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PHASE I CULTURAL RESOURCES SURVEY OF THE KINGSTON-OAK RIDGE NATIONAL LABORATORY 161-KV TRANSMISSION LINE PROJECT, ANDERSON AND ROANE COUNTIES, TENNESSEE

REVISED DRAFT REPORT

LEAD FEDERAL AGENCY: TENNESSEE VALLEY AUTHORITY

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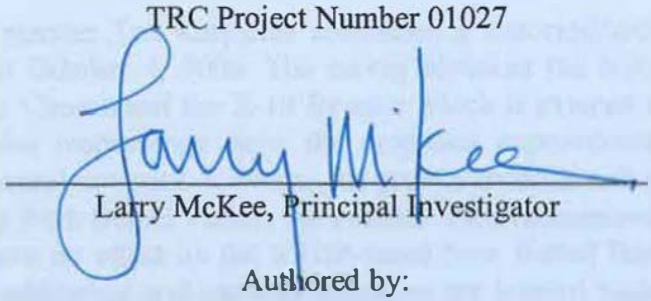

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MANAGEMENT SUMMARY

The Tennessee Valley Authority (TVA) plans for the construction of a 3.22 km (2-mile) transmission line corridor and the replacement of 24 transmission line structures at the Oak Ridge National Laboratory (ORNL) in Anderson and Roane Counties, Tennessee. In September and October of 2006, TRC, Inc. (TRC) conducted a Phase I cultural resources investigation designed to document and assess archaeological and architectural resources located within the Area of Potential Effects (APE) of the planned improvements. This project was conducted under contract to TVA and performed in compliance with Section 106 of the National Historic Preservation Act (as amended) and its implementing regulations at 36 CFR 800 (Code of Federal Regulations 2003).

Archaeologically, the APE consists of the new 3.22 km (2-mile) transmission line (TL), the area immediately adjacent to the 24 transmission line structures to be replaced, and a series of associated access roads. The right-of-way (ROW) for the new TL route will be 45.72 m (150 feet). The APE for architectural studies includes a 0.8-km (0.5-mile) area surrounding the proposed improvements, as well as any areas where the project will alter existing topography or vegetation in view of a historic resource. Viewsheds to and from the project area were terminated where topography and vegetation obstructed lines of sight.

A TRC field crew under the direction of Larry McKee conducted archaeological investigations of the APE on September 19, 2006. Shovel testing within the various segments of the APE found mostly disturbed soils associated with plowing, erosion, and prior road and transmission line construction. No previously recorded or newly discovered archaeological sites are present within the APE. The TRC crew did record one archaeological site, 40RE575,[Exempted from Disclosure by Statute]The site is a late nineteenth/early nineteenth century house site featuring a remnant of a stacked stone chimney. TRC recommends that as a whole this house site lacks integrity or further research potential, and is not eligible for inclusion in the National Register of Historic Places (NRHP). No additional archaeological consideration is recommended in respect to the proposed undertaking.

TRC preservation planner Ted Karpynec conducted a historical/architectural survey of the project APE on October 4, 2006. The survey revisited the National Register-listed New Bethel Baptist Church and the X-10 Reactor which is situated approximately 0.25-miles and 0.45-miles respectively from the proposed improvements. Both properties retain their architectural integrity. Views to the project corridor will be obstructed by the series of ridges that form Bethel Valley. As a result, TRC recommends that the proposed undertaking will have no effect on the NRHP-listed New Bethel Baptist Church and the X-10 Reactor. No additional architectural resources are located within the project APE, and no further architectural consideration is recommended in respect to the proposed undertaking.

ACKNOWLEDGEMENTS

We would like to thank Richard Yarnell and the Tennessee Valley Authority Cultural Resources Staff for providing us with information on the project in a timely fashion. At the Oak Ridge National Laboratory, Bill Needham helped coordinate facility access and safety training. Katatra Vasquez of the ORNL cultural resources staff, proved helpful in coordinating the project with their stewardship and compliance activities. From the Tennessee Division of Archaeology, Suzanne Hoyal provided valuable support in recording the newly discovered archaeological site.

At TRC, Program Director Larry McKee provided oversight for project planning, directed the archaeological fieldwork, and authored this report with TRC Preservation Planner Ted Karpynec. Field technicians Matt Logan, Shanna Underwood, and Grady Lowery conducted the archaeological survey under McKee's direction.

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I. INTRODUCTION

The Tennessee Valley Authority (TVA) plans to construct a new Kingston-ORNL 161-kV transmission line (TL), which will employ single steel pole structures and require a 3.22 km (2-mile) right-of-way (ROW). In addition, project plans call for the replacement of 24 existing TL structures with single pole steel structures on transmission lines associated with properties at the Oak Ridge National Laboratory (ORNL) in Anderson and Roane Counties, Tennessee. The project will also require the development of numerous construction and maintenance access road segments along the project corridor. In September and October of 2006, TRC, Inc. (TRC) conducted a Phase I cultural resources investigation designed to document and assess archaeological and architectural resources located within the Area of Potential Effects (APE) of the planned improvements (Figures 1a–1c).

Archaeologically, the APE consists of the new 3.22 km (2-mile) transmission line (TL), the area immediately adjacent to the 24 transmission line structures to be replaced, and a series of associated access roads. The ROW for the new TL route will be 45.72 m (150 feet).The APE for architectural studies includes a 0.8-km (0.5-mile) area surrounding the proposed improvements, as well as any areas where the project will alter existing topography or vegetation in view of a historic resource. This project was conducted under contract to TVA and performed in compliance with Section 106 of the National Historic Preservation Act (as amended) and its implementing regulations at 36 CFR 800 (Code of Federal Regulations [CFR] 2003).

A TRC field crew under the direction of Larry McKee conducted archaeological investigations of the APE on September 19, 2006. Shovel testing within the various segments of the APE found mostly disturbed soils associated with plowing, erosion, and prior road and transmission line construction. No previously recorded or newly discovered archaeological sites are present within the APE. The TRC crew did record one archaeological site, 40RE575, [Exempted from Disclosure by Statute] The site is a late nineteenth/early twentieth century house site featuring a remnant of a stacked stone chimney (Figure 1b). TRC recommends that as a whole this house site lacks integrity or further research potential, and is not eligible for inclusion in the National Register of Historic Places (NRHP). No additional archaeological consideration is recommended in respect to the proposed undertaking.

Exempted from Disclosure by Statute – Withheld Under 10 CFR 2.390(a)(3)

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TRC Preservation Planner Ted Karpynec conducted a historical/architectural survey of the project APE on October 4, 2006, in order to identify any properties over 50 years in age that might be eligible for listing on the NRHP, as well as those historic properties eligible for registration with the Tennessee Historic Commission (THC). The survey confirmed that no previously unrecorded architectural resources are situated within the project APE.

One previously surveyed architectural property, the New Bethel Church, is located on the north side of Bethel Valley Road approximately 0.25-miles south of the proposed transmission line corridor (see Figure 1a). The church was listed on the NRHP in 1992 as part of the Oak Ridge Multiple Property Submission and the building retains its architectural integrity. Views to the project corridor will be obstructed by the series of ridges that form Bethel Valley. TRC recommends that the proposed undertaking will have no effect on the Bethel Church.

An additional National Register-listed property, the X-10 Reactor, is located within the ORNL complex approximately 0.45-miles south of the proposed transmission line corridor (see Figure 1a). Originally listed on the NRHP in 1966, the X-10 Reactor was elevated as a National Historic Landmark in 1975 as the world's first full-scale nuclear reactor. The structure retains its architectural integrity. Views to the project corridor will be obstructed by the series of ridges that form Bethel Valley. TRC recommends that the proposed undertaking will have no effect on the X-10 Reactor.

No additional architectural resources are located within the project APE, and no further architectural consideration is recommended in respect to the proposed undertaking.

This report continues in Chapter II with a discussion of the project area environmental setting, both past and present. Chapter III presents an overview of prehistoric and historic habitation of Anderson and Roane Counties and the project area. The methodology of the cultural resources survey is presented in Chapter IV, while Chapter V presents the survey results. Finally, Chapter VI presents a summary of the findings and recommendations regarding the NRHP status of identified resources.

II. ENVIRONMENTAL SETTING

PROJECT AREA DESCRIPTION

The project corridor is located on the grounds of ORNL, running in two main segments from the east of the X-10 complex to just south of the K-25 complex (now known as the East Tennessee Technology Park) (see Figures 2–5). The eastern segment consists of the new 3.22 km (2-mile) TL route, starting at a conjunction of several TL's northwest of the confluence of Bearden Creek and the Clinch River (impounded as Melton Hill Lake). After a northern stretch of several hundred meters across the uplands of Haw Ridge, the line turns west across Bethel Valley and then along the southern flank of Chestnut Ridge. In Bethel Valley the line crosses from Anderson County into Roane County. The line terminates to the north of the X-10 reactor complex. For all but the first stretch, the corridor will run adjacent to an existing 13-kV line. The second segment of the project consists of the replacement of 24 TL structures along the existing Elza to X10-K25 TL. This line runs north across Chestnut Ridge and Bear Creek Valley and then southwest along the southern flank of Pine Ridge to the Clinch River (impounded as Watts Bar Lake), with a final segment running northwest along the river shore. Terrain within the APE ranges from relatively level to rolling to steep. Groundcover consists of secondary growth forest in the hilly sections and open grassland (formerly agricultural fields) in the sections crossing Bethel Valley and Bear Creek Valley (Figures 2, 3). Elevations within the APE range from between approximately 990 feet above mean sea level (AMSL) in the hilly section at the eastern end of the project corridor to approximately 830 feet AMSL in both Bethel Valley and Bear Creek Valley.

GEOLOGY AND PHYSIOGRAPHY

The project area lies within the Ridge and Valley (or Great Valley) physiographic province of eastern Tennessee (Figure 6). The development of the Ridge and Valley geologic formations began millions of years in the past with the deposition of alluvial sediments in a large geosyncline west of what is now known as the Blue Ridge province. Folding and fracturing events associated with a mountain building episode 230–260 million years ago (MYA) formed the basic geology and orientation of the province. Erosion-resistant rock including cherty limestone, sandstone, shale, and dolomite form the ridges in the region, while less resistant materials have eroded over time to form valleys (Floyd 1965). Topographic relief in the province varies between 228.6–304.8 m (750–1,000 feet) from valley floor to summit (Miller 1979).

SOILS

According to the United States Department of Agriculture Soil Survey of Anderson County (Moneymaker 1981), soils within the easternmost project area belong to the Lehew-Armuchee-Muskingham and Armuchee-Montevallo-Hamblen Associations. Lehew-Armuchee-Muskingham soils are found on uplands, and characterized as

moderately steep, deep, and well-drained, and are underlain by shale, siltstone, and sandstone. The Armuchee-Montevallo-Hamblen Association is found on uplands and in bottoms, and is characterized as steep to nearly level, well-drained, and underlain by shale.

In Roane County, the soil type crossed by the Elza to X10-K25 TL is primarily Lehew stony fine sandy loam, characterized as a fifth-class soil found on uplands on sandstone and shale parent material (Swann et al. 1942). Where the line crosses ravines, the soil types include Jefferson gravelly fine sandy loam, a third-class soil associated with colluvial slopes, and the eroded slope phase of Apison very fine sandy loam, a fifth-class soil. The polls to be replaced at the west end of the Elza to X10-K25 TL are located in areas along the bottomland and first terraces near the confluence of the Clinch River and Poplar Creek, south of the K25 complex. Originally, this area included Pope very fine sandy loam on the bottomland and Wolftever silt loam on the associated low terraces. Now the area is covered with deep deposits of coal ash from the nearby steam plant also associated with the K25 complex.

Figure 2. View of east end of project area, where new segment of Kingston-ORNL TL will be constructed parallel to existing line corridor.

Figure 3. View of TL structure to be replaced along the Elza to X10-K25 TL, in segment along closed waste haul road visible to right.

Figure 4. TL structure to be replaced, in segment of Elza to X10-K25 TL running across lower slopes of Pine Ridge on north side of Bear Creek Valley.

Figure 5. TL structure replacement locations at west end of project area, along east shore of the Clinch River.

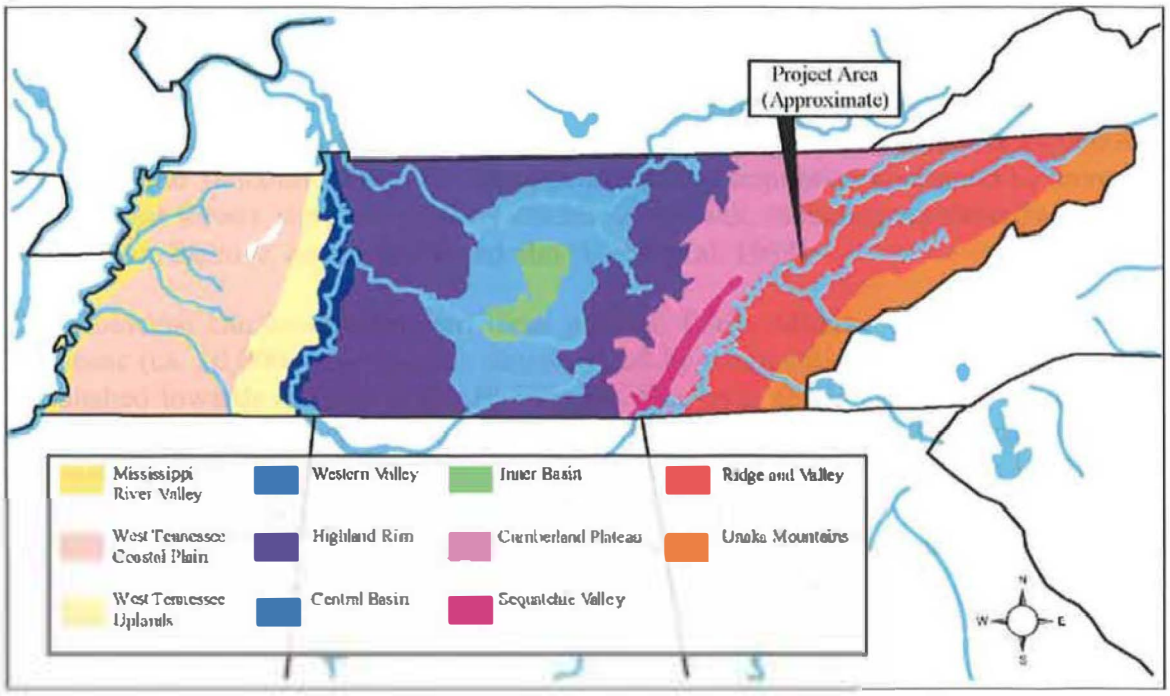

Figure 6. Physiographic map of Tennessee, showing the location of the project area.

CLIMATE AND PALEOENVIRONMENT

The modern climate of the region consists of cold winters and cool summers. Winter temperatures average 39 degrees Fahrenheit, with the lowest record temperature of –9 degrees in January of 1966. Summers average 75 degrees, with a record of 105 degrees in July of 1952. Total annual precipitation is around 55 inches, while humidity averages about 55 percent (Moneymaker 1981).

The environmental setting of the project area has changed dramatically in the approximately 12,000 years since humans first occupied Tennessee. Humans first arrived in the American Southeast between about 10,000 and 12,000 years before present (B.P.), during the final stages of the Pleistocene epoch (ca. 1.8 MYA to 10,000 B.P.). At that time the environment of the region was characterized by repeated glacial stages, punctuated by warmer interglacial periods. Full glacial conditions resulted in less seasonal variations and average temperatures 21–27 degrees Fahrenheit cooler than today (Bense 1994). Sea level had dropped dramatically during the Pleistocene, reaching levels 230–390 feet lower than today and exposing much of the continental shelf, including the Bering land bridge between Alaska and Siberia. During the Wisconsonian glaciation (ca. 28,000–18,000 B.P.), the great Laurentide ice sheet spread across much of North America above the Ohio Valley (Frison and Walker 1990). Many plant and animal species inhabiting the American Southeast during the late Pleistocene closely resembled modern species, and some conifers, mosses, flowering plants, insects, birds, and mammals survive to this day. In addition, a number of now extinct megafauna including mammoth, mastodon, bison, saber-toothed cats, giant ground sloth, horse, and bear roamed the Pleistocene Southeast.

The transition between the Pleistocene epoch and the ensuing Holocene (ca. 10,000 B.P. to present) is marked by fluctuations in global temperatures resulting in a gradual transition to interglacial conditions. As temperatures increased, the glaciers and ice sheets that covered much of North America began to retreat northward (Dawson 1994). Pine and spruce dominated boreal forests were established in the project area by about 14,000 B.P. (Delcourt and Delcourt 1981). As temperatures and precipitation continued to increase, these boreal forests were replaced by deciduous growth, including northern hardwoods such as oak, hickory, beech, birch, and elm (Webb et al. 1993).

The Holocene can be divided into three periods; Early, Middle, and Late. The Early Holocene (ca. 10,000–8,500 B.P.) is characterized by continuation of the warming trends established towards the end of the Pleistocene. Sea level continued to rise rapidly, and deciduous forests flourished throughout the region (Bense 1994). These provided an abundance of small game and plant species for use by the region's earliest inhabitants. Changing environmental conditions during the Early Holocene also contributed to massive extinctions of megafauna species. By about 8,000 B.P., these large animals were largely extinct, and vegetation in the project area closely resembled that of present conditions (Bense 1994; Delcourt 1979).

The Middle Holocene (ca. 8500–4000 B.P.), also known as the Altithermal or Hypsithermal Interval, marked the peak of interglacial conditions. The rise in sea level slowed, precipitation decreased, and temperatures increased as weather patterns changed (Bense 1994). Plant, animal, and human populations were forced to adapt to these altered conditions. By the Late Holocene (ca. 4000 B.P. to present), the weather had again cooled, sea levels had stabilized, and environmental conditions in the Southeast were comparable to today (Bense 1994). Since the beginning of the Late Holocene, coniferous species have steadily intermixed with the predominately deciduous forests of the region.

RESOURCE UTILIZATION

Resource utilization potential in and around the project area is considered moderately high. No outcroppings of lithic materials were noted along the survey route. In addition, the local bedrock predominately consists of shale, and does not contain cherty materials that were heavily employed by prehistoric populations. Some lithic materials were likely available in the form of cobbles along the channel of the Clinch River.

The Clinch River and associated stream system would have provided a significant network of waterways navigable by canoe. These would have provided reliable routes for communication, hunting/gathering excursions, and the establishment and maintenance of local and regional trade networks.

III. CULTURAL HISTORY

Nearly continuous aboriginal occupation of the region is likely from at least 12,000 years ago. This chapter provides a general overview of the regional culture history, and draws together some of the available archaeological data to illustrate temporal and social changes. The prehistoric cultural sequence for the Valley and Ridge of eastern Tennessee derives mainly from the extensive work conducted along the Little Tennessee River in conjunction with TVA's Tellico Reservoir project (e.g., Chapman 1977, 1985a, 1985b; Kimball 1985). This chapter is divided into eight chronological periods: Paleoindian, Archaic, Woodland, Mississippian, Early Euro-American, Agricultural and Commercial Development, Norris Lake and the TVA, and ORNL.

PREHISTORIC OVERVIEW

Paleoindian Period (12,000–10,000 B.P.)

The earliest humans populations entered the Western Hemisphere sometime during the final glacial episodes of the late Pleistocene. The specifics of this migration, including the exact dates and routes of travel, are subject to ongoing research and widespread speculation. However, scholars generally agree that early populations moved into North America via the Bering land bridge and began to spread southwards and into Tennessee by at least 12,000 B.P. (Broster 1982; Broster and Norton 1996).

Paleoindian groups were efficient hunters and carried a variety of tools. The hallmark diagnostic artifacts of the Paleoindian period are fluted lanceolate projectile points (PP/Ks). These large points exhibit parallel sides and feature shallow channels that have been removed from each face. Research on Paleoindian diagnostics suggests that this period can be somewhat arbitrarily subdivided into Early (ca. 11,500–10,900 B.P.), Middle (ca. 10,900–10,500 B.P.), and Late or Transitional Paleoindian (ca. 10,500–10,000 B.P.) subperiods (Anderson 1990, 1995a, 1995b; Anderson et al. 1996). This tentative chronology is primarily based on changes in hafted biface morphology. In particular, these three periods are thought to coincide with occurrences of Clovis and eastern fluted lanceolate projectile point forms like Gainey or Bull Brook; fluted and unfluted lanceolate forms with modified bases such as Cumberland, Quad, and Parkhill; and typically unfluted, notched, and unnotched lanceolate forms such as Dalton and Holcombe, respectively (Anderson 1995b; Morrow 1996).

Paleoindian adaptation in east Tennessee, as well as across North America, was likely characterized by small, highly mobile bands that moved from place to place as preferred resources were depleted and new supplies were sought (Kelly and Todd 1988). The Middle and Late Paleoindian periods saw increases in the frequency of diagnostic point types, as compared with the earlier Clovis and Cumberland forms. This increase, which is especially dramatic along the Tennessee River in Tennessee and Alabama, suggests that Paleoindian populations increased dramatically as the Pleistocene drew to a close.

Fluted and unfluted lanceolate projectile points dating to the Paleoindian period predominately appear as rare isolated finds in the Appalachian Summit. The sparse distribution of Paleoindian archaeological remains in the region reflects its limited use during this period. Purrington (1983) has suggested that this dearth of material may be a reflection of destruction and/or burial of Paleoindian sites by post-Pleistocene erosion; however, this remains to be verified. Others have postulated that a greater amount of Paleoindian materials have been found south of a hypothetical line drawn by Michalek (1969) extending through the Appalachian Summit region from east to west through Ashville, North Carolina. Apparently this line roughly separated a "periglacial climate to the north and a milder climate regime to the south during the final Wisconsin glacial periods" (Purrington 1983: 108). Future archaeological research may discern better the nature of Paleoindian occupation in the Appalachian Summit.

Archaic Period (10,000–3000 B.P.)

The Archaic period is distinguished within the archaeological record by technological changes from the Paleoindian period. Most notably, the onset of the Archaic period is distinguished by the cessation of fluted point manufacture, and the advent of numerous regional projectile forms, as well as a variety of specialized artifact types. In general, the Archaic tradition is associated with environmental changes that occurred at the terminal Pleistocene / Early Holocene transition, and the corresponding shift in adaptive strategies employed by human populations. Extensive Archaic period research in east Tennessee by Jefferson Chapman (e.g., 1973, 1975, 1977, 1981, 1985a, 1990) and others has added much to our knowledge of cultural adaptations in this area. The Archaic is divided into early, middle, and late stages based primarily on archaeological research at sites along the Little Tennessee River.

Early Archaic (10,000–8000 B.P.) populations of the Ridge and Valley continued to subsist in ways closely resembling those of earlier Paleoindian hunters and foragers. However, in contrast to Paleoindian adaptations, the Early Archaic appears to represent a shift to a more localized subsistence pool based on the seasonal harvest of plant and animal resources. With the extinction of Pleistocene megafauna, small highly mobile bands hunted modern fauna such as white-tailed deer and wild turkey. Early Archaic sites, like earlier Paleoindian occupations, tend to consist of light lithic scatters usually found in multicomponent contexts.

Throughout the Southeast, PP/Ks produced during the Early Archaic were noticeably different from earlier Paleoindian forms. Beginning about 10,000 B.P., these artifacts became smaller in size, took on triangular shapes as opposed to earlier lanceolate forms, and begin to exhibit notched bases. It is generally believed that this shift in technology is related to the invention of the atlatl spear thrower. This tool greatly increased the force, accuracy, and distance with which projectiles could be launched, and allowed Early Archaic peoples to successfully hunt the smaller, faster game animals of the Early Holocene.

Early Archaic deposits from east Tennessee have been explored at [Exempted from Disclosure by Statute] [Exempted from Disclosure by Statute](Chapman 1977,

1985b). Bifurcate stemmed (LeCroy) and comer-notched point styles of the Kirk-Palmer cluster are the primary marker types for the latter part of the Early Archaic along the upper reaches of the Tennessee River (Chapman 1985a; 1985b). Early Archaic hafted bifaces are associated with a variety of unifacial flake tools, bifacial knives, drills, denticulates, chipped and ground celts, and pitted stones. Early Archaic clay hearths have been excavated at[Exempted from Disclosure by Statute]but no structural remains (e.g., post molds, prepared floors) from these components have been discovered (Chapman 1977, 1985b).

Green bone cremations from the Kirk and LeCroy components [Exempted from Disclosure by Statute] (Chapman 1977) are some of the best examples of Early Archaic burials. Chapman (1990) has suggested that cremation was the dominant disposal mode during most of the Archaic in the Great Valley of eastern Tennessee. Excavations at the[Exempted from Disclosure by Statute] in Loudon County, Tennessee, led Chapman to propose that some Archaic burial sites mayhave been spatially isolated from habitation areas (Chapman and Myster 1991).

The Middle Archaic (8000–5500 B.P.) is generally seen as a difficult time for prehistoric populations, coinciding with the warmer and drier Hypsithermal Interval. Local inhabitants may have experienced occasional long droughts during this period. It has been postulated that population density increased from the Early to Middle Archaic in most regions of the Southeast (e.g. Amick and Carr 1996; Anderson 1989; McNutt and Weaver 1985). The period can also be divided in to three phases recognized in the Appalachian Summit based on diagnostic hafted bifaces: the Stanly phase (8000–7500 B.P.), the Morrow Mountain phase (7500–6000 B.P.), and the Guilford phase (6000–5000 B.P.).

The Middle Archaic period can be distinguished technologically from the Early Archaic by an increase in ground stone tools manufactured through pecking, grinding, and polishing including adzes, axes, bannerstones, and pendants. Several other types of these ground stone tools, like manos, mortars and pestles, and nutting stones, suggest increased use of plant food resources during this period. The Middle Archaic also generally corresponds to intensified use of major floodplain resources, reflected in the accumulation of substantial shell and[Exempted from Disclosure by Statute]of the Southeast such as the Tennessee River (Smith 1986). Classic shell mounds are rare on the upper Tennessee River, in contrast to the central section of northern Alabama.

Small hunting and gathering bands probably still formed the primary social and economic units during the Middle Archaic. Diagnostic bifaces of the period include Stanly, Morrow Mountain, Guilford, and Sykes-White Springs types (Cambron and Hulse 1990; Coe 1964; Lewis and Lewis 1995), all of which are known to occur in eastern Tennessee (Chapman 1985b).

During the Late Archaic (5500–3000 B.P.), climatic conditions throughout North America were shifting to resemble the modem environment. This change resulted in increasingly moist conditions throughout the American Southeast, and a corresponding boom in local plant and animal life. Prehistoric peoples took advantage of the new, lush conditions by living along major streams where water, plants, and animals were plentiful. Some Late Archaic groups lived for long periods of time in single, strategically placed locations that

laid the foundation for later, fully sedentary villages (Wauchope 1966). Seasonal base camps situated in protected coves and along major river systems may have served as hubs for the exploitation of upper tributary resources (Childress and Buchner 1992).

In east Tennessee, information on the Late Archaic comes from University of Tennessee excavations at [Exempted from Disclosure by Statute]on the Little Tennessee River (Chapman 1981; Schroedl 1975) and from work at[xempted from Disclosure by Statute] sites near Loudon (Chapman 1990; McCollough and Faulkner 1973).

The Late Archaic in the Appalachian Summit is recognized by the Savannah River phase (5000–3000 B.P.). The remains of this phase are among the most abundant in the region and are principally recognized by the appearance of the large, broad-bladed, straight-stemmed Savannah River point. At[Exempted from Disclosure by Statute]in western North Carolina, the Savannah River component overlay the Morrow Mountain component and was comprised of bar gorgets, groundstone grooved axes, large elbow pipes, notched stones (net weights), pitted and pebble hammerstones, pear-shaped manos, mortars, large crude bifaces, and flake scrapers (Keel 1976). Also, soapstone bowls and jars, occasionally with lug handles, are present during this phase. These were probably used to store food and water, suggesting more permanent site occupations during the Late Archaic period in the Appalachian Summit.

Woodland Period (3000–1100 B.P.)

The Woodland period in Tennessee is also divided into three sub-periods: Early (ca. 2850–2150 B.P.), Middle (2150–1600 B.P.), and Late (1600–1050 B.P.) (Kimball 1985). This period has been traditionally linked to decreasing mobility, population growth, and organizational complexity as manifested in the intensive cultivation of crops, establishment of well-defined village settlements, the construction of ceremonial mounds, and the appearance of pottery. However, recent research has proven that all these traditionally Woodland cultural markers have more ancient roots dating back to the Early and Middle Archaic (Fritz 1997; Sassaman 1993; Saunders et al. 1994). In this respect, the beginnings of the Woodland period in Tennessee mark only a gradual transition from subsistence and settlement patterns of the Archaic. However, technological refinement and ideological changes clearly distinguish the Woodland period from its predecessor. With the introduction of ceramics, changes in this artifact class assume a dominant position in the delineation of regional culture-historical sequences. The most recent cultural chronology for the latter part of the prehistoric sequence is a radiocarbon-based temporal ordering of ceramic assemblages from the area (Kimball 1985; Schroedl et al. 1990).

Woodland projectile points exhibit considerable variety in morphological form and quality of workmanship. They are generally smaller than Archaic forms and in part reflect the transition to use of the bow and arrow. Medium-sized triangular points, pentagonals, small to medium side notched and stemmed forms, and Bradley Spikes (Kneberg 1956) appear to be some of the common marker types for the area (e.g., Chapman 1985b; Graham 1964: Kimball 1985; Smith 1988).

Points associated with early, middle, and late divisions of the Woodland have not been as clearly delineated as the associated ceramics (see Kimball 1985). Based on the Tellico Reservoir chronology (Kimball 1985) and on work in other regions of the Tennessee River drainage (e.g., McNutt and Weaver 1985), it seems that barbed or shouldered, stemmed projectile forms such as Wade and Cotaco Creek (DeJarnette et al. 1962) span the Late Archaic/Early Woodland transition and are followed by Adena-like points and straight to contracting stem forms with reduced shoulders such as Flint Creek in the Early Woodland (McNutt and Weaver 1985).

Work at Middle Woodland sites in the Ridge and Valley province (Walthall 1985) and the Tellico Reservoir (Kimball 1985) suggests that medium-sized triangular projectile points such as Greeneville and Camp Creek were the primary types during this period (Keel 1976). Late Woodland to Early Mississippian forms include Jack's Reef Corner Notched (Ritchie 1961), Bradley Spikes, pentagonal points, and triangular Madison and Hamilton forms.

Early Woodland (or Woodland I) settlement in east Tennessee appears to have been exemplified by fairly small sites exhibiting limited long-distance interaction and trade, and increased dependence on horticulture. While a variety of indigenous cultigens had been exploited prior to 3000 B.P., the Early Woodland period saw the beginnings of intensive agriculture or horticulture (Watson 1989). Various plants, including goosefoot, maygrass, knotweed, sumpweed, little barley, and sunflower began to be systematically exploited, and in some cases show morphological variations suggesting the beginnings of domestication (Gremillion 1998, 2002; Smith 1992).

The most clearly identified Early Woodland component recognized on a number of sites throughout the Appalachian Summit is called the Swannanoa phase. It was first described by Keel (1972) and represents the initial appearance of ceramics in the region. The most common Swannanoa vessels are cord marked or fabric-impressed simple bowls and conoidal jars. Keel has correlated simple stamped, check stamped, and smoothed plain ceramics to this phase and believes they are late additions as a result of increased cultural interaction with the Carolina Piedmont to the east (Keel 1976). Artifacts associated with this phase include rather small Swannanoa and Plott short stemmed points, bone awls, bar gorgets, soapstone vessels, pitted and pebble hammerstones, net weights, tubular ceramic pipes, and pigment stones. These have been found in association with fire-cracked rock clusters that overlay Late Archaic deposits at both the[Exempted from Disclosure by Statute sites south of the project area.

The Pigeon phase (2500–1800 B.P.) is the earliest phase of the Middle Woodland (or Woodland II) period in the region. It is recognized ceramically by check stamped or simple stamped vessels with crushed quartz temper and tetrapodal supports (Keel 1976). Vessel forms include conical jars, open hemispherical bowls, and shouldered jars. Diagnostic points of the phase include the large and often concave-based Garden Creek point, the long, narrow Copena Triangular point, and the shallow side-notched Pigeon point. Other artifacts such as flake scrapers, bone and antler awls, hammerstones, celts, expanded-center gorgets, and stone and ceramic pipes were found stratigraphically at the [Exempted from Disclosure by Statute] sites (Keel 1976).

Purrington (1983) reports a significant shift in settlement patterns in the upper Watauga River Valley near the project area for Pigeon phase sites. This is represented by a marked increase of floodplain sites and a decrease in upland sites. He suggests that this may be as a result of increased dependence on horticulture. Evidence of increased regional exchange systems is recognized in the Appalachian Summit during the Pigeon phase of the Middle Woodland period. This is reflected in the strong influence of ceramic styles centered in the Piedmont of Georgia (Keel 1976), the presence of small numbers of east Tennessee Candy Creek series ceramics, and an increase in nonlocal cherts (Bass 1977).

The Connestee phase (1800–1400 B.P.) constitutes the later part of the Middle Woodland period in the region. Much of the information on this phase comes from Keel's (1976) work at the[Exempted from Disclosure by Statute .]The construction of this mound had begun in the Connestee phase and served as a platform for a small rectangular house. Ceramics from the site are sand tempered with plain, brushed, or simple stamped finishes with some cord marked, fabric marked, check stamped, or complicated stamped present. Other artifacts include small Pigeon like side-notched and Connestee triangular points as well as flake scrapers and gravers, stone discs, conical celts, tabular gorgets, elbow and platform pipes, grooved stone plummets and pendants, small cylindrical hammerstones, bone awls, cut deer mandibles, and abraded pigments stones.

In addition to artifacts recovered at[Exempted from Disclosure by Statute]that were manufactured locally, a group of non-local or exotic artifacts were found. These items represent participation in the network of exchange ideas, activities, artifacts, and raw materials, often referred to as the Hopewellian Interaction Sphere (Caldwell 1964). Artifactually, this cultural phenomena is represented by prismatic blades, polyhedral cores, triangular knives, sheet copper, copper beads, a bi-pointed copper pin, human and animal figurines, and certain pottery types. This association with Hopewellian peoples to the north and south suggests that Connestee groups in the Appalachian Summit may have experienced an increase in sociocultural complexity.

Settlement patterning during the Connestee phase is seen as a continuation of increased floodplain or valley occupation that had begun in the proceeding Pigeon phase. Evidence from [Exempted from Disclosure by Statute]show evidence of a relatively stable village settlement (Keel 1976). The recovery of charred vegetal remains indicates that a variety of local plants were being consumed and horticulture was a possible activity.

Starchy seed plants that began to be intensively exploited during the Early Woodland continued to be the focus of an expanding system of horticulture by Middle Woodland people, and cemented the cultural fluorescence that began during the Early Woodland period. In addition to carbonized plant remains, the manufacture of ceramic cooking and storage vessels, construction of storage facilities, and evidence of land clearing point to widespread agriculture during the Middle Woodland (Delcourt et al. 1998; Gremillion 1998, 2002). Maize (corn) remains recovered from sites along the Little Tennessee River have yielded calibrated dates of ca. 1800 B.P. (Chapman and Crites 1987). Corn is thought to have played only a minor role in prehistoric diets until about 1200 B.P. (Smith 1992).

The Late Woodland (or Woodland III) in east Tennessee has traditionally been synonymous with the Hamilton culture (Lewis and Kneberg 1946). As originally conceived, the Hamilton phase was characterized by a preponderance of the limestone tempered Hamilton Cord Marked ceramic type. Minor amounts of stamped- or brushed-surface limestone tempered types also were considered part of the ceramic complex. Small "individual household" shell heaps,[Exempted from Disclosure by Statute]were identified as midden remains at single-family habitation sites. Perhaps the most distinctive characteristic was the Hamilton burial mound complex (Schroedl et al. 1990), long thought to be part of an exclusive Late Woodland, Hamilton-phase mortuary program.

However, recent work on the Late Woodland to Early Mississippian time span has failed to support Lewis and Kneberg's original conception of a distinctive Late Woodland Hamilton cultural complex in east Tennessee. Radiocarbon assays on material from a number of Hamilton conical burial mounds indicate that this physical aspect of the regional mortuary program spanned the period 1250–750 B.P., which indicates use of such mounds well into the Mississippian period (Schroedl et al. 1990). This finding suggests that it may be too simplistic to associate small shell heaps along the Tennessee River exclusively with Hamilton habitation. As Schroedl et al. (1990:182) note, no radiocarbon dates currently are available to assess the association of these features with a particular temporal span.

Horticulture appears to have been important during the Late Woodland, and cultivated foods continued to be supplemented by game and locally available mussels. Models of annual, seasonal movement between the river floodplains and limited activity sites on the Cumberland Plateau have been proposed, but data to test the accuracy of these models have not been gathered. Architectural evidence is conspicuously lacking (Schroedl et al. 1990). Compared to the elaborate mortuary ceremonialism of the Middle Woodland, the Late Woodland may be viewed as probably locally rather than regionally oriented. Cole's (1975) analysis of Hamilton phase mortuary patterning suggests that social stratification was not marked and that observed distinctions in burial treatment were probably linked to achieved rather than ascribed status.

Perhaps the most significant technological advance of the Late Woodland period was the introduction of the bow and arrow. This technology was introduced from the West or Northwest around 1400 B.P., and quickly spread throughout the Southeast. PP/K styles changed dramatically to suit the needs of the new technology (Bense 1994; Blitz 1988). Smaller, lighter Madison and Hamilton types diagnostic of the Late Woodland reflect this adaptation.

Mississippian Period (1100–300 B.P.)

The Mississippian period has been the subject of much research throughout the Southeast. Its cultural manifestations began along the middle course of the Mississippi River between present-day St. Louis, Missouri and Vicksburg, Mississippi. Mississippian culture underwent major development at the site of Cahokia in the American Bottom, and spread primarily along major river systems to all parts of the Southeast (Hudson 1976).

In the Appalachian Summit, Mississippian culture appears during the Pisgah phase (1000–550 B.P.). Diagnostically it is recognized by small, isosceles triangular Pisgah projectile points along with a variety of other artifacts including microtools, gravers, perforators, and drills, ground stone celts, pipes, discoidals, and small discs. Shell artifacts associated with this phase include gorgets, ear pins, beads, and dippers. Pisgah series ceramics are characterized by shouldered vessels with a collared rim, usually decorated by rows of elongated punctate impressions (Purrington 1983). Sand and quartz were common tempering agents.

Pisgah villages were stockaded and structures were square to rectangular measuring about 5 to 7-m (1.5 to 2.1 feet) along the outer walls with wall trench vestibule entrances, slightly depressed floors, and 4 large center posts surrounding a raised clay, central fire basin (Dickens 1976). A circular pattern of post molds was found at[Exempted from Disclosure by Statute] site about 3-m (0.9 feet) in diameter adjacent to a square house and may represent a conical "hot house" or winter house (Dickens 1978; Faulkner 1977, 1978). Ceremonial structures seem to have been restricted to the southwestern part of the region and include earth lodges and rectangular, flat-topped platform mounds topped with square or rectangular houses. Pisgah burials are usually flexed with grave goods typically being confined to personal adornment (Dickens 1976; Keel 1976).

Hunting wild game like white-tailed deer and turkey and gathering of nuts and fruits continue to play a major role in the Pisgah subsistence base much like that of earlier phases (Wing 1976). However, horticulture products, including corn, beans, squash, and sumpweed, seem to have made a much greater contribution to the diet (Yarnell 1976). Dickens (1978) has suggested that Pisgah culture, much like other Mississippian cultures throughout the Southeast, was based on a hierarchical settlement system that included a small number of widely dispersed rather large civic-ceremonial centers (mound sites) surrounded by smaller villages, hamlets, and farmsteads. Given that burial treatments associated with this phase are far less elaborate than other Mississippian cultures in the surrounding region it is likely that Pisgah culture was less socially complex, representing something short of a true chiefdom.

The latter part of the Mississippian period is represented by the early Qualla phase (550–350 B.P.) (Egloff 1967). Ceramics from this period consist of large bowls and jars with complicated stamped, check stamped, and incising. Other artifacts include small triangular points, flake scrapers and drills, rectanguloid celts, stone and potsherd discs, stone and clay elbow pipes, bone awls, and antler flakes.

Typical structures in Qualla villages were of waddle-and-daub construction, usually square and occasionally circular with a bark covered or thatched roof, and a central clay fire basin. Some civic-ceremonial centers have been recognized for the Qualla Phase such as the Cowceta Creek site, which was a small village that contained a central plaza and a platform mound (Egloff 1971). Qualla culture relied on maize, bean, and squash cultivation supplemented by hunting, fishing, and gathering. Burial treatments are more elaborate the earlier Pisgah burials containing grave goods that included marine shell beads, gorgets, fancy clay pipes, polished stone celts and discs, and caches of chipped stone projectile points (Dickens 1976).

HISTORIC OVERVIEW

Early Euro-American Settlement.

The earliest documented European incursion into eastern Tennessee was the de Soto expedition of A.D. 1540. The precise route of de Soto and his men has been the subject of controversy for years, but recent research by Smith (1987), DePratter et al. (1985), and Hudson et al. (1985) has delineated a route that best appears to fit the available archaeological and historical data. According to their reconstruction, de Soto's route tracked through Florida, southern Georgia, South Carolina, North Carolina, Tennessee, and finally northwest Georgia. The de Soto expedition crossed the Appalachians from North Carolina into Tennessee and arrived at the Indian village of Chiaha in late June or early July 1540. DePratter et al.'s (1985) and Hudson et al.'s (1985) research places the town of Chiaha on Zimmerman's Island in the French Broad River, close to Dandridge, Tennessee. Chiaha was located at the northern border of the large chiefdom of Coosa. At least one other early Spanish expedition penetrated the upper drainage of the Tennessee in the sixteenth-century. That expedition, led by Tristan de Luna in 1559–1561, visited many of the same sites as de Soto (Dye 1998).

Anglo-American expansion into eastern Tennessee began after the Revolutionary War, although settlement was concentrated along the fertile valleys of the Tennessee River. Prior to this time the lands of eastern Tennessee belonged to the Cherokee, whose settlements focused on the Little Tennessee River south of Knoxville. Contact between whites and Cherokees in the Colonial period came primarily through fur traders from the Carolinas and Virginia, and later through the manipulations of war. The British Fort Loudon was established on the Little Tennessee River in 1756 to defend the Carolinas against possible invasion during the French and Indian War (Goodspeed 1887). Following British victory, white settlers began to move into northeastern Tennessee, where they purchases or leased lands from the Cherokee. Official British colonial policy restricted settlement of the region, and Anglo-American occupation remained sparse and isolated until after the Revolutionary War. During that conflict, the Cherokee sided with the British, whose defeat gave many land-hungry settlers a basis for assuming that the Cherokee had forfeited their claims to Tennessee.

Following the Revolutionary War, the State of North Carolina sought to annex Cherokee lands along its western border, and in 1783 the state enacted the "land grab act," offering for sale all its lands in the Tennessee country at £10 per 100 acres, except a military land warrant in the Cumberland valley and a Cherokee reservation east of the Tennessee River and south of the French Broad and Big Pigeon rivers (McArthur 1976). The land grab act was the impetus for many early settlers arriving in eastern Tennessee.

North Carolina had ceded its western territories to the United States government in 1783, and then in the following year revoked the act. Settlers of the region, anxious to secure their independence and expand their boundaries through the annexation of Cherokee lands, had rallied behind the figure of John Sevier, an aggressive fighter and land speculator (McArthur 1976). The Jefferson Ordinance, passed by Congress in 1784, encouraged the organization of new states along the western boundary of the former

colonies, and the Tennessee settlers sought to organize themselves as the first state for admission (Rothrock 1946). Sevier was elected the first governor of the State of Franklin, and in that capacity pursued both territorial expansion and recognized statehood. The United States government, however, refused to recognize the State of Franklin (Rothrock 1946).

Frustrated, the settlers of East Tennessee sought and were granted reconciliation with the State of North Carolina. Four North Carolina counties were established in what is now eastern Tennessee. The current study area belonged to the vast Washington County. In 1790, North Carolina ratified the federal Constitution and shortly thereafter ceded its western territorial claims to the United States government. The United States organized these territories as the Territory of the United States South of the Ohio River, or the Southwest Territory for short (McArthur 1976). The capital of the territory was laid out in 1791 and named Knoxville, in honor of Secretary of War James Knox. Knox County was created in 1792 from Hawkins and Greene counties and included all of what is now Anderson County (Petracek 1978).

In 1795, a census of the Southwest Territory was taken to determine whether the Tennessee area was home to the 60,000 occupants required to vote for statehood. The population proved to be 77,262, of which 11,573 (as well as an additional 2,365 slaves) were in Knox County. In 1796, a convention was held in Knoxville to write a state constitution, and Tennessee was admitted to the Union the same year (Rothrock 1946).

Permanent Euro-American settlement of the project vicinity began after the Treaty of Tellico Blockhouse in 1798, which ceded the land between the Clinch River and Cumberland Mountain to the United States. With the threat of conflict with the Cherokee removed, settlement proceeded rapidly. As Euro-American settlements increased, the few remaining Cherokee inhabitants were gradually displaced (Hoskins 1979).

Anderson County was created in 1801 from parts of Knox and Grainger Counties, and named after Joseph Anderson, a U.S. senator and territorial judge from Knoxville (Mielnik 1998). The first county seat was Burrville, named after Vice-President Aaron Burr. Following Burr's fall from grace, the Tennessee General Assembly changed the name of the county seat to Clinton. Roane County was created the same year as Anderson, and was named after the second governor of Tennessee, Archibald Roane (Hall and Parker 1998). Kingston, at the confluence of the Clinch and Tennessee rivers was designated the Roane County seat and had 600 inhabitants by the mid 1870s. When Roane County's borders were extended across the Tennessee River in 1819 following the Cherokee cession, Morgan County was created from the northern part of Roane (Killebrew 1974 [1874]).

Agricultural and Commercial Development (1820–1930)

Self-sufficient agriculture was the principal pursuit of most nineteenth century residents of the Clinch River valley (Hall and Parker 1998; Mielnik 1998). Although much of what was needed was produced on the farm, store-bought items were not uncommon. Surplus crops were bartered or sold for iron goods, kitchenware, coffee, salt, shoes, storage

containers, and other manufactured goods. These might be purchased on a regular basis from local merchants or from markets in Knoxville, where annual or semiannual trips were often made. As early as 1794, Nathaniel and Samuel Cowan advertised that they would accept "corn, rye, oats, beeswax, flax, old Congress money, and Martin's certificates" for goods at their store in Knoxville (*Knoxville Gazette* 1794).

Mills were constructed in convenient locations for grinding corn and wheat into meal. These mills also served as community social centers, where local news was exchanged and business conducted. In 1833, Joseph Black was granted permission to construct a mill on the Clinch River, provided he did not obstruct navigation on the waterway. Sam Fox had a gristmill on Mill Creek in the northeast corner of Anderson County that later fell into disuse after Norris Lake inundated the family homestead (Hoskins 1987).

Although agriculture was the chief pursuit of most settlers in eastern Tennessee, the hilly topography and mineral wealth of the hills led to a number of experiments with industry. As early as 1801, an iron forge was operating on Grant's Creek in what is now Campbell County, using wood charcoal produced from the timbered hillsides for fuel. A rich vein of coal and iron ore at Rockwood in Roane County was discovered in 1840, and furnaces were in operation soon thereafter (Killebrew 1974 [1874]).

Farmers in the region did not depend much on slave labor, relying instead on large families, the help of neighbors, and occasional day labor to tend their farms. However, there were a number of large farms in the river and creek bottoms of Anderson County that employed slave labor. In 1840, slaves made up nearly 9 percent of the population of Anderson County (Hoskins 1987). The percentage of slaves in the county dropped somewhat to 8.2 percent in 1860. Only eight free blacks were reported in Anderson County in 1860, compared to 41 reported 10 years earlier, indicating a crackdown on the few African Americans in the county not enslaved (Hoskins 1987). Slaves were fairly common in Roane County, representing 12.8 percent of the population, reflecting the large amount of productive farmland along the Tennessee River.

Many citizens of East Tennessee supported the Union at the outset of the Civil War, although few would have supported emancipation. Many men from the area enlisted in northern units, some of which organized in Kentucky. The most significant military engagement in the area involved a Union militia unit organized in Campbell County by Joseph Cooper. Cooper led his men to Kentucky and later guided them back into Tennessee, attacking the Confederates at Big Creek Gap (now LaFollette in Campbell County) and Wallace's Cross Roads (now Andersonville in northeast Anderson County). Numerous small skirmishes were fought throughout the region, resulting in great destruction of fields and villages, as troops from both sides struggled over control of Knoxville (Goodspeed 1887; Killebrew 1974 [1874]; Moneymaker 1981).

The Knoxville and Ohio Railroad was completed from Knoxville to the south side of the Clinch River across from Clinton before the Civil War. The line was extended northward after the war (Killebrew 1974 [1874]). The construction of railroads into the hills of East Tennessee offered new opportunities to exploit the area's resources. Mines were opened all along the Cumberland Plateau where rich veins of coal, iron, and other minerals are

located. Besides coal mining, the region's industrial base in the late 19th and early 20th centuries included lumbering and sawmills, stone quarrying, lime kilns, canneries, and wood products.

As railroad connections were expanded in the 1880s and 1890s, the coal and lumber industries also grew. The mines began to employ state convicts to work, much to the disgust of the Welsh, Scottish, and native workers that had been working in the dangerous mines for low pay and were now being forced out. In 1891, the free laborers rallied against the convict system. Joined by workers from Kentucky and around Tennessee, they loaded the prisoners on trains and sent them back to Knoxville. When militia arrived, the miners drove the outnumbered soldiers back to Knoxville. The governor negotiated with the leaders of the revolt and promised to call on the legislature to eliminate the convict system if the prisoners could continue to work for the next two months. The miners agreed, but when no action was taken by the state, they again raided the camps and set the prisoners free, providing them with food and civilian clothing (Hoskins 1987). In 1892, another uprising took place in Grundy County and spread to Oliver Springs, Briceville, and Coal Creek. Again the state sent in militia, and after several attempts captured the town of Coal Creek. In the wake of this revolt, the legislature discontinued the convict lease program (Hoskins 1987).

Agriculture remained the principal pursuit of the region after the Civil War, in terms of overall economic impact and number employed. However, soil depletion, poor management, shrinking farm size, isolation, and the changing character of agriculture in the twentieth century forced many farmers to the edge of poverty. The introduction of county agents in 1915 brought some improvements. Burley tobacco, strawberries, and potatoes became viable alternatives to the traditional corn and livestock. The 1920s was a boom period for the coal mines, and many farmers went to work in factories and other laboring jobs in Knoxville, as well. However, the stock market crash in 1929 closed many of the mines and resulted in layoffs in the manufacturing plants. With employment opportunities narrowed, many workers returned to farming the family land, but due to shrinking local markets for farm products, the improvement of living conditions was difficult (Ridenour 1985).

Norris Lake and the TVA (1930–Present)

As part of his Depression recovery plan, President Franklin Roosevelt proposed the development of the entire Tennessee Valley region, with dams for power generation and flood control coupled with programs for reforestation, erosion control, and diversification of the industrial base. Previous private and public studies had investigated the Clinch River near Cove Creek as a site for a dam that would control Tennessee River flooding, as well as stabilize water levels to aid navigation. The dam site was determined necessary to properly operate the hydroelectric facilities planned for downstream at Muscle Shoals, Alabama. Efforts in the 1910s and 1920s did not come to fruition, but with the creation of the TVA, the Norris Dam project, named for the senator from Nebraska who was instrumental in the passage of the enabling legislation, was put into motion as the first project in the development of the Tennessee Valley (TVA 1940).

Construction began in 1933 and was completed in 1936. Located in northeastern Anderson County, Norris Dam created a lake that covered parts of five counties and significantly transformed the area. The lake would flood 13 percent of the land area of those counties and reduce tax revenue from property taxes by 3.9 percent. However, construction of the dam brought jobs for both skilled and unskilled workers, including engineers, contractors, surveyors, social workers, and realtors, as well as laborers for constructing the dam, building the associated worker village, and clearing trees and structures (TVA 1940).

The construction of Norris Dam was seen as a turning point in the history of Anderson County and the surrounding region, bringing electricity to rural workers, steady employment, and a new way of life for many of its citizens, who began to leave farming and mining. The TVA headquarters in Norris employed hundreds who worked at white-collar jobs and lived a suburban lifestyle. Industry located in the area to take advantage of inexpensive power, and residents of Knoxville purchased houses on the lake or in nearby subdivisions to take advantage of recreational opportunities and the beauty of the countryside.

Oak Ridge National Laboratory

The development of ORNL traces its roots to the 1940s, World War II, and the beginnings of the nuclear arms race. By May of 1941, the Manhattan Project to develop and harness nuclear energy had become a national priority. Over the next two years, the U.S. Army Corps of Engineers (COE) acquired the ORR, consisting of fifty-six-thousand-acres of land between the Clinch River and Black Oak Ridge, in order to construct a top-secret installation for production of plutonium to be used in the United States' first nuclear weapons (Johnson 1998). Construction began in February of 1943 at ORNL, originally known as "Clinton Laboratories."' According to a history published by ORNL (2000), the initial construction boom was nothing short of spectacular. Within the town of Oak Ridge, a house was being constructed every 30 minutes. The city bus system was the nation's sixth largest, and electricity consumption would be 20 percent greater than New York City's.

The heart of ORNL (originally known as the X-10 site) was an experimental graphite reactor that had been constructed in just nine months. The reactor went online in November of 1943, and by March of 1944 had produced its first plutonium sample (ORNL 2000). The materials produced at ORNL would be used to supply research and development at the experimental cyclotron and labs of the University of California, the University of Chicago, Los Alamos, New Mexico, and the Hanford, Washington production plant (Johnson 1998).

In 1948 the X-10 site was officially designated the Oak Ridge National Laboratory. Following the war, the facility was managed successively by the University of Chicago, Monsanto Chemical, Union Carbide, and Lockheed Martin under contract to the Atomic Energy Commission (1947–74), the Energy Research and Development Administration (1975–77), and the Department of Energy (1977–present) (Johnson 1998). During the 1950s, ORNL focused on developing new types of atomic reactors and training nuclear

scientists and engineers. Fourteen types of nuclear reactor were designed at ORNL during this period (Johnson 1998; ORNL 2000). ORNL also contributed to the design of aero and naval propulsion, commercial, and liquid metal breeder reactors.

By the late 1960s, enthusiasm for nuclear and atomic energy had waned significantly. Research at ORNL was expanded to include fusion, fossil, and renewable energy sources along with high-energy physics, environmental, biological, robotics, advanced materials, and allied sciences of national significance (Johnson 1998). During the 1990s ORNL became involved in Department of Energy efforts to clean up toxic and radioactive wastes at both its own facilities and throughout the world. Groundwater at the facility had been severely contaminated by leaking pipes. Storage tanks had to be emptied and decontaminated, while leaking chemical drains had to be repaired and replaced. It was initially estimated that cleaning up the ORNL facility would take as much as three decades and hundreds of millions of dollars (ORNL 2000). The Graphite Reactor at ORNL was shut down in 1963, and would be opened to the public during the 1980s as an educational exhibit. The ORNL reactor is the world's oldest surviving nuclear reactor, and was listed on the NRHP in 1966 (Johnson 1998; NRHP 2005).

IV. METHODS

BACKGROUND RESEARCH

Prior to initiating fieldwork, TRC conducted a background literature and records search in order to identify known historical and archaeological sites in the project area and to develop the historic context for the study area. The literature search included research at the state archaeological site files housed at the Tennessee Division of Archaeology (TDOA), NRHP listings and pending files, and historic structures and buildings files located at the THC located in Nashville. The purpose of the records search was to identify the location and NRHP-status of all previously recorded archaeological sites and architectural properties within the APE of the proposed improvements. The results of this research are presented in Chapter V.

ARCHAEOLOGICAL SURVEY METHODS

TRC personnel surveyed the entire APE on foot, utilizing both systematic visual examinations and shovel testing to prospect for archaeological remains. Visual inspections were undertaken in areas of greater than 50 percent surface visibility. In areas of low surface visibility and less than 15 percent slope, shovel testing was conducted at 30-m (98.43-foot) intervals. A full grid of shovel tests was excavated at 30-m (98.43-foot) intervals within the proposed substation and laydown area footprints. For 91.4-m (300-foot) wide corridors, two parallel transects spaced at 30-m (98.43-foot) were surveyed along the staked APE. For corridors equal to or smaller than 30.5 m (100 feet), a single transect was excavated along the staked TL centerline. Shovel tests were each 30 x 30 cm (11.8 x 11.8 inches) in diameter, and extended 50-cm (1.6 feet) below surface or to archaeologically sterile subsoil.

Once archaeological materials were recovered, site boundaries were determined. If ground surface visibility exceeded 50 percent, the site was delineated by the lateral extent of surface artifacts. In areas where ground surface visibility did not exceed 50 percent, shovel testing was conducted in a cruciform pattern (north-south, east-west) across the site at 10-m (32.8-foot) intervals until two consecutive negative shovel tests were encountered or until the landform changed or became restricted by topography. All excavated dirt from delineation tests was screened through ¼-inch mesh hardware cloth, and all artifacts were segregated by provenience.

Identified sites were mapped using hand-held GPS equipment, and UTM coordinates (NAD27) were recorded for a site datum, usually consisting of the first positive shovel test. Site boundaries were flagged using TVA-approved red fluorescent flagging tape with appropriate labeling, so as to be visible and understandable to transmission line construction crews. Each site was photographed using digital camera equipment, and standardized notes were taken on the site and landscape.

Site Definition

According to the *Tennessee Archaeological Site Survey: A Manual for Completing the Site Form* (TDOA 1997), systematic criteria are applied by the TDOA to formal requests for the assignment of state trinomials (site numbers). Historic sites are assigned state site numbers if a pre–1933 date can be firmly established. If diagnostic materials are not present, a trinomial will be assigned based upon pertinent historic documentation indicating occupation before 1933.

LABORATORY METHODS

All notes, forms, film, etc. were transported to the TRC office in Nashville for processing and analysis. According to the ORNL regulations, all artifacts recovered from the facility have the potential for radioactive contamination. For this reason, recovered artifacts were subjected to in-field analysis and photography, but were not collected or curated. The focus of artifact analysis was geared to determine the occupation span, possible function, and degree of artifact preservation at each site, as well as gather the data necessary to make evaluations regarding NRHP eligibility. All artifacts were comprehensively described in the field using well-established, temporally diagnostic typologies. Analysis of historic artifacts relied primarily on construction methods and maker's marks (e.g. Toulouse 1971).

ARCHITECTURAL SURVEY METHODS

The architectural and historical inventory was conducted in accordance with guidelines provided by THC's survey manual (THC 1991), as well as those contained in National Register Bulletin 24, *Guidelines for Local Surveys: A Basis for Preservation Planning* (Derry et al. 1985). Survey information maintained throughout the course of the inventory included field notes, sketch maps, photographs, informant interviews, and THC Historical and Architectural Resource forms. Each inventoried property was photographed using 35 mm black-and-white film. Color slide film was also used to document each of the inventoried properties. USGS quadrangle maps were used to plot the locations of the inventoried properties.

Federal regulations define the APE as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist" (CFR 2003:123). In regard to the proposed project, the architectural APE was determined to be 0.8 km (0.5 miles) along either side of the proposed transmission corridor(s), encompassing a one-mile radius. The APE includes areas that have a visual link to the proposed project. Viewsheds to and from the proposed project corridor(s) were terminated where vegetation and/or topography obstructed lines of sight.

NRHP ELIGIBILITY CRITERIA

Sufficient data were compiled to make recommendations regarding eligibility for listing on the NRHP for each archaeological and architectural resource addressed during this study. According to 36 CFR 60.4 (CFR 2004; NRHP 2002), cultural resources eligible for listing on the NRHP are defined as buildings, structures, objects, sites, and districts that have "integrity," and that meet one or more of the criteria outlined below.

- Criterion A (Event). Association with one or more events that have made a significant contribution to the broad patterns of national, state, or local history.
- Criterion B (Person). Association with the lives of persons significant in the past.
- Criterion C (Design/Construction). Embodiment of distinctive characteristics of a type, period, or method of construction; or representation of the work of a master; or possession of high artistic values; or representation of a significant and distinguishable entity whose components may lack individual distinction.
- Criterion D (Information Potential). Properties that yield, or are likely to yield, information important in prehistory or history. Criterion D is most often (but not exclusively) associated with archaeological resources. To be considered eligible under Criterion D, sites must be associated with specific or general patterns in the development of the region. Therefore, sites become significant when they are seen within the larger framework of local or regional development.
- Criterion E (Reconstructed Resource). Accurately reconstructed buildings presented in a suitable and dignified manner as part of a restoration plan, when no other similar building has survived.
- Criterion F (Commemorative Marker). A property that is commemorative in intent, if design, age, tradition, or symbolic value has invested the marker with historic significance.
- Criterion G (Recent Properties). Properties that have achieved exceptional significance in the last 50 years.

"Integrity" is perhaps the paramount qualification of NRHP eligibility, and can be related to any or all of the following (NRHP 2002):

- Location: the place where the historic property (or properties) was/were constructed or where the historic event(s) occurred;
- Design: the combination of elements that create the form, plan, space, structure, and style of a property (or properties);
- Setting: the physical environment of the historic property (or properties);
- Materials: the physical elements that were combined to create the property (or properties) during the associated period of significance;
- Workmanship: the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory;
- Feeling: the property's (or properties') expression of the aesthetic or historic sense of the period of significance; and

- Association: the direct link between the important historic event(s) or person(s) and the historic property (or properties).

For the purposes of archaeology, assessment of site integrity depends largely on the level of disturbance exhibited by archaeological deposits. The nature of deposits (intact, partially disturbed, obliterated, etc.) has direct bearing on the potential to view a site within the context of its past, and on the degree to which it can provide data based on the material record (NRHP 2002). In short, the integrity of a site (and thereby its potential for NRHP eligibility) is directly tied to its capacity to address research questions.

V. RESULTS

BACKGROUND RESEARCH

Prior to initiating fieldwork, TRC personnel conducted a background literature and records search in order to identify known archaeological sites and historical properties both in the project area within the specific APE of TVA improvements. The background search included review of NRHP listings and pending files, archaeological site files, and historic structures and buildings files located at the THC and TDOA in Nashville.

A number of previous cultural resource investigations have been conducted on the ORR and along the channel of the Clinch River. The earliest archaeological investigations of the region were conducted along the Clinch River by Cyrus Thomas under the auspices of the Bureau of American Ethnology (Thomas 1894). His 1894 report to the Bureau includes descriptions of visits[Exempted from Disclosure by Statute](40RE27) and[Exempted from Disclosure by Statute](40RE28) sites, both located in Roane County southeast ofthe project area. Later on, construction ofthe Norris and Melton Hill Dams and inundation ofthe Watts Bar Reservoir resulted in the investigation of numerous prehistoric sites along the main channel ofthe Clinch River (McNutt and Fisher 1960; McNuttand Graham 1961;Webb 1938).

Since the establishment of the ORR in 1942, numerous cultural resource surveys have been conducted at the facility on behalf of the Department of Energy. These include work by Schroedl (1972), Fielder (1974), Fielder et al. (1977), Jolley (1982), and nearly twenty surveys by DuVall and Associates (as reported in DuVall and Souza 1996). Of these previous surveys, the investigations by Fielder et al. (1977) and DuVall and Souza (1996) are particularly relevant to the current TVA survey.

The 1977 report by Fielder et al. focused on documenting the numerous historic structures and archaeological sites scattered throughout the ORR. The investigators used documentary sources including land acquisition maps, 1942 TVA "Kingston Demolition Range" maps, and 1941 and 1952 7.5-minute USGS quadrangles to identify historic structure locations. These locations were then examined in the field, and sites were classified as standing, foundation-only, or destroyed. The survey resulted in the relocation and identification of 415 historic sites. All sites identified as a result of this survey were assigned numbers based on the corresponding property tract designations depicted on ORR property acquisition maps. One of these sites, [Exempted from Disclosure by Statute] (40AN28, situated northeast of the project area), was determined eligible for inclusion in the NRHP, and was listed in 1992.

In 1994, DuVall and Associates conducted an investigation at the request of Lockheed Martin Energy Systems, which was designed to relocate and evaluate all previously recorded archaeological sites within the ORR (DuVall and Souza 1996). The investigators prepared a GIS base map of previously recorded sites using latitude/longitude coordinates provided by prior surveys. These locations were then examined in the field. In the final report, DuVall and Souza documented 258 pre-World

War II structures and 42 prehistoric sites within the ORR. Rather than assign state trinomials to historic sites, the investigators relied on site/tract numbers from Fielder et al. (1977).

In 2005, the Nashville office of TRC conducted a Phase I cultural resources survey for TVA of a new substation, transmission lines, and associated construction areas located in the vicinity of the east terminus of the project surveyed in this report (Deter-Wolf and Karpynec). The archaeological portion of the 2005 survey resulted in the documentation and registration with the TDOA of three historic-period domestic sites, 40AN228, 40AN229, and 40AN230.

Figures 1a-1c shows the location of a variety of previously recorded sites in the project vicinity. None of these are located directly in the project archaeological APE. Table 1 lists the sites along with each one's cultural affiliation and NRHP recommendation.

Table 1. Summary of Archaeological Sites Near the Project Area.

Site Number	Cultural Affiliation	NRHP Recommendation
40RE89	Late Mississippian	Unassessed
40RE90	Late Woodland	Unassessed
40RE91	Undetermined Prehistoric	Unassessed
40RE108	Woodland	Unassessed
40RE109	Archaic, Woodland, Mississippian	Unassessed
40RE110	Woodland	Unassessed
40RE111	Archaic, Woodland	Unassessed
40RE123	Historic	Unassessed
40RE126	Paleoindian, Archaic, Woodland, Mississippian	Unassessed
40RE135	Undetermined Prehistoric	Unassessed
40RE138	Paleoindian, Archaic, Woodland, Mississippian	Unassessed
40RE139	Undetermined Prehistoric	Unassessed
40RE140	Archaic, Woodland, Historic	Unassessed
40RE177	Woodland	Unassessed
40RE202	Undetermined Prehistoric	Ineligible
40RE223	Historic Cemetery	Unassessed
40RE232	Historic	Unassessed
40RE233	Historic	Unassessed
40RE488	Undetermined Prehistoric, Historic	Unassessed
40RE492	Undetermined Prehistoric	Unassessed
40RE493	Undetermined Prehistoric	Unassessed
40RE494	Undetermined Prehistoric	Unassessed
40RE500	Undetermined Prehistoric, Historic	Unassessed
40RE501	Undetermined Prehistoric	Unassessed
40RE566	Historic	Unassessed
40RE574	Woodland, Historic	Unassessed
40AN228	Historic	Ineligible
40AN229	Historic	Ineligible
40AN230	Historic	Unassessed

Most of the sites listed in Table 1 are located[Exempted from Disclosure by Statute] [Exempted from Disclosure by Statute]As noted on the state site forms, many of these were revisited[Exempted from Disclosure by Statute]in the 1970s and 1980s. Almost all are described as largely destroyed or disturbed by looting and erosion.

Two properties in the general vicinity of the project area have been previously listed on the NRHP. The X-10 Graphite Reactor was added to the register in 1966 based on its significance to science and invention (NRHP 2005). The graphite reactor is located within the ORNL facility along Bethel Valley Road, northwest of the project area and well outside of the APE. The New Bethel Baptist Church, situated approximately 213.3 m (700 feet) northwest of the proposed TVA improvements along Bethel Valley Road (see Figure 1a), was listed on the NRHP in 1992 as part of the Oak Ridge Multiple Property Submission. This property is discussed below under Architectural Survey Results.

ARCHAEOLOGICAL SURVEY RESULTS

A TRC field crew conducted archaeological investigations of the APE on September 19, 2006. In upland areas, shovel testing revealed that soils have been heavily impacted over time by forces including plowing, and erosion. Stratigraphy generally consisted of a mixed upper stratum of silty clay loam topsoil transitioning to archaeologically sterile subsoil between 1 and 25 cm (1 and 9.8 inches) below surface. The west end of the project corridor runs along bottomlands and terraces associated with the east shore of the Clinch River, now impounded here as Watts Bar Lake. This area has been thoroughly disturbed by coal ash dumping from the nearby steam plant and subsequent grading and redeposition of this material.

No previously unrecorded archaeological sites were identified directly within the APE as a result of the survey. The survey crew did record one[Exempted from Disclosure by Statute] [Exempted from Disclosure by Statute .]The site is now recorded with the TDOA as 40RE575 and is described in the following section.

40RE575

USGS quadrangle: Elverton, TN [Exempted from Disclosure by Statute]

Elevation:[80 Exempted from Disclosure by Statute]

Area (sq. m): 5000

Components: Historic late 19th-early 20th Century

NRHP recommendation: Not eligible

[Exempted from Disclosure by Statute]
[Exempted from Disclosure by Statute]
[Exempted from Disclosure by Statute]
[Exempted from Disclosure by Statute]

The main archaeological feature at the site is a standing stacked stone chimney (Figures 7 and 8). The chimney was first spotted [Exempted from Disclosure by Statute]

At its highest point (on its back side) the chimney stack stands 2.82 m (9.25 ft.) above the surface. It is 1.3 m wide at the back, and 81 cm deep from front to back. Its firebox, facing west-southwest, is 75 cm wide and was approximately 86 cm high. The roughly shaped rock slabs making up the upper stack are consistently 7 to 9 cm thick, with thicker ones (11 to 13 cm) in the courses making up the lower foundation and surrounding the firebox. Some handmade bricks are incorporated in the stack, possibly put in as replacements for lost stone slabs. The entire structure is mortared with mud. There are twelve courses of stone in the remaining portion of the stack above the firebox. The stack narrows above the firebox in two steps, ending up with a width approximately the same as the firebox, 75 cm.

Figure 7. Chimney at 40RE575

There are two flat bars spanning the top of the firebox, serving as supports for the courses above. There is a twisted wire in a hook shape dangling down from one of these, serving as an impromptu pot hook (Figure 9).

There is no aboveground evidence remaining of the building associated with the chimney at 40RE575, and there are no surface remnants of any other nearby structure (Figure 10). Only three of the fifteen shovel tests excavated in the vicinity of the chimney produced artifacts. The three artifacts recovered (one from each positive shovel test) consisted of a small fragment of window glass, a small piece of unidentified textile, and a shell casing from a .32 caliber center-fire cartridge, dating to the early twentieth century.

(In keeping with ORNL policy regarding possible contamination, the artifacts were field recorded and left in place.) No ash layers or other signs of cultural soils were observed in the shovel tests. The relative paucity of archaeological remains other than the chimney suggests that the associated structure was not intensively occupied, and may have been used as a short term tenant dwelling for a nearby farm or as a hunting cabin.

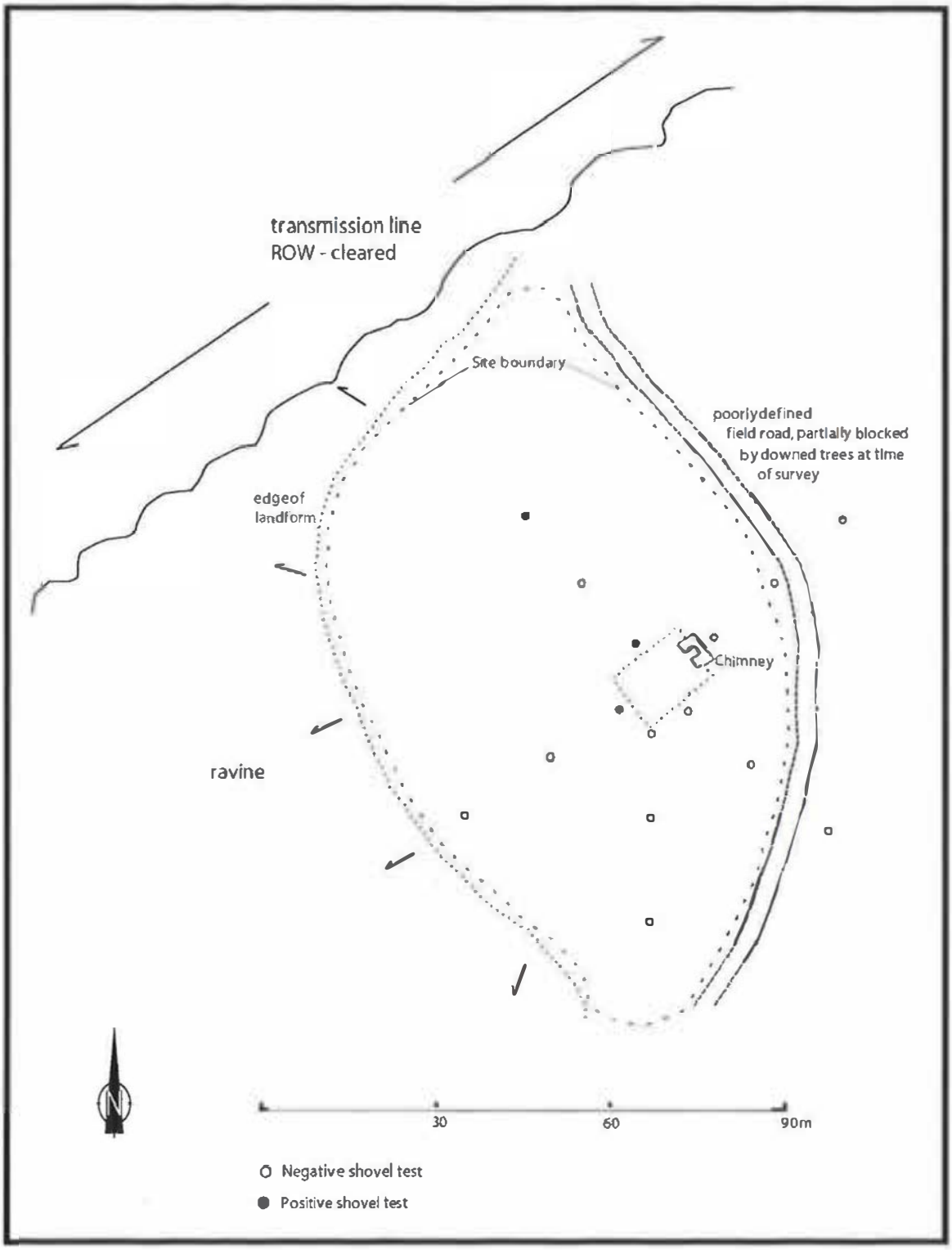

Figure 8. Map of site 40RE575.

Figure 9. Chimney at 40RE575, showing firebox supports and twisted wire pot hook.

Figure 10. View of area around chimney at 40RE575, looking north.

TRC recommends that 40RE575 does not exhibit the necessary integrity or research potential for listing on the NRHP according to the criteria set forth in 36 CFR 60.4 (CFR 2004; NRHP 2002). The chimney is interesting but in generally poor shape and in no way is it a significant or remarkable example of such a common vernacular architectural feature. The site lacks remains of associated buildings or structures which probably once stood in the vicinity, and there are no substantial or intact subsurface archaeological deposits at the site. No additional formal or required archaeological consideration is recommended for 40RE575 in respect to the proposed undertaking. However, TRC recommends that TVA avoid damage to the standing chimney during the development [Exempted from Disclosure by Statute]. Although not required, such attention to this interesting structural remnant would be in keeping with the general commitment of TVA toward careful stewardship of resources potentially affected by its development activities.

ARCHITECTURAL SURVEY RESULTS

TRC conducted a historical/architectural survey of the project APE on October 4, 2006. The survey revisited the National Register-listed New Bethel Baptist Church and the X-10 Reactor which is situated approximately 0.25-miles and 0.45-miles respectively from the proposed improvements. No previously unrecorded architectural resources were identified within the project APE.

New Bethel Baptist Church

Located on the north side of Bethel Valley Road, the New Bethel Baptist Church is a one-story, gable-front building that was constructed in 1924 (Murphy 1991) (see Figure 1a; Figures 11–18). Organized in 1851, the New Bethel Baptist Church originally served the small Scarboro community until the United States Government acquired the building and much of the surrounding area for the construction of the ORNL in 1942. In all, the government's land acquisition totaled some 56,000 acres for the military reservation, which ultimately led to the demolition of all of the buildings in the Scarboro community except for the church (Johnson 1998; Murphy 1991). Although it is not known precisely why the church was spared from destruction, the property's National Register nomination suggests that the Department of Energy (DOE) valued the building's central location within the reservation as a potential meeting facility during the early development of the ORNL. Moreover, the adjoining cemetery and its significance to the local community were other factors that likely played a role in the preservation of the New Bethel Baptist Church. In fact, the DOE allowed congregation members to return to officially close the church with a dedication ceremony in 1949. This event is memorialized in a granite monument located behind the church (Murphy 1991).

Upon acquiring the property, the DOE utilized the church during World War II as a conference room for scientists assigned to the Manhattan Project. After the church was officially closed in 1949, the building was utilized as a storage facility first by the Clinton

Engineering Laboratory and later by the ORNL. In the early 2000s, the church was converted into an interpretive center, which commemorates the development of ORNL and the life of the people who once resided in the Bethel Valley region (Murphy 1991).

The frame building features a roof covered with standing seam metal, a square bell tower capped with a pyramidal roof; an exterior clad with weatherboard siding and a continuous poured concrete foundation. The facade faces south and reveals a pair of centrally place doors that are accessible via a set of concrete steps. Both the east and west elevations of the main block are pierced by three window openings containing four-over-four, double-hung wood sashes. The north (rear) elevation is adorned by a centrally placed canted bay featuring three four-over-four, double-hung wood sash windows. Two doors flank either side of the canted bay.

A cemetery north of the church contains approximately 250 graves dating between ca. 1860 to present, and includes a wide assortment of monument styles including two frame grave houses. The presence of the grave houses is rare to the region and represents unusual examples of mortuary folk architecture. The cemetery also includes a large stone monument that commemorates the church and its congregation (Murphy 1991).

NRHP Assessment: The New Bethel Baptist Church was listed on the NRHP in 1992 under Criterion A for its role in the social history of Oak Ridge and the Scarboro community during the early twentieth century. As a place of worship and for the mortuary folk art exhibited by the grave houses, the church and adjoining cemetery are also listed under Criterion Consideration A for their architectural and historical significance. According to the NRHP nomination form (Murphy 1991), the church was also listed on the NRHP for its association with the Manhattan Project during World War II and the subsequent creation of the Oak Ridge National Laboratory, which extended the resource's period of significance to 1949. As a result, the church was listed under Criterion Consideration G to cover the period that fell under the fifty-year rule established by the NRHP. As a commemorative design, the 1949 dedication monument was listed on the NRHP in 1991, along with the church, under Criterion Consideration F.

The church remains virtually unaltered since it was listed on the NRHP in 1991. The only visible alterations include the replacement of the façade doors with a pair of architecturally compatible wood paneled doors and the installation of wood ramps that are attached to the rear doors. These alterations are minimally invasive and do not detract from the overall architectural character of the church. As a result, it is the opinion of TRC that the New Bethel Baptist Church retains sufficient integrity to remain listed on the NRHP for its historical and architectural significance. The NRHP boundary for the New Bethel Baptist Church includes the church; the cemetery, the two grave houses, and the commemorative monument, which rest on a 1.5-acre parcel (see Figure 18).

Assessment of Effects: The New Bethel Baptist Church is located along the north side of Bethel Valley Road, approximately 0.25-miles south of the proposed TL corridor. The proposed TVA undertaking, including ROW clearing, construction of new TL towers, poles, and access roads, will not destroy, damage, or physically alter any part of the New Bethel Baptist Church property, nor will it remove or isolate the property from its historic

location. The proposed transmission line corridor will not alter the character of the property or its setting. Lastly, the viewshed between the church and the project area will be largely screened by the series of ridges that form Bethel Valley (see Figures 15 and 17). For these reasons, it is the opinion of TRC that the proposed transmission line corridor will have no effect on the historic property. No additional cultural resources consideration is recommended for this property in regard to the proposed TVA undertaking.

Figure 11. New Bethel Baptist Church; view is northwest and features the facade and east elevation.

Figure 12. New Bethel Baptist Church; view is southeast and features the north (rear) and west elevations.

Figure 13. New Bethel Baptist Church; view is northeast and features the facade and west elevation (Murphy 1991).

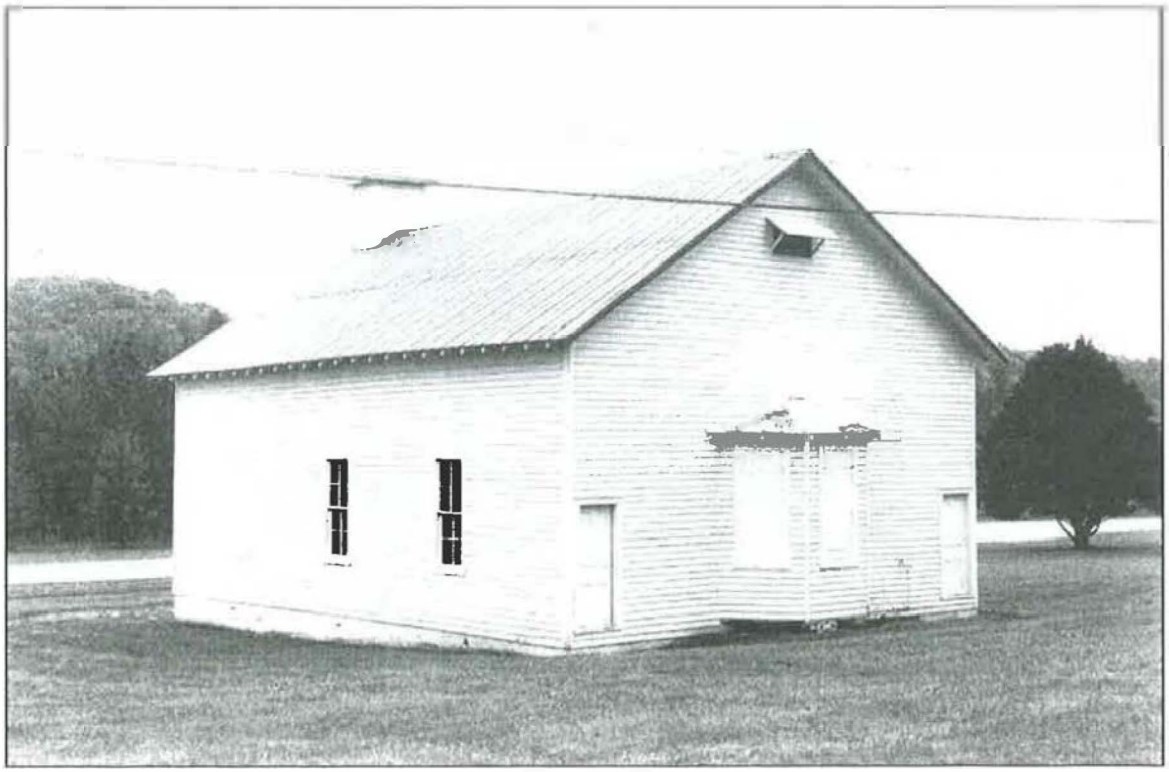

Figure 14. New Bethel Baptist Church; view is southwest and features the north (rear) and east elevation (Murphy 1991).

Figure 15. New Bethel Baptist Church; view is north toward project area and features the cemetery.

Figure 16. New Bethel Church view is southwest and features modern buildings associated with the Oak Ridge National Laboratory.

Figure 17. New Bethel Church view is northwest toward project area and features the 1949 dedication monument.

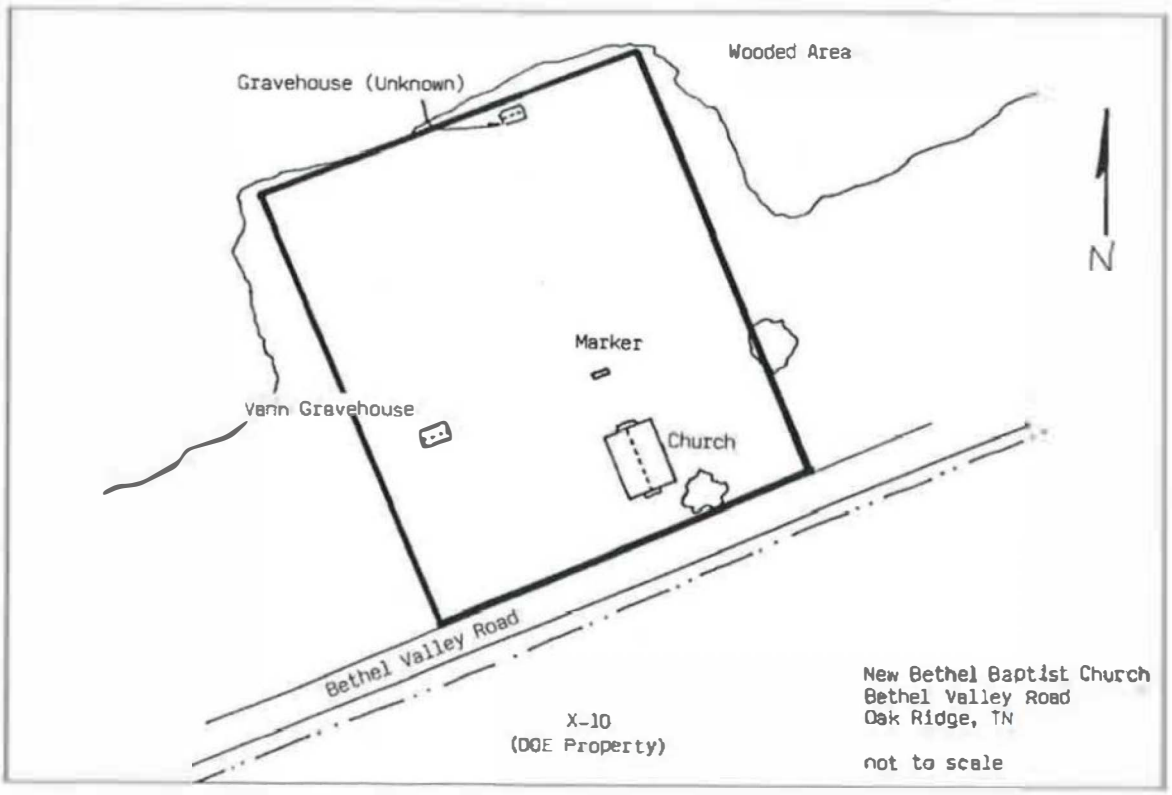

Figure 18. New Bethel Baptist Church; NRHP boundary (Murphy 1991).

X-10 Reactor (Graphite Reactor)

Located in Building 3001 of the ORNL, the X-10 Reactor measures 38-feet wide, 47-feet deep and 32-feet high and features a centrally placed moderator consisting of graphite blocks four inches square and four feet long that are stacked to form a 24-foot cube. The moderator served to slow the speed of neutrons during the fissioning process in which atoms were split. Enveloped in a seven-foot-thick casing of Barytes concrete, the moderator includes an air inlet and exit manifold respectively located on its east and west sides. The reactor face measures 30 by 33-feet and features 1,248 diamond shaped fuel channels that were designed to receive gas-tight, cylindrical aluminum jackets or slugs containing uranium, which fueled the reactor (Retting 1975) (see Figure 1a; Figures 19–22).

The development of ORNL traces its roots to the 1940s, World War II, and the beginnings of the nuclear arms race. By May of 1941, the Manhattan Project to develop and harness nuclear energy had become a national priority. Over the next two years, the U.S. Army Corps of Engineers (COE) acquired the Oak Ridge Reservation, consisting of 56,000-acres of land between the Clinch River and Black Oak Ridge, in order to construct a top-secret installation for production of plutonium to be used in the United States' first nuclear weapons (Johnson 1998). Construction began in February of 1943 at ORNL, originally known as "Clinton Laboratories."' According to a history published by ORNL (2000), the initial construction boom was nothing short of spectacular. Within the town of Oak Ridge, a house was being constructed every 30 minutes. The city bus system was the nation's sixth largest, and electricity consumption would be 20 percent greater than New York City's.

The heart of ORNL (originally known as the X-10 site) was an experimental graphite reactor that had been constructed in just nine months. The reactor went online in November of 1943, and by March of 1944 had produced its first plutonium sample (ORNL 2000). The materials produced at ORNL would be used to supply research and development at the experimental cyclotron and labs of the University of California, the University of Chicago, Los Alamos, New Mexico, and the Hanford, Washington production plant (Johnson 1998).

In 1948 the X-10 site was officially designated the Oak Ridge National Laboratory. Following the war, the facility was managed successively by the University of Chicago, Monsanto Chemical, Union Carbide, and Lockheed Martin under contract to the Atomic Energy Commission (1947-74), the Energy Research and Development Administration (1975-77), and the Department of Energy (1977-present) (Johnson 1998). During the 1950s, ORNL focused on developing new types of atomic reactors and training nuclear scientists and engineers. Fourteen types of nuclear reactor were designed at ORNL during this period (Johnson 1998; ORNL 2000). ORNL also contributed to the design of aero and naval propulsion, commercial, and liquid metal breeder reactors.

By the late 1960s, enthusiasm for nuclear and atomic energy had waned significantly. Research at ORNL was expanded to include fusion, fossil, and renewable energy sources

along with high-energy physics, environmental, biological, robotics, advanced materials, and allied sciences of national significance (Johnson 1998). During the 1990s ORNL became involved in Department of Energy efforts to clean up toxic and radioactive wastes at both its own facilities and throughout the world. Groundwater at the facility had been severely contaminated by leaking pipes. Storage tanks had to be emptied and decontaminated, while leaking chemical drains had to be repaired and replaced. It was initially estimated that cleaning up the ORNL facility would take as much as three decades and hundreds of millions of dollars (ORNL 2000). In 1963, the Graphite Reactor at ORNL was shut down and later opened to the public during the 1980s as an educational exhibit. It is the world's oldest surviving nuclear reactor (Johnson 1998; NRHP 2005).

NRHP Assessment: The X-10 Reactor was listed on the NRHP in 1966 under Criterion A as the world's first full-scale nuclear reactor and the first to produce a significant amount of plutonium. In 1975, the X-10 Reactor achieved National Historic Landmark designation for its significance in science and technology. During TRC's survey of the X-10 Reactor, access and photographs were limited to the exterior east elevation of Building 3001 due to security concerns. According to ORNL personal, the X-10 Reactor is still located within the building and has not been altered since it achieved NHL status in 1975. As a result, it is the opinion of TRC that the X-10 Reactor retains sufficient integrity to remain listed on the NRHP for its historical significance in development of nuclear power. The NRHP boundary for the X-10 Reactor is limited to the foot print of Building 3001 (see Figure 22).

Assessment of Effects: The X-10 Reactor is located south of Bethel Valley Road within the ORNL complex, approximately 0.45-miles south of the proposed TL corridor. The proposed TVA undertaking, including ROW clearing, construction of new TL towers, poles, and access roads, will not destroy, damage, or physically alter any part of the X-10 Reactor. The proposed transmission line corridor will not alter the character of the property or its setting. Lastly, the viewshed between the X-10 Reactor and the project area will be largely screened by the series of ridges that form Bethel Valley (see Figure 20). For these reasons, it is the opinion of TRC that the proposed transmission line corridor will have no effect on the X-10 Reactor. No additional cultural resources consideration is recommended for this property in regard to the proposed TVA undertaking.

Figure 19. Building 3001; view is west and features the east elevation.

Figure 20. Building 3001; view is north toward the project area.

Figure 21. X-10 Reactor ca. 1949 (Rettig 1975).

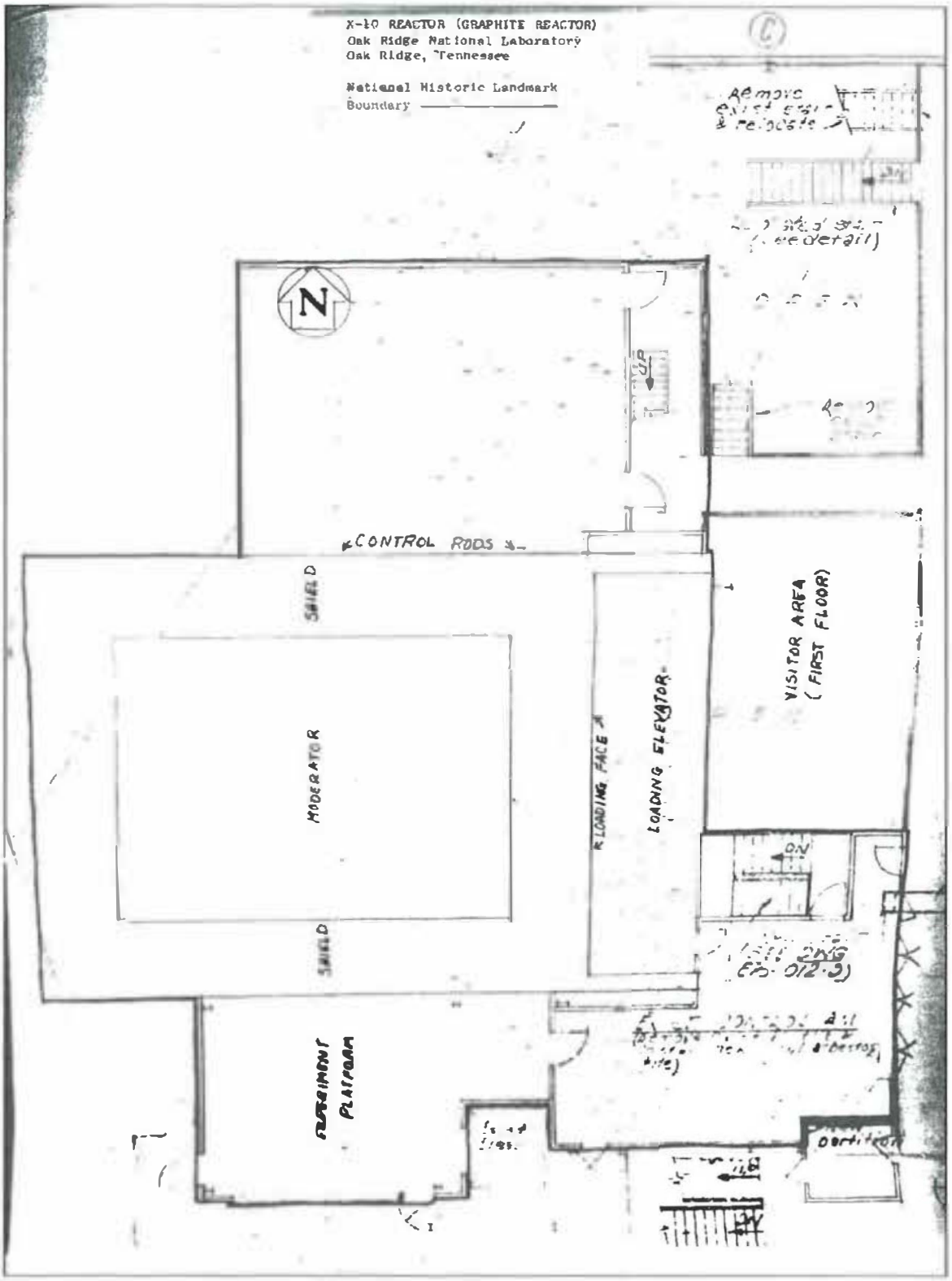

Figure 22. X-10 Reactor; NRHP boundary (Rettig 1975).

VI. SUMMARY AND RECOMMENDATIONS

The TVA plans to construct a new Kingston-ORNL 161-kV transmission line, which will employ single steel pole structures and require a 3.22 km (2-mile) ROW. In addition, project plans call for the replacement of 24 existing TL structures with single pole steel structures on transmission lines associated with properties at the ORNL in Anderson and Roane Counties, Tennessee. The project will also require the development of numerous construction and maintenance access road segments along the project corridor. In September and October of 2006, TRC conducted a Phase I cultural resources investigation designed to document and assess archaeological and architectural resources located within the APE of the planned improvements (Figure 1).

Archaeologically, the APE consists of the new 3.22 km (2-mile) TL, the area immediately adjacent to the 24 transmission line structures to be replaced, and a series of associated access roads. The ROW for the new TL route will be 45.72 m (150 feet).The APE for architectural studies includes a 0.8-km (0.5-mile) area surrounding the proposed improvements, as well as any areas where the project will alter existing topography or vegetation in view of a historic resource. This project was conducted under contract to TVA and performed in compliance with Section 106 of the National Historic Preservation Act (as amended) and its implementing regulations at 36 CFR 800 (CFR 2003).

A TRC field crew under the direction of Larry McKee conducted archaeological investigations of the APE on September 19, 2006. Shovel testing within the various segments of the APE found mostly disturbed soils associated with plowing, erosion, and prior road and transmission line construction. No previously recorded or newly discovered archaeological sites are present within the APE. The TRC crew did record one archaeological site, 40RE575,[Exempted from Disclosure by Statute] The site is a late nineteenth/early twentieth century house site featuring a remnant of a stacked stone chimney. TRC recommends that as a whole this house site lacks integrity or further research potential, and is not eligible for inclusion in the NRHP. No additional archaeological consideration is recommended in respect to the proposed undertaking.

TRC Preservation Planner Ted Karpynec conducted a historical/architectural survey of the project APE on October 4, 2006, in order to identify any properties over 50 years in age that might be eligible for listing on the NRHP, as well as those historic properties eligible for registration with the THC. The survey confirmed that no previously unrecorded architectural resources are situated within the project APE.

One previously surveyed architectural property, the New Bethel Church, is located on the north side of Bethel Valley Road approximately 0.25-miles south of the proposed transmission line corridor (see Figure 1). The church was listed on the NRHP in 1992 as part of the Oak Ridge Multiple Property Submission. The building retains its architectural integrity. Views to the project corridor will be largely obstructed by the series of ridges that form Bethel Valley. TRC recommends that the proposed undertaking will not have any adverse impact on the Bethel Church.

An additional National Register-listed property, the X-10 Reactor, is located within the ORNL complex approximately 0.45-miles south of the proposed transmission line corridor. Originally listed on the NRHP in 1966, the X-10 Reactor was elevated as a National Historic Landmark in 1975 as the world's first full-scale nuclear reactor. Views to the project corridor will be largely obstructed by the series of ridges that form Bethel Valley. TRC recommends that the proposed undertaking will not have any adverse impact on the X-10 Reactor.

No additional architectural resources are located within the project APE, and no further architectural consideration is recommended in respect to the proposed undertaking.

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