# APPENDIX E

# AGENCIES CONTACTED

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**Department of Energy**

Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831—

June 2, 1999

Mr. Reginald Reeves, Director
Division of Natural Heritage
State of Tennessee
Department of Environment and Conservation
401 Church Street
Nashville, Tennessee 37243-0443

Dear Mr. Reeves:

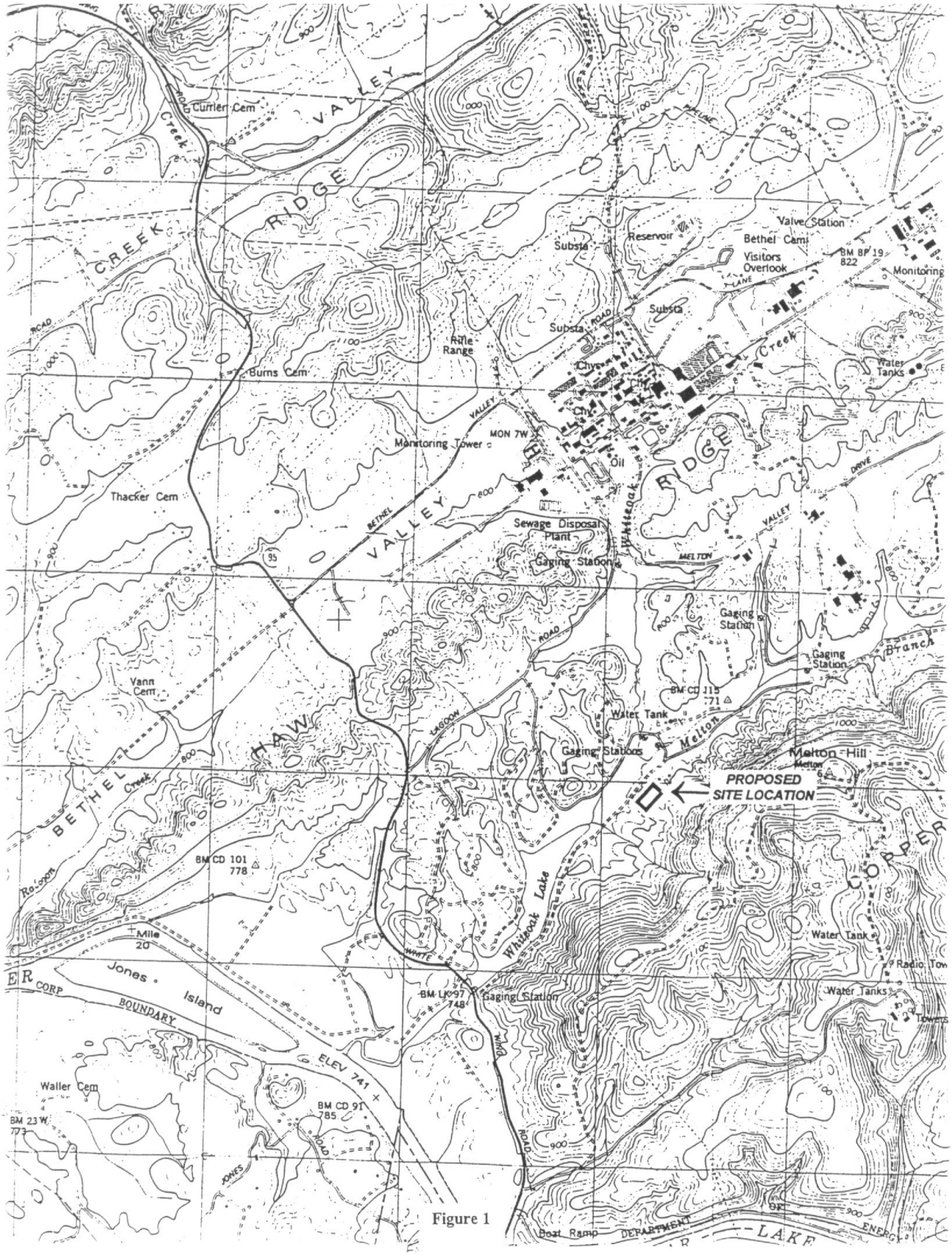
**INFORMAL CONSULTATION UNDER THE ENDANGERED SPECIES ACT FOR THE PROPOSED TRANSURANIC WASTE TREATMENT PROJECT AT THE OAK RIDGE RESERVATION, OAK RIDGE, TENNESSEE**

The United States Department of Energy (DOE) needs to ensure the safe and efficient retrieval, processing, certification, and disposition of legacy transuranic (TRU) waste at Oak Ridge National Laboratory (ORNL). The regional location of ORNL is shown in Figure 1. Waste retrieval operations are currently underway to prepare ORNL TRU waste for processing.

Under the proposed action, a waste treatment facility for the ORNL legacy TRU waste would be constructed, operated for approximately six years, and decontaminated/decommissioned under a contract awarded to the Foster Wheeler Environmental Corporation. DOE would lease the Melton Valley Storage Tanks and adjacent land area totaling approximately 10 acres for construction of the facility. The proposed 37,000 square foot treatment facility would be located within an approximate 5 acre plot of land, fenced, and have controlled access to Tennessee State Highway 95 located 1.25 miles away. The first shipment of treated waste to the Waste Isolation Pilot Plant (WIPP) facility for disposal would be expected in 2003. The proposed construction area is shown in Figure 2.

The area can currently be described as second growth forest that consists of mixed hardwoods and pine plantations. This area is small in comparison to the almost 3,600 acres that comprise ORNL. In a 1988 survey of the surrounding area, executed for a formerly proposed treatment facility, no federally or State listed or candidate plant or animal species were observed adjacent to this site. Two species listed by the State of Tennessee as in need of management, the red-shouldered hawk and black vulture, may occur at the site but have not been documented as nesting there. Field surveys are currently ongoing at the proposed project site for both protected/rare plant and animal species. No rare plant species or federally protected animal species have been identified, although the animal survey has not yet been completed.

This letter is intended to serve as informal consultation under the Endangered Species Act. In this regard, DOE requests an updated list of protected species and habitat on or near the project site and solicits your recommendations and comments about the potential effects of this proposed action. Your input will be used in the preparation of an environmental impact statement for this action pursuant to the National Environmental Policy Act.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Burns Cem
Water Tanks
Monitoring Tower
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Thacker Cem
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Vann Cem
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CORP BOUNDARY
Whitlock Lake
Water Tank
Radio Tow
Water Tanks
Towers
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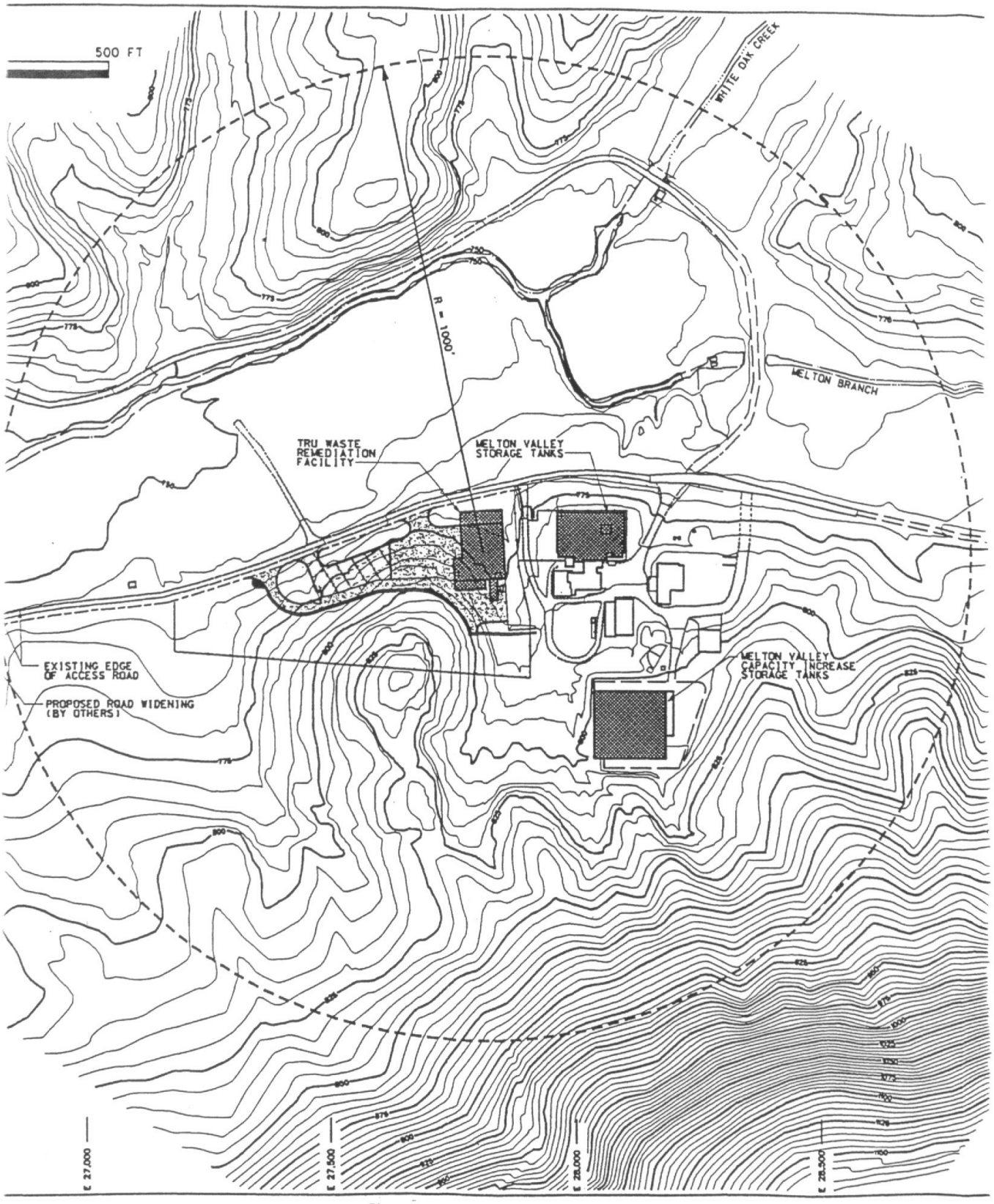
Gaging Station
ELEV 741
Waller Cem
BM CD 91 785
BM 23 W 773
Boat Ramp
LAKE

Figure 1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TRU WASTE
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(BY OTHERS)
MELTON VALLEY
CAPACITY INCREASE
STORAGE TANKS
E 27,000
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**Figure 2**

If you need further information on this request, please do not hesitate to call me at (423) 576-0938.

Sincerely,

James L. Elmore, Ph.D.
Alternate NEPA Compliance Officer

Enclosures

cc:
Gary L. Riner, EM-92
Wayne Tolbert, SAIC

**Department of Energy**

Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831—

June 2, 1999

Dr. Lee Barclay
U.S. Fish and Wildlife Service
446 Neal Street
Cookeville, Tennessee 37501

Dear Dr. Barclay:

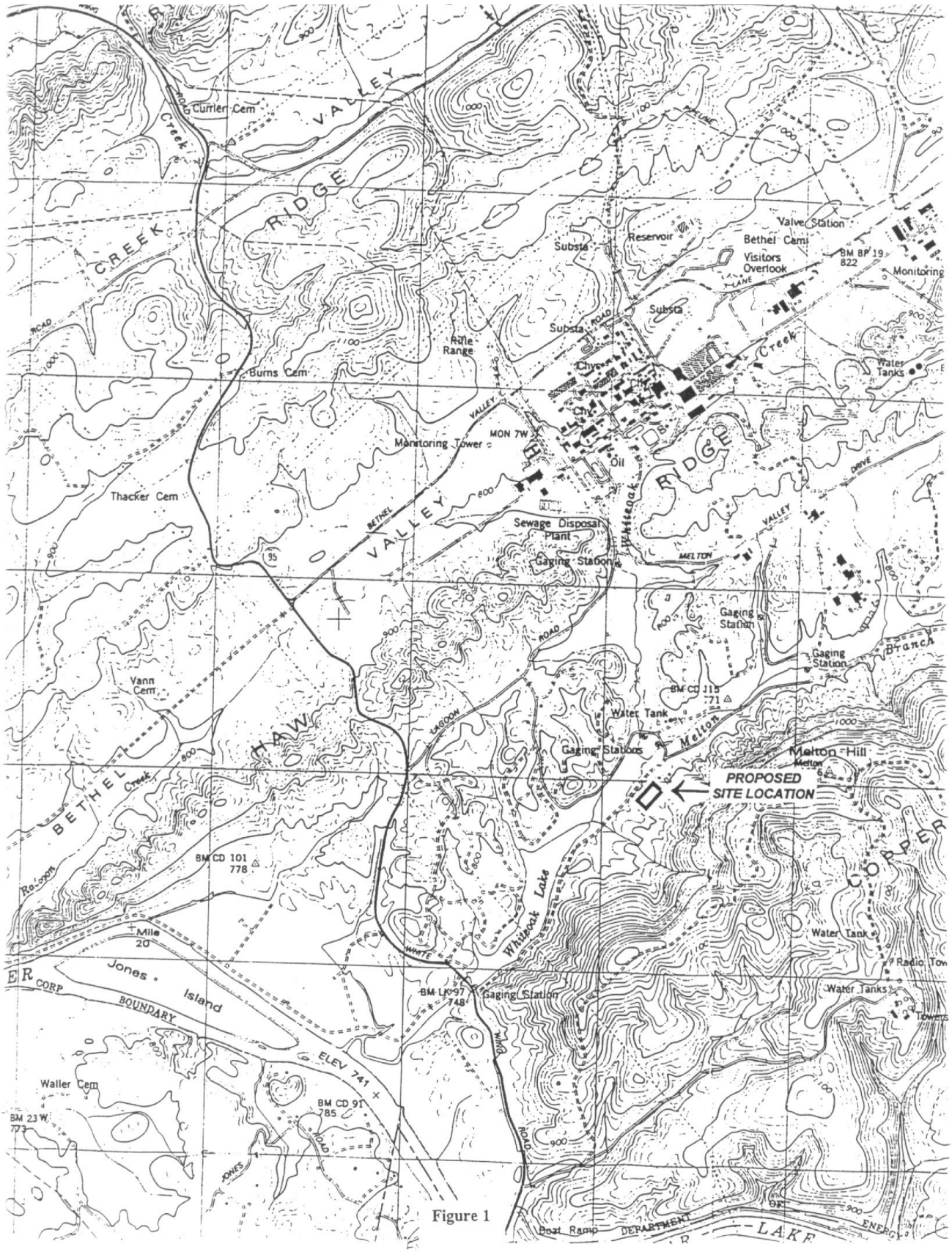
**INFORMAL CONSULTATION UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT FOR THE PROPOSED TRANSURANIC WASTE TREATMENT PROJECT AT THE OAK RIDGE RESERVATION, OAK RIDGE, TENNESSEE**

The United States Department of Energy (DOE) needs to ensure the safe and efficient retrieval, processing, certification, and disposition of legacy transuranic (TRU) waste at Oak Ridge National Laboratory (ORNL). The regional location of ORNL is shown in Figure 1. Waste retrieval operations are currently underway to prepare ORNL TRU waste for processing.

Under the proposed action, a waste treatment facility for the ORNL legacy TRU waste would be constructed, operated for approximately six years, and decontaminated/decommissioned under a contract awarded to the Foster Wheeler Environmental Corporation. DOE would lease the Melton Valley Storage Tanks and adjacent land area totaling approximately 10 acres for construction of the facility. The proposed 37,000 square foot treatment facility would be located within an approximate 5 acre plot of land, fenced, and have controlled access to Tennessee State Highway 95 located 1.25 miles away. The first shipment of treated waste to the Waste Isolation Pilot Plant (WIPP) facility for disposal would be expected in 2003. The proposed construction area is shown in Figure 2.

The area can currently be described as second growth forest that consists of mixed hardwoods and pine plantations. This area is small in comparison to the almost 3,600 acres that comprise ORNL. In a 1988 survey of the surrounding area, executed for a formerly proposed treatment facility, no federally or State listed or candidate plant or animal species were observed adjacent to this site. Two species listed by the State of Tennessee as in need of management, the red-shouldered hawk and black vulture, may occur at the site but have not been documented as nesting there. Field surveys are currently ongoing at the proposed project site for both protected/rare plant and animal species. No rare plant species or federally protected animal species have been identified, although the animal survey has not yet been completed.

This letter is intended to serve as informal consultation under Section 7 of the Endangered Species Act. In this regard, DOE requests an updated list of protected species and habitat on or near the project site and solicits your recommendations and comments about the potential effects of this proposed action. Your input will be used in the preparation of an environmental impact statement for this action pursuant to the National Environmental Policy Act.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Substa
Rifle Range
Burns Cem
Water Tanks
Creek
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Monitoring Tower
Oil
RIDGE
Thacker Cem
BETHEL
VALLEY
Sewage Disposal Plant
Gaging Station
Whiteoak
MELTON
VALLEY
DRIVE
Gaging Station
Gaging Station
Branch
Vann Cem
BM CD 115
771
Water Tank
Melton
Gaging Stations
Melton Hill
PROPOSED SITE LOCATION
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BETHEL
Creek
BM CD 101
778
Whiteoak Lake
COPPER
Mile 20
Water Tank
Radio Tow
Jones Island
CORP BOUNDARY
BM LK 97
748
Gaging Station
Water Tanks
Towers
ELEV 741
Waller Cem
BM CD 91
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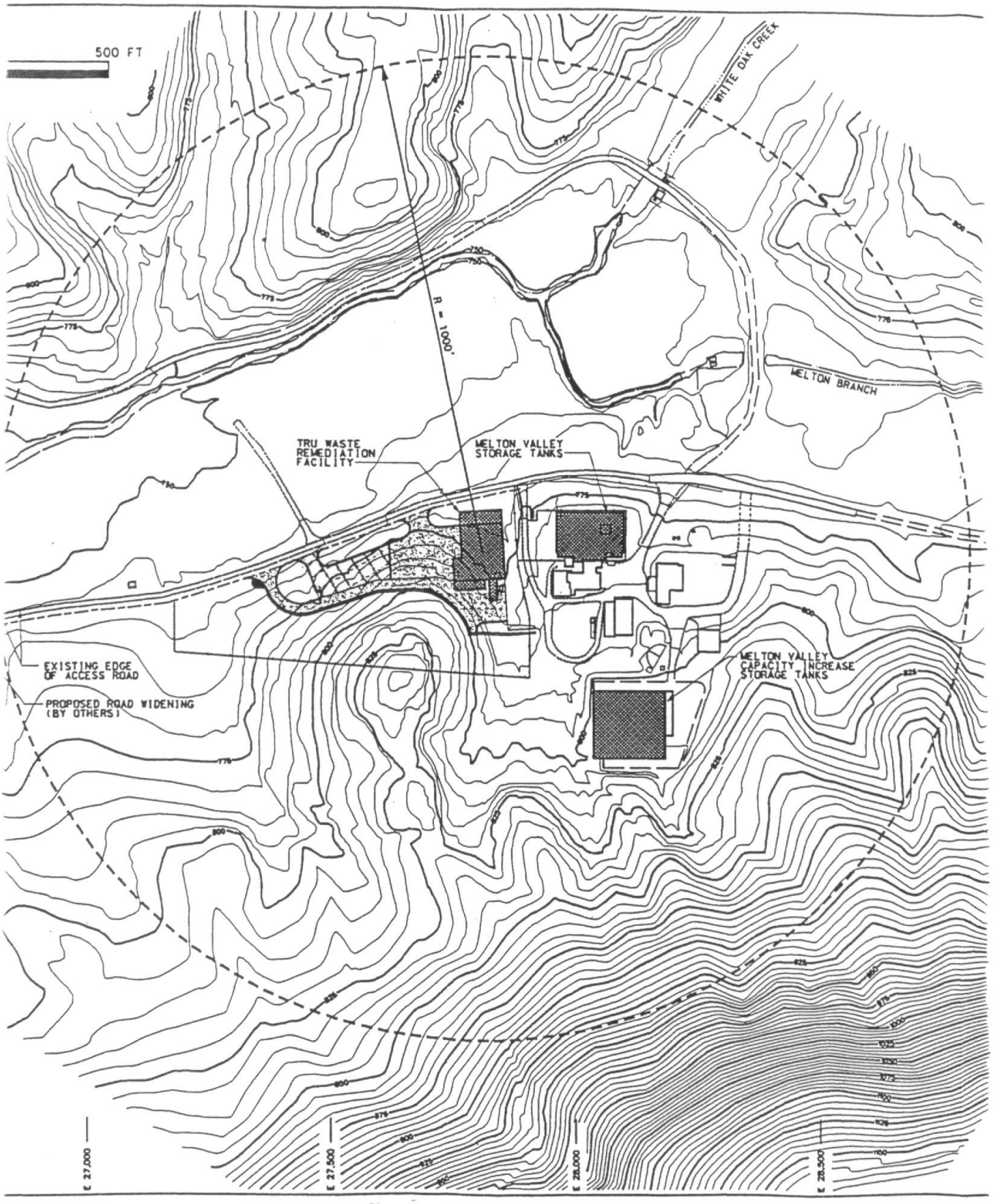
BM 23 W
773
Boat Ramp
DEPARTMENT
LAKE
ENERGY

Figure 1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MELTON BRANCH
TRU WASTE
REMEDIATION
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(BY OTHERS)
MELTON VALLEY
CAPACITY INCREASE
STORAGE TANKS
E 27,000
E 27,500
E 28,000
E 28,500

**Figure 2**

If you need further information on this request, please do not hesitate to call me at (423) 576-0938.

Sincerely,

James L. Elmore

James L. Elmore, Ph.D.
Alternate NEPA Compliance Officer

Enclosures

cc:
Gary Riner, EM-92
Wayne Tolbert, SAIC

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

July 8, 1999

Mr. James L. Elmore, Ph.D.
U.S. Department of Energy
Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831

Dear Dr. Elmore:

Thank you for your letter and enclosures of June 2, 1999, regarding the preparation of an Environmental Impact Statement (EIS) for the construction of a transuranic legacy waste treatment facility at the Oak Ridge Reservation in Roane County, Tennessee. U.S. Fish and Wildlife Service (Service) personnel have reviewed the information submitted and offer the following comments for consideration.

According to our records, the following federally listed endangered species are known to occur near the potential project impact area:

| | |
|---|---|
| gray bat | (*Myotis grisescens*) |
| pink mucket pearlymussel | (*Lampsilis abrupta*) |

Qualified biologists should assess potential impacts and determine if the proposed project may affect the species. We recommend that you submit a copy of your assessment and finding to this office for review and concurrence. A finding of "may affect" could require the initiation of formal consultation procedures.

These constitute the comments of the U.S. Department of the Interior in accordance with provisions of the Endangered Species Act (87 Stat. 884, as amended: 16 U.S.C. 1531 et seq.). We appreciate the opportunity to comment. Should you have any questions or need further assistance, please contact Steve Alexander of my staff at 931/528-6481, ext. 210.

Sincerely,

Timothy B. Merrit

for Lee A. Barclay, Ph.D.
Field Supervisor

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Log No. C 0902
Date Received JUL 12 1999
File Code

**Department of Energy**

Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831—

June 28, 1999

Mr. Joseph Garrison
Tennessee Historical Commission
Department of Environment and Conservation
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. Garrison:

**NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 COMPLIANCE, TRANSURANIC WASTE TREATMENT FACILITY, OAK RIDGE NATIONAL LABORATORY, OAK RIDGE TENNESSEE**

Enclosed is a Project Summary for the proposed construction, operation, and decontamination/decommission of a Transuranic (TRU) Waste Treatment Facility, Roane County, Tennessee. The Department of Energy Oak Ridge Operations (DOE ORO) has determined that the proposed project would have no affect on historical, archeological, or cultural resources included or eligible for inclusion in the National Register of Historic Places (National Register). This determination is included with the Project Summary. The proposed project is addressed in the *Programmatic Agreement Among The Department Of Energy Oak Ridge Operations Office The Tennessee State Historic Preservation Officer And The Advisory Council On Historic Preservation Concerning The Management Of Historical And Cultural Properties At The Oak Ridge Reservation (PA) at Section III.D.1.*

DOE ORO requests documentation of your concurrence with DOE ORO's determination for this proposed project. If you have questions or need additional information related to this proposed project please call me at (423) 576-9574.

Sincerely,

Ray T. Moore

Ray T. Moore
DOE ORO Cultural Resources
Management Coordinator

Enclosure

cc w/enclosure:
E.C. Document Center, Y-12, Bldg. 9734, MS-8130

cc w/o enclosure:
See Page 2

cc w/o enclosure:
Gary Riner, EM-91
Mark Belvin, ER-1b, ORNL Site Office
James Hall, LMER, Bldg. 6026, MS-6395
Sheila Thornton, Bechtel Jacobs, Bldg. K-1550-E, MS 7235
Jennifer Webb, LMES, Bldg. 9115, MS 8219, Y-12
Mick Wiest, LMES, Bldg. 9116, MS 8098, Y-12
Jack Newman, Bechtel Jacobs, 55 Jefferson, Room 117, MS 7604
Wayne Tolbert, SAIC, 800 Oak Ridge Turnpike, Oak Ridge, TN 37831

United States Government **Department of Energy**

Oak Ridge Operations Office

# memorandum

DATE: July 21, 1999

REPLY TO ATTN OF: SE-32:Moore

SUBJECT: **NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 COMPLIANCE, TRANSURANIC WASTE TREATMENT FACILITY, OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE**

TO: Gary L. Riner, Program Manager, Transuranic Waste Treatment Facility, EM-921

Attached is a letter from the Tennessee State Historic Preservation Officer (SHPO) that concurs with the Department of Energy Oak Ridge Operations (DOE ORO) determination that the proposed construction, operation, and decontamination/decommission of a Transuranic (TRU) Waste Treatment Facility, Roane County, Tennessee, would have no adverse affect to properties included or eligible for inclusion in the National Register of Historic Places. With the SHPO's determination, DOE ORO has complied with Section 106 of the National Historic Preservation Act for this proposed project.

If you have questions or need additional information please call me at (423) 576-9574.

Ray T. Moore

Ray T. Moore
DOE ORO Cultural Resources
Management Coordinator

Attachment

cc w/attachment:
E.C. Document Center, Y-12, Bldg. 9734, MS-8130

cc w/o attachments:
Mark Belvin, ER-11, ORNL Site Office
James Hall, LMER, Bldg. 6026, MS-6395
Sheila Thornton, Bechtel Jacobs, Bldg. K-1550-E, MS 7235
Jennifer Webb, LMES, Bldg. 9115, MS 8219, Y-12
Mick Wiest, LMES, Bldg. 9116, MS 8098, Y-12
Wayne Tolbert, SAIC, 800 Oak Ridge Turnpike, Oak Ridge, TN 37831
Jack Newman, Bechtel Jacobs, 55 Jefferson, Room 117, MS 7604

**TENNESSEE HISTORICAL COMMISSION**
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

July 2, 1999

Mr. Ray T. Moore
USDOE/Oak Ridge Operations
Post Office Box 2001
Oak Ridge, Tennessee 37831-8739

RE: DOE, TRANSURANIC WASTE TREATMENT FAC., OAK RIDGE, ROANE COUNTY

Dear Mr. Moore:

Pursuant to your request received by this office on Wednesday, June 30, 1999, this office has reviewed documentation concerning the above-referenced undertaking. This review is a requirement of Section 106 of the National Historic Preservation Act for compliance by the participating federal agency or applicant for federal assistance. Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (RIN3010-AA04: June 17, 1999), and an Agreement Document.

Considering available information, we find that the project as currently proposed will not adversely affect any property that is eligible for listing in the National Register of Historic Places. Therefore, this office has no objection to the implementation of this project.. Please direct questions and comments to Joe Garrison (615)532-1559. We appreciate your cooperation.

Sincerely,

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer

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AMESQ
Log No. C 0884
Date Received JUL 07 1999
File Code 2182.2

HLH/jyg

**Department of Energy**

Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831—

Dr. Lee A. Barclay, Ph.D.
Field Supervisor
Fish and Wildlife Service
446 Neal Street
Cookeville, Tennessee 38501

Dear Dr. Barclay:

**ADDITIONAL INFORMAL CONSULTATION UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT FOR THE PROPOSED TRANSURANIC WASTE TREATMENT PROJECT AT THE OAK RIDGE RESERVATION, OAK RIDGE, TENNESSEE**

Thank you for your prompt reply to my letter dated June 2, 1999 concerning the proposed transuranic waste treatment project. As you requested, the Department of Energy (DOE) has prepared a Biological Assessment (BA) of the two federally listed species identified in your July 8, 1999 letter. Furthermore, one additional species mentioned in comments from the U.S. Department of the Interior (DOI), dated April 11, 2000 on the Draft Environmental Impact Statement (DEIS) was included in the BA.

The enclosed BA is submitted for your review and concurrence. Based on the BA, DOE has determined that the proposed project would not adversely affect any of the listed species during either the construction or operation activities. DOE will ensure that any potentially occurring Indiana bats are protected by not performing tree clearing during May through September when the bats are using their summer roosts. Results of the BA will be summarized in the text of the Final Environmental Impact Statement (FEIS) for the project and the BA will be appended to the FEIS.

Following your review of the BA, please check the appropriate concurrence block and sign below. Please fax your concurrence to me at (865)576-0746 as soon as possible, so that we may expeditiously complete the FEIS. If you need further information or wish to discuss the BA, please call me at (865)576-0938. Thank you in advance for your prompt reply.

Sincerely,

James L. Elmore

James L. Elmore, Ph.D.
Alternate NEPA Compliance Officer

☐ This Biological Assessment supports the conclusion that the proposed construction and operation of the transuranic waste treatment facility would not adversely impact federally listed protected species and/or habitat. With this BA, DOE has satisfied consultation requirements of Section 7 of the Endangered Species Act.

☐ This Biological Assessment does not support the conclusion that the proposed construction and operation of the transuranic waste treatment facility would not adversely impact federally listed protected species and/or habitat. DOE has not satisfied consultation requirements of Section 7 of the Endangered Species Act.

Signature Date

Enclosure

cc:
Bill Cahill, EM-92
Wayne Tolbert, SAIC
Warren Webb, Bldg. 1505, MS-6036

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**Endangered Species Act**

# BIOLOGICAL ASSESSMENT

## Treating Transuranic (TRU)/Alpha Low-level Waste at the

## Oak Ridge National Laboratory,

## Oak Ridge, Tennessee

U.S. Department of Energy
Oak Ridge Operations Office
Oak Ridge, Tennessee 37831

May 2000

# BIOLOGICAL ASSESSMENT FOR THREATENED AND ENDANGERED SPECIES UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT FOR THE TREATING TRANSURANIC (TRU)/ALPHA LOW-LEVEL WASTE PROJECT AT THE OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE

## SUMMARY

This biological assessment (BA) assesses potential impacts on three federally listed animal species that could result from the construction and operation of the Transuranic (TRU)/Alpha Low-level Waste Treatment Facility by the U.S. Department of Energy (DOE) on the preferred location in the Melton Valley watershed on the Oak Ridge Reservation (ORR). The species discussed in this BA are those mentioned in a letter from the U.S. Fish and Wildlife Service (FWS) to DOE, dated July 8, 1999 (FWS 1999a), as well as a species mentioned in comments from the U.S. Department of the Interior, dated April 11, 2000, on the *Draft Environmental Impact Statement (DEIS) for Treating Transuranic (TRU)/Alpha Low-Level Waste at the Oak Ridge National Laboratory, Oak Ridge, Tennessee* (DOE 2000). The three species include two endangered mammals (gray bat and Indiana bat) and one endangered mollusk (pink mucket pearly mussel). None of the three species appears likely to be present on the proposed site, and proposed or designated critical habitats for the species are not present on or near the proposed site. However, caves that could provide potential roosting habitat for the gray bat are present within 4 miles of the proposed site. Suitable roosting habitat for the Indiana bat is also present within the vicinity of the proposed project. In addition, the Clinch River, lower White Oak Creek, and White Oak Lake, located adjacent to the proposed site, provide suitable foraging habitat for the gray bat and Indiana bat.

DOE staff conclude, based on the information presented in this BA, that the TRU Waste Treatment Facility is not likely to adversely affect any of the listed species during the construction or operation activities. Because the proposed site contains no proposed or designated critical habitat for the gray bat, Indiana bat, or pink mucket mussel, none would be affected. In addition, any potential adverse impacts to the Indiana bat would be eliminated by not cutting down any trees during the Indiana bat's summer roosting season from May through September. Such actions should prevent the loss of any bats that otherwise might be using the trees for rearing young and should eliminate the need for mist netting or detailed surveys. Although the project would require removal of suitable and potentially suitable roost trees, there are adequate numbers of suitable and potentially suitable roost trees available immediately adjacent to the proposed impact area. Construction activities would also not directly impact any of the potential foraging habitat that exists in the vicinity. Construction would occur only during the day, so any foraging by Indiana bats would not be disrupted. Activities associated with the operation of the proposed facility would also primarily occur during the day and would not disrupt any foraging Indiana bats near the site. DOE requests the concurrence of the FWS with these conclusions.

## INTRODUCTION AND PROJECT DESCRIPTION

DOE proposes to proceed with construction and operation of the TRU Waste Treatment Facility at the preferred location in the Melton Valley watershed on the ORR (Fig. 1). The Preferred Alternative would involve construction of a three-and-one-half-story TRU Waste Treatment Facility on a trapezoid-shaped plot of land containing approximately 2 ha (5 acres). Dimensions of the 2-ha (5-acre) plot include a maximum length of approximately 214 m (703 ft), a maximum width of 114 m (375 ft), and a minimum width of 36 m (118 ft). Stormwater drainage would be directed around the facility by a series of culverts and drainage ditches. Construction of the TRU Waste Treatment Facility and the stormwater drainage ditches and culverts would result in the clearing of trees and other vegetation from much of the 2-ha (5-acre) site. Excavation of approximately 22,937 $m^3$ (30,000 $yd^3$) of soil would also be required during the construction activities. A pre-existing single-lane road that ran from Tennessee State Route 95 to the proposed facility [approximately 2 km (1.25 miles) in length] has already been upgraded to become the main access road. The road upgrade was completed after a categorical exclusion under the National Environmental Policy Act was completed [CX-TRU-98-007, *Construction/Relocation of Access Road at Oak Ridge National Laboratory, Oak Ridge, Tennessee* (DOE 1999)].

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## ECOLOGICAL DESCRIPTION OF THE SITE

Past disturbances within the 2-ha (5-acre) site have shifted the types of terrestrial vegetation cover toward younger woodland compositions, with some sections of the parcel in early successional, herbaceous stages. The site also contains some cleared areas; two small, ephemeral streams; and two small wetlands. This section of the BA briefly describes each of these components. The sources of information summarized in this section include Jacobs and Pounds (1999), Jacobs and Rosensteel (1999), and Jacobs and Schacher (1999).

Woodland habitats are present on the knolls, ridges, and upland portions of the site. The site is at the base of Copper Ridge on the northwest side, with drainages to the east and west of a small side ridge off Copper Ridge. The Nolichucky Shale outcrops in upland areas. There is partial clearing along two of the site boundaries, but most of the site is still vegetated. Trees on the site are generally young.

Virginia pine (*Pinus virginiana*) is dominant in the western slope area, but drop out toward the eastern part of the slope. There are some white pines (*P. strobus*) in the middle section of the slope. Sugar maple (*Acer saccharrum*) and various oaks (*Quercus* sp.) become more common as the pines fade out. On the eastern drainage area, red bud (*Cercis canadensis*), tulip poplar (*Liriodendron tulipifera*), red maple (*Acer rubrum*), and box elder (*Acer negundo*) are dominant. Soft rush (*Juncus effusus*) and two exotics, Japanese honeysuckle (*Lonicera japonica*) and Nepal grass (*Microstegium virmineum*), are common herbaceous vegetation in the eastern drainage. In the upper middle portion of the eastern drainage, deciduous trees (oaks) and pines are common, along with shrubs such as blueberries (*Vaccinium arboreum* and *V. stamineum*), rusty viburnum (*Viburnum rufidulum*), juneberry (*Amelanchier sp*.), and hop hornbeam (*Ostrya virginiana*). There are areas of closed canopy and partially open canopy in the woodland areas. The soil surface is firm and gravelly, with minimal buildup of organic matter. There are no caves or large rock outcrops on the site.

On the western and eastern boundaries of the site, small, ephemeral streams flow down from the wooded uplands toward the access road. The stream channel on the eastern slope is well-defined, with silt, gravel, rootwads, and small rocks. The stream on the western boundary flows from the woodland through a disturbed, slash, and early successional habitat to form a small pool with growths of young black willow (*Salix nigra*) and herbaceous vegetation. Both streams have small wetlands associated with them, which are described below.

A palustrine scrub-shrub wetland (PSS1A/B) exists in the ephemeral stream on the eastern side of the site. The soil is temporarily flooded and saturated, mostly due to an old road-crossing culvert that is on the downstream side of the wetland. The culvert acts to slow and retain stream flow. The dominant vegetation in the wetland includes sweetgum (*Liquidambar styraciflua*), green ash (*Fraxinus pennsylvanica*) saplings, silky dogwood (*Cornus* sp.), sedges (*Carex* sp.), and various herbaceous species. The soil includes fine gravel alluvium and a silt loam with low chroma matrix, mottles, and partially decomposed plant fragments.

A palustrine, saturated, emergent wetland (PEM1B) is located on the ephemeral stream on the western side of the site. The wetland developed in a seep area, but the hydrology is at least partially due to the slowing of stream and groundwater flow by a culvert under the old Melton Valley Road, which forms a small pool. Dominant vegetation identified during a survey in April 1992 included black willow, soft rush, cattails (*Typha latifolia*), fox sedge (*Carex vulpinoidea*), shallow sedge (*C. lurida*), and rice cutgrass (*Leersia oryzoides*).

## ECOLOGICAL DESCRIPTION AND POTENTIAL IMPACTS OF THE PROJECT ON LISTED SPECIES

The general ecology of federally listed species that are known to occur near the site and the expected potential impacts on them from the project are summarized below. Unless otherwise noted, general biological information on the species is derived from the published literature, reports, and Internet resources listed under each species heading.

### Gray Bat (*Myotis grisescens*)

Unless otherwise noted or referenced, the following general biological information on the gray bat is derived from FWS (1991), Harvey (1992), and Kentucky Bat Working Group (KBWG) (2000). The core range of the endangered gray bat encompasses the cave regions of Alabama, northern Arkansas, Kentucky, Missouri, and Tennessee, but a few occur in northwestern Florida, western Georgia, southwestern Kansas, south Indiana, south and southwestern Illinois, northeastern Oklahoma, northeastern Mississippi, western Virginia, and possibly western North Carolina. Gray bats are restricted to caves or cave-like habitats, and few caves meet their specific roost requirements. These restrictions result in about 95% of the populations hibernating in only eight or nine caves. For hibernation, the roost site must have an average temperature of 5.6°C to 11.1°C (42°F to 52°F). Most of the caves used by gray bats for hibernation have deep vertical passages with large rooms that function as cold air traps. Summer caves must be warm, between 13.9°C to 25.0°C (57°F and 77°F), or have small rooms or domes that can trap the body heat of roosting bats. Summer caves are normally located close to rivers or lakes where the bats feed. Gray bats have been known to fly as far as 12 miles or more from their colony to feed.

Gray bats roost, breed, rear young, and hibernate in caves year round. They migrate between summer and winter caves and will use transient or stopover caves along the way. One-way migrating distance between winter and summer caves may vary from as little as 16.09 km (10 miles) to well over 321.8 km (200 miles). Mating occurs as bats return to winter caves in September and October. By November most gray bats are hibernating. Adult females begin to emerge in late March, followed by juveniles and adult males. Females store sperm over the winter and become pregnant the following spring. A few hundred to many thousands of pregnant females congregate to form maternity colonies. Males and nonreproductive females gather in smaller groups to form what are known as bachelor colonies. A single pup is born in late May or early June. The young begin to fly 20 to 25 days after birth. Gray bats primarily feed on flying insects over lakes, rivers, and streams. Aquatic insects, particularly mayflies, make up most of their diet.

Information about the occurrence of gray bats on the ORR is limited. In November 1994, a single, dead gray bat was found in a display cabinet in Building 9204-3 at the Oak Ridge Y-12 Plant. The bat was probably an isolated individual juvenile that became lost, disoriented, and trapped. Mist netting for bats was conducted on the lower East Fork Poplar Creek and its tributaries in May 1992 and again in May–June 1997 (Harvey 1997). The 1997 survey included portions of lower Bear Creek near its confluence with lower East Fork Poplar Creek. The creeks in this area provided good gray bat foraging habitat at the time of the surveys. No gray bats were recorded among the six species captured. More than 20 caves have been identified on the ORR. Seven of the caves (Copper Ridge, Flashlight Heaven, Walker Branch, Big Turtle, Little Turtle, Pinnacle, and Bull Bluff) were surveyed by Mitchell et al. (1996), but no gray bats were found. There is an unverified report of ten gray bats roosting in Little Turtle Cave in September 1996. These bats were observed roosting and were not further disturbed; therefore, a definite, in-the-hand identification was not made (Webb 1996). Examination of photographs taken of the roosting bats indicate that they appeared to be *Myotis* and more than likely were gray bats, but the species could not be positively determined [Major (2000) and Henry (2000)].

Although no caves are present within the area of the proposed project, several caves are located within 6.4 km (4 miles) of the proposed site location and two of the caves are located within 2.4 km (1.5 miles). None of the caves has been completely and systematically surveyed for bats, except for the limited surveys reported in Mitchell et al. (1996) and the 1996 report of *Myotis* roosting in Little Turtle Cave. The caves within the vicinity of the project area may not provide adequate hibernacula for gray bats, but they could provide transient or stopover roosting habitat for migrating gray bats. Suitable foraging habitat for gray bats within the vicinity of the proposed facility includes the Clinch River, lower White Oak Creek, and White Oak Lake. Upper White Oak Creek, the unnamed tributary to White Oak Creek, and Melton Branch are narrow, small streams and are considered suboptimal for frequent foraging for gray bats. No caves would be disturbed during the construction of the proposed facility, and construction activities would also not directly impact any of the potential foraging habitat that exists in the vicinity. Construction would occur only during the day, so any foraging by gray bats would not be disrupted. Activities associated with the operation of the proposed facility would also primarily occur during the day and would not disrupt any gray bats that might forage near the site. In addition, no significant emissions or effluents would be produced by the facility that could directly impact foraging gray bats or indirectly affect aquatic insect fauna on which the gray bats would prey. Thus, the proposed project is unlikely to adversely affect the gray bat or its habitat.

**Pink mucket pearly mussel (*Lampsilis arbrupta* Say-1831; also called *L. orbiculata* Hildreth-1828)**
(http://fwie.fw.vt.edu/WWW/esis/lists/e404009.htm)
(EPA 2000; http://www/epa/gov/espp/arkansas/seviert.htm)

The endangered pink mucket pearly mussel [41 FR 24062; June 14, 1976] is a bivalve aquatic mollusk in the Unionidae family with an elliptical-shaped shell. The species is generally about 10.2 cm (4 in.) long, 6.1 cm (2.4 in.) wide, and 7.6 cm (3 in.) high. The valves are heavy and thick. The species is sexually dimorphic, with both males and females having rounded anterior margins, but males having a pointed posterior margins and females a truncated, expanded posterior to accommodate the gravid condition. Young mussels have a yellow to brown shell that is smooth and glossy with green rays, while older specimens are dull brown. The nacre color varies from white to pink, with the posterior margin iridescent. The early life stage of the mussel, glochidia, is an obligate parasite on the gills or fins of fish, but the required fish host species are unknown. The adult mussels are filter feeders and consume particulate matter that is suspended in the water column. Identifiable stomach contents from mussels invariably include mud, desmids, diatoms, protozoa, and zooplankton. However, studies on the food habits for this species have not been conducted, so its specific food requirements are not known. The species has no known commercial value. The reproductive cycle of the pink mucket is presumed to be similar to that of other freshwater mussels. Males release sperm into the water column, which is then taken up by the females during siphoning and results in the eggs being fertilized. The embryos develop into the glochidia inside the female and are then released into the water column. The glochidia must then attach to a suitable fish host for metamorphosis to the free-living juvenile stage. There is no information on the population biology for this species.

The pink mucket is found in medium to large rivers. It seems to prefer larger rivers with moderate to fast-flowing water, at depths from 0.5 to 8.0 m (1.6 to 26.2 ft). The species has been found in substrates including gravel, cobble, sand, or boulders. Silt clogs the species' siphon, so silty substrates and water columns are not conducive to the species being present. Habitat of the glochidia is initially within the gills of the female, then in the water column, and finally attached to a suitable fish host. Habitat requirements for the juvenile stage are unknown. Any alteration of the life-stage-specific habitats during the pink mucket's lifecycle would likely affect the long-term success of a population. In addition, impoundments and surface water contaminants are known to adversely affect this species and contribute to its decline in numbers.

Currently, the pink mucket is known in 16 rivers and tributaries from 7 states, with the greatest concentrations in the Tennessee (TN, AL) and Cumberland (TN, KY) rivers and in the Osage and Meramec rivers in Missouri. Smaller populations have been found in the Clinch River (TN); Green River (KY); Kwanawha River (WV); Big, Black and Little Black, and Gasconde rivers (MO); and Current and Spring rivers (AR). The FWS indicated that the pink mucket is known to occur near the project area (FWS 1999a). However, pink muckets have not been observed on the proposed site for the TRU Waste Treatment Facility. Furthermore, the aquatic habitat in the bodies of water closest to the proposed facility (Melton Branch, White Oak Creek, and White Oak Lake) is not appropriate to support the pink mucket. Melton Branch is a small stream with low flow. White Oak Creek is somewhat larger, but still relatively small and has slow flow due to the impoundment (White Oak Lake) into which it flows. White Oak Creek and White Oak Lake also receive contaminant inputs from several sources, as described in the Cumulative Impacts section in the DEIS (DOE 2000). White Oak Lake is an impoundment of White Oak Creek. As mentioned above, impoundments and water contaminants are known to be adverse for pink muckets. Therefore, the combination of unsuitable stream sizes, improper habitat (impoundment), and presence of contaminants leads DOE to conclude that the presence of pink mucket pearly mussel on or nearby the proposed TRU Waste Treatment Facility site is extremely unlikely.

**Indiana bat (*Myotis sodalis*)**

Unless otherwise noted or referenced, the following general biological information on the Indiana bat is derived from FWS (1991, 1999b, 1999c, 2000), Harvey (1992), and KBWG (1997, 2000). The Indiana bat is a migratory species found throughout much of the eastern half of the United States from Oklahoma, Iowa, and Wisconsin east to Vermont and south to northwestern Florida. For hibernation, Indiana bats prefer limestone caves with stable temperatures of 3.3°C to 6.1°C (38°F to 43°F) and high relative humidity. As with the gray bat, few caves meet the specific roost requirements of the species. Subsequently, more than 85% of the population hibernates in only nine sites. However, Indiana bats have been found hibernating in a few abandoned mines, a tunnel, and a hydroelectric dam. The bats hibernate from October to April, depending on climatic conditions. Density in tightly packed clusters is usually estimated at 3228 bats per square meter (300 bats per square foot), although as many as 5165 bats per square meter (480 per square foot) have been reported.

Female Indiana bats depart hibernation caves before males and arrive at summer maternity roosts in mid-May. A single offspring is born between late June and early July. The young bats can fly within a month of birth. Early researchers considered floodplain and riparian forest to be the primary roosting and foraging habitats used during the summer by the Indiana bat, and these forest types unquestionably are important. More recently, upland forest has been shown to be used by Indiana bats for roosting. Within the range of the species, the existence of Indiana bats in a particular area may be governed by the availability of natural roost structures, primarily standing dead trees with loose bark. The suitability of any tree as a roost site is determined by (1) its condition (dead or alive), (2) the quantity of loose bark, (3) the tree's solar exposure and location in relation to other trees, and (4) the tree's spatial relationship to water sources and foraging areas. The most important characteristic of roost trees is probably not species but structure (i.e., exfoliating bark with space for bats to roost between the bark and the bole of the tree). To a limited extent, tree cavities and crevices are also used for roosting. Maternity colonies use multiple primary roost trees, which are used by a majority of the bats most of the summer, and a number of "secondary" roosts, which are used intermittently and by fewer bats, especially during periods of precipitation or extreme temperatures. The summer roost of adult males is often near maternity roosts, but where most spend the day is unknown. Others remain near the hibernaculum, and a few males are found in other caves during summer. Researchers have found that primary roosts are generally in openings or at the edge of forest stands, while alternate roosts can be either in the open or in the interior of the forest stands. Indiana bats use roosts in the spring and fall similar to those selected during the summer. During

the fall, when Indiana bats swarm and mate at their hibernacula, male bats roost in trees nearby during the day and fly to the cave during the night.

Indiana bats forage in and around the tree canopy of floodplain, riparian, and upland forest. In riparian areas, Indiana bats primarily forage around and near riparian and floodplain trees (e.g., sycamore, cottonwood, black walnut, black willow, and oaks), and solitary trees and forest edge on the floodplain. Streams, associated floodplain forests, and impounded bodies of water (e.g., ponds, wetlands, and reservoirs) are preferred foraging habitat for pregnant and lactating Indiana bats, some of which may fly up to 1.5 miles from upland roosts. Indiana bats also forage within the canopy of upland forests, over clearings with early successional vegetation (e.g., old fields), along the borders of croplands, along wooded fencerows, and over farm ponds in pastures. Indiana bats return nightly to their foraging areas. Indiana bats feed strictly on flying insects, and their selection of prey items reflects the environment in which they forage. Both aquatic and terrestrial insects are consumed. Moths, caddisflies, flies, mosquitoes, and midges are major prey items. Other prey include bees, wasps, flying ants, beetles, leafhoppers, and treehoppers. During September, the bats depart for hibernation caves.

Information about the occurrence of Indiana bats on the ORR is limited. Mist netting for bats was conducted on lower East Fork Poplar Creek and its tributaries in May 1992 and again in May–June 1997 (Harvey 1997). The 1997 survey included portions of lower Bear Creek near its confluence with lower East Fork Poplar Creek. The creeks in this area provided Indiana bat summer roosting and foraging habitat at the time of the surveys. No Indiana bats were recorded among the six species captured.

In Tennessee, the nearest hibernating population of Indiana bats exists in White Oak Blowhole Cave, located in Blount County in the western end of the Great Smoky Mountains National Park. This cave has been designated as critical habitat for this species. A few Indiana bats also hibernate in Bull Cave, also located in Blount County. No maternity roosts have been located on the ORR, or as yet in Tennessee. However, in July 1999 a small colony of Indiana bats was discovered roosting in a dead hemlock tree on the Cheoah Ranger District of the Nantahala National Forest in Graham County, North Carolina. This discovery represents the first record of a reproductive female Indiana bat being found south of Kentucky. Recent collections of individual Indiana bats have also been recorded from the Cherokee National Forest near Tellico Lake in Monroe County, Tennessee. These reports indicate that summer colonies of the species may be present in east Tennessee. The habitat from which these individuals were collected is similar to suitable habitat found on the ORR.

Suitable habitat for the Indiana bat is present within the vicinity of the proposed project location. A site inspection conducted by FWS personnel as part of the Melton Valley Remedial Investigation/Feasibility Study noted that Class 1 and Class 2 tree species of suitable sizes to support primary and secondary maternity roosting habitat for the Indiana bat existed adjacent to the new access road to the proposed facility. Suitable tree species for maternity roosting habitat is also present on the site proposed for the facility. Information provided by the FWS on the components of suitable habitat for the Indiana bat is provided in Attachment 1. Suitable foraging habitat for Indiana bats within the vicinity of the proposed facility includes the Clinch River, lower White Oak Creek, and White Oak Lake. Upper White Oak Creek, the unnamed tributary to White Oak Creek, and Melton Branch are narrow, small streams and are considered suboptimal for frequent foraging for Indiana bats. Although unlikely, a maternity colony, an adult male colony, or individual Indiana bats could use roosting habitat located in the vicinity of the proposed project. Any potential adverse impacts to the Indiana bat would be eliminated by not cutting down any trees during the Indiana bat's summer roosting season from May through September. Such actions should prevent the loss of any bats that otherwise might be using the trees for rearing young and should also eliminate the need for mist netting or detailed surveys. Although the project would require removal of suitable and potentially suitable roost trees, there are adequate numbers of suitable and potentially suitable roost trees available immediately adjacent to the proposed impact area. Construction

activities would also not directly impact any of the potential foraging habitat that exists in the vicinity. Construction would occur only during the day, so any foraging by Indiana bats would not be disrupted. Activities associated with the operation of the proposed facility would also primarily occur during the day and would not disrupt any foraging Indiana bats near the site. In addition, no significant emissions or effluents would be produced by the facility that could directly impact foraging Indiana bats or indirectly affect aquatic insect fauna that the Indiana bats would prey on.

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