidence of plant processing activities. The analysis of the chert sample from 23CY349 indicates a heavy reliance on or preference for Burlington chert, probably procured from local redeposited sources, over readily available residual or stream deposited Jefferson City chert. This small habitation site may be associated or affiliated with 23CY74, a Middle or Late Woodland mound located at the southern end of the site.

23CY350

This small rock feature is probably a mortuary mound site and may represent a Boone Phase mound. A few waste flakes suggests that flint knapping also was carried on in the site vicinity. The setting high on a bluff overlooking the Missouri River Valley is consistent with the location of Boone Phase mounds (Denny 1964:137), and burials do sometimes occur under stone cairns (Denny 1964:141). The Boone Phase is largely confined within the lower Missouri Valley Locality II (Chapman 1980:112; Denny 1964:154), and it is firmly affiliated with the Late Woodland period (Chapman 1980:112; Denny 1964:158).

23CY351

The site is probably a seasonal camp and knapping station with evidence of plant processing activities. There is also some evidence of a possible hearth on site. Analysis of the chert artifacts from 23CY351 indicates a predominant use of and preference for Burlington chert, probably procured entirely from redeposited sources, over readily available residual or stream deposited Jefferson City chert. Most of the limited amount of Jefferson City chert that was used probably came from residual sources. One-fourth of the Burlington artifacts were thermally altered, whereas only two flakes knapped from Jefferson City chert had been heat treated. The fact that three-quarters of the flakes were less than 2 $cm^2$ suggests primary reduction at the chert sources and tertiary reduction or finishing/resharpening on the site. Cultural affiliation is unknown.

23CY352

The site is a village or residential base camp and is probably associated with the mound group (23CY356) atop the adjacent ridge. Similar pottery sherds suggest 23CY352 is at least contemporaneous if not affiliated with 23CY20, another village site located on a similar terrace 500 m to the west. Activities suggested by the tool types and debitage include secondary, but predominantly tertiary, flint knapping and tool maintenance, the manufacture of groundstone tools, butchering, drilling, hematite processing, plant food processing, and pottery making and food preparation/storage.

As evidenced by the sand, grit, and dolomite tempered pottery, the major component at 23CY352 is probably affiliated with the Late Woodland period and may be associated with the Boone Phase of central and east-

central Missouri; suggested dates range from 1500-1000 B.P. Both Boone Plain and Moreau or Boone Cord Marked pottery types are identified as Boone Phase in the Late Woodland period (Chapman 1980:276-277, 288-289; Denny 1964:96-99, 72-75), and Darnell or Graham Cord Marked and Graham Plain pottery types probably are associated with Late Woodland peoples (Chapman 1980:280-281). All four pottery types are found primarily in the Lower Missouri Valley II Locality (Chapman 1980:276, 280-281, 289). The site's location on an alluvial terrace suggests a high potential for buried cultural deposits.

Phase II testing produced two radiocarbon dates, A.D. 470 ± 140 and A.D. 830 ± 100 and verified Middle Woodland and Late Woodland occupations, the latter represented by artifacts diagnostic of Maramec Spring Phase, Boone Phase, and Moreau Subphase (Traver 1985). This site is eligible for nomination to the NRHP.

23CY353

The site is probably a reoccupied seasonal camp and knapping station. Analysis of the chert artifacts from 23CY353 indicates a predominant utilization of Burlington chert (71%), probably procured entirely from stream deposited sources, and a supplemental role (29%) for Jefferson City chert. Even among the Jefferson City chert that was used, there was a tendency to procure it from nearby stream deposited sources rather than from residual sources.

Examination of the debitage suggests primary, secondary, and tertiary reduction on the site. Activities other than flint knapping suggested by tool types include hunting and butchering, hide processing, and plant food preparation/processing. The incidence of heat treatment

among Burlington chert tools was very high at this site -- 68% of the tools are thermally altered as compared to 23% of the debitage.

The diagnostic tools found at 23CY353 indicate a multicomponent site with predominantly Archaic and Woodland occupations. Although possibly inhabited during the Early Archaic period, the major components suggested by the surface collection tentatively have been affiliated with the Middle to Late Archaic (7000-2500 B.P.) and Late Woodland (1500-1000 B.P.) periods. The site's terrace setting provides the potential for buried cultural deposits.

23CY356

The site is a seasonal camp and knapping station with a probable mortuary mound complex located on the south end of the site. Five low earthen mounds were located, recorded, and tested with a soil probe. Analysis of the chert artifacts from 23CY356 indicates an unexpected preference for Burlington chert, probably procured entirely from stream deposited sources, and a supplemental role for nearby Jefferson City chert.

Other activities suggested by the tool types and debitage include hunting and butchering, drilling, plant food processing, and human burial. Twenty two bifacial thinning flakes indicate a fair amount of biface manufacture/maintenance, and at least three pieces of fire-cracked rock suggest the presence of a hearth on the site.

The diagnostic artifacts found at 23CY356 indicate a multicomponent site with predominantly Archaic and Woodland occupations. The two Big Sandy Notched points located by the survey are associated with the Middle Archaic period ca. 7000-5000 B.P. (Chapman 1975:242), and the two

Big Sandy-like points represent styles which may have persisted into the Late Archaic period.

The major component at 23CY356 is affiliated with the Late Woodland period (15000-1000 B.P.) and may represent a manifestation of the Boone Phase in east-central Missouri. The setting high on a bluff overlooking the Missouri River Valley is consistent with the location of Boone Phase mounds (Denny 1964:137), and the mounds are sometimes constructed entirely of earth (Chapman 1980:112). The grit-tempered sherd (Graham Plain) found on mound A is similar to Late Woodland pottery found at Graham Cave and Arnold Research Cave (Chapman 1980:121). In addition, the Rice Side Notched, Steuben Expanded Stemmed, and Scallorn Corner Notched projectile points found on the site are all characteristic of Late Woodland Boone Phase (Chapman 1980:115). This Late Woodland component is probably associated with the village or residential base camp (23CY352) located on the adjacent terrace directly below or west of the ridge and 23CY356.

23CY359

From the small (selective) amount of material collected during the preliminary reconnaissance, it is evident that the site is probably a seasonal camp and knapping station. Although the small selective sample is biased toward tools, there was no bias in collecting artifact chert types. A chert analysis indicates that there may have been a preference for making tools out of Burlington chert since all of the projectile points and all but one biface were knapped from this fossiliferous chert. Activities other than flint knapping suggested by the tool types includ hunting and butchering and plant food processing.

The diagnostic artifacts indicate the site is multicomponent with predominantly Archaic and Woodland occupations. The side-notched point tentatively identified as Graham Cave Notched suggests the site may have been occupied during the Early Archaic (10,000-7000 B.P.) period (Chapman 1975:249) and the Big Sandy-like point probably representing the Middle to Late Archaic period (7000-3000 B.P.). The expanding stemmed Steuben point is restricted to the Middle Woodland and Late Woodland periods (Chapman 1980:313), and the Scallorn Corner Notched arrow point is a Late Woodland (1500-1000 B.P.) point type (Chapman 1975:312).

Phase II testing confirmed the function and multiple Archaic occupations at this site (Traver 1985). The site is eligible for nomination to the National Register of Historic Places.

Significant Historic Archaeological Sites

As indicated earlier, many of the former homes and farmsteads in the study area were razed and impacted by subsequent clearing. As a result, archaeological integrity is lacking at most of the sites; however, two sites appear to be potentially significant and offer some potential for further archaeological and historical research.

Site 23CY261 is an undisturbed homestead in the upland prairie zone. The artifact assemblage from the site ranges from ca. 1840-1929. The site is depicted on early maps in 1876, 1897, and 1919. This evidence indicates some continuity from the mid nineteenth century to the early twentieth century. This was a period of rapid change in central Missouri, and the apparent undisturbed nature of the deposits may offer an opportunity to study this change in the archaeological record.

Site 23CY339 is a log structure, partially in ruin, located in the rugged forest zone in the southern part of the study area (Map 2). The site's unique location on a rocky hillside poses interesting historical research questions.

## Historical Architectural Sites

When measured against the criteria of the National Register of Historic Places, the historic architectural sites and features do not appear to represent a significant level of innovation, uniqueness, or artistry. While they may be potential candidates for preservation, they are best categorized as standard examples of their respective building types. For more detailed information on the architectural resources, the reader is referred to the Phase I cultural resources survey report (Ray et al. 1983).

## Potential Adverse Impacts

Protecting and preserving cultural resources from a variety of destructive activities stimulated by an expanding society is fundamental to cultural resources management. The recognition over 85 years ago that archaeological and historical sites were being destroyed and would continue to be destroyed provided the impetus for the enactment of the Antiquities Act of 1906. Today, two types of adverse impacts, direct and indirect, are recognized (Schiffer and House 1975). Direct impacts are usually major land altering activities carried out in conjunction with road, reservoir, pipeline, stock pond, and landfill construction, to mention just a few. The effect of such activities on fragile, non-renewable cultural resources is obvious and often decisive. There are direct impacts that are much less destructive than these major

construction activities. Cultivation related to agricultural production, logging activities, trenches for underground telephone cables, trenches for small diameter water lines, camp grounds, and development of picnic areas are examples of direct impact which are less destructive than the impacts from major construction. Each category of direct impact may have related indirect impacts. For example, various silvicultural harvesting techniques may have varying degrees of adverse effects to cultural resources; however, a new road constructed to the proposed logging area would be far more destructive to cultural resources than the actual timber harvest. Or, a 100-acre reservoir constructed in a ravine which contains no archaeological sites may have a variety of construction related indirect impacts (e.g., borrow areas used for dam fill) which may effect other archaeological sites. The construction of equestrian or hiking trails on the residual lands would have little or no direct adverse impacts to cultural resources, yet, potential indirect adverse impacts could be high due to increased public exposure to archaeological sites. For example, a hiking trail near the prehistoric mound (23CY74, Map 2) would increase the opportunities for vandalism, malicious looting, or uninformed collecting. Some examples of potential indirect impacts might include increased public usage of all recreational facilities on the residual lands, soil erosion on archaeological sites, and timber harvesting.

Examination of these potential impacts serves to point out the need for a cultural resources management plan and the usefulness of a management plan as a short and long range planning tool, both for Union Electric Company and the Missouri Department of Conservation. Generally,

the current land use management plan which emphasizes wildlife management and recreation is compatible with the needs of cultural resources management. Potential adverse impacts from cultivation, erosion, trail construction, picnic grounds, silviculture, etc., are not as destructive as some other types of activities. Also, agricultural crop rotation may be altered easily to accommodate archaeological site preservation without compromising the requirement of wildlife food and habitat production. For example, limited agricultural activities could occur at some of the potentially significant archaeological sites without adverse effects to the site. The various types of land use restrictions and limitations will be central to the specific management recommendations.

Management Recommendations and Guidelines

The key management elements with regard to the prehistoric and historic archaeological sites which will be of primary concern to Union Electric Company and the Missouri Department of Conservation will be current land use, land use limitations, and the statement of potential National Register eligibility.

The four primary types of land use on the residual lands are cemeteries, agricultural, nonagricultural, and operation and maintenance of the power plant. Cemeteries consist mostly of small family plots, long abandoned and overgrown with brush and weeds. Agricultural use includes row crop, pasture, and related agricultural land usage. Nonagricultural use consists of forest, brush, and weeds. The land use and ground cover notations (Table 1) reflect conditions at the time of survey in the fall and winter of 1981.

For management purposes, land use recommendations consist of three types of limitations: (1) subplow zone disturbance, (2) avoid, and (3) limited agriculture (Table 1). A land use limitation of "subplow zone" is recommended at all sites which are not considered potentially eligible for nomination to the National Register but will be protected by the recommendations in this management plan. Avoidance requires that a site's surface and subsurface integrity be maintained by prohibiting land altering activities. All potentially eligible sites which are in forest vegetation and all historic cemeteries are to be avoided.

Current state cultural resources management guidelines recommend Phase II testing of potentially eligible sites identified during the Phase I survey to further evaluate National Register eligibility (Weichman 1979). Three potentially eligible sites (23CY20, 23CY352, 23CY359) are located in an area of potential environmental impact related to the operation and maintenance of the plant or associated facilities. Phase II testing was conducted at the three sites in 1985 by American Resources Group (Traver 1985). The results of these investigations indicated that all three sites were eligible for nomination to the NRHP. National Register forms were completed for the sites and submitted to MSHPO following completion of the assessments (Traver 1985:133). Sites 23CY352 and 23CY359 are located within transmission line rights-of-way and 23CY20 in the area of the railroad spur, "Areas of Potential Effects of the Undertaking", as defined in 36CFR800.2. Current operations and maintenance activities in the vicinity of the three sites is as follows:

Table 2

Management Recommendations for Potentially Significant Sites

| Site No 23CY- | Size (Acres) | Location | Cultural Affiliation | Ground Cover | Land Use Limitations* | Cultural Resources Management Recommendations* |
|---|---|---|---|---|---|---|
| 20 | 7.4 | SE¼, NW¼, SW¼, S35 | Middle Woodland | Weeds | Limited Agri | Preserve, Phase II testing completed 1985, NR forms submitted to MSHPO |
| 74 | .1 | SW¼, NW¼, SE¼, S35 | Middle-Late Woodland Burial mound | Forest | Avoid | Preserve, Phase II if threatened |
| 256 | 5.9 | NE¼, SE¼, SE¼, S11 | Middle Archaic | Crop | Limited Agri | Preserve, Phase II if threatened |
| 257 | 14.8 | SE¼, NW¼, SE¼, S1 | Late Archaic | Brush, crop | Limited Agri | Preserve, Phase II if threatened |
| 267 | 8.2 | NW¼, SW¼, SW¼, S2 | Paleo-Indian | Crop | Limited Agri | Preserve, Phase II if threatened |
| 291 | 6.0 | W½, NW¼, SW¼ NE¼, NE¼, SE¼, S6 | Unknown | Crop | Limited Agri | Preserve, Phase II if threatened |
| 303 | 14.8 | SE¼, SE¼, S10 | Unknown | Crop | Limited Agri | Preserve, Phase II if threatened |
| 304 | 3.2 | NW¼, NW¼, SE¼, S10 | Late Woodland Mississippian | Crop | Limited Agri | Preserve, Phase II if threatened |
| 309 | 13.8 | E½, NW¼, NE¼, S10 | Late Archaic | Crop | Limited Agri | Preserve, Phase II if threatened |
| 314 | .25 | NE¼, NE¼, NE¼, S11 | Unknown | Crop | Limited Agri | Preserve, Phase II if threatened |
| 321 | 10.5 | NE¼, SW¼, NE¼, S15 | Unknown | Crop | Limited Agri | Preserve, Phase II if threatened |
| 322 | 4.5 | SW¼, NE¼, NE¼, S22 | Late Woodland Mississippian | Weeds | Limited Agri | Preserve, Phase II if threatened |
| 328 | 1.0 | NW¼, SW¼, SE¼, S23 | Late Archaic? | Crop | Limited Agri | Preserve, Phase II if threatened |

*Limited Agriculture-see page 38
Avoid-see page 39
*O&M-operation and maintenance

Table 2 (cont.)

| Site No 23CY- | Size (Acres) | Location | Cultural Affiliation | Ground Cover | Land Use Limitations* | Cultural Resources Management Recommendations* |
|---|---|---|---|---|---|---|
| 334 | 1.1 | SW, NW, NE, S25 | Unknown | Forest | Avoid | Preserve, Phase II if threatened |
| 345 | 1.25 | SW, SE, NE NE, NE, SE, S35 | Middle Archaic | Grass | Limited Agri | Preserve, Phase II if threatened |
| 346 | 10.0 | NW, NW, SE SW, SW, NE, S35 | Early Archaic Dalton | Grass | Limited Agri | Preserve, Phase II if threatened |
| 349 | 2.5 | W, NW, SE, S35 | Late Woodland | Forest | Avoid | Preserve, Phase II if threatened |
| 350 | .1 | SW, NW, SE, S35 | Late Woodland Burial mound? | Forest | Avoid | Preserve, Phase II if threatened |
| 351 | 5.0 | W, NE, SE NE, NE, SE, S35 | Unknown | Grass | Limited Agri | Preserve, Phase II if threatened |
| 352 | 6.2 | NW, NE, SW NE, NW, SW, S36 | Middle and Late Woodland | Crop | Limited Agri | Preserve. Phase II testing completed 1985, NR forms submitted to MSHPO |
| 353 | 8.4 | E, NE, NW, S36 | Middle and Late Archaic | Crop | Limited Agri | Preserve, Phase II if threatened |
| 356 | 11.0 | NW, NE, SW SE, SE, NW, S36 | Middle Archaic Late Woodland | Weeds | Limited Agri | Preserve, Phase II if threatened |
| 359 | 30.0 | W, NW, S36 | Middle Archaic Late Woodland | Grass | Close upper road to prevent erosion; Avoid | Preserve, Phase II testing completed 1985, NR forms submitted to MSHPO |
| 261 | 1.0 | NE, NE, NW, S13 | Historic | Grass | Limited Agri | Phase II evaluation if threatened |
| 339 | 1.0 | SE, SE, NW, S25 | Historic | Forest | Avoid | Phase II evaluation if threatened |

The railroad spur is no longer in use and has been abandoned in place. Therefore, no further operational or maintenance activities will take place in the area of 23CY20. This site has been fenced and any activity within the fence, including vehicular traffic (other than routine grass maintenance), is prohibited.

Activities associated with maintenance and repair operations on transmission facilities will be those associated with vehicular movements, when required, along access roads and rights-of-way. No earthmoving work is required. Herbicides will be applied, as necessary, to maintain rights-of-way and trees will be trimmed to maintain the required line clearance. Vegetation growth will be controlled on a periodic basis using a standard farm tractor with a bush hog in tow. Vegetation is normally cut above the ground surface with no plowing or excavation required. No other maintenance activities are anticipated.

In accordance with Callaway Plant written procedures, any new construction or change in procedures requires that the following two questions be answered:

1. Will there be a physical change to site grounds or land layout?

2. Will there be any excavation on UE property outside of owner controlled area fence?

If the answer to either of these questions is yes, then a Final Environmental Evaluation must be performed by Radiological Engineering. This includes a full evaluation of cultural resources impacts. If it is determined that any cultural resources site could be impacted, then the new construction or procedure will be altered to avoid the effect or the NRC and SHPO will be contacted for consultation prior to implementation of the activity or procedure.

In addition to the above plant procedural safeguards, the Missouri Department of Conservation (DOC) has been notified that activities such as fishing, hunting, and outdoor recreation will be planned to minimize opportunities for vandalism, malicious looting, or uninformed collecting by not directing attention to potentially significant cultural resources. DOC is required to submit all plans for any land disturbing activities (including parking lots, roads, and any new significant public attractions) to Radiological Engineering for review prior to implementation.

It is the opinion of the writer that the operations and maintenance activities described above do not constitute any effect to sites 23CY20, 23CY352, and 23CY359.

The other 22 sites identified as potentially eligible for nomination to the National Register of Historic Places will be protected from adverse impact by placing a conservative protection boundary zone around each site. The protection boundary will range from 50 m to 100 m depending upon site specific circumstances. For example, at many sites, the boundary stakes are set along the fence line even though the artifact distribution is well out in the field.

Limited agriculture can continue at potentially significant sites presently being used for agricultural purposes. Limited agricultural activity with reference to potentially significant archaeological sites permits shallow discing to allow the sowing of grass seed. The rationale for this recommendation is twofold. First, these sites are often surrounded by major row crop areas and to allow brush and forest vegetation to return could be inconvenient to other agricultural activities. Second, the sites could be used for hay production and grazing without adverse effects to the cultural resources.

Final management considerations and objectives are: to preserve the potentially significant archaeological sites in place, provide recommendations for nonsignificant resources, and provide specific guidelines for potentially significant archaeological sites for Union Electric Company and the Missouri Department of Conservation. The following guidelines will insure site preservation and facilitate the management objectives of Union Electric Company.

To insure the identification and preservation of all prehistoric archaeological sites and these sites potentially eligible for nomination to the NRHP, metal reinforcing rod stakes have been placed at the corners of all sites along field edges. Boundaries which fall within

agricultural fields (pastures) are marked with wooden lath to avoid damaging farm machinery. All stake tops are painted and flagged. The boundaries are placed approximately 50 m to 100 m beyond site limits to provide a proper buffer zone.

In addition, all archaeological sites are identified with an aluminum plate affixed to a reinforcing rod upon which is painted the Archaeological Survey of Missouri site number (Figure 1). These site numbers are keyed to confidential site location maps and field notes describing the marker and site locations. A map with accompanying notes will be on file at the Environmental Services Department of Union Electric Company.

1. Land altering activities are prohibited at all potentially significant archaeological sites (Table 1). These activities include, but are not limited to, road construction, water line excavation, electrical and telephone line excavations, transmission line construction, pond and reservoir construction, building construction, electrical transmission substation construction, cultivation (deep plowing or chisel plowing), and silviculture.

2. Limited cultivation in the form of shallow discing is permissible in order to maintain grass cover on those sites where limited agriculture is recommended (Table 2).

3. Coordination with the Environmental Services Department of Union Electric Company should occur well in advance of any land use activities outside those found in Table 1 which may affect the potentially significant sites. The Environmental Services Department


Figure 1. Site Identification Marker

will insure identification of site boundaries, will establish buffer zones, and contact other regulatory agencies when appropriate.

4. Phase II testing for the purpose of further evaluating significance will not occur until a potentially significant site is threatened by adverse impacts (Table 2).

5. The architectural sites on the residual lands are not eligible for nomination to the National Register of Historic Places and are not subject to land use limitations.

6. There is the remote possibility that the prehistoric and historic archaeological sites considered noneligible for nomination to the National Register may contain useful information. Current land use (ie. farming) may occur at these sites but land altering activities are permitted only after consultation with the proper authorities.

7. For planning and management purposes, a USGS topographic map precisely locates all the cultural resources on the residual lands. If

there is any question regarding the exact location of a site, the Environmental Services Department shoudl be contacted.

8. There is the possibility that sites 23CY20, 23CY352, and 23CY353 contain buried cultural occupations. The Environmental Services Department should be aware of this, and future research plans should account for these buried deposits.

9. Although a very intensive survey was conducted, there is the possibility that undiscovered resources may be present. If artifacts or cultural features are encountered during construction projects, supervisors will be instructed to notify the Environmental Services Department immediately.

The Phase I cultural resources survey and assessment and the Phase II testing of three sites in the operations and maintenance zone of the Callaway residual lands along with the several other survey and assessments of the direct impact zones adequately meet the letter and spirit of federal laws and regulations dealing with cultural resources. Further, responsible use of this management plan will insure the continued preservation of the potentially significant archaeological resources into the future.

## REFERENCES


Chapman, Carl H.

1975 The Archaeology of Missouri, I. University of Missouri Press, Columbia.

1980 The Archaeology of Missouri, II. University of Missouri Press, Columbia.

Comptroller General of the United States

1981 Are Agencies Doing Enough or Too Much for Archaeological Preservation? Guidance Needed. Report to the Chairman, Committe of Interior and Insular Affairs, House of Representatives. U.S. Government Accounting Office Report CED-81-61. Gaithersburg, Maryland.

Denny Sidney G.

1964 A Re-Evaluation of the Boone Focus: A Late Woodland Manifestation in Central Missouri. Unpublished Ph.D. dissertation, Department of Anthropology, University of Missouri.

Evans, David R.

1975 Proposal for Mitigation of Impact on Archaeological Site 23CY20. Ms. on file, Union Electric Company, St. Louis, Missouri.

1979 A Cultural Resources Survey of the Proposed Bland Substation Site, Gasconade County, Missouri. Ms. on file, Union Electric Company, St. Louis, Missouri.

Evans, David R., and David J. Ives

n.d. Archaeological Site 23CY20: Recommendations. Ms. on file, Union Electric Company, St. Louis, Missouri.

1973 Initial Archaeological Survey of the Proposed Union Electric Company Nuclear Reactor Near Reform, Callaway County, Missouri. Archaeological Survey of Missouri, Columbia.

1978 A Cultural Resources Survey of the Proposed Union Electric Company 345KV Transmission Line Right-Of-Way, Callaway and Montgomery Counties, Missouri. Ms. on file, Union Electric Company, St. Louis, Missouri.

1979a 23CY20 The Preservation Plan For An Archaeological Site. Archaeological Survey of Missouri, Columbia.

1979b A Cultural Resources Survey of the Proposed Union Electric Company 345KV Transmission Line Right-Of-Way,

Gasconade and Osage Counties, Missouri. Ms. on file, Union Electric Company, St. Louis, Missouri.

Federal Register
1986 Rules and Regulations 51F.R.31115.

Goodyear, Albert C.
1982 The Chronological Position of the Dalton Horizon in the Southeastern United States. American Antiquity 47(2):382-395.

King, Thomas F., Patricia Parker Hickman, and Gary Berg
1977 Anthropology on Historic Preservation, Caring for Culture's Clutter. Academic Press, New York.

McNerney, Michael J.
1978 A Cultural Resource Overview of the Shawnee National Forest. Cultural Resources Management Studies #27. Fischer-Stein Associates, Carbondale, Illinois.

1982 Cultural Resources Assessment of Proposed Borrow Pit Nos. 7 and 8, Callaway Nuclear Power Plant Site. Ms. on file, American Resources Group, Ltd., Carbondale, Illinois.

Missouri Department of Conservation
1976 A Plan of Management for the Residual Lands of the Union Electric Company Nuclear Power Plant. Prepared in cooperation with Union Electric Company, St. Louis, Missouri.

Ray, Jack H., Michael J. McNerney, Edward Morin, R. Gail White, and Kurt R. Moore
1983 A Phase I Cultural Resources Survey and Assessment on Residual Lands at Union Electric Company's Nuclear Power Plant, Callaway County, Missouri. Cultural Resources Management Report #52. American Resources Group, Ltd., Carbondale, Illinois.

Schiffer, Michael B., and John H. House (assemblers)
1975 The Cache River Archaeological Project: An Experiment in Contract Archaeology. Research Series #8. Arkansas Archaeological Survey, Jonesboro.

Traver, Jerome D.
1985 Phase II Cultural Resource Testing and Assessment of Sites 23CY-20, 23CY-352 and 23CY-359 at Union Electric Company's Callaway Nuclear Power Plant, Callaway County, Missouri. Cultural Resources Management Report No. 96, American Resources Group, Ltd., Carbondale, Illinois.

Tucker, Patrick M., and Edward M. Morin
1981a A Cultural Resources Survey and Assessment of the Sanitary Landfill Area, Callaway Nuclear Power Plant

Site, Callaway County, Missouri. Cultural Resources Managment Report No. 50, American Resources Group, Ltd., Carbondale, Illinois.

1981b A Cultural Resources Survey and Assessment of the Emergency Operational Facility, Callawa Nuclear Power Plant Site, Callaway County, Missouri. Cultural Resources Management Report No. 51, American Resources Group, Ltd., Carbondale, Illinois.

Weston, Donald E., and Michael S. Weichman (editors)
1987 Master Plan for Archaeological Resource Protection in Missouri. Prepared for Division of Parks, Recreation, and Historic Preservation, Missouri Department of Natural Resources, under the direction of Historic Kansas City Foundation, by Archaeological Associates and Environmental Systems Analysis.