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Comprehensive Integrated Planning:

A Process for the Oak Ridge Reservation Oak Ridge, Tennessee

May 1998

Prepared by
Lockheed Martin Energy Research Corporation
and
Lockheed Martin Energy Systems, Inc.
for the
U.S. DEPARTMENT OF ENERGY

MASTER

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ABBREVIATIONS

AM	Assistant Manager (DOE)	FY	fiscal year
ATDD-NOAA	Atmospheric Turbulence Diffusion Division—National Oceanic and Atmospheric Administration	GIS	geographic information systems
		HFIR	High Flux Isotope Reactor
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	LMER	Lockheed Martin Energy Research Corporation
		LMES	Lockheed Martin Energy Systems, Inc.
		M&I	management and integration
		M&O	management and operating
CROET	Community Reuse Organization of East Tennessee	NFI	no further investigation
		NPL	National Priorities List
D&D	decontamination and decommissioning	ORAU	Oak Ridge Associated Universities
DOE	U.S. Department of Energy	ORCMT	Oak Ridge Center for Manufacturing Technology
DOE-AL	DOE Albuquerque Field Office		
DOE-HQ	DOE Headquarters	ORISE	Oak Ridge Institute for Science and Education
DOE ORO	DOE Oak Ridge Operations	ORNL	Oak Ridge National Laboratory
DP	Defense Programs	ORR	Oak Ridge Reservation
EM	Environmental Management	ORRMT	ORR Management Team (DOE)
EM/EF	Environmental Management/Enrichment Facilities	OSTI	Office of Scientific and Technical Information
ES&H	environmental, safety, and health	PEIS	Programmatic Environmental Impact Statement
ESHQ&I	environmental, safety, health, quality, and infrastructure	R&D	research and development
		RMO	Reservation Management Organization
ETNG	East Tennessee Natural Gas	SMS	Site Management Services
ETTP	East Tennessee Technology Park	SSAB	Site Specific Advisory Board
ETMC	East Tennessee Mechanical Contractors	UEFPC	Upper East Fork Poplar Creek

INTRODUCTION

The Oak Ridge Comprehensive Integrated Plan is intended to assist the U.S. Department of Energy (DOE) and contractor personnel in implementing a comprehensive integrated planning process consistent with DOE Order 430.1, Life Cycle Asset Management and Oak Ridge Operations Order 430. DOE contractors are charged with developing and producing the Comprehensive Integrated Plan, which serves as a summary document, providing information from other planning efforts regarding vision statements, missions, contextual

conditions, resources and facilities, decision processes, and stakeholder involvement.

The Comprehensive Integrated Plan is a planning reference that identifies primary issues regarding major changes in land and facility use and serves all programs and functions on-site as well as the Oak Ridge Operations Office and DOE Headquarters. The Oak Ridge Reservation is a valuable national resource and is managed on the basis of the principles of ecosystem management

and sustainable development and how mission, economic, ecological, social, and cultural factors are used to guide land- and facility-use decisions. The long-term goals of the comprehensive integrated planning process, in priority order, are to support DOE critical missions and to stimulate the economy while maintaining a quality environment.

1. REGIONAL OVERVIEW

The Oak Ridge Reservation (ORR) is located in Roane and Anderson counties in East Tennessee and mostly within the corporate limits of the city of Oak Ridge (population 27,310, 1990 census). The ORR boundary lies in the southern and southwestern quadrant of the city limits. About 15 miles to the east is the city of Knoxville (population 165,121, 1990 census). Whereas these cities serve as the principal residences of ORR employees, the entire area from which ORR facilities draw employees encompasses more than 15 counties and has a total labor force of 357,000. This labor force is highly diverse, and many people are specially trained for production or high-technology-oriented industry. Refer to Figure 1 for the location of the ORR.

1.1 Regional Socioeconomic Impact

The presence of the ORR has a highly significant socioeconomic impact on the region. DOE Oak Ridge Operations (DOE ORO) is establishing partnerships with

public and private sector entities to alleviate the regional economic impact of DOE's reduced funding through redevelopment of underutilized assets and technology transfer. The lease of Parcel ED-1 to the Community Reuse Organization of East Tennessee (CROET) is one example of such efforts.

1.2 Community Attitudes and Stakeholder Involvement

DOE has many past and ongoing efforts to ensure that a broad range of stakeholder concerns, ranging from local public attitudes to attitudes of the global technical and scientific community, is assessed and incorporated into the reservation decision-making process. Stakeholder input, which facilitates decision making in collaboration with the public as well as state and federal agencies, is critical to the successful implementation of policy.

The Oak Ridge National Laboratory (ORNL), the Oak Ridge Y-12 Plant, and East Tennessee Technology Park (ETTP) (formerly the K-25 Site) provide opportunities for public review of many activities, and the Environmental Management (EM) organizations sponsor regular stakeholder involvement at the project level as well as the program level. The stakeholder involvement for this year's Comprehensive Integrated Planning process will consist of a public review of draft documents at strategic locations. Future iterations will be available on the World Wide Web. Refer to Section 4 (4.1.6, 4.2.6, and 4.3.6) of this document for a description of current stakeholder involvement activities at each of the plant sites.

1.3 Adjacent Land Use and Physical Characteristics

Land uses near the ORR are predominantly rural, with agricultural and forest land dominating. The city of

ORNL SHARED DATA INITIATIVE

LEGEND

-  Oak Ridge Reservation
-  Counties most affected by the ORR
-  Additional affected Counties
-  County Seat
-  National Park Boundary

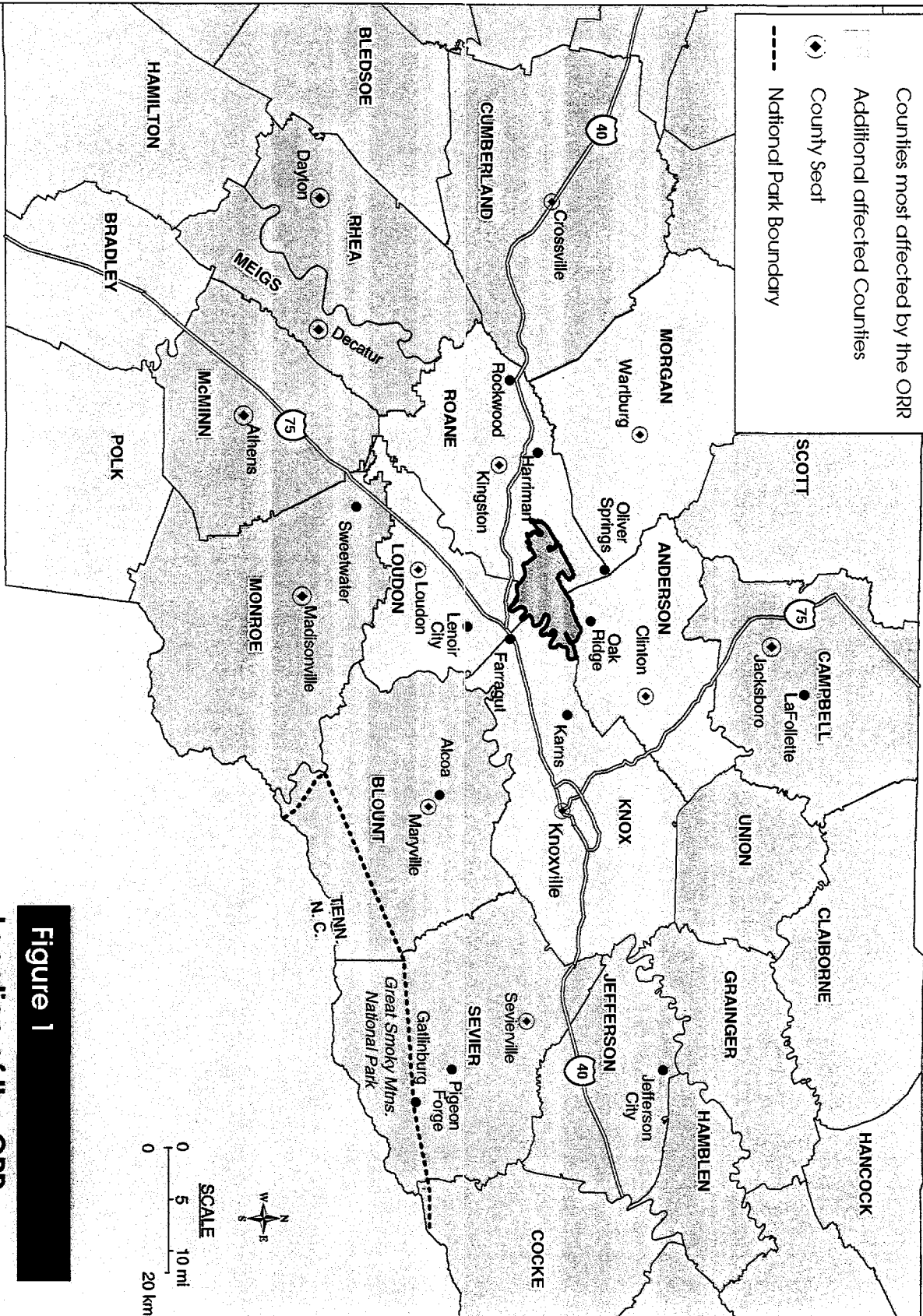


Figure 1

Location of the ORR
and Surrounding Region

Oak Ridge has residential areas primarily along the northern and eastern boundaries of the reservation. Some Roane County residents have homes adjacent to the western boundary. The Clinch River forms a boundary between Knox County, Loudon County, and portions of Roane County.

The area is characterized by a ridge and valley topography that provides security and isolation for the ORR but also constrains the land use because of moderate to severe slopes.

The hydrogeology of the ORR is complex. Highly fractured interbedded shale-limestone units predominate, and karst features are prevalent in some areas. These characteristics make it difficult to predict and monitor movement of groundwater. Protecting groundwater quality on the ORR is extremely important to ensure that potential contamination does not spread to the surrounding region.

2. OVERVIEW OF THE OAK RIDGE RESERVATION

The ORR currently consists of 34,516 acres of federally owned land and is the site of four DOE installations: the ETRP, the Y-12 Plant, ORNL, and the Oak Ridge Institute for Science and Education (ORISE).

2.1 Oak Ridge Reservation Vision

The ORR serves as an integrated science, education, industrial, and technology complex managed by DOE in partnership with the private sector—supporting a dynamic regional and national economy.

The intent of the federal government is to manage the reservation as a single parcel. DOE will retain sole responsibility and will continue to manage it in support of DOE missions. Future use is to include a mixture of activities that are compatible with and contribute to ongoing and anticipated DOE missions. According to current plans, the reservation will be used to support many of the same programs it currently supports while adapting to

changing national goals and interests and to reduced federal budgets.

2.2 Planning Assumptions

The following important points related to the way DOE missions affect future ORR land use emerged from a recent stakeholder involvement effort called the Common Ground Process.

- DOE missions will be given priority for future use of the ORR.
- Because it is impossible to know the nature of all future DOE activities, planning should preserve reasonable flexibility to allow the establishment of other DOE activities on the ORR. Where the nature of future DOE activities is known, appropriate sites should be reserved for those purposes.
- Among DOE activities included in future ORR land-use plans are research and development (R&D), environmental restoration, and the treatment and long-

term management of wastes generated on the ORR.

- Because of the risks associated with some DOE operations, it is appropriate to maintain buffer areas within the reservation and to coordinate an emergency planning and response capability with state and local governments.

A significant portion of the reservation will be maintained as federal land. A robust R&D mission is anticipated to continue for ORNL, and an industrial capability will continue at the Y-12 Plant to support the maintenance of the enduring nuclear weapons inventory. ORNL includes a primary site, where most of the facilities are located, and the National Environmental Research Park, where outdoor laboratory research is performed. Defense Programs (DP) work will continue to be performed at the Y-12 Plant, and the manufacturing footprint will be reduced consistent with the expected workload.

Future use planning will primarily support ongoing and anticipated DOE missions. Portions of the reservation will be used to promote the development of private-sector enterprises in ways that are consistent with and complementary to DOE missions. Support also has been expressed for various forms of passive recreational use that are compatible with anticipated research, industrial, and conservation uses of the reservation.

DOE's reindustrialization initiative is highlighted at ETPP, where private industry is directly involved in cleanup operations as well as leasing of areas for nongovernment work.

The reindustrialization and/or reuse of DOE facilities to directly or indirectly offset the cost of cleaning up contaminated facilities will have a dramatic effect on the reservation. DOE's current plans are to substantially complete currently planned environmental restoration of its facilities by 2006. DOE's current cleanup plans are documented in *Accelerating Cleanup*:

Paths to Closure, Oak Ridge Operations Office (Draft DOE/EM-0342, February 1998).

Public-private partnerships will be used to further the programmatic interests of DOE, including those associated with environmental cleanup. Select areas of land may be sold or made available for private industrial development if and when the determination is made that it is appropriate to do so.

DOE will privatize facilities and the operation of utilities that serve ETPP. The ORR's primary electrical power transmission system, including the 161-kV transmission lines and the substations at each of the three plant sites (the Y-12 Plant, ORNL, and ETPP), is currently maintained and operated by the Y-12 Plant's Facilities Management Organization. DOE is presently negotiating with the Tennessee Valley Authority (TVA) about the transfer of the operation and maintenance responsibility for the DOE-owned 161-kV transmission lines. The Y-12 Plant is reviewing with

DOE the possibility of conveying the responsibility for the "river lines" portion of its electrical distribution system (located east and southeast of the Y-12 Plant) to the City of Oak Ridge. These river lines support activities to the south of Y-12 and are not mission-essential to the Y-12 Plant's operations. Two important facilities supported by the "river lines" are the Water (River) Pumping Station and the Water Booster Station, which support the Water Treatment Plant located north of the Y-12 Plant. Current plans call for the Water Treatment Plant and operating system to be turned over to the City of Oak Ridge in March 2000. If the water system is conveyed to the City of Oak Ridge, then the electrical supply to the Water Treatment Plant will need to be supplied from the city's electrical system. If the Water Treatment Plant is to be operated by the City of Oak Ridge, it appears logical for the city to control the electrical system that supports it.

For the next 10 years, significant defederalization and private development

is expected at the ETPP and the east end of the Y-12 Plant. During this time frame, significant areas of the reservation need to be retained in order to discharge the current mission of DOE in Oak Ridge and to provide the ability to pursue future initiatives, particularly the construction and operation of major scientific facilities such as the Spallation Neutron Source.

2.3 History

For more than 50 years, government missions and operations have been the primary factor in the development of Oak Ridge. In 1942, approximately 58,575 acres (the original acreage of the ORR) was purchased to build facilities for large-scale production of fissionable material for the world's first nuclear weapons. In 1943, construction began on the X-10 nuclear research facility (now known as ORNL), the first uranium enrichment facility (the Y-12 Plant), and a gaseous diffusion enrichment facility (the current ETPP). By mid-1945, "the city behind the fence," so-

called because of the extensive use of security checkpoints and fences on the site, had a population of 75,000, and employment at the three installations reached a peak of 82,000. The end of World War II came shortly thereafter in September 1945, and the population of Oak Ridge began to decline as people began returning to their pre-war occupations.

A summary of management changes on the ORR since 1947 follows.

- In January 1947, the Atomic Energy Commission assumed control of the operations at Oak Ridge as part of its mandate to oversee the nation's nuclear energy effort. The Union Carbide Nuclear Division was contracted to manage the land and installations for the government, implementing the strategic long-range plans of the Atomic Energy Commission to sustain Oak Ridge as a center of nuclear research and production.
- In 1975, the Energy Research and Development Administration succeeded the Atomic Energy Commission as the operator of the reservation.
- With the formation of DOE in 1977, oversight of the Oak Ridge installations became the responsibility of DOE ORO.
- In 1984, Martin Marietta Energy Systems, Inc., replaced Union Carbide Nuclear Division as the prime contractor to DOE for ORR management. Through a merger with the Lockheed Corporation, Martin Marietta Energy Systems, Inc., became Lockheed Martin Energy Systems, Inc. (LMES) in 1995.
- In January 1996, Lockheed Martin Energy Research Corporation (LMER) was established and became prime contractor for ORNL, which includes the Oak Ridge National Environmental Research Park.
- In April 1998, Bechtel Jacobs Company LLC became the management and integration (M&I) contractor for

Environmental Management and Enrichment Facilities.

Since the end of the Cold War, the missions for the installations on the ORR have changed, as described below.

- The Oak Ridge Gaseous Diffusion Plant Cascade was placed in "ready standby" mode in 1985 and permanently shut down in 1987. The plant was renamed the Oak Ridge K-25 Site in 1990. The mission of the site, managed by the DOE's EM Program, became the demonstration of technology development for environmental restoration, waste management, and decontamination and decommissioning (D&D). In 1997 the site was renamed the East Tennessee Technology Park to reflect its new mission of reindustrialization. The LMES management and operating (M&O) contract for ETPP expired in April 1998 and was transitioned to an M&I contractor, Bechtel Jacobs Company.

- The Y-12 Plant's mission has changed from nuclear weapons production to limited production and increased emphasis on maintaining the capability to produce secondaries and cases (capability assurance) and to provide storage. The Y-12 Plant remains essential to the core stockpile management mission of the Nuclear Weapons Complex Defense Programs. The current M&O contract with LMES has been extended through March 2000.

- ORNL has become DOE's largest multiprogram R&D laboratory. Because the federal government owns the ORR and its status has been protected over a period of five decades, during which intensive characterization of the physical and biological components of the landscape has occurred, the ORR is perhaps the most intensively and extensively studied and understood parcel of land its size in the world. For this reason, the ORR plays an important role in the national

environmental research agenda; it is one of a few sites in the nation where large-scale ecological research, environmental technology, and measurement science intersect against a backdrop of 30 years of environmental monitoring and research on these lands. A new subsidiary, LMER, was recently formed as the M&O contractor at ORNL. The current M&O contract with LMER extends through March 2000.

- ORISE is managed and operated by Oak Ridge Associated Universities (ORAU) for DOE through a contract that extends through December 1998.

2.4 Summary of Land Conveyances

The population of neighboring counties, primarily Knox County, is growing toward the ORR. Roane and Anderson counties and the City of Oak Ridge have continued to request that DOE release some underutilized properties for commercial, industrial, and residential land uses. DOE

has evaluated and responded to these requests on a case-by-case basis as summarized in this section.

Of the original 58,575 acres of land purchased in 1942 by the federal government, 24,059 acres have been sold and 34,516 acres remain within the ORR. A summary of these conveyances is presented below.

- Private entities and homeowners: 12,682 acres, including permanent road easements granted to the city, counties, and state and land for rail service, area churches, house lots, country club and golf course development, sporting clubs, quarry operations, cemetery association, Girl and Boy Scout organizations, and conveyances and exchanges for a medical complex.
- City of Oak Ridge: 5,960 acres for development purposes such as residential, commercial, industrial, school site, utilities, roads, municipal properties, and public housing.

- TVA: 2,992 acres.
- State of Tennessee: 2,316 for health, forestry, agricultural research, and a biomedical graduate school.
- Other federal agencies: 73 acres.

- Anderson County: 27 acres.
- Oliver Springs: 9 acres.

In 1979 the Secretary of Energy approved a program to permit DOE to make financial assistance payments to the City of Oak Ridge for a 5-year period under the authority of the Atomic Energy Community Act of 1955. The city submitted a self-sufficiency plan, which proposed that DOE sell land to the city for industrial and commercial development. DOE ORO determined that the land could be transferred directly at fair market value to the city in support of the self-sufficiency program rather than being reported excess to the General Services Administration for screening and subsequent disposal. When the self-sufficiency program ended, certain

remaining designated parcels that had been in review at the time were "grandfathered," thus permitting DOE to consider those transfers should the land become excess to the needs of DOE.

2.5 Reservation-Wide Land Uses and Missions

2.5.1 Current Land Uses

This section describes (1) the primary land-use designations on the ORR, (2) specific activities and uses that are reservation-wide, and (3) key land-use considerations (the National Environmental Research Park, surveillance and maintenance of infrastructure outside the plant sites, and ecosystem management).

The primary land-use designations on the ORR are shown on Figure 2 and listed below.

- ORNL: Institutional and research (national research laboratory),

KEY: POTENTIAL SITES

- Environmental Mgmt. Waste Mgmt. Facility (proposed locations)
- Oak Ridge National Laboratory Expansion
- Mammalian Genetics Research Facility
- Waste Handling, Packaging, and Solidification Facility
- Spallation Neutron Source (alternate sites)
- Joint Institute for Neutron Sciences
- Spallation Neutron Source (preferred site)
- Engineering Technology Complex
- Fusion Materials and Irradiation Facility



Current and Potential Future Land Uses

- Y-12: Industrial (defense support, manufacturing, and storage),
- ETP: Mixed industrial (EM and reindustrialization),
- ORISE: Institutional and environmental laboratory, and
- Areas outside the primary mission areas: Mixed research and future DOE initiatives.

Specific activities and uses that are reservation-wide are listed below.

- Oak Ridge National Environmental Research Park
- environmental research and demonstration areas
- safety training facilities and associated safety buffers (surface danger zones)
- transportation
- utilities
- public use areas (Clark Center Recreation Park, visitors centers)

- ecological resources management
- land application of biosolids
- education
- wetland mitigation
- waste management
- environmental monitoring
- environmental restoration
- protected cultural resources
- conservation of unique ecological resources
 - State Natural Areas
 - Oak Ridge Wildlife Management Area
 - Nature Conservancy–ranked biodiversity sites
 - Nature Conservancy–designated landscape complexes
 - Research Park endangered species habitats (natural areas)
 - Research Park endangered species potential habitats (reference areas)
 - wetlands

- Oak Ridge National Environmental Research Park Biosphere Reserve
- emergency response planning zones

National Environmental Research Park.

The mixed-use activity that occupies the largest portion of the ORR is the Oak Ridge National Environmental Research Park, comprising approximately 21,980 acres. The Research Park is an outdoor laboratory for studying the nature of present and future environmental consequences stemming from DOE's mission. It provides a protected land area for research and education in environmental sciences and is used to demonstrate that environmental quality can be compatible with energy technology development and does not preclude planned and selected development and other activities approved through the land-use approval process discussed in Section 3.4.

The National Environmental Research Park is an ORNL User Facility with more than 700 users from colleges, universities,

industries, Lockheed Martin, and other (i.e., non-DOE) state and federal government agencies over the past 5 years. The Research Park coordinates natural resource management for the ORR. Some contaminated areas exist in the Research Park, and it serves as a buffer area for ongoing hazardous operations at the DOE installations.

Surveillance and Maintenance of Infrastructure Outside the Plant Sites.

The policy of the responsible organizations at each of the sites is to conduct surveillance and maintenance activities to maintain the exterior properties (areas outside main fences) within their geographic area of responsibility in a safe and environmentally sound condition. Maintenance on state highways and city-owned roads that cross the ORR is not the responsibility of DOE contractors.

East Tennessee Mechanical Contractors (ETMC) is the DOE prime contractor responsible for selected infrastructure

maintenance outside the main security fences within the ORR. ETMC performs maintenance on selected paved and unpaved DOE roads; culverts and bridges associated with the selected roads; cemeteries; selected fields, yards, and firing ranges; and George Jones Memorial Baptist Church. ETMC also operates a DOE-owned water treatment plant (which provides potable water to most of the ORR), a water booster station, a water intake station, and raw water lines and treated water lines up to the boundaries of the city of Oak Ridge, the Y-12 Plant, and ORNL.

The major utilities serving the ORR are electrical power, raw and treated water, natural gas, and telecommunications (see Figure 3). Utility suppliers with specific maintenance responsibilities with respect to easement rights-of-way for utilities and various other purposes are as follows:

- TVA,
- East Tennessee Natural Gas (ETNG),

- Oak Ridge Utility District,
- BellSouth,
- Cumberland Utility Board,
- City of Oak Ridge, and
- US West.

The Y-12 Plant's Facilities Management Organization has the overall operational and maintenance responsibility for the DOE-owned power lines across the ORR and for DOE-owned gas lines from the ETNG metering stations that feed the ORR installations. These responsibilities remained with LMES after the M&I

contract with Bechtel Jacobs Company began on April 1, 1998. The gasoline from the ETNG metering station feeding ETTP is managed, operated, and maintained by Operations Management International, Inc. DOE is presently negotiating with TVA about the transfer of the operation and maintenance responsibility for the DOE-owned 161-kV transmission line from ETTP to ORNL and the Y-12 Plant.

ORNL SHARED DATA INITIATIVE

LEGEND

- Water Mains
- - - Natural Gas Line
- - - Natural Gas Line - OR Utility District
- - - Natural Gas Line - Rockwood
- Electrical Lines
- Telecommunications Lines
- Fiber Optic Line
- Sanitary Sewer Line
- Water Treatment Plant
- ▲ River Pumping Station
- Water Reservoir
- Electrical Substation
- Natural Gas Station

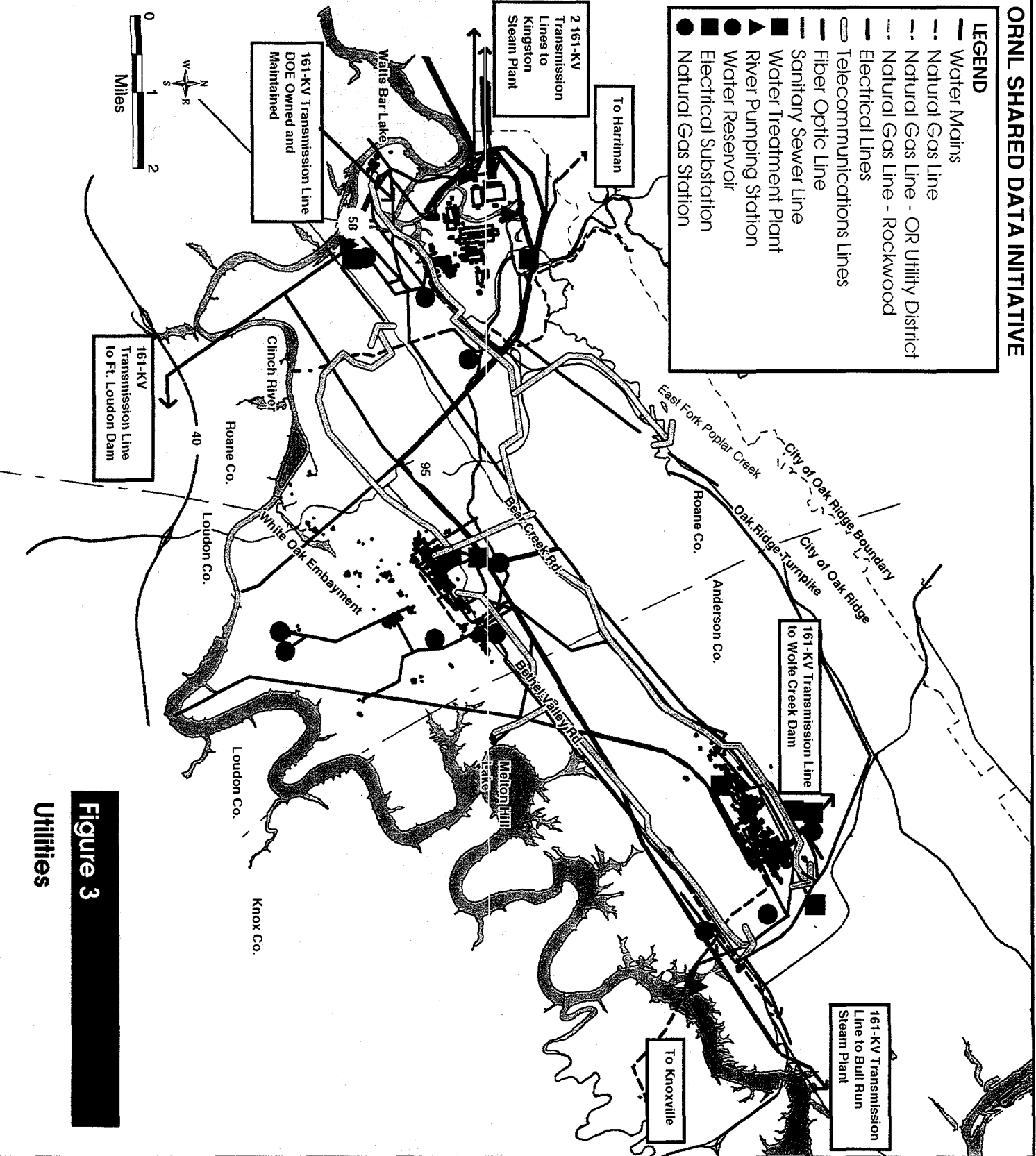


Figure 3

Utilities

Ecosystem Management. DOE has committed to exercising stewardship over its assets based on ecosystem management principles (*Stewards of a National Resource*, 1995). An ecosystem is an interconnected community of living things, including humans, and the physical environment within which they interact (*The Ecosystem Approach: Healthy Ecosystems and Sustainable Economies*, 1995). Ecosystem management integrates ecological, economic, and social factors (*Comprehensive Land-Use Planning Process Guide*, 1996). Land-use planning for the DOE ORR will incorporate elements that promote ecosystem management, such as clustering like uses, preserving clean areas, reusing disturbed areas, preventing pollution, protecting natural and cultural resources, balancing costs and benefits, considering future generations, optimizing appropriate recreational use, ensuring compatibility with the surrounding landscape, and integrating stakeholder input.

2.5.2 Future Land Uses

Future land uses are dependent on funding for missions, activities, and projects. The current proposed future initiatives on the ORR are as follows:

- Spallation Neutron Source;
- environmental research on the National Environmental Research Park;
- EM waste management facility;
- ORNL expansion;
- Laboratory for Comparative and Functional Genomics;
- Waste Handling, Packaging, and Solidification Facility;
- Joint Institute for Neutron Sciences;
- Large-Scale Environmental Process Research;
- Engineering Technology Complex;
- Fusion Materials Irradiation Facility; and
- reindustrialization/commercial development.

Figure 2 shows the currently known potential sites for proposed DOE facilities on the ORR.

Other portions of the Research Park have been identified for additional uses, as described in the *Oak Ridge National Laboratory Land and Facilities Plan* (1998).

2.5.3 Non-Site-Specific Missions

Each of the installations on the reservation supports its own mission; however, three missions involving enhanced interface and partnerships with private industry are reservation-wide—environment management, reindustrialization, and technology transfer. These missions are described below.

Environmental Management. DOE ORO has incorporated aggressive management and productivity goals into its planning for the accelerated completion of the DOE EM mission. Key to the accomplishment of these goals are the following assumptions.

- Reindustrialization will be the primary method of accomplishment for D&D of the ETPP.
- An on-site waste management facility will be operational on the ORR in fiscal year (FY) 2000 for wastes resulting from Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) actions.
- The watershed approach will be implemented for assessment and cleanup of the ORR (refer to Figure 4 for location of surface areas contaminated with hazardous wastes from government activities and watershed projects).

Stakeholder Involvement. DOE ORO has had extensive stakeholder involvement in its EM planning effort. A series of public meetings are being held at which the planning assumptions and results of project sequencing are discussed. A representative board of public stakeholders has been chartered as part of the formal review process for EM

activities. Known as the Site Specific Advisory Board (SSAB), its purpose is to make recommendations to DOE and its regulators in the areas of environmental restoration, waste management, and related activities. One outcome of this board's activities has been the assignment of future land-use designations for specific areas requiring remediation and restoration. Contractors will use these designations to establish acceptable risk levels and corresponding cleanup levels. Issues are documented, and paths forward for implementation are identified. The public meetings have been collaborative and cooperative.

EM Future-Land-Use Assumptions. As stated in the *Accelerating Cleanup: Paths to Closure, Oak Ridge Operations Office*, published by DOE in June 1997, the EM future-land-use assumptions for the ORR are (1) controlled access (waste management areas), (2) industrial, and (3) open space (conservation areas). Future-land-use assumptions for ORR off-site areas are (1) industrial and

(2) recreational (conservation areas). An additional assumption is that institutional controls will be required for only a small portion of the ORR that is under the stewardship of the EM program.

Footprint Reduction Process. In December 1989, the ORR was placed on the National Priorities List as a high-priority hazardous waste site requiring remediation and subject to use restrictions imposed by CERCLA. In 1996, DOE began an incremental investigation of segments of the ORR that had not been used for purposes related to hazardous materials. The goal of this process is to release the surface use of uncontaminated segments of land from restrictions imposed by cleanup laws. Subsurface restrictions would still apply in affected areas. Known as the Footprint Reduction Process, this activity is transitioning back about 5,000 acres per year for other DOE purposes (See Figure 5).

ORNL SHARED DATA INITIATIVE

KEY

- 1 - K-25 Watershed
- 2 - Bear Creek Watershed and Project
- 3 - Bethel Valley Watershed
- 4 - White Oak Creek Watershed
- 5 - UEPPC Watershed
- 6 - Union Valley Watershed

LEGEND

- Contaminated Areas
- Watershed Projects

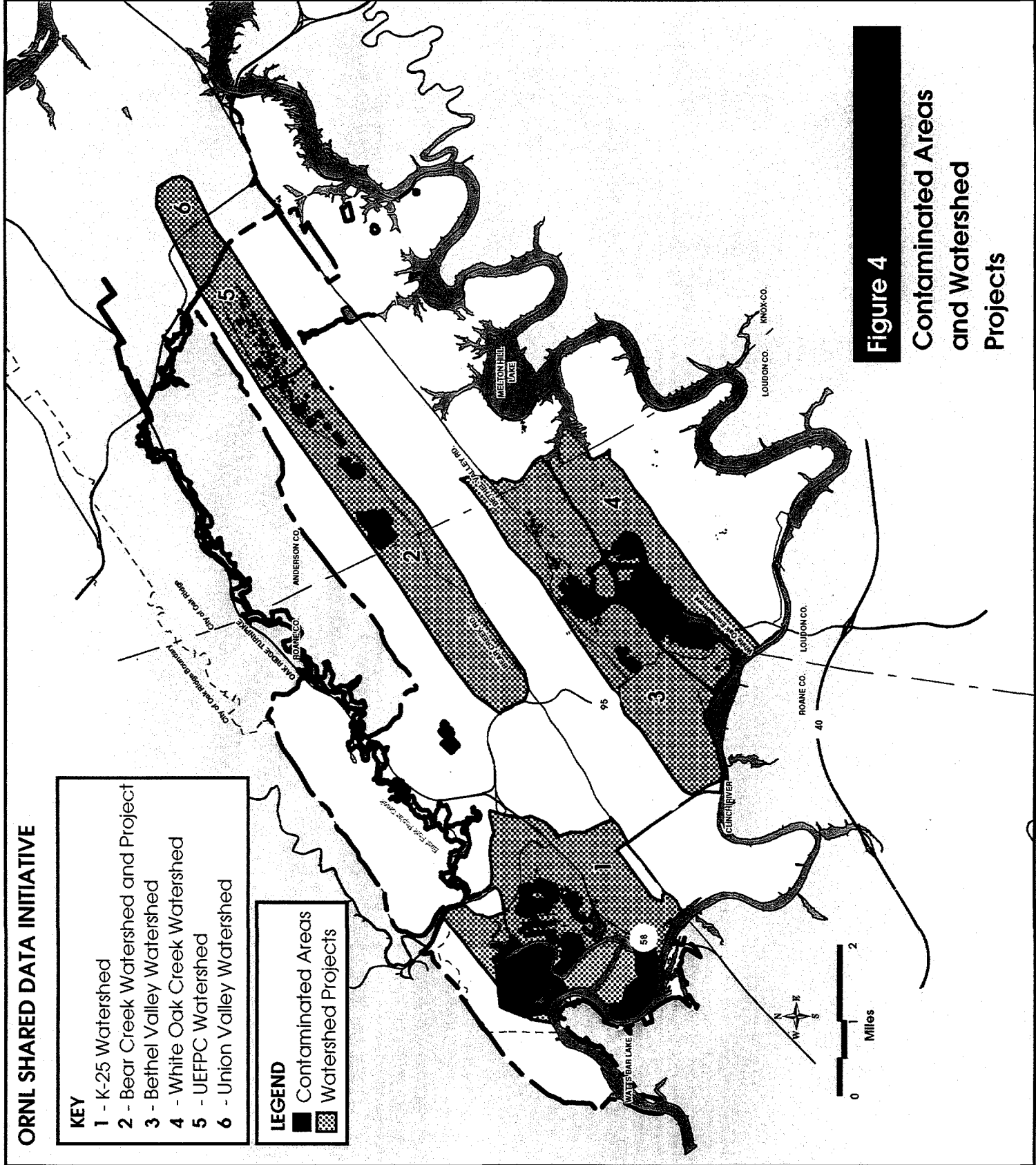


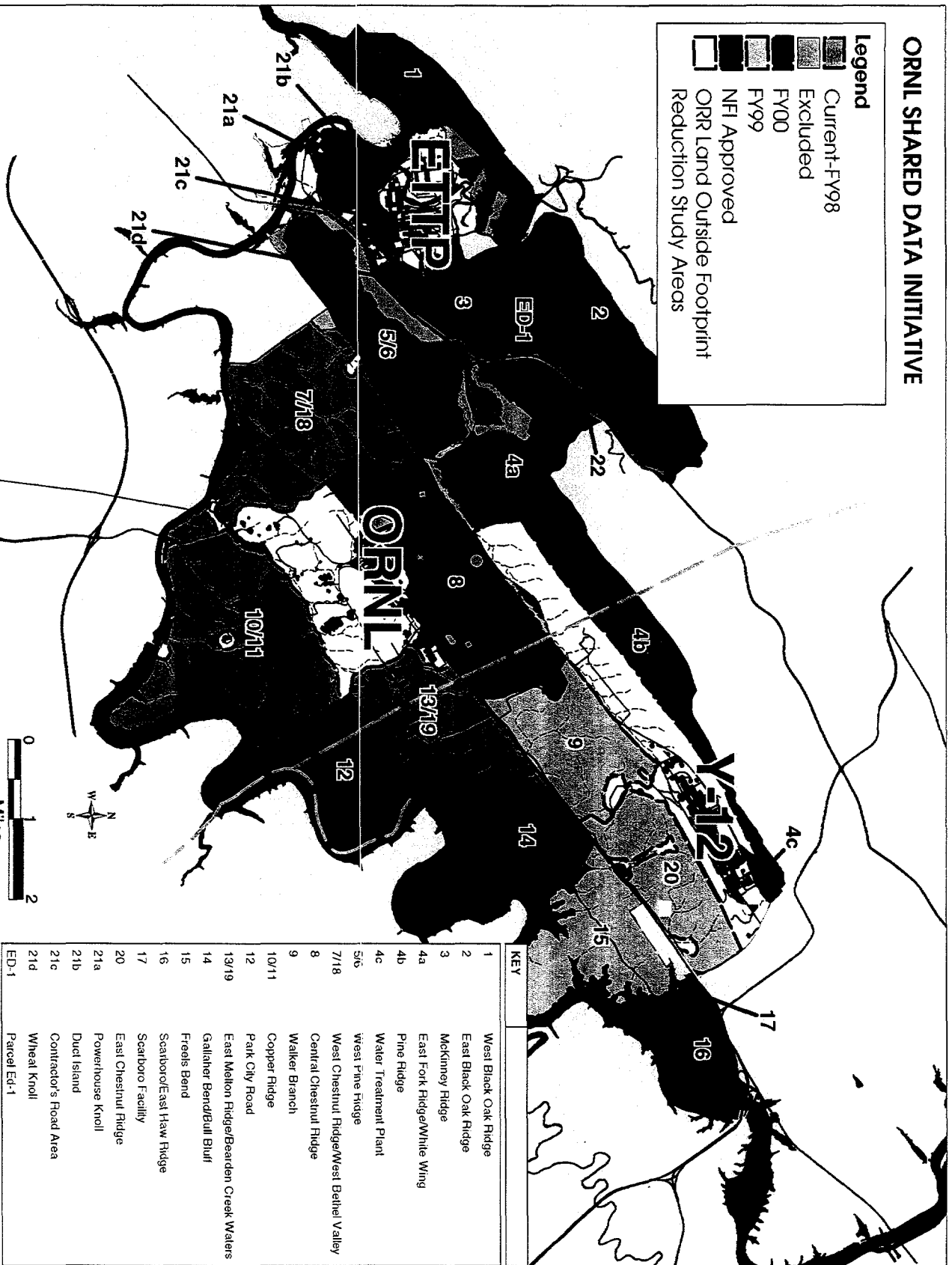
Figure 4

**Contaminated Areas
and Watershed
Projects**

ORNL SHARED DATA INITIATIVE

Legend

- Current-FY98
- Excluded
- FY00
- FY99
- NFI Approved
- ORR Land Outside Footprint
- Reduction Study Areas



KEY	
1	West Black Oak Ridge
2	East Black Oak Ridge
3	McKinney Ridge
4a	East Fork Ridge/White Wing
4b	Pine Ridge
4c	Water Treatment Plant
5/6	West Pine Ridge
7/18	West Chestnut Ridge/West Bethel Valley
8	Central Chestnut Ridge
9	Walker Branch
10/11	Copper Ridge
12	Park City Road
13/19	East Melton Ridge/Bearden Creek Waters
14	Gallagher Bend/Bull Bluff
15	Freets Bend
16	Scarboro/East Haw Ridge
17	Scarboro Facility
20	East Chestnut Ridge
21a	Powerhouse Knoll
21b	Duct Island
21c	Contractor's Road Area
21d	Wheat Knoll
ED-1	Parcel Ed-1

Figure 5

Footprint Reduction Study Areas

Reindustrialization. The goal of reindustrialization is to accelerate cleanup of the ORR, reduce the cost of EM activities within DOE ORO, and create new business opportunities and jobs for the region.

The emphasis of reindustrialization is to

- defederalize ETP by the year 2010;
- transition the underutilized physical, nonphysical, and infrastructure assets within the ORR to the private sector; and
- reuse DOE facilities and assets to accelerate cleanup and reduce costs, resulting in the creation of private-sector jobs.

Technology Transfer. The technology transfer mission is to conduct activities that transfer benefit from federal research to U.S. industrial competitiveness and regional economic growth by means of

- intellectual property licenses,
- tangible research products,
- cooperative R&D agreements,
- technical consulting,
- personnel exchanges,
- science education,
- reimbursable work for others,
- information exchanges, and
- user centers.

The individual missions of each of the four installations are described in Section 4.

3. THE OAK RIDGE RESERVATION LAND- AND FACILITY-USE PROCESS

Each installation on the ORR has a committee and process in place to identify, plan, and implement land- and facility-use changes based on programmatic need (refer to Section 4). These individual committees also ensure project review for various compliance issues. This section describes the objectives, land-use priorities, and the review process that constitute the ORR land- and facility-use process for proposed changes in land use outside the immediate plant site boundaries.

3.1 Goals

The review process of proposed land-use changes includes consideration of the goals presented below.

- Proposed changes should incorporate the ORR vision for land use.
- Proposed changes require safe and environmentally responsible evaluation and operation.

- Proposed changes should contribute to regional economic development.

- Similar activities and uses should be clustered to achieve synergistic benefits, except where programmatic requirements dictate a specific location.

- Proposed changes should give priority and due consideration to the reuse of disturbed areas, thereby preserving clean areas and optimizing future-use options for the reservation.

- Desired projects or activities should either minimize pollution or serve as innovative approaches to cleaning up existing disturbed areas.

- Proposed changes should be compatible with adjacent uses.

3.2 Land-Use Priorities

The following priorities have been established so that conflicts between competing uses can be resolved. Decisions concerning land-use changes

are made on a case-by-case basis to ensure compatibility with these priorities.

Priority 1—Preserve and protect land needed to meet the requirements of existing and future DOE mission-related facilities and programs that require large, biologically and physically diverse protected land areas so DOE can continue to meet its local, regional, and national mission obligations.

Priority 2—Maintain land and facilities to promote sustainable economic development for the region through enhanced DOE missions, as well as, through technology transfer and reindustrialization.

Priority 3—Protect the environment, meet the requirements of scientific and technical education, and support educational research opportunities on the ORR.

3.3 Review Process

When proposed changes in land use are outside of the immediate plant site boundaries, a comprehensive and integrated process is used to ensure the proper planning, coordination, and communication among DOE and the various contractor representatives. These proposed changes in land use are evaluated by subject matter experts, program managers, and senior management (if potential impacts are significant). Recommendations for changes in land use are made by senior management, on the basis of these evaluations. The roles and responsibilities of the key DOE and contractor personnel/committees involved in the ORR land- and facility-use decision-making process are described as follows.

ORO Manager—The final approval authority for all land- and facility-use changes submitted from internal and external sources. May initiate changes as needed. Forwards new requests through the review process.

DOE Assistant Managers (AMs)—Group consists of all DOE assistant managers; reviews and approves or rejects proposed land- and facility-use changes. May initiate changes as needed. Forwards approved changes to the ORO Manager.

DOE Assistant Manager for Project and Technical Services—Provides oversight management and coordination of land- and facility-use change process. Reviews ORR Management Team recommendations and coordinates with other AMs.

DOE ORR Management Team (ORRMT)—Consists of staff representatives from all major programs and functions within DOE ORO. Coordinates and integrates all ORR land-use management activities outside the plant boundaries. Reviews, comments on, and makes recommendations for proposed land- and facility-use changes submitted by contractor organizations (Land-Use Committee and Reservation

Management Organization) and external organizations or individuals.

Contractors Land-Use Committee—Consists of senior Lockheed Martin and Bechtel Jacobs Company management (vice president-level) representatives. Reviews, comments on, and approves proposed land- and facility-use changes submitted by the Reservation Management Organization. Chaired by LMER.

Contractors Reservation Management Organization (RMO)—Consists of contractor representatives. Obtains subject matter expert review and comments and makes recommendations on proposed land- and facility-use changes submitted by other process groups and individuals, project managers, and other internal contractor organizations. Provides communication, coordination, and integration services to DOE for ORR land-use management activities outside the plant boundaries. Provides coordination and interface with

contractor site organizations that have land- and facility-use responsibilities. Facilitates land- and facility-use planning services as needed by approval process individuals and organizations. Chaired by LMER.

3.4 Description of the Land-Use Approval Process

3.4.1 Changes in Primary Land-Use Designations

The primary ORR land-use designations, shown in Figure 2, are institutional/ research at ORNL, industrial at the Y-12 Plant, mixed industrial at ETRP (including Parcel ED-1), institutional/environmental laboratory at ORISE, and mixed research/ future DOE initiatives on areas outside primary sites. The DOE Oak Ridge National Environmental Research Park has a research designation.

Changes in the designation of these areas or portions of these areas require review through the Land Use Approval Process.

Proposed land-use designation changes generally originate internally from DOE and contractor personnel but include external sources also. Land-use designation changes typically have potential to impact activities and resources within the areas to be changed. DOE and/ or externally proposed land-use changes go directly to DOE ORRMT for review. Evaluation of impacts on activities and resources resulting from land-use designation changes is solicited, as required, from RMO by DOE ORRMT.

Contractor-generated proposals for land-use designation changes will be screened by RMO prior to submission to DOE ORRMT to ensure compatibility with mission and compliance requirements.

Significant or controversial issues identified by RMO are raised to the Land-

Use Committee for recommendation/ discussion with DOE AMs.

Following DOE ORRMT review of proposed changes in land-use designations, recommendations are forwarded to the DOE AMs for review through the DOE AM/C&E. Final land-use decisions rest with the DOE ORO Manager.

Decisions regarding land-use changes related to property excess are coordinated within DOE Headquarters (DOE-HQ) to determine if programmatic needs exist.

3.4.2 Changes in Activities on the Oak Ridge Reservation

Multiple activities occur within the land-use designations described above. Types of activities that require review are described in the *Oak Ridge Reservation Management Plan* (1997) and include any proposal with a potential impact on resources, current uses, or future initiatives.

Requests for changes in activities on the ORR generally originate from contractor personnel. In addition, some may originate from DOE or external sources and, as appropriate, are forwarded to RMO for evaluation and recommendation.

RMO reviews proposed changes to evaluate the potential for impact on various ORR resources or users. Input is solicited from subject matter experts with detailed knowledge of the location, resources, or other activities associated or potentially impacted. A formal process for the review by RMO is included in the appendix of the *Oak Ridge Reservation Management Plan* (1997). Subject matter expert input is summarized and evaluated by RMO.

Additionally, project leaders are encouraged to obtain RMO input on their proposals as early as possible to become

aware of potential conflicts at the initial stages of the planning process. This is followed by formal RMO review later.

Activity changes may need only RMO and DOE ORRMT review; however, in the case of significant or potentially controversial changes, recommendations are forwarded from the DOE ORRMT and the Land-Use Committee to the DOE ORO Manager via the DOE AMs for the final decision.

A final approval or rejection is then communicated through the DOE ORRMT Chair to the RMO Chair, who will inform the originating party.

Figure 6, on the following page, illustrates the land-use process for the ORR.

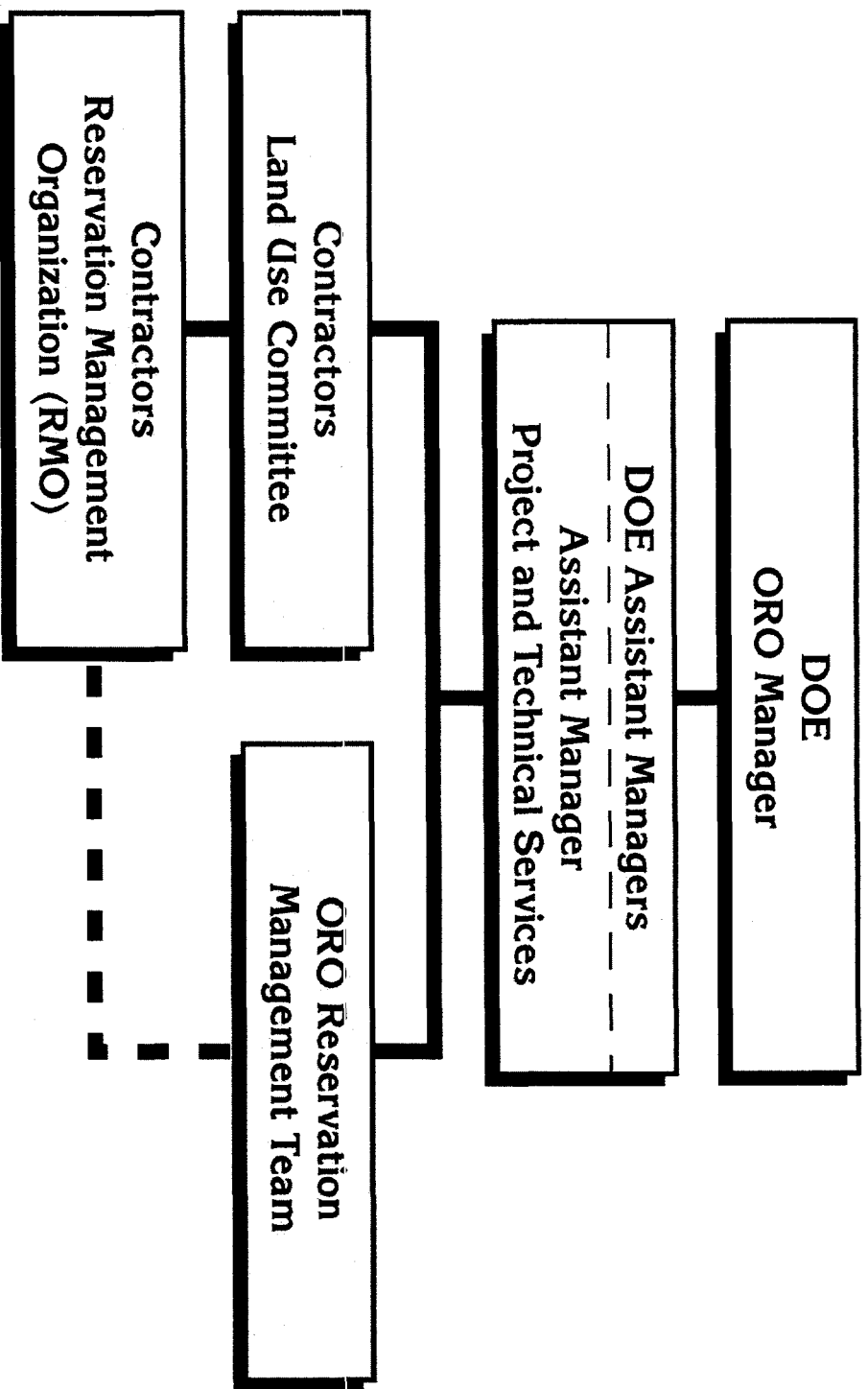


Figure 6
Land-Use
Approval Process
for the ORR

4. RESOURCES OF THE OAK RIDGE RESERVATION

Each installation on the ORR, as well as the two other prime contractors with real property management responsibilities, ETMC and ORAU, have been assigned real property management responsibilities for certain geographic areas on the ORR (see Figure 7). Portions of the National Environmental Research Park overlap the geographic areas of responsibility for the Y-12 Plant, ETPP, ORAU, and ETMC. Within these areas of overlap, the Y-12 Plant, ETPP, ORAU, and ETMC have real property management responsibilities.

4.1 Oak Ridge National Laboratory

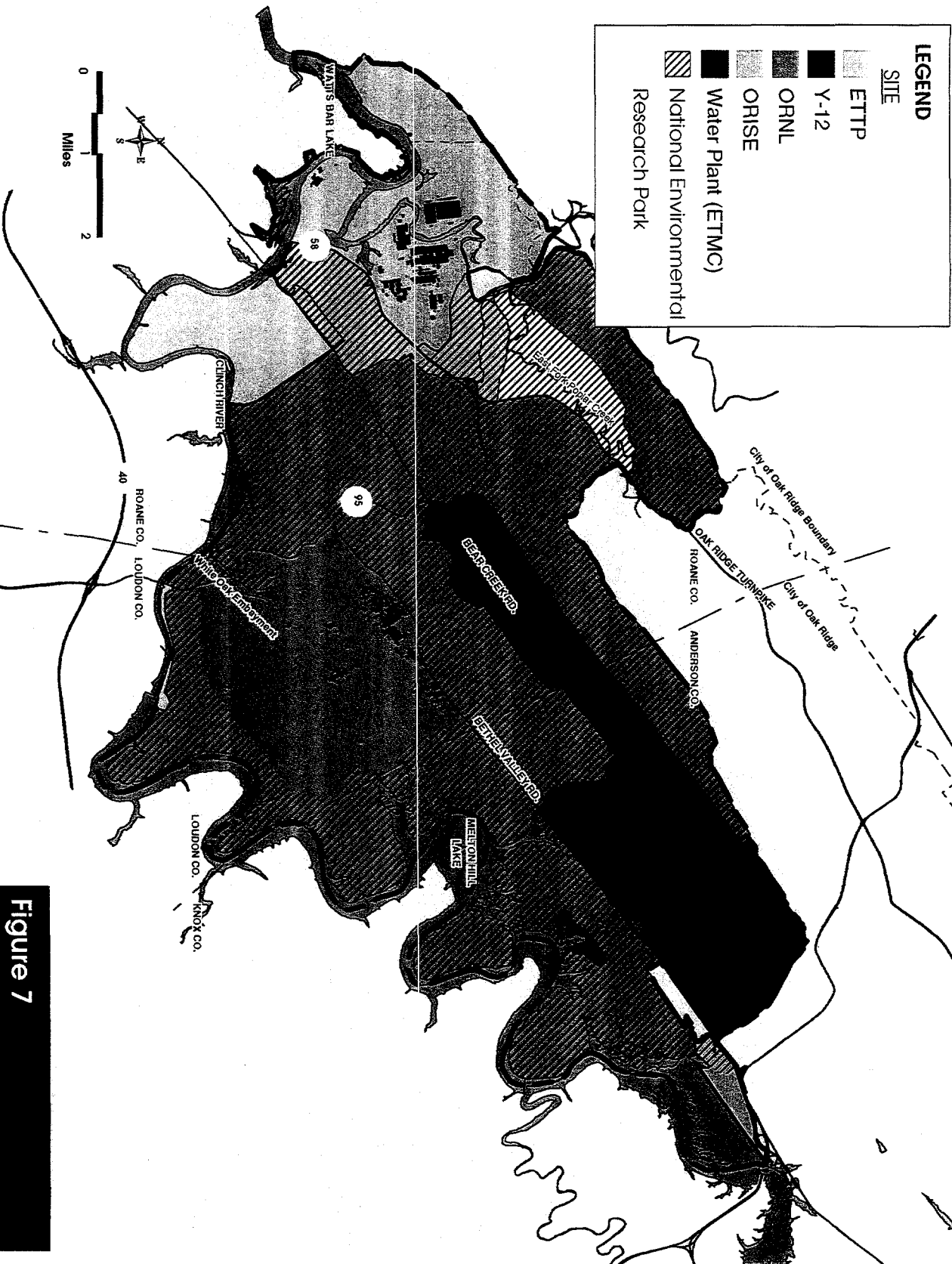
4.1.1 Mission

In support of DOE's missions, ORNL conducts basic and applied R&D to create scientific knowledge and technological solutions that strengthen the nation's leadership in key areas of science; increase the availability of clean, abundant energy; restore and protect the environment; and contribute to national security.

As a multiprogram national laboratory, ORNL carries out R&D in support of all four of the Department's major missions: science and technology, energy resources, environmental quality, and national security. The Laboratory plays a principal role in fundamental science and energy resources and applies special capabilities to support the Department's needs in environmental quality and national security. Key R&D activities that support the Department's major missions are as follows:

- Science and Technology
 - Analytical and separations chemistry
 - Environmental and social sciences
 - Fusion science and technology
 - Genetics, genomics, and biotechnology
 - Materials science and engineering
 - Neutron science
 - Nuclear physics and astrophysics with radioactive ion beams
- Energy Resources
 - Biomass: renewable energy feedstock and conversion technologies
 - Energy-efficient technologies for buildings, industry, transportation, and utility end-use
 - Fossil fuel: applied materials and turbines
 - Nuclear technology and safety
- Environmental Quality
 - Environmental restoration and waste management
 - Environmental technology development
 - Health and environmental risk assessment
- National Security
 - Management and disposition of weapons-related nuclear material
 - Promoting nonproliferation and international nuclear safety
 - Strategic computing for safe stockpile management

ORNL SHARED DATA INITIATIVE



ORNL focuses its capabilities through several areas of R&D emphasis:

- energy production and end-use technologies;
- neutron-based science and technology;
- advanced materials synthesis, processing, and characterization;
- biological and environmental sciences and technology;
- instrumentation and measurement science and technology; and
- computational science and advanced computing.

Integration of broad technical foundations—in physical, chemical, and materials sciences; biological, environmental, and social sciences; engineering sciences; and computational sciences and informatics—characterizes ORNL's R&D programs.

These capabilities and areas of R&D emphasis are described more fully in the

Oak Ridge National Laboratory Institutional Plan (1998) found on the World Wide Web at http://www.ornl.gov/inst_plan/IP_outline.html.

4.1.2 Land Use

The ORR is a unique and irreplaceable resource for DOE to address its national science and technology missions. Land-use planning will identify and prioritize needs for preservation of reservation land to meet the requirements of existing and future scientific facilities, environmental research, education, and other compatible uses.

ORNL management's expectation is that facilities and land currently in, or candidate for, the DOE EM program will be returned to ORNL for future use in support of DOE's R&D programmatic activities after all remedial actions have been completed.

The ORNL primary site is approximately 4,250 acres, the National Environmental Research Park is 21,980 acres, and the

additional reservation area for which ORNL has contractual responsibility for management (Solway Bend) is approximately 350 acres. Within the main site, the land use is institutional and research to support the core competencies listed above. The Oak Ridge National Environmental Research Park also includes uses that provide the foundation for and support ORNL core competencies. Specific uses include the following:

- environmental research and demonstration areas and facilities
 - neutron science research
 - Walker Branch Watershed Research Facility
 - Global Change Field Research Facility
 - environmental research areas
 - Bear Creek Valley Hydrology Field Sites
 - Field Lysimeter Facility
- National Environmental Research Park
 - research and demonstration areas
 - ecological resources management

- education
 - wetland mitigation
 - State Natural Areas
 - Oak Ridge Wildlife Management Area
 - Nature Conservancy-ranked biodiversity areas
 - Nature Conservancy-designated landscape complexes
 - Research Park Natural Areas and Reference Areas
 - wetlands
 - Oak Ridge National Environmental Research Park Biosphere Reserve
 - education
 - Ecological and Physical Sciences Study Center
 - environmental monitoring
 - environmental restoration
 - protection of cultural resources
 - emergency planning zones
- Environmental research is supported by DOE as well as other federal agencies (e.g., National Science Foundation,

U.S. Environmental Protection Agency, U.S. Department of Agriculture, and U.S. Department of Defense).

Land Requirements. A primary priority for land-use planning on the ORR is to retain the necessary land for existing and future scientific research facilities, programs, and various initiatives. The ORNL area has candidate sites for new initiatives by DOE and guest users. The following current and future proposed projects require land:

- ORNL expansion;
- Laboratory for Comparative and Functional Genomics;
- Waste Handling, Packaging, and Solidification Facility;
- National Isotope Separator On-Line Facility;
- Joint Institute for Neutron Sciences;
- Spallation Neutron Source;
- Engineering Technology Complex;

- Fusion Materials Irradiation Facility;
- environmental R&D;
- Transportation and Packaging Facility;
- Center for Computational Science; and
- Advanced Materials Characterization Laboratory.

Major scientific research programs of the DOE Office of Energy Research require a considerable portion of the land base of the ORR to meet mission objectives. The following research areas have been identified as important in pursuing future ecosystem or environmental research:

- Copper Ridge Research Area;
- Bull Bluff Research Area, North and South;
- White Wing Research Area;
- Walker Branch Watershed;
- Freels Bend;
- Melton Branch Watershed;

- Bear Creek Valley Hydrology Field Sites;
- Global Change Field Research Facility;
- Raccoon Creek Research Area; and
- Chestnut Ridge.

Future environmental partnership areas include (1) State Natural Areas (potential additions), with many locations around the ORR, and (2) wetland mitigation potential areas such as Freels Bend, Bull Bluff, and lower Bearden Creek. The *Oak Ridge National Laboratory Land and Facilities Plan*, currently in draft, will provide detailed maps of current and future reservation land and facility uses.

4.1.3 Facility Use

Current Facility Uses. Approximately 455 buildings, trailers, and other major facilities totaling 3.4 million square feet are located throughout the main ORNL site. ORNL facilities are also located outside the primary site boundary and at the Y-12

Plant. The distribution of ORNL's space is presented below.

Location	Area (square feet)
Main ORNL site	3,355,758
Y-12 site	1,381,666
Off-site (lease)	62,892
Total	4,800,316

Note: Square footage of ORNL facilities at the Y-12 Plant includes trailers.

About 139 facilities (buildings, structures, experimental systems, and equipment) at ORNL sites, including ORNL facilities at the Y-12 Plant, are currently inactive or projected to become inactive because the programs for which they were built have ended. Figures 8 and 9 show inactive/projected inactive facilities at ORNL. Figure 10 shows inactive/projected inactive ORNL facilities at the Y-12 Plant. Of the identified inactive/projected inactive facilities, approximately 100 facilities have

been accepted into either the EM40 or EM60 programs. These programs manage and ultimately dispose of facilities that have exceeded their useful life and that require continual surveillance and maintenance to ensure safe shutdown. Funding for these programs of renovation and disposal will be supplied by DOE EM. In the future, it is expected that the additional facilities will not be accepted into these programs. The other 39 facilities are currently inactive or will become so beyond FY 1999 because of a lack of definable mission and a continuing trend of declining budgets. Furthermore, it is expected that additional ORNL assets will become inactive as a result of obsolescence and deterioration. Whether or not additional facilities will be accepted into these DOE EM programs (EM40/EM60) in the future is uncertain. The objective of the ORNL Surplus/Inactive Facilities Program is to address these legacy facilities, achieving compliance with ES&H requirements while maintaining the necessary safety envelope through final disposition of the facilities.

ORNL SHARED DATA INITIATIVE

LEGEND

- Facilities Currently in EM D&D Program
- Facilities Projected for D&D by 2005

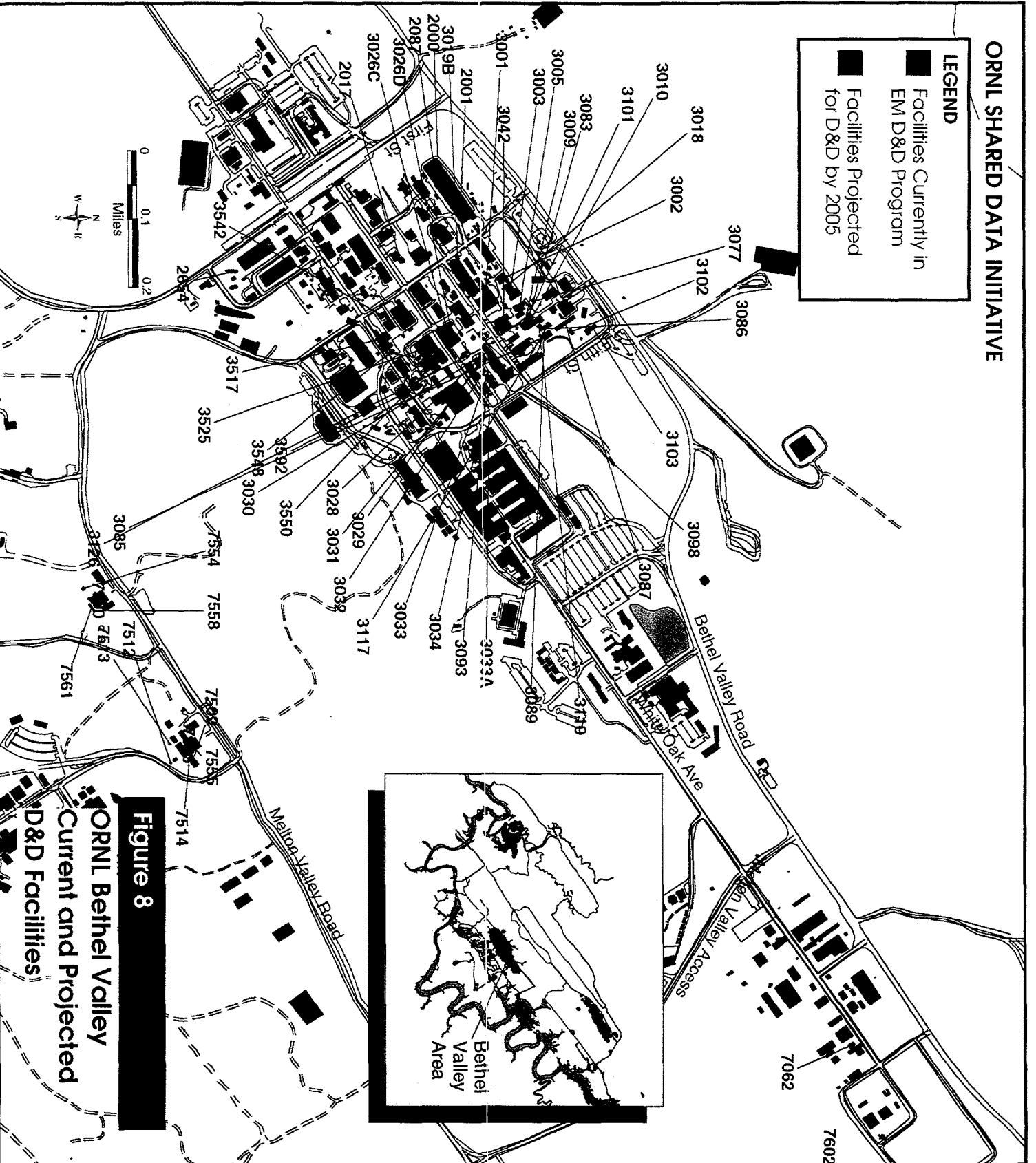


Figure 8

**ORNL Bethel Valley
Current and Projected
D&D Facilities**

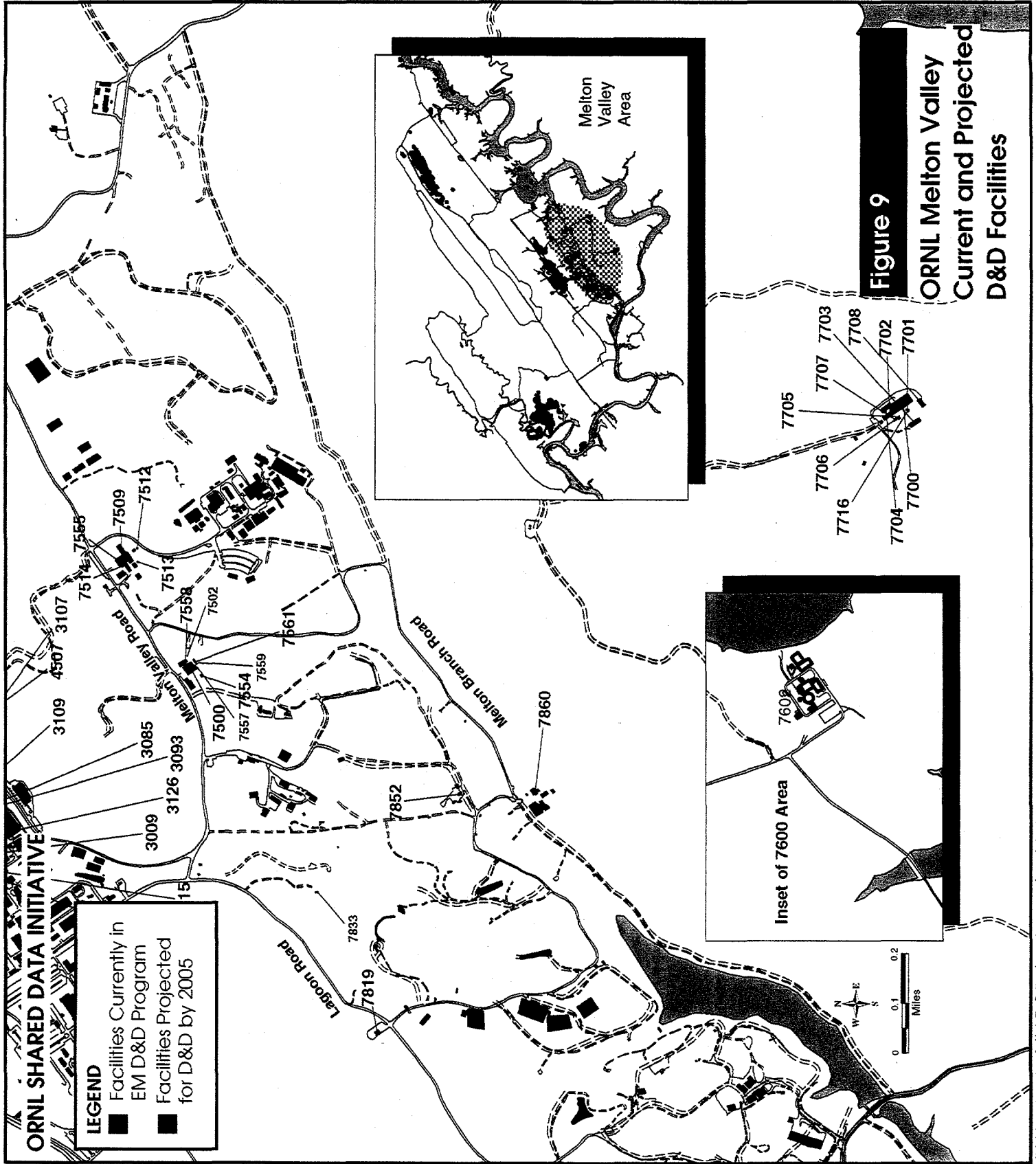


Figure 9
ORNL Melton Valley
Current and Projected
D&D Facilities

ORNL SHARED DATA INITIATIVE

KEY:

- 1 **9204-3** Plutonium Processing Facility
Curium Glovebox Handling Facility
Generator Motor, 9999-1
- 2 **9204-1** Contaminated Attic, East End Basement
Cathrate Test Facility
Inactive Hoods and Roof Stocks
Forced Convection Test Facility
Homogeneous Reactor Test
Thermal Energy Storage Test Loop
Tank, 2nd Floor
Basement Tanks
- 3 **9204-1K** Tank on Southeast Circle
- 4 **9201-2** 86-Inch Cyclotron
Thermal Heat Transfer Facility
- 5 **9419-1** Decontamination Facility
- 6 **9201-3** Single Rod Test Facility
Cool Lab Hood
Fuel Aerosol Test (FAST)
Small Oil Tanks (3), Basement
- 6 **9201-3** Coolant Salt Technology Facility
Molten Salt Corrosive Loop
Oil Tanks
- 7 **9743-2** Pigeon House
- 8 **9207** Biology Building

LEGEND

- Facilities Currently in
EM D&D Program
- Facilities Projected
for D&D by 2005

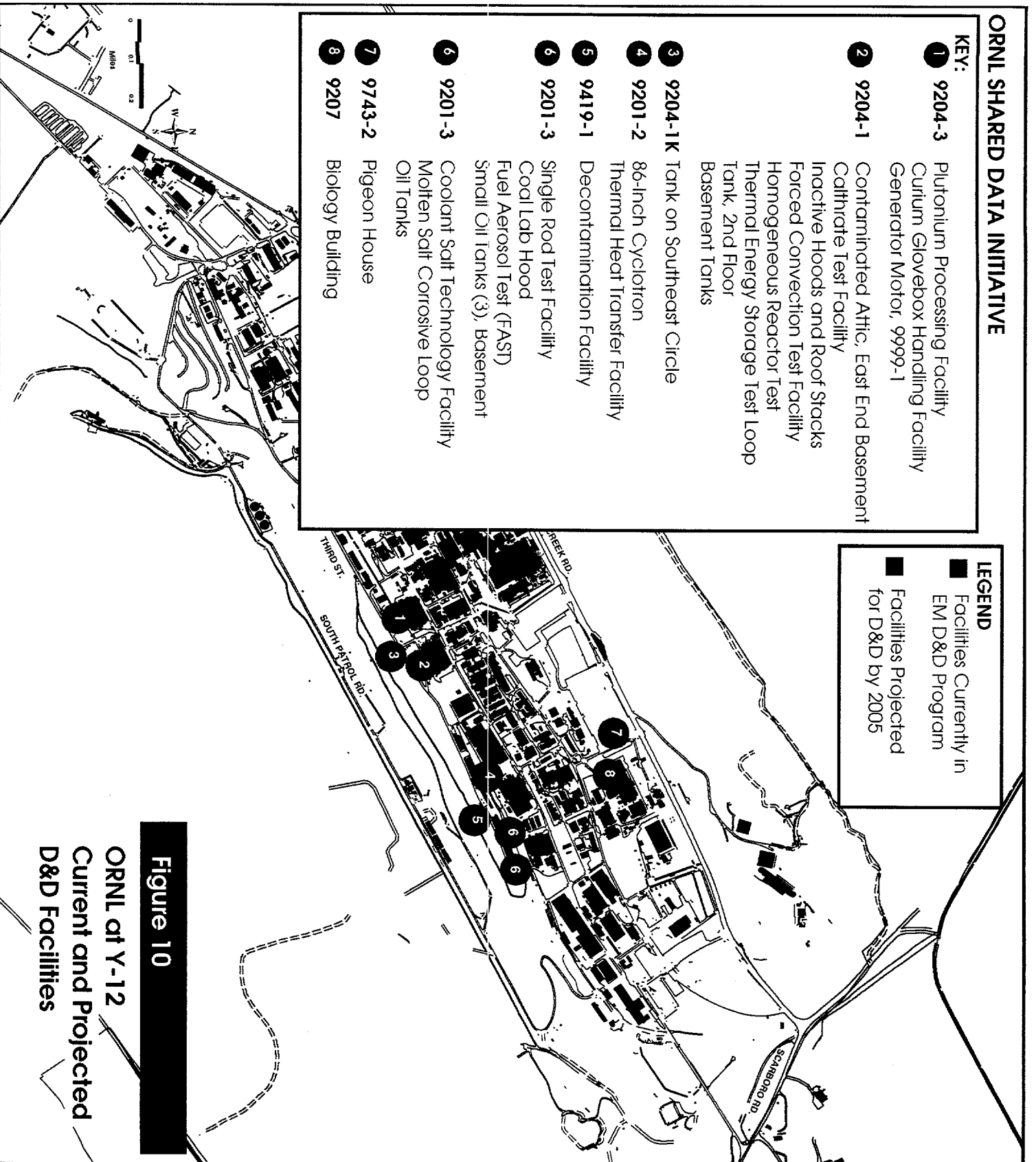


Figure 10

**ORNL at Y-12
Current and Projected
D&D Facilities**

Future Facility Uses. Major proposed initiatives in the Bethel Valley area include the Laboratory for Comparative and Functional Genomics, the Center for Computational Sciences, the Advanced Materials Characterization Laboratory, and the Isotope Separator On-Line Facility. The proposed site for the Spallation Neutron Source is located north of the main ORNL complex in Bethel Valley. Figure 11 shows the proposed locations of these facilities.

The major proposed initiative in the Melton Valley area is the High Flux Isotope Reactor upgrade and refurbishment, which would make the facility the most powerful research reactor in the world and greatly enhance the ORNL's already unique neutron science capabilities and programs. Other major proposed initiatives in Melton Valley include the Engineering Technology Complex and a Fusion Materials Irradiation Facility. These proposed initiatives reflect ORNL's long-term objective of consolidating all R&D facilities at the ORNL main complex

including facilities currently housed at the Y-12 Plant. Areas for waste operations and facilities are also proposed for Melton Valley. Refer to Figure 12 for the location of the proposed facilities in Melton Valley.

User Facilities at ORNL. An important part of DOE's science mission is to provide large-scale, complex scientific facilities for laboratory, academic, and industrial users. ORNL has 16 designated national user facilities:

- Atomic Physics EN Tandem Accelerator;
- Bioprocessing Research and Development Facility;
- Buildings Technology Center;
- Computational Center for Industrial Innovation;
- High Temperature Materials Laboratory;
- Holifield Radioactive Ion Beam Facility;
- Metals Processing Laboratory User Center;

- Metrology Research and Development Laboratory;
- Mouse Genetics Research Facility;
- Neutron Scattering Research Facilities;
- Oak Ridge Centers for Manufacturing Technology;
- Oak Ridge Electron Linear Accelerator;
- Oak Ridge National Environmental Research Park;
- Radiochemical Engineering Development Center Californium Facility;
- Shared Research Equipment Program; and
- Surface Modification and Characterization Research Center.

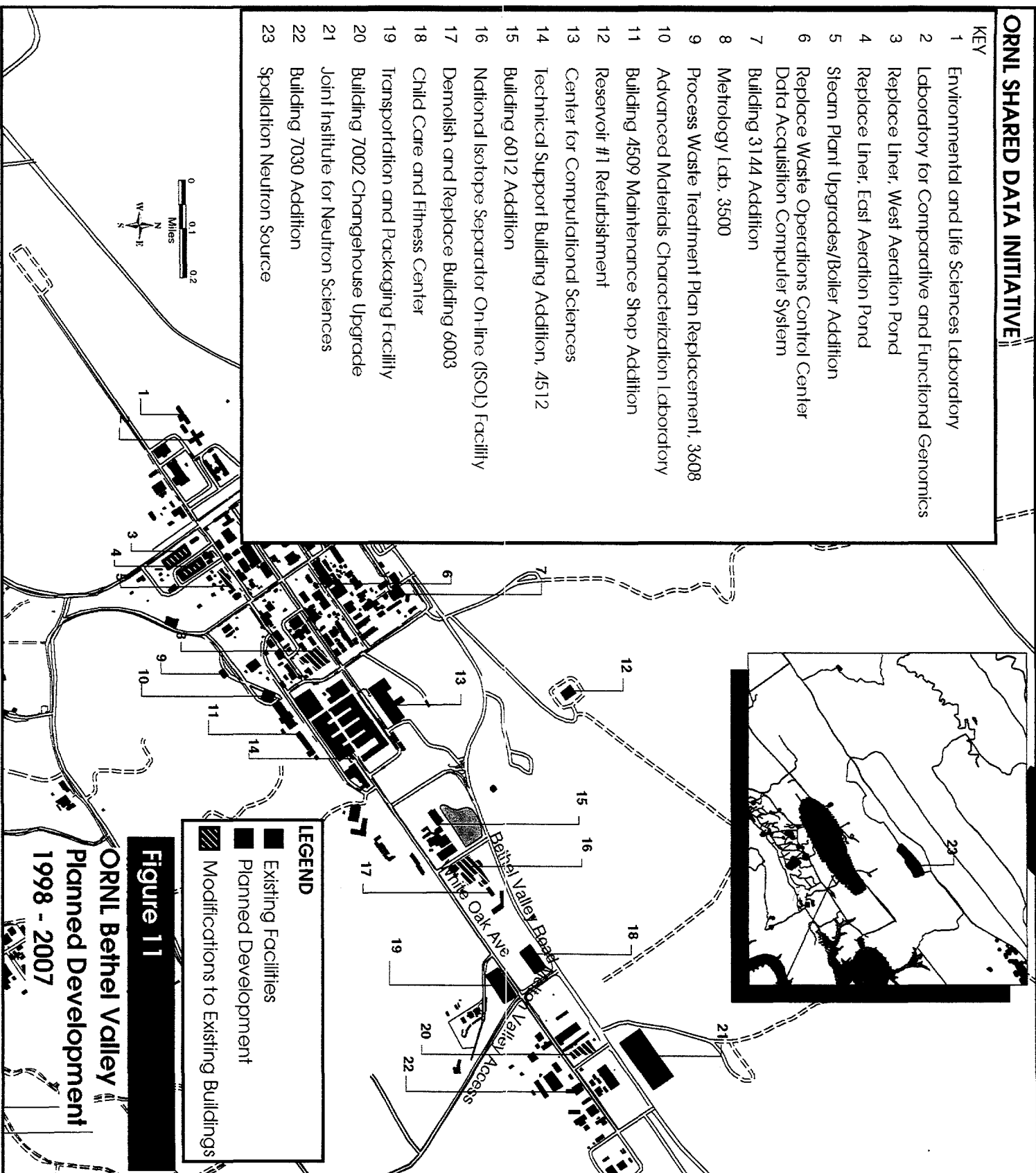
4.1.4 Infrastructure Needs

ORNL has one of the oldest physical plants in the DOE laboratory system. Appropriate infrastructure upgrades will be required as facilities and utility systems

ORNL SHARED DATA INITIATIVE

KEY

- 1 Environmental and Life Sciences Laboratory
- 2 Laboratory for Comparative and Functional Genomics
- 3 Replace Liner, West Aeration Pond
- 4 Replace Liner, East Aeration Pond
- 5 Steam Plant Upgrades/Boiler Addition
- 6 Replace Waste Operations Control Center Data Acquisition Computer System
- 7 Building 3144 Addition
- 8 Metrology Lab. 3500
- 9 Process Waste Treatment Plan Replacement, 3608
- 10 Advanced Materials Characterization Laboratory
- 11 Building 4509 Maintenance Shop Addition
- 12 Reservoir #1 Refurbishment
- 13 Center for Computational Sciences
- 14 Technical Support Building Addition, 4512
- 15 Building 6012 Addition
- 16 National Isotope Separator On-line (ISOL) Facility
- 17 Demolish and Replace Building 6003
- 18 Child Care and Fitness Center
- 19 Transportation and Packaging Facility
- 20 Building 7002 Changehouse Upgrade
- 21 Joint Institute for Neutron Sciences
- 22 Building 7030 Addition
- 23 Spallation Neutron Source



ORNL SHARED DATA INITIATIVE

KEY

- 1- Melton Valley Road Upgrade
- 2- Transuranic Waste Processing Facility
- 3- Thermal Neutron Guide Hall
- 4- HFIR User Facility
- 5- Neutron Sciences Support Building
- 6- HFIR Cold Source
- 7- 7920 Expansion
- 8- Class III/IV Below Ground Storage
- 9- Class III/IV Above Ground Storage
- 10- Above Ground Waste Disposal Complex
- 11- Solid Waste Storage Area 7

LEGEND

- Existing Facilities
- ORNL Planned Development
- EM/EF Planned Development

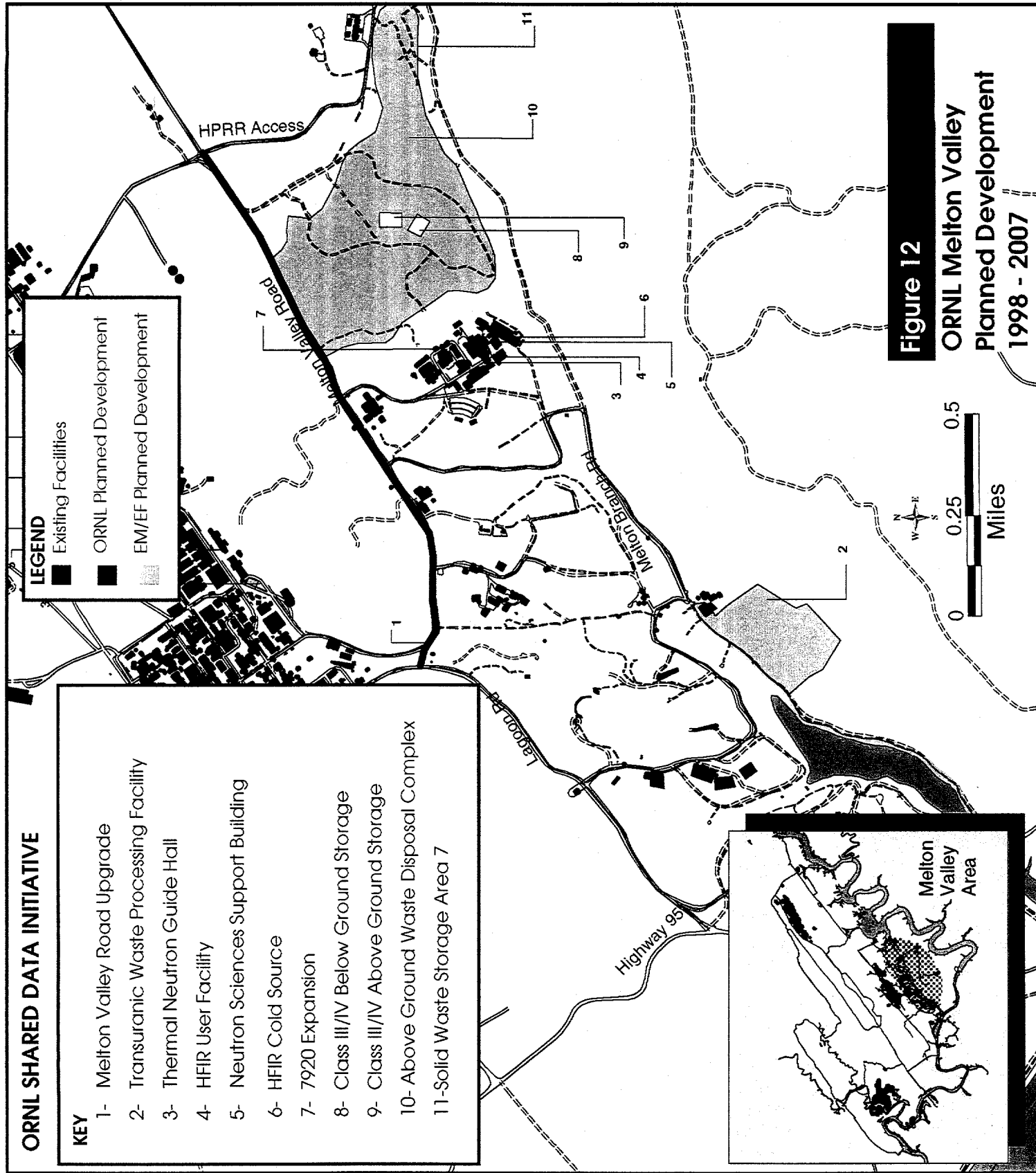


Figure 12
ORNL Melton Valley
Planned Development
1998 - 2007

age. Major infrastructure upgrades currently under way, or planned for the near future, include the following:

- The Laboratory's chiller systems will have been completely replaced and upgraded by the year 2000.
- Upgrades to the steam distribution system are nearing completion, and a plan to convert the steam plant from coal fired (with gas backup) to gas fired (with oil backup) has been developed. Implementation will begin in FY 1998 with the addition of a second gas-fired boiler through a line-item project. This conversion should be completed by the year 2004.
- General plant projects and line items are planned to provide new or to renovate existing research and support facilities; to upgrade, replace, or renovate the electrical, fire protection, heating, ventilating, and air conditioning systems; and for other projects.

Refer to the *FY 2000 Environmental, Safety, Health, Quality, and Infrastructure*

Budget Formulation Submission for Oak Ridge National Laboratory (1998) for a complete listing of proposed infrastructure upgrades.

4.1.5 Site and Facility Planning/Reuse Activities

Within the Operations, Environment, Safety, and Health Directorate, the Capital Assets Management Group carries out capital asset management and facility planning for ORNL. This group develops the Integrated Facilities Plan (see Sect. 3 in *Oak Ridge National Laboratory Land and Facilities Plan*, 1988) and Environmental, Safety, Health, Quality, and Infrastructure Budget Formulation Submissions for DOE's Life-Cycle Asset Management Process. The Integrated Facilities Plan contains technical site information and site development plans and serves as the master plan for future site development. The ESHQ&I Budget Formulation Submissions serve as the primary document to support planning and budgeting efforts in this area.

The disposition of orphaned and/or inactive and projected inactive facilities that have not already been accepted into DOE EM programs must be determined. Funding in future years is uncertain.

Should no further facilities be added to the DOE EM programs, the burden of disposition of inactive/projected inactive facilities would fall on currently funded programs. Significant negative impacts will be experienced for R&D and/or landlord programs, with the resultant decline in research activities and continued deterioration of infrastructure conditions. ORNL management's expectation is that facilities and land currently in, or candidates for, the DOE EM program will be returned to ORNL for future use in support of DOE's R&D programmatic activities after all remedial actions have been completed.

4.1.6 Stakeholder Involvement

ORNL stakeholders include those who use the land for DOE mission activities, those who fund activities on the ORR, those with

state or federal regulatory interest, neighbors who may be impacted by land-use decisions, and those with a perspective on regional/national/international impacts of ORR land-use decisions. ORNL has frequent stakeholder interaction with various sponsors, the Neutron Users Group, the Tennessee Wildlife Resources Agency, the Tennessee Department of Environment and Conservation, the Tennessee Natural Heritage Program, and others.

Stakeholder input was obtained through summarizing existing comments from local stakeholders (e.g., the Common Ground Process that solicited input from stakeholders in the surrounding region in 1995) and will be supplemented by requesting input from external stakeholders not represented in the Common Ground Process.

Responses of stakeholders external to ORNL and participants in the Common Ground Process, as well as public comments received informally throughout

the planning, will be evaluated for compatibility with the ORNL vision for land use. Where appropriate and possible, these responses have been and will be incorporated into the plan of current land uses and planning for future land uses.

4.2 The Y-12 Plant

4.2.1 Mission

The Y-12 Plant's mission is to meet the needs of DOE's management of the nuclear weapons stockpile inventories of highly enriched uranium, other government agencies, and private industry through a commitment to excellence in the use of a technology-based manufacturing center. The mission includes

- production of complex components and assemblies;
- safe and secure storage of nuclear materials;

- dismantlement, disposition, evaluation, and assessment of weapons components;
- modification of the plant size to meet DOE needs;
- technology partnership with private industry;
- maintenance of DOE capabilities;
- national prototype center; and
- support of other national priorities.

This mission will be accomplished in a cost-effective manner by integrating manufacturing, engineering, and development technologies. Emphasis will be on protecting the health and safety of the public and employees and on protecting the environment.

4.2.2 Land Use

The main area of the Y-12 Plant comprises 811 acres, with 630 acres enclosed by a perimeter security fence. The total area of the ORR for which the

Y-12 Plant is responsible is approximately 5,279 acres.

Within the main plant site, the primary uses are manufacturing and storage, technology transfer and work for others, and environmental restoration and waste management. As a result of the ridge and valley terrain upon which it is built, the Y-12 Plant has evolved in a long, linear configuration. Approximately 1/2 mile wide from north to south and 2-1/2 miles long from east to west, the Y-12 Plant may be broadly conceptualized in three main areas: east end, central area, and west end.

Generally speaking, the east end of the Y-12 Plant is devoted to the ORNL at the Y-12 Plant facilities and the Oak Ridge Center for Manufacturing Technology (ORCMT), which is responsible for the technology transfer and work-for-others programs. The central area of the Y-12 Plant houses many administrative services such as Medical, Engineering, Site Management Services, and related

activities. The west end comprises the Y-12 Plant's DP and EM operations, including waste management. Also located at the west end are the Y-12 Plant construction subcontractor, MK-Ferguson, and DOE's Transportation Safeguards Division facilities.

Areas outside the main plant site but within the Y-12 Plant's ORR area of responsibility are used primarily for a buffer area between the Y-12 Plant's nuclear operations and the public as well as for environmental restoration and waste management activities. Other activities include environmental monitoring and research and the protection of sensitive cultural and natural resources.

Land Requirements. Land requirements for current missions are not expected to increase in the foreseeable future. Surplus space at the Y-12 Plant, when excessed from DP mission needs, will be made available for other mission growth, other government work, or compatible private sector use.

4.2.3 Facility Use

Current Facility Uses. The Y-12 Plant supports 582 buildings and other major facilities. These facilities total approximately 7.6 million square feet of space. Surplus and candidate surplus facilities are shown in Figure 13. The site continues to move to a consolidated and right-sized DP production footprint. The distribution and area of the Y-12 Plant's buildings by function are shown below.

Function	Number of buildings	Space (square feet)
Y-12 Plant	440	4,503,951
ORNL at Y-12	29	1,379,230
Environmental Management	70	1,467,180
MK-Ferguson and other	43	261,457
Total	582	7,611,818

Note: This table does not include the Y-12 Plant's trailers.

ORNL SHARED DATA INITIATIVE

LEGEND

- Facilities that are now surplus or will be surplus in 10 years*
- Candidate Surplus Facilities

*45 additional small support facilities that are surplus and in the Y-12 Facility Transition Program are not shown on the map.

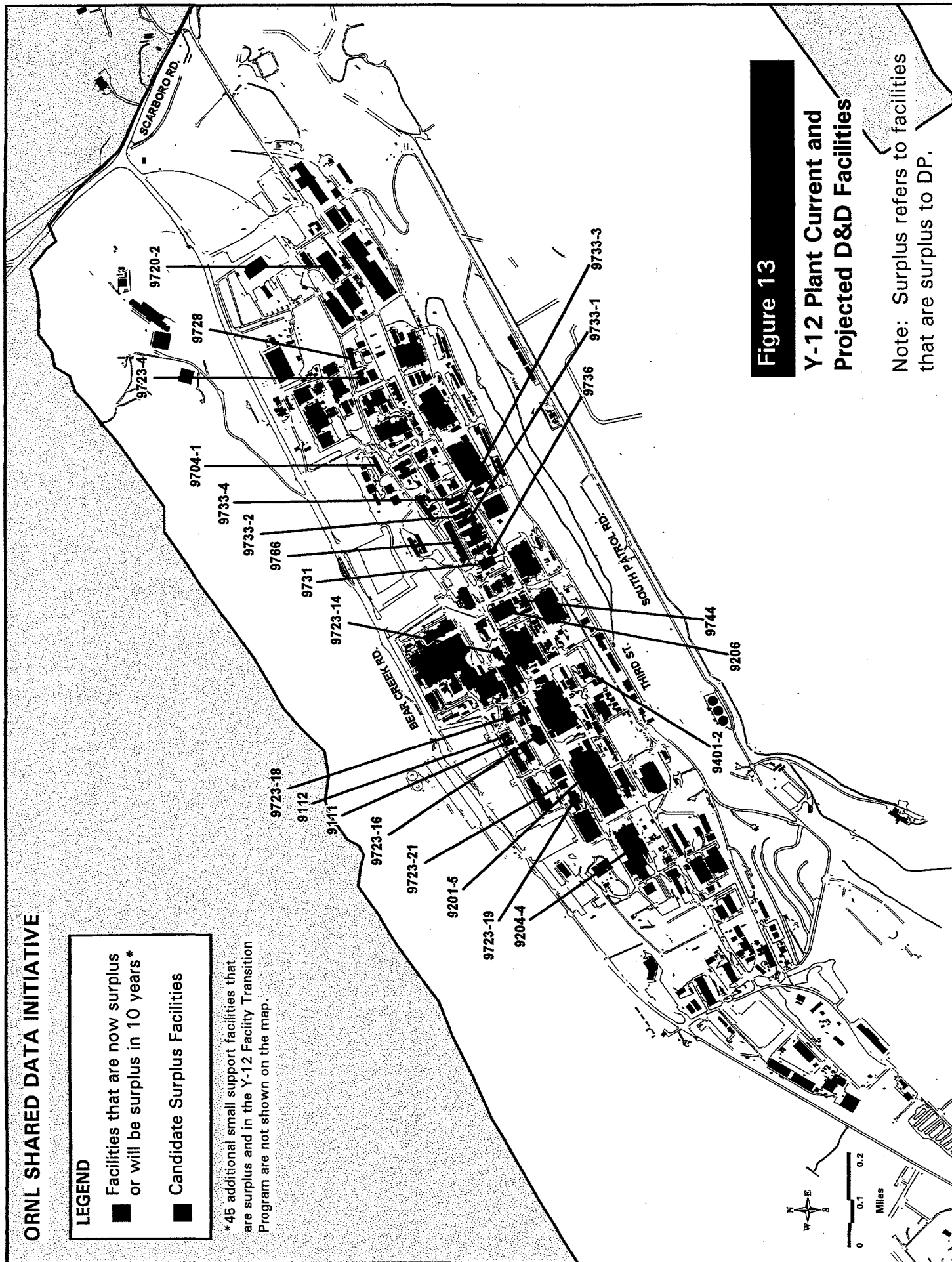


Figure 13

Y-12 Plant Current and Projected D&D Facilities

Note: Surplus refers to facilities that are surplus to DP.

Future Facility Uses. The *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (PEIS, 1996) provides basic guidance for program mission projections and mission resource planning. DOE plans to right-size or consolidate existing facilities in support of stockpile management program activities. In the PEIS preferred alternative for stockpile stewardship, a downsized Y-12 Plant retains capability for production of secondary and case components. The PEIS assumes that outlined operations would begin in the year 2005. According to the PEIS assumption, the active DP footprint at the Y-12 Plant in 2004 will be approximately 10% of the historical DP footprint, with the DP mission being performed by 20% to 40% of the current DP workforce. It should be noted that PEIS activities will be executed as funding is identified; reductions and/or delays in receipt of funding for PEIS activities will delay the schedule, resulting in a slip in the 2004–2005 dates. Figure 14 depicts the future facility uses at the Y-12 Plant.

The DP production footprint does not include the maintenance, utilities, or general purpose facilities required to support production, materials storage for excess weapons program materials, or other Y-12 Plant missions.

The east end of the Y-12 Plant will be experiencing change as areas are adapted to new uses, to technical information exchanges, and to skills transfer. Partnerships among governments, universities, and private industry are creating an open and inclusive infrastructure for leveraging resources and broadening participation. Technology application, industrial opportunities such as precision manufacturing and specialized analysis, a national prototype development program, modeling, and reindustrialization activities with private industry will present opportunities for future facility use and economic development.

The Y-12 Plant will remain an integral part of the DOE complex and a necessary part

of the nation's nuclear deterrent program. The Y-12 Plant continues to change with the changing business and governmental environments. Alternative revenue sources will be important to the maintenance and growth of technical knowledge, research, and application of specialized skills. Although the initial assumption of the PEIS described EM as the future site landlord, EM funding does not support the transfer of DP surplus facilities.

4.2.4 Infrastructure Needs

To ensure a continued and viable nuclear posture, it is critical that the evaluation, surveillance, maintenance, repair, and dismantlement capabilities at the Y-12 Plant be maintained. To support the Y-12 Plant's missions into the next century, manufacturing technologies supporting stockpile evaluation and maintenance need to be modernized, information systems need to be upgraded, aging process equipment needs to be replaced or upgraded, and infrastructure

ORNL SHARED DATA INITIATIVE

LEGEND

-  Defense Programs Stockpile Management (active)
-  Material Disposition Program
-  Defense Programs Stockpile Management (standby)
-  Environmental Management
-  Work for Others/Technology Transfer
-  Site Services/Site Landlord
-  ORNL Campus at Y-12
-  Construction Services

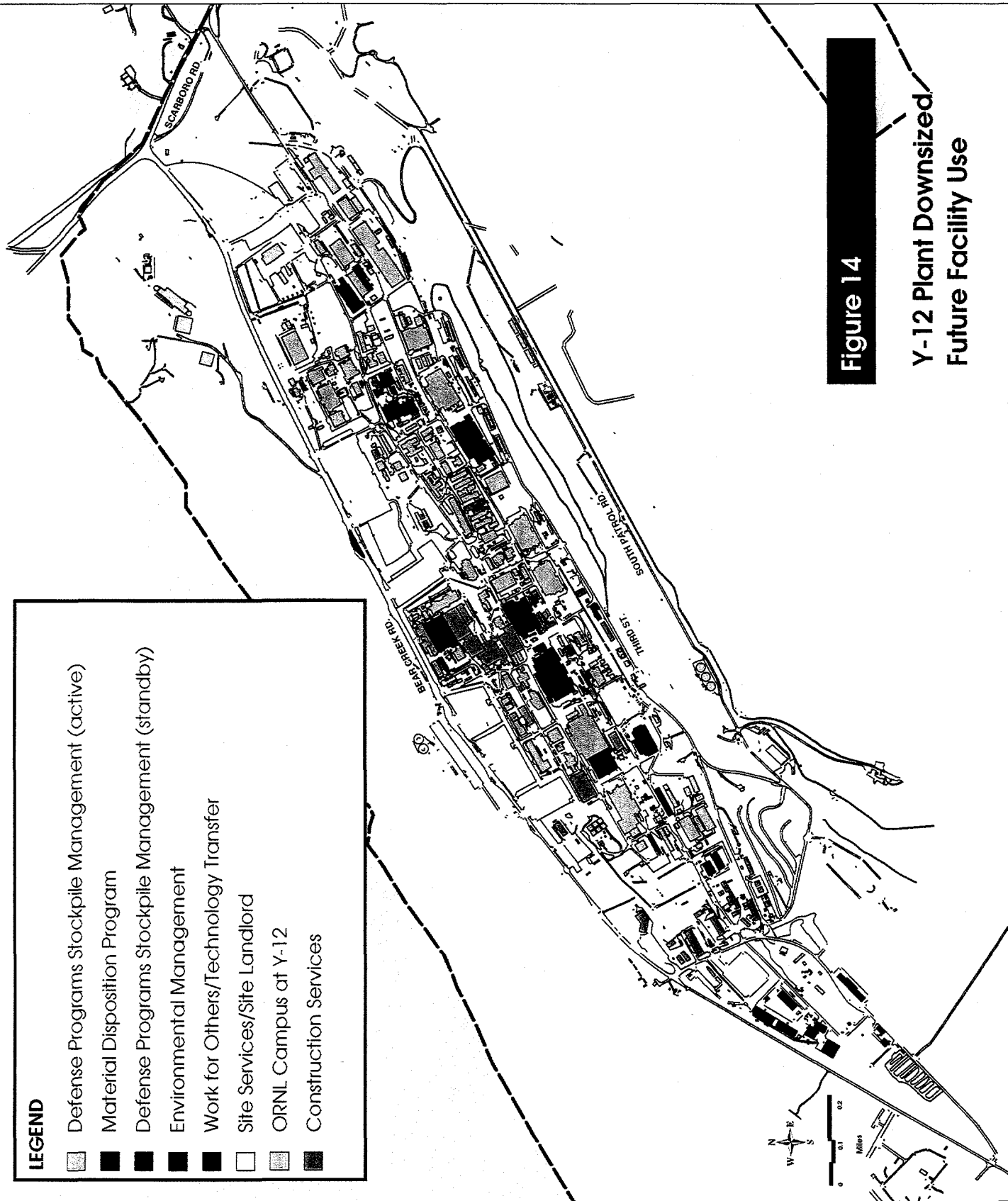


Figure 14

Y-12 Plant Downsized,
Future Facility Use

modernization needs to be addressed. The annual funding for these tasks has been estimated to be between \$40 and \$50 million. This estimate is based upon several factors, including the Y-12 Plant's primary mission as the uranium and lithium technology, manufacturing, and materials management center of excellence and an aging but downsized facility infrastructure.

Modernization needs at the Y-12 Plant can be summarized as follows.

- **Modernization to support future stockpile evaluation, maintenance, and production capability.** Projects in this category will address manufacturing technology improvements and upgrades for both information systems and process equipment. Examples include the acquisition of equipment to implement model-based manufacturing and the improvement of sophisticated tooling and machining capabilities.

- **Infrastructure improvements to support acceleration of the Stockpile Stewardship and Management footprint reduction.** These projects will address the start-up and prove-in of previously relocated equipment, acceleration of nuclear materials storage technologies, security infrastructure, reduction in operating costs, and building improvements related directly to the Y-12 Plant's DP footprint. Project examples include upgrades to heating and ventilation systems in critical buildings and automated equipment to reduce the costs of nuclear materials control and accountability requirements.
- **Reduction of surveillance, maintenance, and infrastructure deterioration costs.** Improvements in this category will address the reduction of maintenance costs through implementation of preventive maintenance programs and the repair, upgrade, or replacement of deteriorated building or utility system components.

These improvements will be accomplished through General Plant Projects, Line Item Projects, or through the Capital Equipment acquisition process. Projects will include replacement or upgrades to the Kathabar dehumidification and related systems in Building 9204-4, a maintenance optimization program, and roof repairs or replacements on major DP buildings at the Y-12 Plant.

4.2.5 Site and Facility Planning/Reuse Activities

The Y-12 Plant's site and facility planning/reuse activity responsibilities are shared by the Y-12 Plant's Site Management Services (SMS) Organization and the Y-12 Plant's Facility Transition Program.

Within the SMS organization, the Site Planning and Assessment Group carries out facility planning for the Y-12 Plant site. This group is responsible for site planning, office and non-office space management, and reservation management. The site

planner develops the Integrated Site Plan for DOE's Life-Cycle Asset Management Process. The Integrated Site Plan contains information about the Y-12 Plant's physical facilities and infrastructure, missions, and population. It outlines not only current plant conditions but also conditions and trends predicted for the future. Also within the SMS is the Site Special Project Engineering Services Group and the Capital Program Management function. These groups are responsible for addressing all the major expense infrastructure activities for the site.

Site and facility reuse activities to date have included developing documentation on underutilized facilities and facilities that are or will be surplus to the needs of DOE in general and DP in particular. Additionally, the Y-12 Plant's transition program has participated in site visits by potential reuse organizations to surplus manufacturing facilities such as the Plating Shop (Building 9401-2) and to

surplus support facilities such as the Carpenter's Shop (Building 9929-1).

ORCMT has experienced considerable success in marketing and providing user facilities in support of its technology transfer and work-for-others activities. Of approximately 970,000 square feet of the Y-12 Plant's floor space in use by ORCMT, less than half (approximately 44%) is being charged to DOE accounts. The remainder (56%) of the space is being supported financially by private-sector and other government agency customers.

4.2.6 Stakeholder Involvement

The Y-12 Plant's site planning involves its stakeholders in the planning process at both local and remote locations. The Y-12 Plant's site planning documents are essentially a roll-up of programmatic-support and mission activities at the Y-12 Plant. Major activities enumerated in the documents (e.g., proposed storage of

highly enriched uranium and the PEIS for Stockpile Stewardship and Management) have been the subject of extensive public meetings, reviews, and comments. The Y-12 Plant's site planning documents will be placed on the DOE ORO World Wide Web home page for public review and comment.

Remote planning stakeholders for the Y-12 Plant consist primarily of the DOE DP and Facilities Management programs at the DOE Albuquerque Field Office (DOE-AL) and DOE-HQ locations. Planning documents are distributed to DOE-AL and to DOE-HQ stakeholder organizations, and visits to these organizations and to other DOE sites are planned annually to share, comment, and benchmark site-planning documents and related activities [e.g., geographic information systems (GIS) and facility transition]. Furthermore, the Y-12 Plant participates in annual DOE conferences and workshops by attendance and presentation where pertinent.

4.3 East Tennessee Technology Park

4.3.1 Mission

The mission of the ETPP is to reindustrialize and reuse site assets (i.e., facilities, equipment, materials, utilities, trained workforce) through leasing of vacated facilities and incorporation of commercial industrial organizations as partners in the ongoing environmental restoration, D&D, waste treatment and disposal, and diffusion technology development activities.

Specific activities include the following:

- management of the Toxic Substances Control Act Incinerator, a unique mixed waste treatment facility;
- support of risk-based environmental cleanup programs for contaminated facilities and natural resources at DOE facilities in Oak Ridge and in Paducah, Kentucky, and Portsmouth, Ohio;

- treatment, storage, and disposal of hazardous and radioactive wastes; and
- cost-effective support services for ETPP users.

The emphasis of the reindustrialization mission is to defederalize ETPP by the year 2010.

4.3.2 Land Use

The ETPP main site comprises 725 acres enclosed within a security fence, and the ETPP geographic area of responsibility consists of approximately 5689 acres.

Current Land Uses Inside the Security Fence. Existing land uses within the security fence are typically mixed industrial, with much of the area undergoing environmental restoration.

Current Land Uses Outside the Security Fence. Much of this land has been maintained as natural areas (open space and forest management land). Many areas are protected and managed

as sensitive cultural and natural resources. Some areas are designated as being available for "alternate uses" in connection with reindustrialization. Other uses are as follows:

- Parcel ED-1 (a lease to CROET became effective April 28, 1998);
- the Visitor's Overlook Center;
- the Transportation Safeguards Division Maintenance Facility (funded by DOE-AL);
- an MK-Ferguson Company Construction Management Storage/Training Facility; and
- a few areas of contamination listed in the Federal Facility Agreement (most notably the K-1070A Burial Ground, the Contractor's Spoil Area, the K-901A Holding Pond, the K-901 South Waste Disposal Area, and the 1007-P1 Holding Pond).

Three significant land areas within the ETPP site outside the fence, comprising

approximately 2400 acres of the total 5882 acres within the ETPP area of responsibility, have been reviewed during FY 1997 by the Environmental Restoration Footprint Reduction Program for removal from the National Priorities List under CERCLA. Of these areas, approximately 2300 acres of land are being recommended to the Federal Facilities Agreement parties for removal from CERCLA requirements because there is no evidence of any surface contamination on this land.

Land Requirements. An Environmental Assessment for ETPP has been released and has assessed the impact of the reindustrialization of the site. It is now being reviewed after an extensive process of public comment to finalize a decision under the National Environmental Policy Act.

The Reindustrialization Team has prepared a predecisional *Preliminary ETPP Master Land Use Plan* (1997) to identify future land-use requirements as

well as to serve as a starting point for several follow-on activities. The predecisional *Preliminary ETPP Master Land Use Plan*, developed in June 1997, represents a 20–30 year period for implementation; many of the features in the plan are based upon the completion of the EM Accelerated Cleanup Plan by 2006. The predecisional *Preliminary ETPP Master Land Use Plan* is illustrated in Figure 15. Plan objectives include the following seven focus objectives:

- serve as a guidance for ETPP transition from federal to private management,
- reinforce aesthetic site amenities to attract and retain long-term tenants,
- provide a tool for developing a comprehensive site marketing plan,
- promote compatible adjacent tenant uses through site zoning,
- serve as a basis for development sequencing,
- help analyze required site infrastructure, and

- justify to stakeholders the long-term sustainable development and use of the site.

A GIS land analysis was performed on the ETPP site in early 1997 to provide information to the predecisional *Preliminary ETPP Master Land Use Plan*. The purpose of the GIS analysis was to identify parcels outside the security fence that could be made available for alternate uses, including industrial development in conjunction with site reindustrialization and privatization. Buffers were applied to protected resources and areas, and the GIS then plotted remaining areas of land that contained areas with less than 15% slopes. These parcels were deemed suitable parcels for potential reindustrialization and are included in the predecisional *Preliminary ETPP Master Land Use Plan*.

Desired land uses/elements were grouped by land-use categories adopted by the SSAB Oak Ridge Reservation End Use Working Group, a DOE-sponsored public

Figure 15

East Tennessee Technology Park

Preliminary Master Land Use Plan (Pre-decisional 20-Year Plan)

Prepared for
ORR REINDUSTRIALIZATION TEAM
ARCHITECTURE & PLANNING
Lockheed Martin Energy Research Corp.

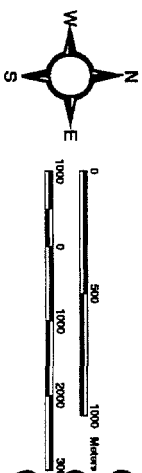
LEGEND:

LAND USES:

- ED1 Parcels
- Mixed Light Industrial, R&D, Office/lab Facilities
- Heavy Industrial, Warehousing/Distribution
- Waste Storage, Treatment, & Disposal
- Parcel Boundaries
- Passive Recreation -
- Greenway Walking/Jogging Trails
- Conservation - Biodiversity
- Preserved Natural Areas
- Conservation - Open Space & Forest Management Areas
- Recreated Sites -
- Areas of Contamination

SITE FEATURES:

- ETRP Area of Responsibility & ED1
- Clinch River, Poplar Creek, & Streams
- 100 Year Floodplain, 50' Stream Buffers
- Protected Biodiversity Ranked Areas
- Open Space & Forest Management Areas
- Historical/Archaeological Sites
- Retained Site Structures
- Existing Rail Lines
- Available Property Protection Fences
- Existing Electrical Power Lines
- Parking Areas
- Existing Areas of Contamination - Settlement Ponds



Prepared by: Geographic Information Science and Technology, ORR
Base Source: 1993 Orthophoto Imagery and Planimetric Vectors,
Becoming and Imagery Project, EIM Program
Date prepared: June 24, 1997



stakeholder group. These initial end-use categories (in the order of most- to least-restricted future uses) were as follows:

- (1) restricted, (2) industrial/commercial, (3) conservation, (4) recreational, (5) residential, and (6) agricultural.

The predecisional *Preliminary ETPP Master Land Use Plan* presented the following land-use assumptions:

- Mixed light industrial uses will include commercial office, R&D, and laboratory facilities, where appropriate, to serve the needs of site tenants.
- Heavy industrial uses will include manufacturing; warehousing and distribution; and waste storage, treatment, and disposal facilities.
- Recreational uses will be limited to passive recreation facilities, such as "greenway" walking and jogging trails, which may be integrated with preserved archeological or historic sites or with historic experience "remnant" or "memory" exhibits.

- Agricultural uses on the ETPP site will be limited to forest management areas, which are primarily conservation-use areas to maintain healthy forested land as well as open space.

- Residential uses on the ETPP site area will be limited to potential lodge/conference facilities located adjacent to the potential mixed light industrial/R&D/office facilities on west Black Oak Ridge.

- These existing land uses will continue to be protected: natural areas identified as Biodiversity Significance Ranked habitats, significant archeological and historical sites, and 100-year floodplain areas, with appropriate buffer areas for the latter.

- The K-29, K-31, and K-33 buildings will be decontaminated to a level that will allow future industrial use of these buildings through private long-term industrial leases.
- The demolition of the K-25 and K-27 buildings will include engineered fill of

the below-grade areas of each building (using appropriately crushed or compacted demolition building debris, if possible) before capping, allowing future site industrial development and reuse. The K-770 Contaminated Scrap Metal Yard and K-1070C/D Burial Grounds will be assessed and capped to allow future industrial use with minimum use as storage and laydown areas or for vehicle parking.

The final draft of the ETPP Master Land Use Plan will be presented to the SSAB Oak Ridge End Use Working Group and the full SSAB public stakeholder groups in 1998 for review of the recommended land uses on the ETPP site.

4.3.3 Facility Use

Current Facility Uses. Of the total 14 million square feet of building space at the site, 90% (12.5 million square feet) of space is under the purview of the EM D&D Program. Space in several buildings is now under lease or under Memoranda of

Understanding for leasing through CROET as a part of the reindustrialization mission for the site. CROET is a private-sector organization established by DOE to lease underutilized facilities on the ORR. CROET leases facilities from DOE and then subleases them to private industry.

Facilities at the site are grouped by Functional Unit categories established by the DOE Capital Asset Management Program, with the majority being administrative (10), storage (12), production (13), service (14), laboratory (15), and utility plants (34).

Facilities at the ETTTP site include the only licensed mixed-waste incinerator in the country, low-level and special nuclear material storage and handling areas, prior gaseous diffusion facilities in the process of being remediated and salvaged for metal-recycling initiatives, electron microscopy and specific elemental analysis laboratories, testing facilities, as well as one-of-a-kind machining and fabricating facilities found almost nowhere

else in the world. Of these facilities, many are being included in reindustrialization initiatives with private industry partners.

Future Facility Uses. DOE is negotiating prime contracts with private industry for metal recycling/remediation projects in shutdown process buildings such as the metal recycling contract for Buildings K-29, K-31, and K-33 which was signed August 25, 1997. Many of these contractors or lessees will accomplish environmental remediation of existing buildings as a part of material-recycling activities in these buildings, thereby reducing the environmental remediation "mortgages" at the site.

4.3.4 Infrastructure Needs

Short-term ETTTP infrastructure needs (over the next 5–10 years) are being determined by an assessment of needs by two sets of users: (1) Environmental Management and Enrichment Facilities mission-related site occupants who, under the new M&I contract, will complete the

environmental cleanup of the site, and (2) Reindustrialization tenants who may participate in the site cleanup activities or may bring immediate alternate industrial reuses for the site's future as a defederalized, privately managed industrial park. Infrastructure needs that translate into major capital upgrades are prioritized and budgeted by the site's Facility Management and Planning organization and the Landlord Program, managed by the DOE Site Office. The

FY 1997 Integrated Strategic Plan integrates planning by many different on-site programs and divisions, addressing infrastructure as one of its focus areas, promoting the sharing of complementary needs as well as resolution of conflicting infrastructure needs.

The ORR Vision 2010 Reindustrialization Team is responsible for identifying long-term infrastructure needs for ETTTP. According to the Reindustrialization Team in the *FY 1997 Integrated Strategic Plan*, "necessary infrastructure" is defined as including the (1) electrical distribution

system, (2) sewer system, (3) natural gas distribution system, (4) potable water system, (5) steam supply system, (6) rail system, (7) common grounds and roads, and (8) security for required federal classified and protected areas.

In the reindustrialization section of the *FY 1997 Integrated Strategic Plan*, long-term management of "necessary infrastructure" is described as being subcontracted to private-sector firms during the site's transition from a DOE-operated facility to a privately managed industrial park. The first such contract will likely be either the contracting of the management and operations of ETPP utility systems to a private-sector utility systems M&O contractor or the subcontracting of EM tasks by the new M&I contractor. Final infrastructure outsourcing as DOE reduces its footprint on the site will gradually transition to CROET, with ultimate outsourcing of electrical/power, sewer, and potable water to the City of Oak Ridge; steam, rail, and common grounds/roads to CROET; and

security as required for federal classified areas retained by DOE.

In the *FY 1997 Integrated Strategic Plan*, the Reindustrialization Team defines "Desired Infrastructure" as including industrial security; fire/medical, and environmental emergency response; radiological safety; mail/parcel service; food service; transportation service; building maintenance and janitorial service; computer/electronics maintenance; vehicle/heavy equipment maintenance; fueling service; waste pickup; design/engineering, telecommunications, analytical laboratory, and copy/photographic services; continuing education/training; records management; material inventory/property management; and conference services. On the premise of tenant freedom of choice from a variety of sources (in-house personnel, private contract, or DOE contract), the demand for private services will dictate whether private firms supplying those services locate at the ETPP.

The *East Tennessee Technology Park FY 1998 ETPP Integrated Strategic Plan* (1997), seeks resolution of many crosscutting ETPP issues by grouping issues under overarching strategic objectives that identify what needs to be accomplished. Then plans of action, stated as tactical objectives, are developed for each issue. These action plans denote how and when actions will be completed. Each focus area of the Integrated Strategic Plan identifies the goals that need to be met, along with fiscal year projects that accomplish those goals. Thus each area is informed about the activities under other areas. Each focus area next studies activities of the other areas, analyzes possible conflicts and compatibilities, and addresses crosscutting issues with resolutions for conflicts and strategies for enhancing cooperation. Some of the important issues in the current Integrated Strategic Plan are (1) management and budgeting of short-term infrastructure support needs by EM mission activities and early reindustrialization tenants until final

transition to a private industrial park after site remediation; (2) coordination of EM, Enrichment Facilities, and other DOE program activities; and (3) resolution of management and budgeting of "returned facilities" (facilities returned by CROET to DOE after leasing activities are completed) and "orphan facilities" (unowned facilities not supported by any existing DOE program direct funding source, steward, or "parent").

4.3.5 Site and Facility Planning/ Transition and Reuse Activities

The four primary nonprogrammatic ETPP site and facility planning activities are the ETPP Integrated Strategic Plan, the M&O ETPP Transition Plan, the ETPP Master Land Use Plan, and the ETPP Facility Transition Plan. Each plan has its own important objectives.

The ETPP Integrated Strategic Plan is an iterative process, begun by the DOE Site Office in 1995, to use a multiprogrammatic, multidisciplinary

approach to integrate the activities of separately managed Energy Research, Waste Management, Reindustrialization, and Site Operations organizations by identifying issues for resolution. The role of the *East Tennessee Technology Park* FY 1998 *Integrated Strategic Plan* is (1) to identify strategic site activities under focus areas and to share, discuss, and summarize these activities, identifying crosscutting issues for resolution, and

(2) to develop action plans in the form of tactical objectives to resolve conflicts and enhance synergy among activities. The ETPP Integrated Strategic Plan focuses on the site's ultimate destination while identifying the impact of that destination on the following year's direction and focus, with an understanding of outyear goals. The *East Tennessee Technology Park* FY 1998 *Integrated Strategic Plan* does not attempt to resolve issues related to the transition from the current M&O contract to the M&I contract, but it is conditioned by those issues and contributes to the issues being addressed by the M&O ETPP Transition Plan. The ETPP Integrated

Strategic Plan will also help facilitate a smooth contractor transition in that the site's strategic and tactical objectives (activities and crosscutting issues) are identified in one document.

The M&O ETPP Transition Plan is the shortest-focus planning activity at the site. This plan focuses on (1) the work transitioned to the M&I contractor on April 1, 1998, and (2) the supporting systems used to control or report on that work, including whether those systems will be transferred or shared by the M&I and remaining LMER and LMES M&O contractor forces on the ORR. The objectives of the transition plan are to ensure an orderly transition and fairness to employees while minimizing total cost of the transition. The transition plan has broken the tasks into a work breakdown structure including the following elements: transition work, assets, resources, processes, and final M&O ETPP Transition Plan (see U.S. Department of Energy Oak Ridge Operations Office *Planning Document for Transition of the*

Environmental Management and Enrichment Facilities Program to the Management and Integration Contractor, October 1997).

The predecisional Preliminary ETPP Master Land Use Plan, described previously under Section 4.3.2, "Land Use," is the longest-focus planning activity at the site, considering the long-term future use of the site 20 years hence. The Preliminary ETPP Master Land Use Plan therefore provides initial guidance and recommendations to the public stakeholder group, the SSAB End Use Working Group, whose responsibility it will be to assess the site's planned remediation levels based on ETPP's long-term "end state," including Parcel ED-1. The final ETPP Master Land Use Plan will then provide guidance for the sequencing of reindustrialization, as well as a zoning plan for long-term site redevelopment.

The ETPP Facility Transition Plan was developed as a proactive attempt to make

facilities on the site available for use for reindustrialization purposes, thus facilitating the transition of ETPP to a private-sector lease site (see *Updated List of Oak Ridge Operations Facilities Managed by the Environmental Management and Enrichment Facilities (EMEF) Program*, December 1997). The plan is a detailed document that includes (1) the physical location of all site personnel and functions and any estimated costs to the Reindustrialization Program for required moves to make facilities available, (2) a preliminary analysis of personnel and functions that are necessary to meet short- and long-term missions, and (3) a schedule for building availability. It is anticipated that the plan will be updated on a quarterly basis.

4.3.6 Stakeholder Involvement

The ETPP EM organization has made, and continues to make, public stakeholder

presentations, to hold public workshops, and to integrate public stakeholder feedback into the ETPP Environmental Assessment for Reindustrialization (see *Final Environmental Assessment: Lease of Land and Facilities at the East Tennessee Technology Park, November 1997*) and the EM Accelerated Cleanup Plan, as well as into various cleanup projects, such as the watershed approach to the ORR, the Mixed Waste Treatment Facility, and K-901A and the remediation plans for the K-1007-P1 settlement ponds (see *Removal Action Work Plan for the K-901-A Pond, East Tennessee Technology Park, Oak Ridge, Tennessee, September 1997; Removal Action Work Plan for the K-1007-P1 Pond, March 1998*).

Stakeholders for the ETPP Master Land Use Plan are listed here as examples of the types of stakeholders who are

typically involved in reviewing and commenting on ETPP activities:

- DOE;
- CROET (and private companies that have leases or Memoranda of Understanding);
- LMES, LMER, Bechtel Jacobs Company, and other DOE contractors;
- SSAB Oak Ridge Reservation End Use Working Group;
- SSAB Land-Use Subcommittee;
- Local Oversight Committee;
- Oak Ridge Environmental Quality Advisory Board;
- U.S. Environmental Protection Agency;
- Tennessee Department of Environment and Conservation;
- City of Oak Ridge;
- Roane, Anderson, and other surrounding counties; and
- local citizens.

4.4 Oak Ridge Institute for Science and Education

4.4.1 Mission

The ORISE mission is to develop and provide critical research and operational capabilities in workforce health and safety, national security, environmental assessments, science education, and technical training for DOE and other government agencies.

ORISE has seven core competencies:

- 1. Conducting research and training in workforce health, safety and security**—occupational epidemiology; internal dosimetry and biomarkers of exposure; human and personnel reliability; hands-on radiation safety and environmental, safety, and health (ES&H) compliance training; and critically safety and training assessments.
- 2. Providing worldwide emergency preparedness, response, and training**—comprehensive emergency planning (nuclear, chemical, and biological), national security and counterterrorism support, emergency exercises and drills and crisis management training, radiation medicine and pathology, physical and biological dosimetry, radiation accident response registry, and emergency public information and risk communication.
- 3. Performing hazardous-site characterization and cleanup verification**—radiological-survey technology development and training, equipment development and evaluation, and laboratory quality assurance.
- 4. Developing and implementing technical training systems**—training and performance systems and evaluations; management of training networks, distance learning, and computer-based and other instructional systems development.

5. **Developing and administering fellowship and research-participation programs**—science and engineering workforce-needs trends and assessments, program evaluations, faculty development, and academic access to federal research facilities.

6. **Integrating scientific and technical resources for multidisciplinary programs**—assessments of policy issues and research trends, support for science advisory committees and face-to-face and on-line stakeholder meetings, personnel and environmental security, peer/merit research and proposal reviews, technical standards development, and meteorological research coordination.

7. **Creating collaborative research partnerships**—user facilities (e.g., University Radioactive Ion Beam), governmental-academic-industrial research partnerships, and multi-disciplinary teaming arrangements.

4.4.2 Land Use

The ORISE Scarboro Operations Site on the ORR is located on approximately 164 acres of ORR land. Land uses at the site include laboratory and office facilities, sample archives, support services, and storage.

Figure 16 depicts existing on-site land use at the ORISE Scarboro Operations Site.

Land Requirements. Existing land is adequate for ORISE to support its current DOE missions; however, future development or growth will require additional land. The site expects to lose about 40 acres of its land to the State of Tennessee Department of Transportation when the planned overpass at the intersection of Bethel Valley Road and South Illinois Avenue is started. A site land survey and preliminary design work have been conducted by the Tennessee Department of Transportation. Effectively, the only developable land will remain on the west side of Scarboro Creek. Because

no ORISE town sites have land for development, the remaining land at the Scarboro Operations Site is ORISE's only available land for future development or growth. Consolidation of the southern portion of Solway Bend into the current ORISE site would provide additional area for future initiatives.

4.4.3 Facility Use

Current Facility Uses. ORISE has stewardship for 15 buildings on the ORR totaling 112,976 gross square feet. The ages of the buildings are as follows: more than 50 years (1 building), 31 to 40 years (10 buildings), 21 to 30 years (2 buildings), and 11 to 20 years (2 buildings).

A breakdown of non-surplus facilities by space type follows:

- office space (16%),
- laboratory (21.5%),
- sample archives and storage (55.9%),

ORNL SHARED DATA INITIATIVE

LEGEND	
	Laboratory
	Inactive/Unoccupied Laboratory
	Office
	Storage
	Cemetery

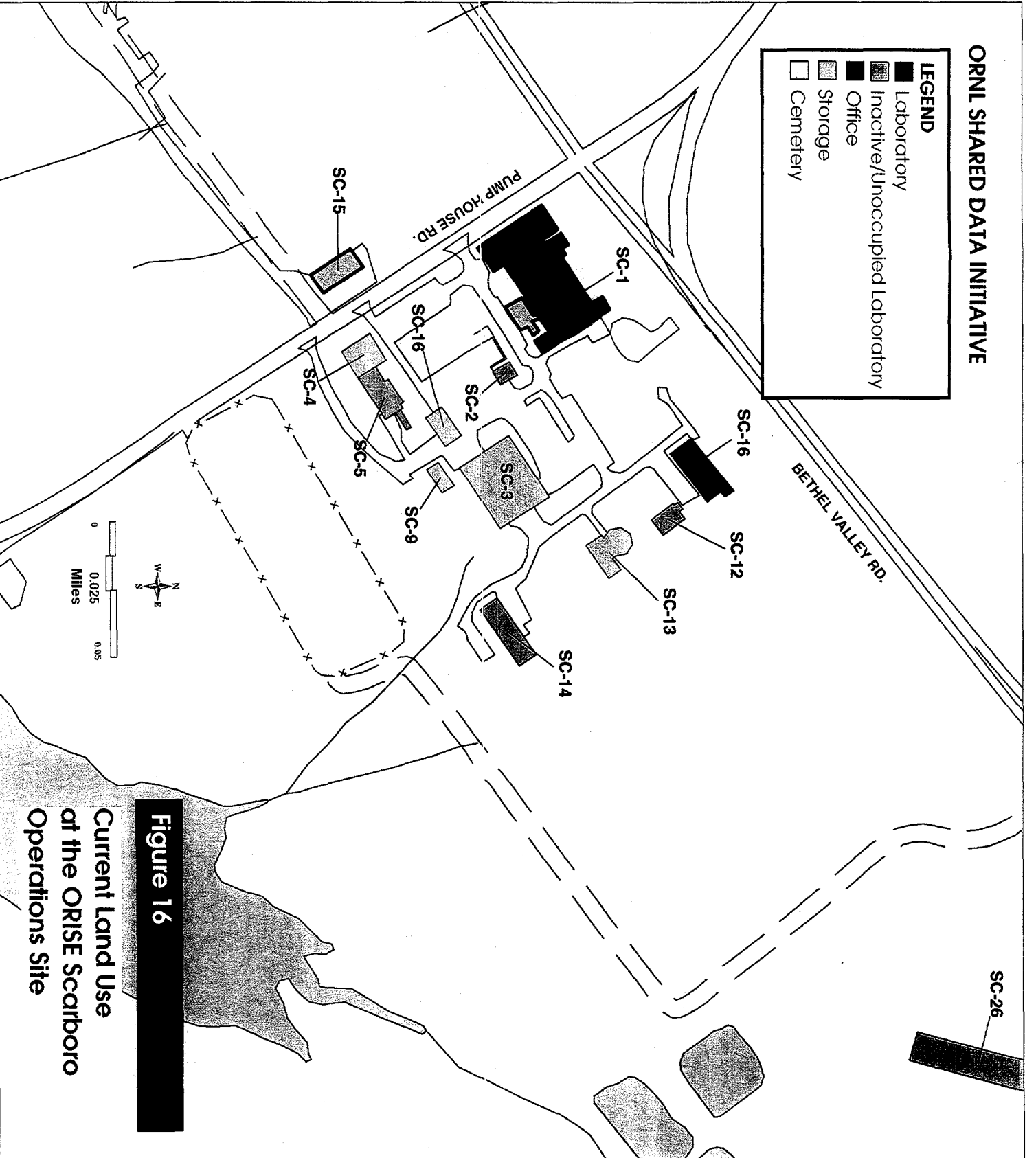


Figure 16

Current Land Use
at the ORISE Scarboro
Operations Site

- training (1.2%), and
- miscellaneous (5.4%).

Approximately 27% of the total space needs rehabilitation. Four of the facilities at the Scarborough Operations Site are surplus, require decontamination, and have no future programmatic need. These are all orphaned and have no programmatic funding for support. None have been accepted into the EM40 or EM60 programs. Funding has been requested for the characterization and cleanup necessary for ultimate demolition. Two other facilities are on standby for potential program use after they are characterized and decontaminated. All other buildings are currently utilized.

ORISE town site facilities and their uses are as follows:

- ORAU Main Campus: administrative, medical sciences research, education;
- East Vance Road Facility: medical research;

- Laboratory Road Facility: training;
- South Illinois Facility: Atmospheric Turbulence Diffusion Division—National Oceanic and Atmospheric Administration (ATDD-NOAA) facilities for meteorological and atmospheric diffusion research; and
- Warehouse Road Facility: administrative.

Future Facility Uses. The Oak Ridge *Institute for Science and Education 1994 Site Development Plan* provides a description of the ORISE facilities plans and viable options. The site's Master Plan indicates how potential program growth over the next 20 years can be

accommodated on existing DOE property by using rehabilitated existing facilities and constructing new facilities at the Scarborough Operations Site. In general, the existing conditions and the planning present a preferred alternative with a future net gain of 108,000 square feet of building space. This scenario assumes fulfillment of the stated site and facilities goals. The Oak

Ridge Institute for Science and Education 1994 Site Development Plan includes a total of 170,000 square feet of new construction over the next 20 years. In addition, several existing buildings located at the site will need significant upgrade, renovation, and/or reconfiguration. As with any list of projects spanning an extended period of time, the details of the plan are subject to modification as priorities change, future budgets become firm, and new or changing program requirements become known. Figure 17 depicts future land and facility use at the Scarborough Operations Site.

4.4.4 Infrastructure Needs

The site infrastructure is sufficient to meet current needs. The site's master plan identified site improvements if growth or change warranted. Except for electrical services at the ORISE Scarborough Operations Site (which are supplied by the Y-12 Plant), all utility services are procured from the City of Oak Ridge and the Oak Ridge Utility District.

ORNL SHARED DATA INITIATIVE

LEGEND

- Proposed Laboratory Use Area
- Proposed Office Use Area
- Proposed Training/Classroom Area
- Proposed Site Support/Storage Area
- Parking
- Greenway/Pedestrian Circulation
- Future Land Cell Use
- Proposed Entry Nodes/Plazas
- ✕ Cemetery

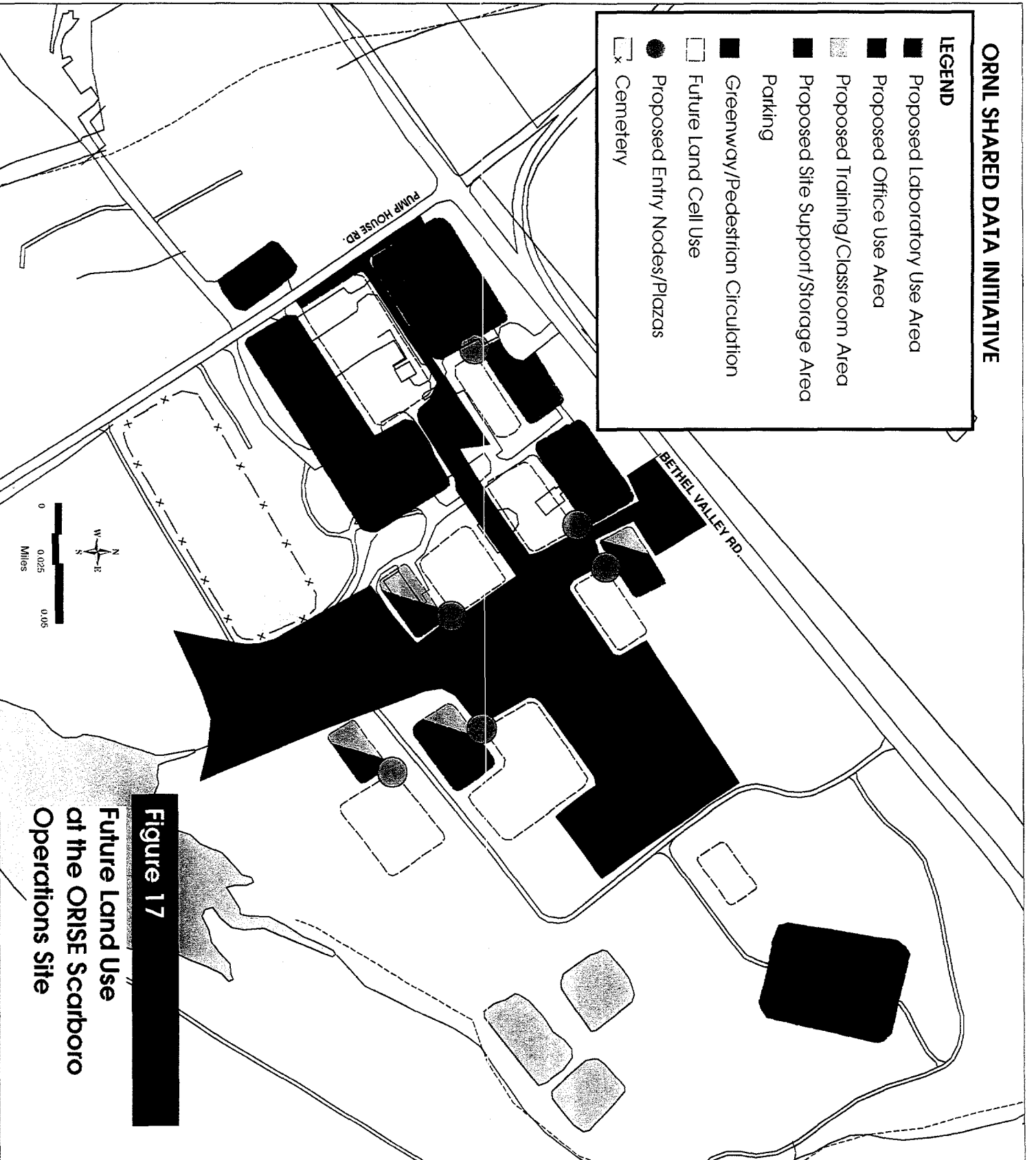


Figure 17

**Future Land Use
at the ORISE Scarboro
Operations Site**

4.4.5 Site and Facility Planning/Reuse Activities

An ORISE facilities planning committee helps conduct an organized and quality-based approach to managing its facilities. This group assists in long-range planning and management of the sites. The group also helps to establish priorities for infrastructure and capital improvements and to ensure facilities are able to meet current and future program requirements. Identified projects are estimated and submitted to DOE for possible funding through the annual budget submission process.

4.4.6 Stakeholder Involvement

The stakeholders of ORISE are principally the member universities and their client research grant providers.

4.5 Other DOE Properties

4.5.1 Current Land Use and Facility Use

These are the primary DOE properties outside of the four installation sites:

- Clark Center Recreation Park,
- Central Training Facility,
- Transportation Safeguards Maintenance Facility,
- Office of Scientific and Technical Information (OSTI),
- American Museum of Science and Energy,
- Charlotte Hall and Cheyenne Hall,
- Water Treatment Plant,
- Turnpike Building,
- Building 2714,
- Federal Office Building,
- Transportation Safeguards Division Firing Range,

- Parcel ED-1,
- Parcel ED-2, and
- ATDD-NOAA Facility.

The primary DOE properties outside the installation sites are shown in Figure 18 and described below.

Clark Center Recreation Park is an 80-acre park currently open to the public. It consists of an office/toilet building, three shelters, a boat ramp, improved parking areas, two softball fields, an unguarded swimming area, and a paved access road. The park is operated by the Corporate and Community Affairs Office of the LMES Recreation Department.

The **Central Training Facility** is used exclusively by LMES security forces and consists of a small office building, an indoor firing range, a classroom/storage trailer, another storage trailer, on-site parking, fitness facilities (an outdoor track), and numerous outdoor firing ranges. The site, including a buffer area,

ORNL SHARED DATA INITIATIVE

KEY

- 1 Parcel ED-2
- 2 Transportation Safeguards Division Maintenance Facility
- 3 Central Training Facility
- 4 Transportation Safeguards Division Firing Range
- 5 Parcel ED-1
- 6 Clark Center Park
- 7 Water Treatment Plant
- 8 ATDD - NOAA
- 9 Turnpike Building
- 10 American Museum of Science and Energy
- 11 Townsite - Charlotte and Cheyenne Halls
- 12 Federal Office Building
- 13 Building 2714
- 14 1916T1 - (OSTD)

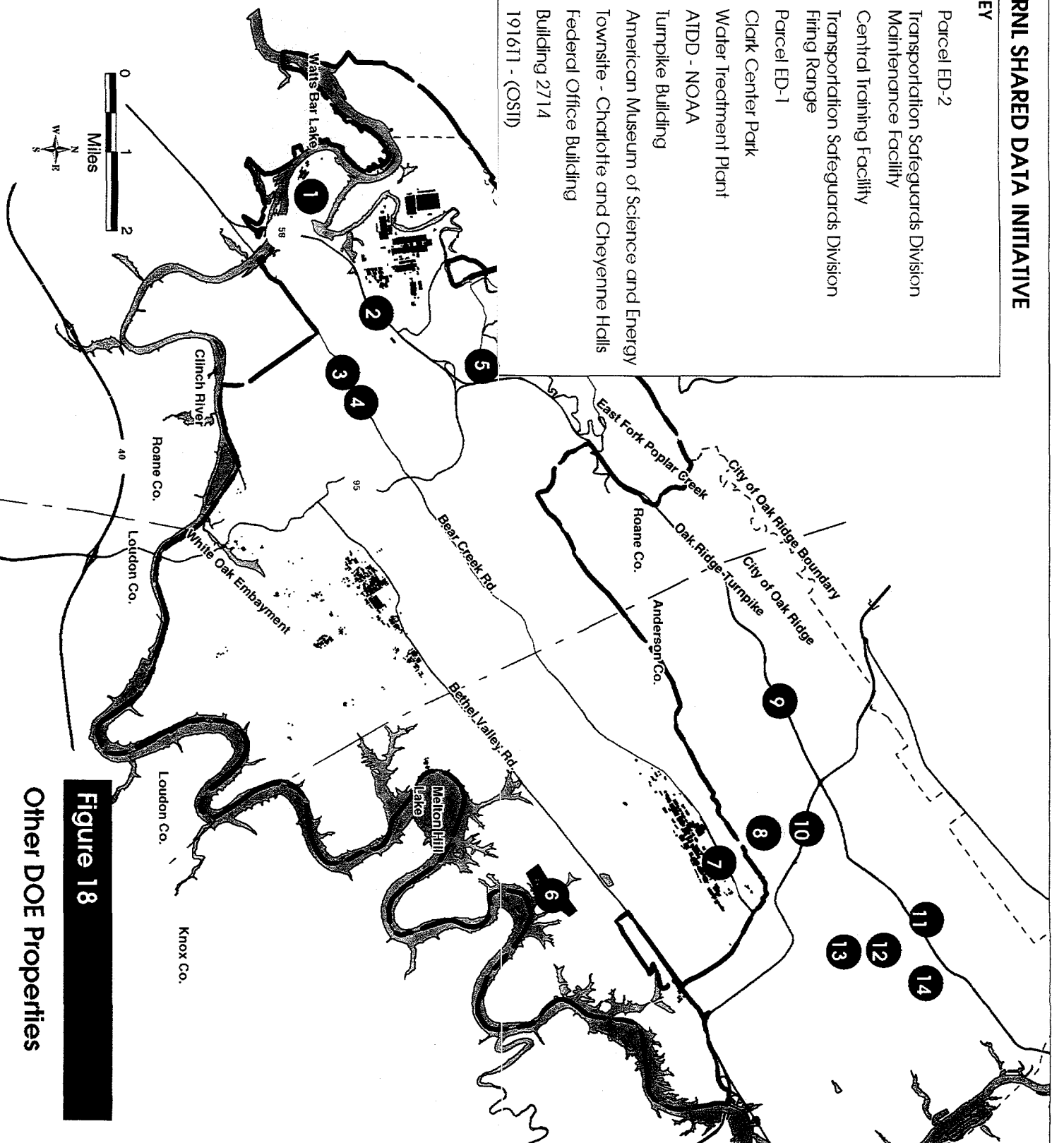


Figure 18

Other DOE Properties

is south of Bear Creek Road, less than 1 mile southeast of ETPP, and currently consists of about 150 acres.

The Transportation Safeguards

Maintenance Facility is the former Stone & Webster (OS-3) warehouse, located about 1 mile east of ETPP, on the south side of State Route 58 (Oak Ridge Turnpike), near the intersection with Blair Road. The building is situated on a 20-acre site and has undergone major modifications, including the addition of security fencing, paved parking, and paved access around the building. Additional expansions include a target range with a safety buffer zone, a fitness facility, and the eventual relocation of office facilities from the Y-12 Plant. The total site area constitutes about 100 acres. The maintenance facility is operated and maintained by the Y-12 Plant's Facilities Management Organization and funded by DOE-AL.

OSTI is located in two masonry buildings constructed as warehouses in the 1940s:

Buildings 1916T-1 and 1916T-2.

Building 1916T-1 houses the main OSTI functions as well as other occupants.

Portions of this building were converted to office space in the 1950s, and additional bays were added in the 1950s and 1960s. Currently, the building has one office bay and seven other bays for a total space of 135,000 square feet. Building 1916T-2 houses OSTI's subcontractor in charge of distribution and storage. The two OSTI buildings are located on a 7-acre tract that parallels the Oak Ridge Turnpike about 2 miles east of the Federal Office Building. Because of their age and configuration, they are classified as Class B buildings (i.e., semipermanent buildings, constructed primarily of wood, which may need to be renewed, renovated, or rehabilitated in the near future) but are deemed adequate for current functions.

In 1975, the **American Museum of Science and Energy** was relocated from its original facility (55-59 Jefferson Circle) to a 17-acre site contiguous to the ORAU campus, on South Tulane Avenue in Oak

Ridge. The masonry structure contains about 55,400 square feet (33,932 for exhibition space and 21,468 for offices and related space).

This facility contains the energy house, which is licensed to the City of Oak Ridge for use by the Convention and Visitors' Bureau. The building is considered adequate for its current use. The museum also has warehouse space in OSTI's Building 1916T-2 complex.

Charlotte Hall (Building 1801T4) and **Cheyenne Hall** (Building 1801T8), along with two trailer annexes, house the LMES administrative support office buildings. These facilities are located at 231-241 Tyrone Road in Oak Ridge, on two adjacent tracts of DOE-owned land comprising 4 acres. The two wood-frame buildings (Charlotte Hall and Cheyenne Hall), which were constructed in the 1940s, and the two office trailers (Buildings 9983-22 and 9982-23) contain a total area of 46,744 square feet. These facilities currently house the central

employment, auditing, and purchasing functions of LMES, but are being considered for conveyance to the City of Oak Ridge. The wood-frame buildings are Class B facilities.

Water Treatment Plant, located on Pine Ridge just north of the Y-12 Plant, can process an estimated 28 million gallons per day. The sanitary (treated) water is stored in four reservoirs that have a combined capacity of 10 million gallons. From the reservoirs, water is supplied by gravity flow to the Y-12 Plant, ORNL, the ORISE Scarboro Operations Site, and the city of Oak Ridge. The water treatment plant is managed and operated by ETMC for DOE.

The **Turnpike Building** is a DOE-owned facility comprising approximately 46,000 square feet on a 3-acre site located on Jefferson Circle along the Oak Ridge Turnpike in Oak Ridge. The primary facility use is administrative. The building is a temporary wood-frame structure constructed in the 1940s.

Building 2714 is a DOE-owned facility that DOE shares with ORISE (referred to as the "Laboratory Road Facility" in Section 4.4.3). The facility comprises approximately 18,000 square feet and is located in Oak Ridge immediately south of the Federal Office Building.

The **Federal Office Building** is owned by the General Services Administration and is maintained by DOE. DOE ORO offices occupy the vast majority of space in the building, which consists of 113,000 square feet and is located in Oak Ridge.

The **Transportation Safeguards Division Firing Range** is located to the east of the Central Training Facility and is operated by DOE-AL.

The surface danger zones for the Central Training Facility and the Transportation Safeguards Division Firing Range overlap and together comprise about 2500 acres.

Parcel ED-1 comprises 957 acres leased to CROET (effective April 28, 1998).

CROET is authorized to lease facilities from DOE and sublease to the private sector for purposes of economic development. The lease is for a period of 10 years and contains an option for an additional 30-year period. CROET is responsible for the protection and maintenance of all portions of the property at all times and will report directly to DOE. DOE continues to have oversight responsibility for this area, and ETTTP will continue to assist DOE to the extent that DOE directs and funds.

Parcel ED-2 consists of a barge facility and an adjacent 9-acre area located in the K-700 area west of the main ETTTP site. The barge facility has already been leased to CROET, which intends to offer the barge facility to the business community on a fee basis. CROET plans to develop the facility, in conjunction with adjacent rail service and interstate corridor, as a mini-port authority. The adjacent 9-acre area is pending lease to CROET for use as a laydown area supporting the barge facility.

The **ATDD-NOAA Facility** is composed of a wood-frame building built in the 1940s and several smaller buildings at 456 South Illinois Avenue in Oak Ridge. ATDD conducts meteorological and atmospheric diffusion research that is jointly supported by DOE and NOAA. It also provides services to other DOE contractors and operates the Weather Instrument Telemetering Monitoring System for DOE.

LITERATURE CITED

- Accelerating Cleanup: Paths to Closure, Oak Ridge Operations Office.* February 1998. U.S. Department of Energy, Environmental Management Program.
- Comprehensive Land-Use Planning Process Guide.* March 1996. GPG-FM-033. U.S. Department of Energy, Office of Field Management, Office of Project and Fixed Asset Management.
- East Tennessee Technology Park FY 1998 Integrated Strategic Plan.* K/2108. September 26, 1997. Lockheed Martin Energy Systems, Inc.
- The Ecosystem Approach: Healthy Ecosystems and Sustainable Economies.* Vol. 1, Overview. June 1995. Interagency Ecosystem Management Task Force.
- Final Environmental Assessment: Lease of Land and Facilities at the East Tennessee Technology Park.* November 1997. DOE/EAN1175. Lockheed Martin Energy Systems, Inc.
- Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management.* September 1996. DOE/EIS-0236. U.S. Department of Energy.
- FY 1997 Integrated Strategic Plan.* November 22, 1997. KOPS-055R1. Lockheed Martin Energy Systems, Inc.
- FY2000 Environmental, Safety, Health, Quality, and Infrastructure Budget Formulation Submission for the Oak Ridge National Laboratory.* March 31, 1998. Lockheed Martin Energy Research Corporation.
- "Integrated Facilities Plan." In Oak Ridge National Laboratory Land and Facilities Plan.* Preliminary draft. May 1998. Lockheed Martin Energy Research Corporation.
- Oak Ridge National Laboratory Institutional Plan.* 1998. Lockheed Martin Energy Research Corporation. Also available on-line [http://www.ornl.gov/inst_plan/IP_outline.html].
- Oak Ridge National Laboratory Land and Facilities Plan.* Preliminary draft. May 8, 1998. Lockheed Martin Energy Research Corporation.
- Oak Ridge Reservation Management Plan.* February 1997. ES/EN/SFP-46/R1. Lockheed Martin Reservations Management Organization.
- Removal Action Work Plan for the K-901-A Pond, East Tennessee Technology Park, Oak Ridge, Tennessee.* September 15, 1997. DOE/OR/01-1625. U.S. Department of Energy.
- Removal Action Work Plan for the K-1007-P1 Pond.* March 15, 1998. DOE/OR/01-1705. U.S. Department of Energy.

Stewards of a National Resource. 1995.
DOE/FM-0002. U.S. Department of
Energy.

*Updated List of Oak Ridge Operations
Facilities Managed by the Environmental
Management and Enrichment Facilities
(EMEF) Program.* December 5, 1997.
Lockheed Martin Energy Systems, Inc.

*U.S. Department of Energy Oak Ridge
Operations Office Planning Document for
Transition of the Environmental
Management and Enrichment Facilities
Program to the Management and
Integration Contractor.* October 1, 1997.
ES/M-25/R0. Lockheed Martin Energy
Systems, Inc.

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