APPENDIX C: CONSULTATION LETTERS AND BIOLOGICAL ASSESSMENT

Department of Energy

National Nuclear Security Administration
P. O. Box 2050
Oak Ridge, Tennessee 37831-8009

July 11, 2006

Dr. Lee Barclay, Field Supervisor
Fish and Wildlife Service, Cookeville Field Office
United States Department of Interior
446 Neal Street
Cookeville, Tennessee 38501

INFORMAL CONSULTATION UNDER SECTION 7 OF *THE ENDANGERED SPECIES ACT* FOR THE Y-12 SITE-WIDE ENVIRONMENTAL IMPACT STATEMENT (SWEIS)

Dear Dr. Barclay:

In accordance with the *National Environmental Policy Act* (NEPA), the National Nuclear Security Administration (NNSA), an agency within the Department of Energy (DOE), is preparing a Site-Wide Environmental Impact Statement (SWEIS) for the Y-12 plant at the Oak Ridge Reservation, Oak Ridge, Tennessee. In addition to the No Action Alternative, the SWEIS will evaluate the following alternatives: (1) Uranium Processing Facility (UPF) Alternative; (2) Upgrade Existing Enriched Uranium Facilities; and (3) Reduced Operations Alternative.

Under the UPF Alternative, NNSA would construct and operate a modern UPF sized to support the smaller nuclear stockpiles of the future. Under the Upgrade Alternative, NNSA would continue modernization activities and upgrade the existing enriched uranium and non-nuclear processing facilities to contemporary environmental, safety, and security standards to the extent possible within the limitations of the existing structures and without prolonged interruptions of manufacturing operations. Under the Reduced Operations Alternative, NNSA would invest no additional funds beyond normal maintenance at the Y-12 plant. Facilities posing an unacceptable risk to worker safety or to the public would be minimally upgraded if a minimal inexpensive upgrade would allow operations to continue safely, or deactivated if the costs to operate safely exceeded the costs of normal maintenance.

The Y-12 plant consists of industrial type structures on previously disturbed land with limited habitat favorable for animal and plant species. The only federally listed plant or animal that has been identified near the facility is the gray bat (*Myotis grisescens*) which has been observed within the Oak Ridge Reservation. The gray bat is federally listed as endangered.

The Y-12 SWEIS study area (approximately 5,400 acres) includes upper Bear Creek and its tributaries. Past surveys of Bear Creek tributaries have identified a number of State-listed plants including *Lilium canadense* (Canada Lily), *Panax quinquefolius* (American Ginseng), and *Platanthera flava var. herbiola* (Tubercled Rein-orchid), and a State-listed fish species, *Phoxinus tennesseensis* (Tennessee Dace).

NNSA requests an updated list of protected species and habitat in the vicinity of the Y-12 plant site and solicits your recommendations and comments regarding this proposed action. Your input will be used in the preparation of the SWEIS. We would appreciate a reply to this letter by August 1, 2006.

If you need further information on this request, please call me at (865) 576-9903.

Sincerely,

Pamela L. Gorman

Pamela L. Gorman
SWEIS Document Manager
Y-12 Site Office

Department of Energy

National Nuclear Security Administration
P. O. Box 2050
Oak Ridge, Tennessee 37831-8009

July 11, 2006

Mr. Richard Kirk
Endangered Species Coordinator
Tennessee Wildlife Resources Agency
Ellington Agricultural Center
P.O. Box 40747
Nashville, Tennessee 37204

INFORMAL CONSULTATION UNDER SECTION 7 OF *THE ENDANGERED SPECIES ACT* FOR THE Y-12 SITE-WIDE ENVIRONMENTAL IMPACT STATEMENT (SWEIS)

Dear Mr. Kirk:

In accordance with the *National Environmental Policy Act* (NEPA), the National Nuclear Security Administration (NNSA), an agency within the Department of Energy (DOE), is preparing a Site-Wide Environmental Impact Statement (SWEIS) for the Y-12 plant at the Oak Ridge Reservation, Oak Ridge, Tennessee. In addition to the No Action Alternative, the SWEIS will evaluate the following alternatives: (1) Uranium Processing Facility (UPF) Alternative; (2) Upgrade Existing Enriched Uranium Facilities; and (3) Reduced Operations Alternative.

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The Y-12 SWEIS study area (approximately 5,400 acres) includes upper Bear Creek and its tributaries. Past surveys of Bear Creek tributaries have identified a number of State-listed plants including *Lilium canadense* (Canada Lily), *Panax quinquefolius* (American Ginseng), and *Platanthera flava var. herbiola* (Tubercled Rein-orchid), and a State-listed fish species, *Phoxinus tennesseensis* (Tennessee Dace).

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If you need further information on this request, please call me at (865) 576-9903.

Sincerely,

Pamela A. Gorman

Pam Gorman
SWEIS Document Manager
Y-12 Site Office

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

July 26, 2006

Ms. Pamela L. Gorman
SWEIS Document Manager
Department of Energy
National Nuclear Security Administration
P.O. Box 2050
Oak Ridge, Tennessee 37831-8009

Re: FWS# 2006-EC-0282

Dear Ms. Gorman:

Thank you for your letter and enclosures received July 19, 2006, regarding the preparation of a Site-Wide Environmental Impact Statement (SWEIS) for the Y-12 plant at the Oak Ridge Reservation, Anderson County, Tennessee. U.S. Fish and Wildlife Service personnel have reviewed the information submitted and offer the following comments for consideration.

According to our records, the gray bat (*Myotis grisescens*) and Indiana bat (*Myotis sodalis*), federally listed endangered species, may occur in or near the Y-12 facility. Qualified biologists should assess potential impacts and determine if the proposed alternatives may affect the species. We recommend that you submit a copy of your assessment and the draft SWEIS 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.) and the National Environmental Policy Act (42 U.S.C. 4321 -4347; 83 Stat. 852). 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, or via e-mail at *steven_alexander@fws.gov*.

Sincerely,

Lee A. Barclay, Ph.D.
Field Supervisor

Y-12 SITE OFFICE
COR- Y12-7/31/2006-86926
File Code

DOE F 1325.8
(10/00)

United States Government **Department of Energy**

National Nuclear Security Administration

memorandum

DATE: June 13, 2007

REPLY TO
ATTN OF: Y12-30:Gorman

SUBJECT: **NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 COMPLIANCE FOR THE Y-12 NATIONAL SECURITY COMPLEX SITE-WIDE ENVIRONMENTAL IMPACT STATEMENT**

TO: Katatra Vasquez, Cultural Resource Management Coordinator, ORO

In accordance with the *National Environmental Policy Act* (NEPA), the National Nuclear Security Administration (NNSA), an agency within the Department of Energy (DOE), is preparing a Site-Wide Environmental Impact Statement (SWEIS) for the Y-12 National Security Complex (Y-12) at the Oak Ridge Reservation, Oak Ridge, Tennessee. In addition to the No Action Alternative, the SWEIS will evaluate the following alternatives: (1) Uranium Processing Facility (UPF) Alternative; (2) Upgrade Existing Enriched Uranium Facilities; and (3) Reduced Operations Alternative.

Under the UPF Alternative, NNSA would construct and operate a modern UPF sized to support the smaller nuclear stockpiles of the future. Under the Upgrade Alternative, NNSA would continue modernization activities and upgrade the existing enriched uranium and non-nuclear processing facilities to contemporary environmental, safety, and security standards to the extent possible within the limitations of the existing structures and without prolonged interruptions of manufacturing operations. Under the Reduced Operations Alternative, NNSA would invest no additional funds beyond normal maintenance at Y-12. Facilities posing an unacceptable risk to worker safety or to the public would be minimally upgraded if a minimal inexpensive upgrade would allow operations to continue safely, or deactivated if the costs to operate safely exceeded the costs of normal maintenance.

The proposed activities under consideration are located within the developed portion of the Y-12 plant area. The cultural resources of the Y-12 plant area have been previously inventoried and evaluated. A historic district has been proposed which encompasses the original Y-12 plant and consists of 72 contributing buildings and structures. Two buildings in the Y-12 plant have also been recognized as potential National Historic Landmarks as individual properties. Much of the Y-12 plant has been disturbed by past activities and the potential for discovery of archaeological resources eligible for inclusion in the National Register of Historic Places is considered low. No Native American or other ethnic traditional use areas, cemeteries, or religious sites are known to be present in the developed Y-12 plant area.

The proposed UPF site is in the Y-12 West Portal Parking Lot, collocated to the west of the Highly Enriched Uranium Manufacturing Facility (HEUMF). This site is outside of, but adjacent to, the existing Perimeter Intrusion, Detection, and Assessment System (PIDAS). This West Portal Parking Lot represents a large level site with minimal site preparation requirements.

DOE has determined that implementing the Y-12 SWEIS action alternatives may require undertakings that could have an adverse affect on historic properties, specifically buildings in the proposed Y-12 plant historic district. Potential impacts could include the physical destruction of historic properties, changes in the character of the use of historic properties, the neglect of properties leading to the deterioration, loss of components contributing to the integrity of historic properties, and alterations to the setting. NNSA will comply with provisions in the Programmatic Agreement and/or the final Cultural Resources Management Plan to evaluate, address, and mitigate possible adverse effects that would result from the Y-12 plant SWEIS action alternatives in consultation with your office and the Tennessee State Historic Preservation Office.

Upon your review and concurrence with the content of the package, please forward the report to the Tennessee State Historic Preservation Officer for concurrence. I request their concurrence by August 1, 2007.

If you have any questions or require additional information, please contact me at (865) 576-9903.

Pam Gorman

Pam Gorman
Y-12 NEPA Compliance Officer

Department of Energy

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

October 24, 2007

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

Dear Dr. Garrison:

NOTIFICATION OF PROPOSED UNDERTAKING AND INITIATION OF CONSULTATION FOR THE Y-12 NATIONAL SECURITY COMPLEX SITE-WIDE ENVIRONMENTAL IMPACT STATEMENT

The National Nuclear Security Administration (NNSA), an agency within the U.S. Department of Energy (DOE) has the responsibility to maintain and enhance the safety, reliability, and performance of the U.S. nuclear weapons stockpile to meet national security requirements. NNSA manages DOE's nuclear weapons programs and facilities, including those at the Y-12 National Security Complex (Y-12) located in Oak Ridge, Tennessee.

NNSA is preparing a *Site-Wide Environmental Impact Statement for the Y-12 National Security Complex* (Y-12 SWEIS). This Y-12 SWEIS will analyze the environmental impacts of reasonable alternatives for ongoing and foreseeable future operations, facilities, and activities at Y-12. Alternatives to be analyzed in the Y-12 SWEIS will include the No Action Alternative (Alternative 1), the Proposed Action to Construct and Operate a New Uranium Processing Facility Alternative (Alternative 2), an Upgrade to Existing Facilities Alternative (Alternative 3), and a Reduced Operations Alternative (Alternative 4).

The Y-12 SWEIS will assess the environmental impacts of operations on land uses and applicable plans, socioeconomic characteristics and environmental justice, community services, prehistoric and historic cultural resources, aesthetics and scenic resources, geology and soils, biological resources, water, noise, traffic and transportation, utilities and energy, materials and waste management, human health and safety, site contamination, and accidents. The NNSA has identified Alternative 2, the Proposed Action to Construct and Operate a New Uranium Processing Facility, as the preferred alternative. The enclosed map shows the location of the proposed New Uranium Processing Facility.

PRINTED ON RECYCLED PAPER

We have determined, in accordance with §800.3 of the Advisory Council on Historic Preservation's (Council) regulations for the protection of historic properties, that NNSA's proposed action in this SWEIS is (1) an undertaking, as defined in 36 *Code of Federal Regulations* (CFR) 800.16(y), and (2) is the type of activity that has the potential to cause effects on historic properties. In accordance with §800.8(c) of the Council's regulations, we are notifying you and the Council, by copy of this letter, that we intend to use the process and documentation required to comply with the National Environmental Policy Act (NEPA) to comply with Section 106 of the National Historic Preservation Act for this undertaking. In using the NEPA process in lieu of the procedures set forth in §800.3 through §800.6 of the Council's regulations (i.e., the Section 106 process), we will ensure the standards set forth in §800.8(c)(l) through §800.8(c)(5) are met.

Thank you for your attention to our notification of initiation of consultation. If you have any questions or need additional information, please contact me at (865) 576-0835.

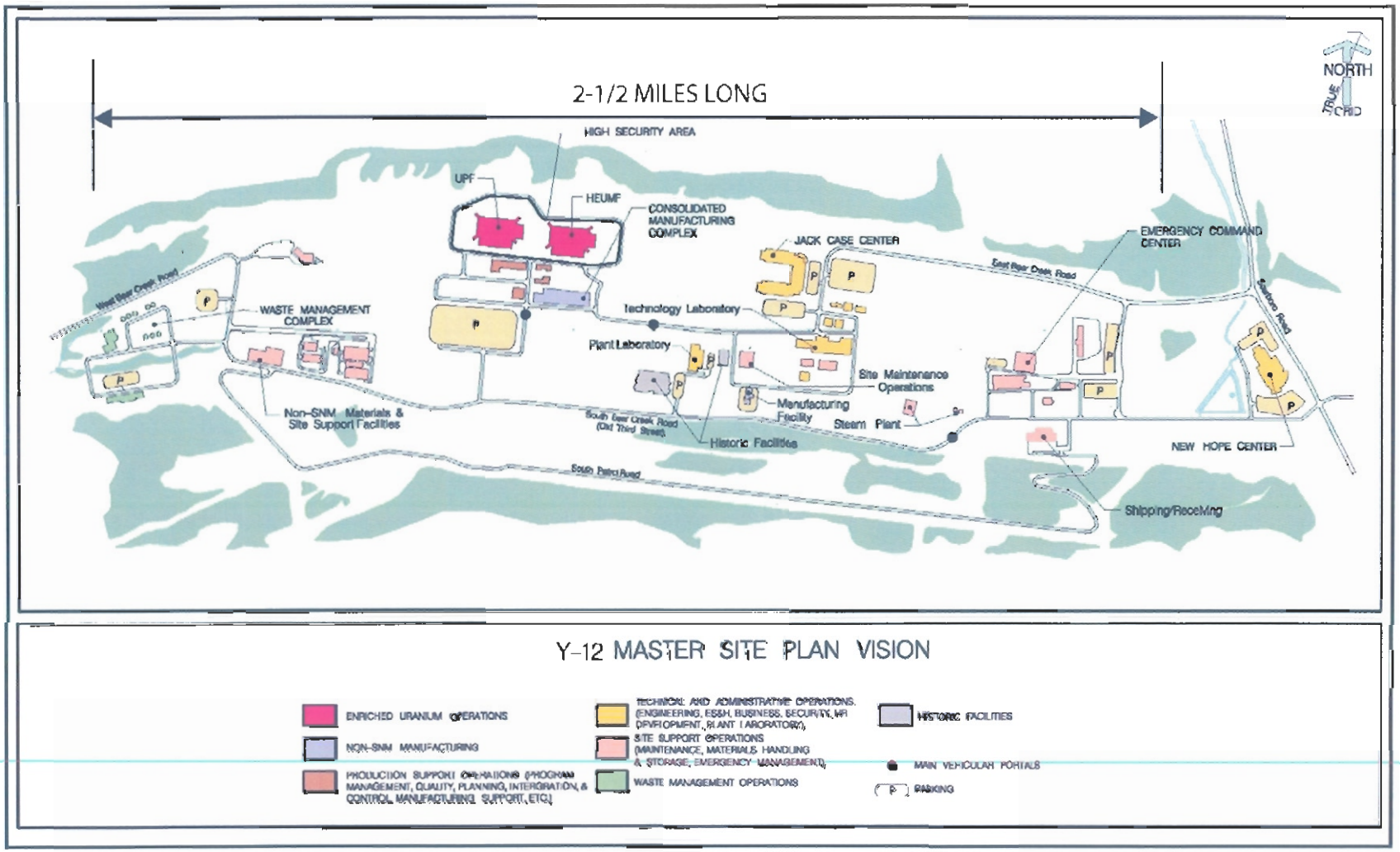
Sincerely,

Katatra C. Vasquez

Katatra C. Vasquez
Cultural Resources
Management Coordinator

Enclosure

cc w/enclosure:
Skip Gosling, HR-76, HQ/FORS
Tom McCulloch, Advisory Council on Historic Preservation
David Allen, SE-32, ORO
Gary Hartman, SE-32, ORO
Randy Smyth, SE-30, ORO
Kevin Smith, NNSA, YSO
Pam Gorman, NNSA, YSO
Steve Wyatt, NNSA, YSO
Ted Sherry, NNSA, YSO
Terry Olberding, NNSA, YSO
Terry Slack, NNSA, YSO



Source: NNSA 2007.

Enclosure 1. The End State for the Modernization of Y-12.

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

November 1, 2007

Ms. Katatra C. Vasques
Oak Ridge Operations Office
Post Office Box 2001
Oak Ridge, Tennessee, 37831

RE: DOE, Y-12 NATIONL SECURITY COMPLEX, OAK RIDGE, ANDERSON COUNTY

Dear Ms. Vasques:

In response to your request, received on Friday, October 26, 2007, we have reviewed the documents you submitted regarding your proposed undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicant for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800. You may wish to familiarize yourself with these procedures (Federal Register, December 12, 2000, pages 77698-77739) if you are unsure about the Section 106 process.

Considering available information, we find that the project as currently proposed MAY ADVERSELY AFFECT PROPERTIES THAT ARE ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER OF HISTORIC PLACES. You should now begin immediate consultation with our office. Please direct questions and comments to Joe Garrison (615) 532-1550-103. We appreciate your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jyg

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

June 11, 2010

Lt. Colonel Anthony P. Mitchell
District Engineer
U.S. Army Corps of Engineers
3701 Bell Road
Nashville, Tennessee 37214

Attention: Ms. Lisa R. Morris, Regulatory Branch

Subject: Public Notice No. 10-13. Department of Energy, Proposed Haul Road Construction, Anderson and Roane Counties, Tennessee.

Dear Colonel Mitchell:

Fish and Wildlife Service (Service) personnel have reviewed the subject public notice. The applicant (Department of Energy) proposes to construct a 1.2-mile haul road along the existing power line easement at the Oak Ridge Reservation in Anderson and Roane counties, Tennessee. Associated with the proposed project would be one acre of permanent wetland fill and the extension of two existing culverts. The applicant proposes to mitigate the wetland impacts on site at a 3:1 ratio by creating/enhancing 3.02 acres of wetlands. The applicant also proposes to restore 300 linear feet of channelized stream. The mitigation sites and buffer areas would be protected in perpetuity through a conservation easement within the Oak Ridge Reservation. The following constitute the comments of the U.S. Department of the Interior, provided in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

Endangered species collection records available to the Service do not indicate that federally listed or proposed endangered or threatened species occur within the impact area of the project. We note, however, that collection records available to the Service may not be all-inclusive. Our data base is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitat and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality. However, based on the best information available at this time, we believe that the requirements of section 7 of the Endangered Species Act of 1973, as amended, are fulfilled. Obligations under section 7 of the Act must be reconsidered if (1) new information reveals impacts

JUN 14 2010

of the action that may affect listed species or critical habitat in a manner not previously considered, (2) the action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated that might be affected by the action.

Best management practices should be utilized during the construction of the project to minimize runoff of sediment into the streams. All sediment structures should be inspected and cleaned regularly to ensure the maximum level of sediment control. If structures fail or are found to be inadequate, work should cease and not resume until appropriate corrective measures have been taken. Provided best management practices are utilized, we would have no objection to the issuance of a permit for the work described in the subject public notice.

Thank you for this opportunity to review the subject notice. Please contact Robbie Sykes of my staff at 931/528-6481 (ext. 209) if you have questions about these comments.

Sincerely,

Stephen A Chan

for Mary E. Jennings
Field Supervisor

xc: Robert Todd, TWRA, Nashville, TN
Dan Eagar, TDEC, Nashville, TN
Todd Bowers, EPA, Atlanta, GA

BIOLOGICAL ASSESSMENT

1.0 INTRODUCTION

This biological assessment (BA) evaluates the potential impacts of the proposed action at the Y-12 National Security Complex (hereafter referred to as the Y-12 Complex) on two federally listed bat species. Y-12 is one of three installations on the DOE Oak Ridge Reservation (ORR) in Oak Ridge, Tennessee.

1.1 PURPOSE AND NEED FOR AGENCY ACTION

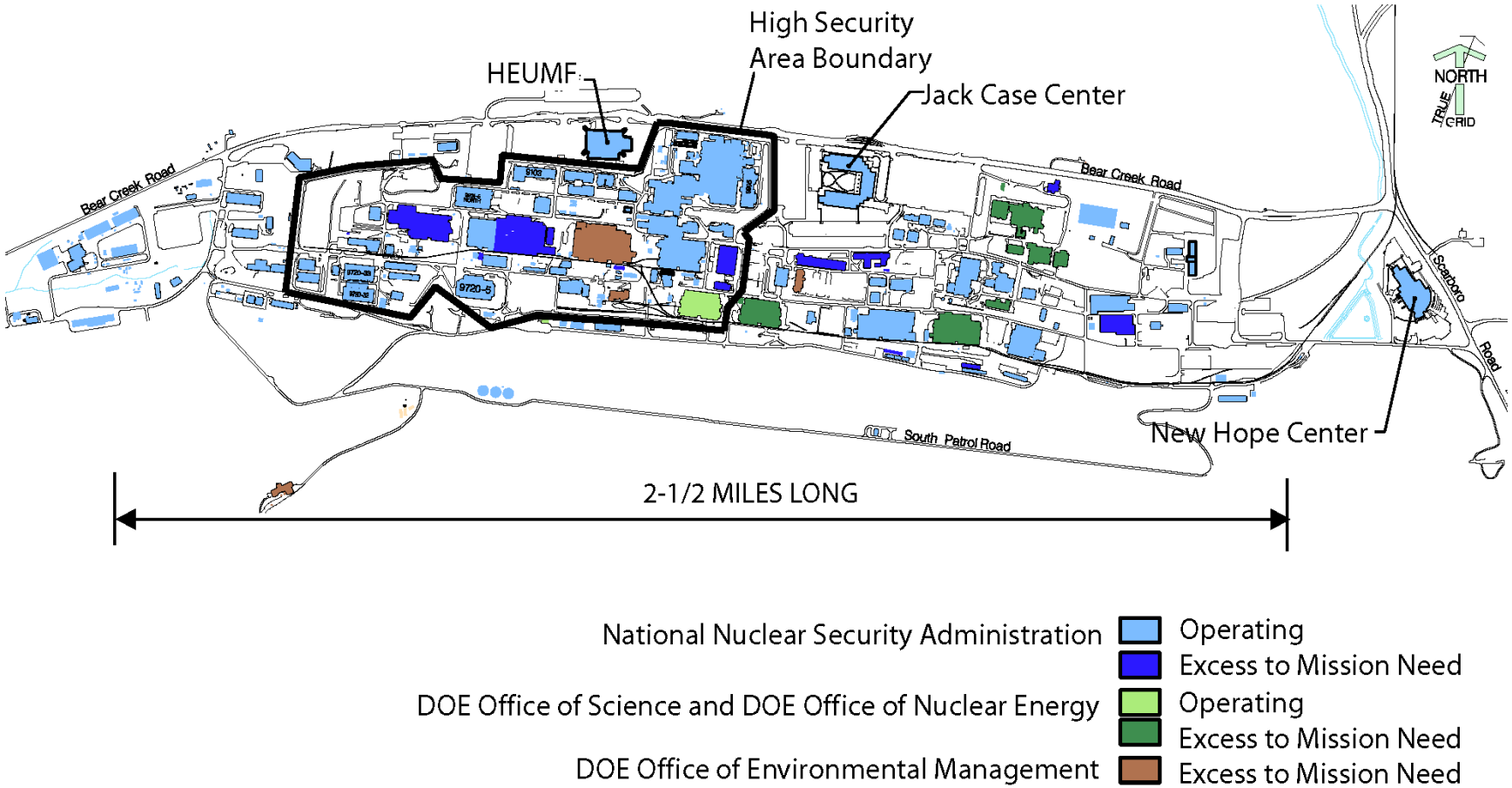
The National Nuclear Security Administration (NNSA), an agency within the U.S. Department of Energy (DOE), is the Federal agency responsible for maintaining and enhancing the safety, security, reliability, and performance of the nations' nuclear weapons stockpile, without nuclear testing.

As one of the NNSA major production facilities, the Y-12 Complex is the primary site for enriched-uranium processing and storage, and one of the primary manufacturing facilities for maintaining the U.S. nuclear weapons stockpile. Existing enriched-uranium operations at the Y-12 Complex are decentralized in several buildings that are not connected, old and oversized. Security, maintenance and safety have become increasingly costly and inefficient. Modernization of this infrastructure is a goal.

Previously, site-wide impacts of the Y-12 Modernization Program (DOE 2001) were assessed for the removal of excess buildings and the construction and operation of the Highly Enriched Uranium Metals Facility (HEUMF) and a Special Materials Complex (SMC). The SMC was subsequently cancelled and replaced by a smaller Purification Facility (DOE 2002a). The HEUMF is currently under construction. The current state of Y-12 is depicted in Figure 1.

1.2 PROPOSED ACTION

Four action alternatives are proposed for consideration in this SWEIS in addition to the No Action Alternative. Each alternative analyzed includes the No Action Alternative (Alternative 1) as a baseline. The three alternatives differ in that: Alternative 2 involves a new, fully modernized manufacturing facility (the Uranium Processing Facility [UPF]) optimized for safety, security, and efficiency; Alternative 3 involves upgrading the existing facilities to attain the highest level of safety, security and efficiency possible without constructing new facilities; and Alternatives 4 and 5 involve a reduction in the production capacity of Y-12 to support smaller stockpile requirements. Figure 2 shows the proposed location for the UPF and Complex Command Center (CCC).



Source: NNSA 2008a.

Figure 1. Major Operational Facilities Currently Supporting Y-12 Missions.

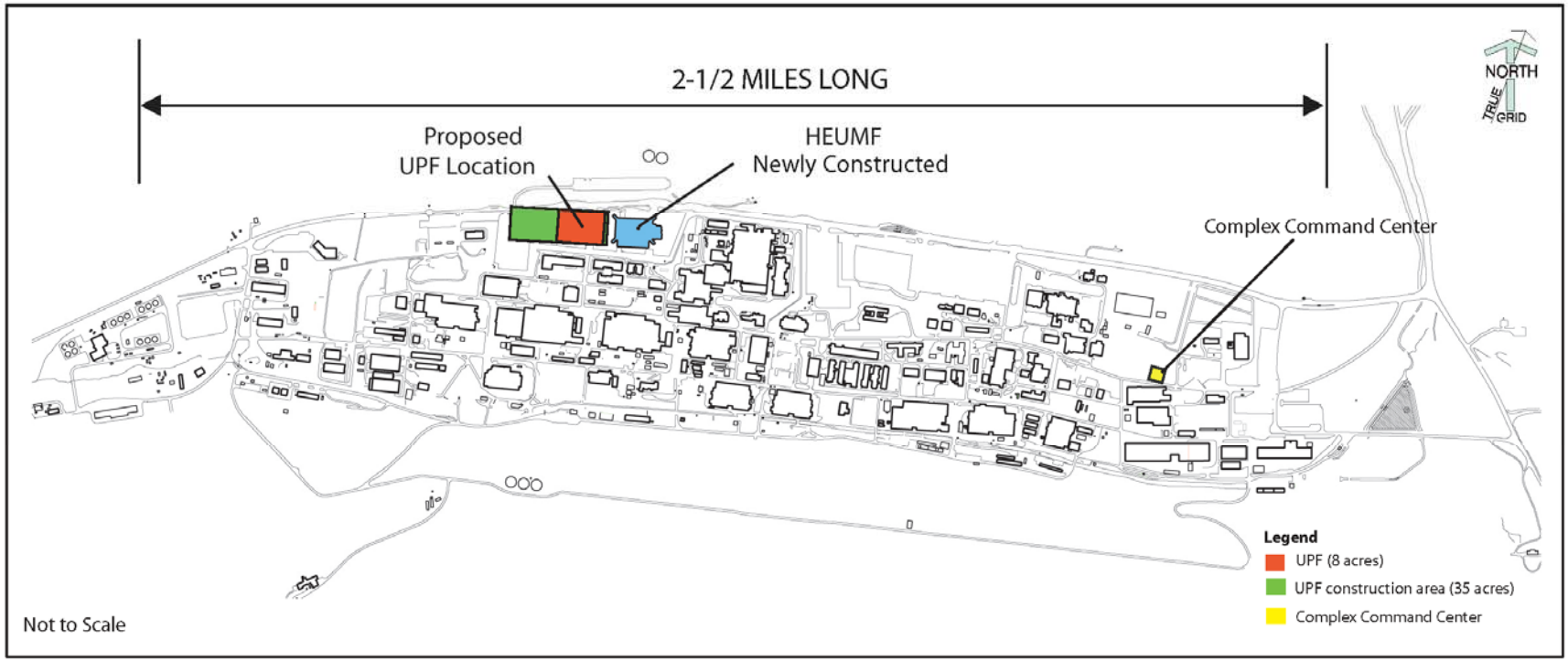


Figure 2. Location of the Proposed UPF and CCC Relative to Other Buildings at Y-12 Complex.

1.3 ECOLOGICAL DESCRIPTIONS OF THE SITE

ORR covers approximately 35,000 acres of mostly deciduous forested land in the Valley and Ridge physiographic province. Much of the land (20,000 acres) is designated for biological and ecological research as the Oak Ridge National Environmental Park. The ORR is bounded on the north by a residential section of the City of Oak Ridge and on the east, west and south by the Tennessee Valley Authority's Melton Hill and Watts Bar reservoirs on the Clinch and Tennessee rivers.

From south to north, the main ridges on the ORR are Copper, Haw, Chestnut, Pine, East Fork and Black Oak Ridge. Karst features, such as caves and sinkholes, are present mostly in the limestone of the Knox Group which includes Copper, Chestnut and Black Oak Ridge. Several preservation and conservation areas have been designated on Black Oak Ridge (Black Oak Ridge Conservation Easement) and Haw Ridge (Three Bend Scenic and Wildlife Management Refuge Area).

Bats are being managed on the ORR under a featured-species program established to inventory bat species, enhance woodland bat habitat using forestry management practices and protect cave bat habitat. Planned management activities (FY2007 to FY2012) include surveys for bats using mist nets, harp nets and acoustical identification systems (Giffen, Evans, and Parr 2007).

1.3.1 Y-12 Complex

The Y-12 Complex occupies a highly-industrialized area of 811 acres in the east end of Bear Creek Valley between Pine Ridge to the north and Chestnut Ridge to the south. Approximately 600 acres are presently enclosed by a security fence. Grass and unvegetated areas surround the entire facility for security purposes. There are no wetlands and limited forested areas are present within the Y-12 fenced boundary. The eastern portion of Y-12 is occupied by Lake Reality and the former New Hope Pond (now closed), maintenance facilities, office space, training facilities, change houses, and former Oak Ridge National Laboratory (ORNL) Biology Division facilities. The far western portion consists primarily of waste management facilities and construction contractor support areas. The central and west-central portions encompass the high-security portion, which supports the core NNSA missions.

1.3.2 Water Resources

Two creeks originate in the Y-12 Complex – East Fork Poplar Creek (EFPC) and Bear Creek. Upper EFPC flows east along the south side of the Y-12 Complex, and then flows north. Various Y-12 wastewaters discharge to the upper reaches of EFPC and much of the flow is fed by the Y-12 storm sewer system. Bear Creek drains only a small portion of the west end of the Y-12 Complex and flows southwest. It is mostly affected by stormwater runoff, groundwater infiltration, and tributaries that drain former waste disposal sites (DOE 2007).

Stream flow in upper EFPC was controlled until November 1988 by New Hope Pond, a settling basin which is now filled in and capped. The replacement basin, Lake Reality, is a lined basin of approximately 2.7 acres in area with a maximum depth of 16 feet and functions primarily as an

emergency spill containment basin. Upper EFPC lacks riparian vegetation, is confined by riprap stream banks of limestone rock and is channelized. Stream substrate also consists of limestone rocks with some interspersed gravel. Stream width varies from 3 to 15 feet between the headwaters and Lake Reality.

After leaving the Y-12 Complex, lower EFPC flows northwest through densely forested secondary-growth hardwoods. Small portions of it flow through urban areas where no forest canopy is present. Unlike Bear Creek, EFPC is a sediment-rich stream. The predominant substrate is 1 to 4 inch diameter rocks. Stream width varies from 10 to 25 feet. Average stream gradient is about 21 feet per mile. Urban runoff from the COR impacts lower EFPC for approximately 7 miles after it leaves the Y-12 Complex. The COR Sewage Treatment Plant discharges into lower EFPC at River Mile 7.5 (LMES 1995).

Upper Bear Creek is channelized and has a vegetated riparian zone. There are mature second-growth hardwood forests in the upper Bear Creek valley within 1 mile of the Y-12 Complex. Stream width and depth from the Y-12 Complex to the mouth of Bear Creek increase from 3 to 15 feet and 4 to 35 inches, respectively. At Hwy 95, the average flow in lower Bear Creek is approximately 2.4 million gallons per day (3.7 cubic feet per second). Except for a few impacted sections, Bear Creek contains a relatively small amount of sediment and is made up of many riffles and pools. About 65 percent of the Bear Creek watershed is wooded, predominantly in oak and oak-hickory associations on the upper slopes and ridge tops, with mixed hardwoods and planted pines along the creek and floodplain area (SAIC 2000).

Under DOE's wastewater discharge permits, stream water quality is monitored using the numbers and kinds of aquatic invertebrates living in stream sediments (benthic) as biological indicators of water quality. The presence and ratios of pollution-sensitive benthic insects are, of particular importance, including the mayflies, stoneflies and caddisflies (Ephemeroptera, Plecoptera, and Trichoptera – EPT). Mayflies are especially sensitive to some forms of pollution.

Benthic macroinvertebrate communities were monitored at three sites in East Fork Poplar Creek and at two reference streams in the spring of 2007. The macroinvertebrate communities at East Fork Poplar Creek kilometer (EFK) 23.4 and EFK 24.4 remained degraded as compared with reference communities, especially in the richness of pollution-sensitive taxa. The pace of improvement in benthic macroinvertebrate communities has slowed in recent years at these sites in the upper reaches of East Fork Poplar Creek (DOE 2008).

1.3.3 Caves

Karst features including sinkholes and caves are shown in Figure 4.5.2-3 of the Draft SWEIS. Several caves have been identified within approximately 3 miles of the Y-12 Complex including Horseshoe Cave (TAN-17) and Linden School Cave (TAN-18) on Black Oak Ridge, Walker Branch Cave (TAN-43) on Chestnut Ridge, and Little Turtle Cave (TAN-38), Big Turtle Cave (TAN-15), Turtle Pit (TAN-40), Rainy Knob Cave (TAN-42) and two unnamed bluff caves on Copper Ridge. The Copper Ridge caves are all adjacent to the Clinch River/Melton Hill

reservoir. The Freels Bend area of the reservoir contains Rainy Knob Cave and the Gallaher Bend area contains the turtle-cave complex and unnamed bluff caves.

None of the caves of the ORR are known to be gated to prevent human intrusion and protect resident bat species.

2.0 ORR SURVEYS FOR BATS

Several bat surveys have been performed on the ORR in recent years. Quantitative surveys usually consist of two methods: (1) mist netting where the individual is actually captured and its species determined in-hand, and (2) acoustic surveys where the bat's ultrasonic call is recorded, displayed as a frequency-time representation and compared to a library of reference calls to determine species. The Anabat® system was used primarily but is just one of several systems for the recording and analysis of ultrasonic bat calls. Each method has advantages and disadvantages. Acoustic methods usually require mist netting to confirm species identification and, in the past, management decisions have not been based on acoustic identification only. Mist nets only capture a few of the many bats that fly in the vicinity of the nets, but acoustic methods record all species present at a particular site.

In 1992 and 1997, mist-net surveys were conducted by Harvey (Webb 2000) on lower EFPC and its tributaries including lower Bear Creek near the confluence with EFPC. During May 1992, 13 bats of 4 species (silver-haired bat [*Lasionycteris noctivagans*], 1; big brown bat [*Eptesicus fuscus*], 4; eastern pipistrelle [*Perimyotis subflavus*], 3; eastern red bat [*Lasiurus borealis*], 5) were mist netted at 5 sites during 7 nights. During 2 separate surveys in May-June and July 1997, 27 sites were mist-netted during 16 nights resulting in the capture of 14 bats of 6 species (silver-haired bat, 1; big brown bat, 6, eastern pipistrelle, 2; eastern red bat, 3; evening bat [*Nycticeius humeralis*], 1; northern long-eared bat [*Myotis septentrionalis*], 1). The lower reaches of EFPC and Bear Creek were reported to provide good gray bat (*Myotis grisescens*) foraging habitat and excellent Indiana bat summer roosting and foraging habitat at the time of the surveys. No gray or Indiana bats (*Myotis sodalis*) were recorded among 6 species captured (Harvey and Britzke 2003).

During July 2003, 22 bats of 3 species (big brown bat, 12; eastern pipistrelle, 5; eastern red bat, 5) were captured at 4 sites during 4 nights of mist-netting at upper and lower Bear Creek and upper EFPC. Bear Creek was expected to yield the most bats, but only 2 bats of one species were captured (both big brown bats). The most productive site was upper EFPC (near Scarboro Road) where 12 bats of 3 species were captured (big brown bat, eastern pipistrelle, eastern red bat). Acoustic surveys were conducted at East Walker Branch, upper and lower Bear Creek, and Freels Bend. A total of 1,096 ultrasonic call files were recorded of mostly the same 3 species as captured in mist nets. However, the presence of a gray bat was recorded at Freel's Bend on the shoreline of Melton Lake (Harvey and Britzke 2003). The Freels Bend area lies in Copper Ridge, approximately 3.5 miles south of the Y-12 Complex and contains a forested rocky limestone bluff with sinkholes and caves adjacent to the Clinch River Melton Hill reservoir.

During August of 2004, an acoustic bat identification system recorded 6,899 call files of 4 species at the K1007 P1 pond in the East Tennessee Technology Park (ETTP, formerly known as

the K-25 Oak Ridge Gaseous Diffusion Plant) during 4 nights. Mist-netting was not performed since the pond is in an open area with no suitable netting sites. A majority of the calls recorded were those of eastern red bats but eastern pipistrelles, big brown bats and calls of the gray bat were also detected. The roost site/cave of the detected gray bats is unknown (Harvey and Britzke 2004). The K1007 P1 holding pond is an active 25-acre stormwater retention pond historically receiving wastes from an area lab drain and surrounded by open grass and roads (Goddard et al. 1995).

Two mist net surveys were performed at Parcel ED-6 at the east end of the ORR. The parcel consists of 336 acres of forested land on Black Oak Ridge containing four intermittent streams that drain to lower EFPC along the southern boundary. On July 29-August 1, 2005, two nets were operated for 2 nights at 3 sites capturing 67 bats of 3 species (big brown, 50; red bat, 12; and eastern pipistrelle, 5). On July 11-16, 2006, a second mist net survey was conducted at 3 additional locations selected by USFWS. Eight bats of 2 species were captured from 2 nets for 2 nights (big brown bat, 5 and red bat, 3). The survey also included a habitat assessment for the Indiana bat that found less than 20 percent of the parcel provided moderate quality summer habitat and less than 80 percent provided low-quality habitat. No Indiana or gray bats were captured at ED-6 (SAIC and BHE Environmental Inc 2007).

On July 24-28, 2006, a mist net survey at the entrance of 4 caves identified the following species:

- Big Turtle Cave – eastern pipistrelle and northern long-eared bat;
- Little Turtle Cave – eastern pipistrelle, little brown bat, northern long-eared bat, seminole bat (*Lasiurus seminolus*) and gray bat;
- Copper Ridge Cave – little brown bat and northern long-eared bat, and
- Pinnacle Cave – big brown bat.

The two gray bats were juveniles, newly able to fly (volant), so their summer roost is very likely in close proximity to Little Turtle Cave. These caves are located on Copper Ridge in the Gallaher Bend area, adjacent to the Clinch River/Melton Hill reservoir, and about 3-4 miles southwest of the Y-12 Complex.

3.0 ECOLOGICAL DESCRIPTION AND POTENTIAL IMPACTS OF THE PROPOSED PROJECT ON FEDERALLY LISTED BAT SPECIES.

Summarized below is the general ecology of federally listed bat species that potentially occur near the site and the expected impacts on them from the proposed project. Biological information on the species is derived from the published literature, reports and Internet resources listed under each species heading.

3.1 GRAY BAT (*Myotis grisescens*)

Listed as endangered since 1976, the gray bat is a year-round resident of caves and usually migrates seasonally between a winter hibernating cave and a summer maternity or roosting cave. The range of the gray bat is concentrated in the limestone cave (karst) region of Arkansas,

Missouri, Kentucky, Tennessee, and Alabama but it is known to occur in adjacent states. About 95 percent of the species' total population (estimated at over 2.5 million) hibernates in only 17 caves – 5 in Tennessee, 4 in Missouri, 5 in Arkansas, 2 in Kentucky and 1 in Alabama (Harvey and Redman 2003). Less than 5 percent of available caves (Tuttle 1979 as cited in Mitchell and Martin 2002) meet the necessary habitat requirements for gray bats which are caves warm in summer for digestion and rearing young and cool in fall/winter for inducing hibernation (Mitchell and Martin 2002). For management purposes, the U.S. Army Corps of Engineers (USACE) considers the gray bat a riparian species because it forages over water or in riparian areas of streams and lakes (Mitchell and Martin 2002). The USACE has specified that any activities that might adversely affect foraging habitat within 15.5 miles of gray bat caves should be carefully evaluated and modified to protect the habitat (Mitchell and Martin 2002).

Gray bats return to their winter and summer habitat year after year. They mate at hibernation caves upon arrival in September thru October. Females hibernate after mating but males and juveniles are active for several more weeks. Both males and females hibernate in the same caves in large clusters of several thousand bats with densities of approximately 170 per square foot (Harvey and Redman 2003). Hibernation cave temperatures average 42-52 degrees Fahrenheit (°F) which are slightly higher than Indiana bat preferences (38-43 °F). Indiana bats (*Myotis sodalis*) may hibernate in the same caves with gray bats but in different sections (Mitchell and Martin 2002).

Adult females emerge from hibernation first in late March and April, and disperse to summer caves. During spring and autumn transient periods, they may occupy a wide variety of caves. In the summer, the females form maternity colonies in large warm caves often containing streams. Summer colonies, especially maternity caves, are usually 1-2 miles from rivers and lakes where they forage. A single young is born in late May or early June and begins flying within 20 to 25 days after birth (Harvey and Redman 2003). Growth rates and survival of young increase with higher temperature at maternity roosts and with proximity of the roost to the nearest overwater foraging habitat. In the summer, males and non-reproductive yearling females occupy roosting caves separate from the maternity colony (Tuttle 1976 as cited in Mitchell and Martin 2002). As many as 6 different caves may be used during the summer (Mitchell and Martin 2002). Life spans are at least 14-15 years (Harvey and Redman 2003).

Gray bats may also roost in man-made structures including abandoned mines, barns (Gunier and Elder 1971 as cited in Mitchell and Martin, 2002) storm drains/sewers (Hayes and Bingham 1964, Elder and Gunier 1978, Timmerman and McDaniel 1992 as cited in Mitchell and Martin 2002), and deep vertical crevices under concrete bridges (Bennett 2003). Maternity colonies have also been reported in reservoir dam facilities (Lamb 2000 as cited in Mitchell and Martin 2002). Use of and numbers in caves and structures are estimated by the size of guano deposits and ceiling stains.

In the early evening, gray bats forage primarily over water with mayflies a major component of their diet. However, depending upon prey abundance in the habitat, they consume a variety of both aquatic and terrestrial flying insects particularly moths, flies, and beetles. Riparian and wetland habitats may also be important foraging sites (Mitchell and Martin 2002). The home

range of a summer colony contains several roosting caves along approximately 50 miles of river or lake shoreline (Harvey and Redman 2003).

Site Occurrence of Gray Bat

The first reported occurrence at Y-12 was in November 1994, where a single dead juvenile gray bat was found in a display case in the Beta-3 building. Gray bats have been identified by acoustic methods near the Y-12 Complex at the Freels Bend area approximately 3.5 miles south (5.6 km), the K1007 P1 Holding Pond at ETTP approximately 9 miles east (14.5 km) and by mist-netting at Little Turtle cave approximately 3 miles southwest (5 km). The maternity roost for the mist-netted juvenile gray bat is likely very near Little Turtle Cave. Gray bats have not been observed foraging over streams such as upper EFPC or Bear Creek but have been identified on larger expanses of water such as the Melton Hill reservoir and K1007 P1 Holding Pond. Gray bats are known to occur on the ORR, although probably in low numbers.

Potential Impacts to Gray Bats

The potential impacts from construction and operation of the proposed action are identified for hibernating, roosting and foraging gray bats. The gray bat hibernates in caves in the winter, roosts in caves in the summer, and forages over streams, rivers and lakes.

Construction of the proposed facilities might result in impacts from:

- the physical disturbance by earthwork (siting, grading, excavations, etc.) to cave habitat or to riparian or wetland vegetation;
- existing soil contaminants in the construction area that might act as a source to surface water contamination;
- the movement of equipment causing physical harm to individual animals;
- noise disturbances requiring the animal to expend more energy or reducing the effectiveness of foraging or roosting;
- emissions or accidental releases or spills to waterways which might affect the water quality and the abundance of aquatic invertebrates;
- increased flow in streams from stormwater runoff causing increased flooding, physical changes to the streambed sediments, or resuspension of existing sediment contaminants; and
- increased soil erosion during storms causing increased turbidity and sediments entering the stream which impacts habitat for benthic insects used as prey by bats.

No caves are known to exist within the Y-12 Complex so none will be impacted by construction of the proposed facilities. The proposed UPF including construction laydown and staging areas are located in an area previously used for parking and adjacent to a previously developed industrial area with little natural habitat. The proposed UPF construction area is in the north central section of the complex and distant from the headwaters of upper EFPC and upper Bear Creek. No riparian or wetland vegetation will be cleared during construction of the proposed facilities. The proposed CCC is located adjacent to a 2.7-acre spill containment basin (Lake Reality). No direct impacts to caves or to riparian vegetation will result from the construction of

the proposed facilities. Although the gray bat has been known to use man-made structures for roosting, structures near active facilities are expected to provide less suitable man-made habitat. Existing soil contaminants in the construction area will be identified and removed prior to disturbance to prevent it from becoming a source of surface water contamination.

The proposed UPF area is located in a previously developed area containing several overhead features; including pole mounted lighting fixtures, utility poles, and overhead transmission lines. The proposed area is not a known foraging corridor for the gray bat. Any presence of equipment (e.g. skyscraper cranes), equipment movement or noise from construction activities would occur during the day and cease prior to those times of day (sunset through nighttime hours) when the gray bats are utilizing the stream corridors for foraging. It is not anticipated that the gray bat would be disrupted during foraging activities by the presence of construction equipment. No significant emissions or effluents would be produced by construction of the proposed facilities that could directly impact foraging habitat, stream water quality or indirectly affect aquatic insects on which the bats might prey. Fueling activities will occur distant from streams and storm sewers to avoid impacts to streams. Releases or spills from transportation and waste-handling accidents are not expected to increase from the proposed action. Equipment for containment, prompt cleanup and response training for accidental spills would minimize the potential impacts. Standard best management practices (BMPs) for controlling soil erosion and stormwater flow from construction activities will minimize potential impacts to the streams from increased sedimentation and stormwater runoff. Construction BMPs include use of silt fences, hay bales, and prompt or interim revegetation to control soil erosion and settling/retention ponds to control stormwater runoff. Although impacts might occur from construction of the proposed facilities these impacts are not expected to adversely impact foraging habitat of the gray bat or water quality of streams.

Operation of the proposed facilities might result in impacts from:

- increased chemical or radiological toxicity of effluents or emissions which might affect bats, the availability of benthic insects or increase contaminants that bioaccumulate in the food chain and
- increased security lighting that would attract insects and bats.

Chemical and radiological exposure to humans and biota are expected to decrease from the increased efficiencies associated with the modernization of the proposed facilities. Y-12 is the source of mercury and other legacy contamination, polychlorinated biphenyl (PCB) in sediments of upper EFPC. Fish and other fauna of the upper EFPC floodplain continue to have high levels of contaminants. Some cleanup actions to remediate the mercury contamination have been completed; others are ongoing or planned. Surface water biota will continue to be monitored under the wastewater discharge permit and a Biological Monitoring and Abatement Program (BMAP).

Radiological exposure from the proposed UPF will not exceed dose limits for human exposures which are protective of wildlife. DOE has recently developed a graded approach to determine radiation doses to aquatic and terrestrial biota (DOE, 2002b). Newly proposed dose limits for aquatic (1 rad per day) and terrestrial (0.1 rad per day) biota are several orders of magnitude

lower (0.1 rad per day approximately 36,500 mrem per year) than human dose limits (100 mrem per year). Initially during a screening phase, maximum radionuclide concentrations in surface water, sediment, and soil are compared to media-specific biota concentration guides (BCG). Site-specific sampling of biota, soil, sediment and/or surface water will follow where calculated absorbed dose rates exceed the dose limits. Locations on upper BC and upper EFPC are expected to undergo additional site-specific analyses. Sampling for terrestrial biota dose assessment was begun only recently (DOE 2007).

At night, the Y-12 Complex is currently well-lighted for security purposes, which attracts insects that might be used as prey by bats. The gray bat, however, is reported to forage primarily over water and avoids large cleared areas to escape predation. Operation of the proposed facilities is not expected to adversely impact gray bats.

The ORR reservation contains many acres of high quality gray bat habitat in the Copper Ridge Area with numerous caves adjacent to large bodies of water. The Y-12 Complex and nearby areas contain only marginal gray bat foraging habitat. Cave habitats on the ORR should be monitored periodically for the presence of gray bats and/or by visual estimates of guano and ceiling stains. Gray bat populations should be counted annually. Caves with gray bats may be considered for gating. If population counts decrease, the quality of foraging areas may be monitored for residues in guano (Mitchell and Martin 2002). DOE has previously committed to perform annual bat surveys as a part of wildlife management activities on the ORR (Giffen, Evans, and Parr 2007). Based on the information presented in this BA, the proposed action is not likely to adversely affect the gray bat.

3.2 INDIANA BAT (*Myotis sodalis*)

Listed as endangered in 1967, the Indiana bat uses two distinct habitat types – caves for winter hibernation and trees for summer maternity or roosting colonies. The range of the Indiana bat is also associated with the limestone cave region of the eastern US and areas north of the cave regions from Oklahoma, Iowa, and Wisconsin, east to Vermont and south to northwestern Florida (Harvey and Redman 2003). The present population is estimated at approximately 380,000 with approximately 80 percent hibernating at only 9 locations – 2 caves and a mine in Missouri, 3 caves in Indiana, and 3 caves in Kentucky (Harvey and Redman 2003). The nearest known hibernation cave to the ORR is in Blount County in the Great Smoky Mountains National Park (GSMNP). There are likely other caves in Tennessee that are known to or may support smaller hibernating populations of Indiana bats. Maternity roosts were found for the first time in the south in the Nantahala National Forest in 1999 and the GSMNP in 2001 (Britzke, Harvey, and Loeb, 2003). Individuals of the Indiana bat have also been recently collected in Cherokee National Forest near Tellico Lake in Monroe County, Tennessee during a 2007 bat survey (US Forest Service 2007). These reports indicate that summer colonies may also be potentially present in east Tennessee.

Indiana bats, especially females, are known to return annually to specific roosting and foraging areas (Harvey and Redman 2003). They arrive near hibernation caves in early August through mid-September and begin to swarm and mate outside the cave entrances. Swarming continues into mid- to late-October. Hibernation occurs from October to April in large tightly-packed

clusters of several thousand individuals with densities of approximately 300-400 per square foot (Harvey and Redman 2003). Hibernation caves have relatively high humidity (74-100 percent) and temperatures averaging 38-43 °F, which is slightly colder than the gray bat preference (42-52 °F). Females depart the hibernation caves before males, forage outside the entrance and migrate to summer maternity roosts in mid-May. During the summer, Indiana bats are widely dispersed in suitable habitat, usually north of the hibernation caves. Movements of more than 300 miles (500 km) from the hibernating cave to maternity roosts have been documented (Kurta and Murray 2002 as cited in Britzke et al. 2003). Maternity colonies consist of more than 100 adult females roosting in tree cavities or under loose bark of dead and partially dead trees of many species (Harvey and Redman 2003) in agriculturally dominated landscapes but, recently, have been found in heavily forested areas (Britzke et al. 2003). Roost trees are often snags (dead trees) but may be shag-barked trees or trees with cavities or crevices of various species. If available, maternity colonies use numerous alternative roost trees in addition to a primary roost. Primary roost trees are generally taller than surrounding trees and exposed to direct sunlight (Britzke et al 2003). A single young is born during June and raised under loose tree bark often in wooded streamside habitat. The growth rate of offspring is increased by higher temperatures inside the roost (Britzke et al 2003). The summer roost of adult males is often near the maternity roost or near or in the hibernation caves. The longest life span for this species is less than 14 years (Harvey and Redman 2003).

Most Indiana bat roost sites are in trees, but some, especially males, have roosted in man-made structures (e.g., bat boxes, old church attics, barns, or wooden power poles) (USFWS Reynoldsburg Ohio Field Office, no date). Population numbers of Indiana bats are difficult to quantify. During hibernation, they are packed so tightly that exact numbers can only be estimated and they leave little evidence of their past use of caves so their historical population cannot be determined (Harvey and Redman 2003). It has also been reported that roost stains in caves historically used by Indiana bats have been observed (Tuttle and Kennedy, no date) and can be used to estimate past use.

Indiana bats forage within 3 miles of the maternity roost trees (Bennett 2003, USFWS Cookeville, no date) and lactating females are reported to feed primarily on small moths (Harvey and Redman 2003). Major food items are terrestrial insects from the canopy of riparian floodplain or upland forests. Aquatic insects such as caddisflies and stoneflies are also consumed from impounded bodies of water (Evans et al. 1998). Indiana bats tend to avoid vast open spaces (USFWS Reynoldsburg Ohio Field Office, no date).

Site Occurrence of Indiana Bat

The only record of Indiana bats on the ORR is a single specimen in the 1950s (USFWS 2000 as cited in Webb, 2000). No maternity roosts have been located on the ORR. However, since a winter hibernation cave is located in Blount County and summer maternity roosts have been identified recently in pine snags from the GSMNP and in forests from the Cherokee National Forest in Monroe County which are similar to habitats on the ORR, summer colonies may be present in east Tennessee. Mist net sampling and acoustic techniques have not identified Indiana bats foraging or roosting in suitable habitat on EFPC, Bear Creek or in caves within the ORR.

Reports suggest that most summer roosts are north of hibernation caves and occur in the more northerly parts of their range (Webb 2000). In lieu of conducting surveys, it is assumed that Indiana bats are present near the proposed action area. Indiana bats are assumed to occur on the ORR, more likely in summer, although probably in very low numbers.

Potential Impacts to Indiana Bat

The potential impacts from construction and operation of the proposed action are identified for hibernating, roosting and foraging Indiana bats. The Indiana bat hibernates in caves, roosts in the summer in forests, and forages over streams, rivers, lakes and in wooded riparian and upland habitat.

Construction of the proposed facilities might result in impacts from:

- the physical disturbance by earthwork (siting, grading, excavations, etc.) to cave habitats, upland forested areas or to vegetation outside of the cave or adjacent to waterbodies;
- existing soil contaminants in the construction area that might act as a source to surface water contamination;
- the movement of equipment causing physical harm to individual animals;
- noise disturbances requiring the animal to expend more energy or reducing the effectiveness of foraging or roosting;
- emissions or accidental releases or spills to waterways which might affect the water quality and the abundance of aquatic invertebrates;
- increased flow in streams from stormwater runoff causing increased flooding, physical changes to the streambed sediments, or resuspension of existing sediment contaminants; and
- increased soil erosion during storms causing increased turbidity and sediments entering the stream which impacts habitat for benthic insects used as prey by bats.

No caves are known to exist within the Y-12 Complex so none will be impacted by construction of the proposed facilities. The proposed UPF including construction laydown and staging areas are located in an area previously used for parking and adjacent to a previously developed industrial area with little natural habitat. The proposed UPF construction area is in the north central section of the complex and distant from streams and forest land. No riparian vegetation or forested areas will be cleared during construction of the proposed facilities. The proposed CCC is located adjacent to a 2.7-acre spill containment basin (Lake Reality). Although the Indiana bat has been known to use man-made structures for roosting, structures near active facilities are expected to provide less suitable man-made habitat. Existing soil contaminants in the construction area will be identified and removed prior to disturbance to prevent it from becoming a source of surface water contamination.

Although no wooded areas will be cleared, a few single trees or snags (dead trees) may be removed. Any potential adverse impacts to the Indiana bat would be eliminated by not cutting any trees or clearing snags during the Indiana bat's summer roosting season. The Indiana bat maternity roosting season is considered to begin on April 1st and last through August 15th, when maternity colonies begin to disperse. However, depending on the climatic conditions in a

particular year, females and young-of-the-year may remain in the maternity roost through mid-October. Tree removal would be avoided between April 1 and October 15 in areas of suitable maternity roosting habitat (USFWS Cookeville, no date). If tree removal cannot be avoided during the summer, emergence surveys may be performed, in concurrence with USFWS, on single trees in marginal roosting habitat to determine the presence of bats. Tree removal will immediately follow the emergence survey if results are favorable to avoiding adverse impacts to tree roosting bats.

The proposed UPF area is located in a previously developed area containing several overhead features; including pole mounted lighting fixtures, utility poles, and overhead transmission lines. The proposed area is not a known foraging corridor for the Indiana bat. Any presence of equipment (e.g. skyscraper cranes), equipment movement or noise from construction activities would occur during the day and cease prior to those times of day (sunset through nighttime hours) when the Indiana bats are utilizing the stream corridors for foraging. It is not anticipated that the Indiana bat would be disrupted during foraging activities by the presence of construction equipment. No significant emissions or effluents would be produced by construction of the proposed facilities that could directly impact roosting or foraging habitat, upland forests, wetlands or streams that could indirectly affect the abundance of aquatic or terrestrial insects on which the bats might prey. Fueling activities will occur distant from streams and storm sewers to avoid impacts to streams. Releases or spills from transportation and waste-handling accidents are not expected to increase from the proposed action. Equipment for containment, prompt cleanup and response training for accidental spills would minimize the potential impacts. Standard best management practices (BMPs) for controlling soil erosion and stormwater flow from construction activities will minimize potential impacts to the streams from flooding, increased sedimentation and stormwater runoff. Construction BMPs include use of silt fences, hay bales, and prompt or interim revegetation to control soil erosion and settling/retention ponds to control stormwater runoff. Although impacts might occur from construction of the proposed facilities these impacts are not expected to adversely impact roosting or foraging habitat of the Indiana bat, water quality of streams, or upland forested areas.

Operation of the proposed facilities might result in impacts from:

- increased chemical or radiological toxicity of effluents or emissions which might affect bats, the availability of benthic insects or increase contaminants that bioaccumulate in the food chain and
- increased lighting that would attract insects which might be used as prey by bats.

Chemical and radiological exposure to humans and biota are expected to decrease from the increased efficiencies associated with the modernization of the proposed facilities. Y-12 is the source of mercury and other legacy contamination (PCB) in sediments of upper EFPC. Fish and other fauna of the upper EFPC floodplain continue to have high levels of contaminants. Some cleanup actions to remediate the mercury contamination have been completed; others are ongoing or planned. Aquatic and terrestrial biota will continue to be monitored under BMAP.

Radiological exposure from the proposed UPF will not exceed dose limits for human exposures which are protective of wildlife. DOE has recently developed a graded approach to determine

radiation doses to aquatic and terrestrial biota (DOE 2002b). Newly proposed dose limits for aquatic (1 rad/day) and terrestrial (0.1 rad per day) biota are several orders of magnitude lower (0.1 rad/day approximately 36,500 mrem per year) than human dose limits (100 mrem per year). Initially during a screening phase, maximum radionuclide concentrations in surface water, sediment, and soil are compared to media-specific BCG. Site-specific sampling of biota, soil, sediment and/or surface water will follow where calculated absorbed dose rates exceed the dose limits. Locations on upper Bear Creek and upper EFPC are expected to undergo additional site-specific analysis. Sampling for terrestrial biota dose assessment was begun only recently (DOE 2008).

At night, the Y-12 Complex is currently well-lighted for security purposes, which attracts insects and potentially, bats. The Indiana bat, however, is reported to forage over water or upland forests and avoids large cleared areas to escape predation. Operation of the proposed facilities is not expected to adversely impact Indiana bats.

The ORR reservation contains many acres of high quality Indiana bat habitat with upland forest and dead pine snags adjacent to large bodies of water. Whereas, the Y-12 Complex and nearby areas contain only marginal summer roosting and foraging habitat for the Indiana bat. Summer colonies of Indiana bats are more dispersed in forests and more difficult to detect and monitor in annual surveys than gray bats. High quality Indiana bat roosting habitat on the ORR should be identified and monitored periodically (Mitchell and Martin 2002). DOE has previously committed to perform annual bat surveys as a part of wildlife management activities on the ORR (Giffen, Evans, and Parr 2007). Based on the information presented in this BA, the proposed action is not likely to adversely affect the Indiana bat.

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