CHAPTER 2 ENVIRONMENTAL DESCRIPTION

Chapter 2 describes the existing environmental conditions at the Clinch River Nuclear (CRN) Site, vicinity, and region. The environmental descriptions provide sufficient detail to identify those environmental resources that have the potential to be affected by the construction, operation, or decommissioning of two or more Small Modular Reactors (SMRs). The level of detail is commensurate with level of information associated with an Early Site Permit Application (ESPA). This chapter is divided into eight subsections:

- Site Location (Section 2.1)
- Land (Section 2.2)
- Water (Section 2.3)
- Ecology (Section 2.4)
- Socioeconomics (Section 2.5)
- Geology (Section 2.6)
- Meteorology and Air Quality (Section 2.7)
- Noise (Section 2.8)
- Related Federal Project Activities (Section 2.9)

2.1 SITE LOCATION

The Tennessee Valley Authority (TVA) proposes to demonstrate that the approximately 935-acre (ac) Clinch River Nuclear (CRN) Site is a suitable site for the construction and operation of two or more small modular reactors (SMRs). The CRN Site is located in Roane County in eastern Tennessee. The property is owned by the federal government and is managed by TVA (Reference 2.1-1). TVA is the named applicant for the Clinch River SMR Project. The regional setting for the CRN Site is depicted in Figure 2.1-1. The CRN Site and immediate vicinity (6-mile [mi] radius) are shown in Figure 2.1-2.

The proposed site configuration, including the location of the surrogate plant as defined by the plant parameter envelope (see Subsection 3.1.2 for a description), is presented in Figure 2.1-3. The CRN Site center point is listed in Tables 2.1-1 and 2.1-2 and shown on Figure 2.1-2. The center point of the CRN Site is located approximately 11 mi southwest of the City of Oak Ridge, Tennessee business district. The center point of the CRN Site is approximately 25 mi west-southwest of downtown Knoxville, Tennessee; 24 mi west-northwest of Maryville/Alcoa, Tennessee; and 30 mi north-northeast of Athens, Tennessee. (Reference 2.1-2; Reference 2.1-3)

The nearest population center to the CRN Site, as defined by Title 10 of the Code of Federal Regulations 100.3, is the City of Oak Ridge, Tennessee. The Site is located within the Oak Ridge city limits. The City of Oak Ridge, Tennessee is also the largest city whose boundary lines are located within 10 mi of the CRN Site. (Reference 2.1-4; Reference 2.1-3)

Although the urbanized area of Oak Ridge, Tennessee is within 10 mi north of the CRN Site, the majority of the city's incorporated area within the 10-mi radius of the CRN Site is occupied by federally-owned land, including the U.S. Department of Energy's (DOE's) Oak Ridge Reservation. The next closest communities from the center point of the CRN Site are the cities of Kingston, Tennessee (7.2 mi to the west) and Lenoir City, Tennessee (approximately 8.9 mi to the southeast). Oak Ridge, Tennessee is the only urbanized area located within the CRN Site vicinity (6-mi radius). (Reference 2.1-3)

A principal arterial, Interstate 40, is located south of the CRN Site as shown in Figure 2.1-1. Two rural, principal arterials frame the CRN Site on the north as shown in Figure 2.1-2. Tennessee State Highway (TN) 58 is located northwest of the CRN Site and TN 95 is located to the northeast. The CRN Site is accessed from either of these roadways via Bear Creek Road. No known major roadway improvements are planned for the area. The City of Oak Ridge has supported several studies related to the possible development of a general aviation airport at the East Tennessee Technology Park (Reference 2.1-5). A rail spur (EnergySolutions Heritage Railroad) is located approximately 2.5 mi north-northwest of the center point of the CRN Site, northwest of TN 58 (Reference 2.1-6).

The CRN Site is located on a peninsula on the north shore of the Clinch River arm of Watts Bar Reservoir (Figure 2.1-2), between approximately Clinch River Mile (CRM) 14.5 and CRM 19.

(Reference 2.1-7; Reference 2.1-8) There is an inactive DOE barge terminal at CRM 13.1, near Bear Creek Road and the TN 58 ramp approximately 1.3 mi northwest of the primary CRN Site entrance (Reference 2.1-9). A former barge terminal that was used for construction of TN 58 is located between the TN 58 bridge and the CRN Site entrance. A barge terminal was approved to be constructed in association with the Clinch River Breeder Reactor Project (CRBRP) in the 1970s and 1980s. This terminal was proposed within the CRN Site south of the mouth of Grassy Creek but was never constructed (Reference 2.1-10; Reference 2.1-11). The Grassy Creek Habitat Protection Area is located adjacent to the northern boundary of the CRN Site as shown in Figure 2.1-2.

The majority of the CRN Site is within the 7.5 minute Elverton Quadrangle. The eastern portion of the site is in the Bethel Valley Quadrangle. The site is bracketed by the Petros and Windrock Quadrangles to the north, the Lovell Quadrangle to the east, the Lenoir City and Cave Creek Quadrangles to the south, and the Harriman Quadrangle to the west. (Reference 2.1-12; Reference 2.1-13)

2.1.1 References

Reference 2.1-1. Executive Office of the President and Bureau of the Budget, "Order Transferring to the Tennessee Valley Authority the Use, Possession, and Control of Certain Lands from the Atomic Energy Commission WBR-1790," March 24, 1998.

Reference 2.1-2. U.S. Census Bureau, "2010 Census - Urbanized Area Reference Map: Knoxville, TN," March 10, 2012.

Reference 2.1-3. Enercon, Figure 1: Site Vicinity Map, Prepared for Tennessee Valley Authority, February 13, 2013.

Reference 2.1-4. U.S. Census Bureau, State and County QuickFacts, Oak Ridge, TN, Website: http://quickfacts.census.gov/qfd/states/47/4755120.html, January 10, 2013.

Reference 2.1-5. City of Oak Ridge, Tennessee, 2013 State and Federal Legislative Agenda, Website: http://www.oakridgetn.gov/images/uploads/Documents/Featured%20Projects/2013%20State%20%20Federal%20Agenda%20final.pdf, January 14, 2013.

Reference 2.1-6. U.S. Environmental Protection Agency, "Clinch River NEPAssist, Railroads Map," 2013.

Reference 2.1-7. Tennessee Valley Authority, "Final Environmental Impact Statement Watts Bar Reservoir Land Management Plan Loudon, Meigs, Rhea, and Roane Counties, Tennessee," February, 2009.

Reference 2.1-8. Watts Bar - Clinch Watershed Team, Final Watts Bar Reservoir Land Management Plan, Panel 4; Alternative B "Preferred", January 23, 2009.

Reference 2.1-9. Tennessee Valley Authority, Tennessee and Cumberland River Terminal Directory, Website: http://www.tva.com/river/navigation/pdf/terminal_list.pdf, 2013.

Reference 2.1-10. U.S. Department of Energy, Tennessee Valley Authority, and Project Management Corporation, "Clinch River Breeder Reactor Plant DOE/TVA/PMC Site Redress Planning Task Force Report," January, 1984.

Reference 2.1-11. Project Management Corporation, "Clinch River Breeder Reactor Plant Environmental Report Volume II," 1982.

Reference 2.1-12. U.S. Geological Survey, Elverton Quadrangle Tennessee 7.5-Minute Series, 2013.

Reference 2.1-13. U.S. Geological Survey, Bethel Valley Quadrangle Tennessee 7.5-Minute Series, 2013.

Table 2.1-1
CRN Site Center Point in Longitude and Latitude (Decimal Degrees)

Longitude	Latitude
-84.380927	35.890889

Table 2.1-2
CRN Site Center Point in Tennessee State Plane Projection (NAD27 UTM Zone 16 Meters)

Easting	Northing
736,407.140357	3,974,815.263382

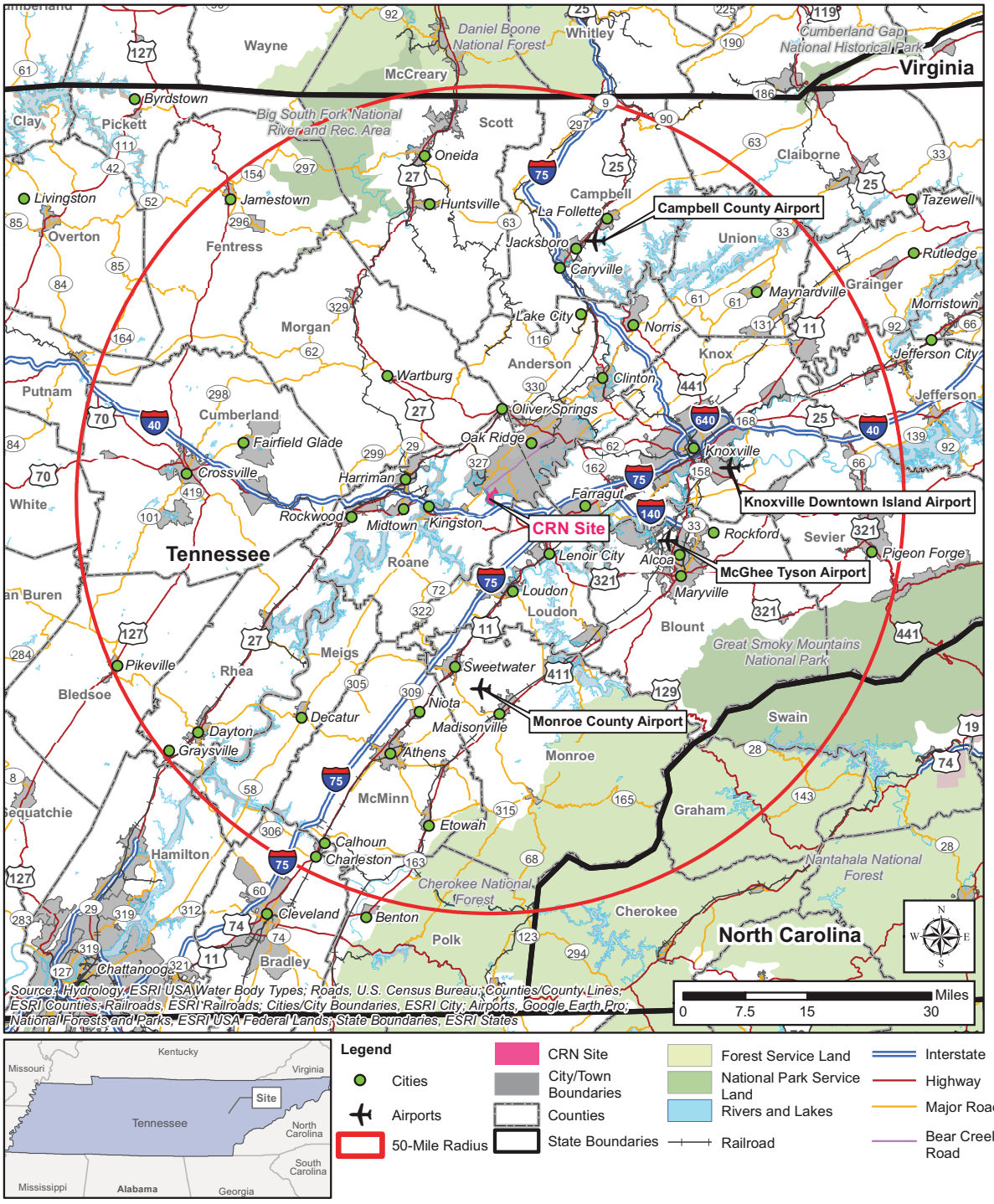
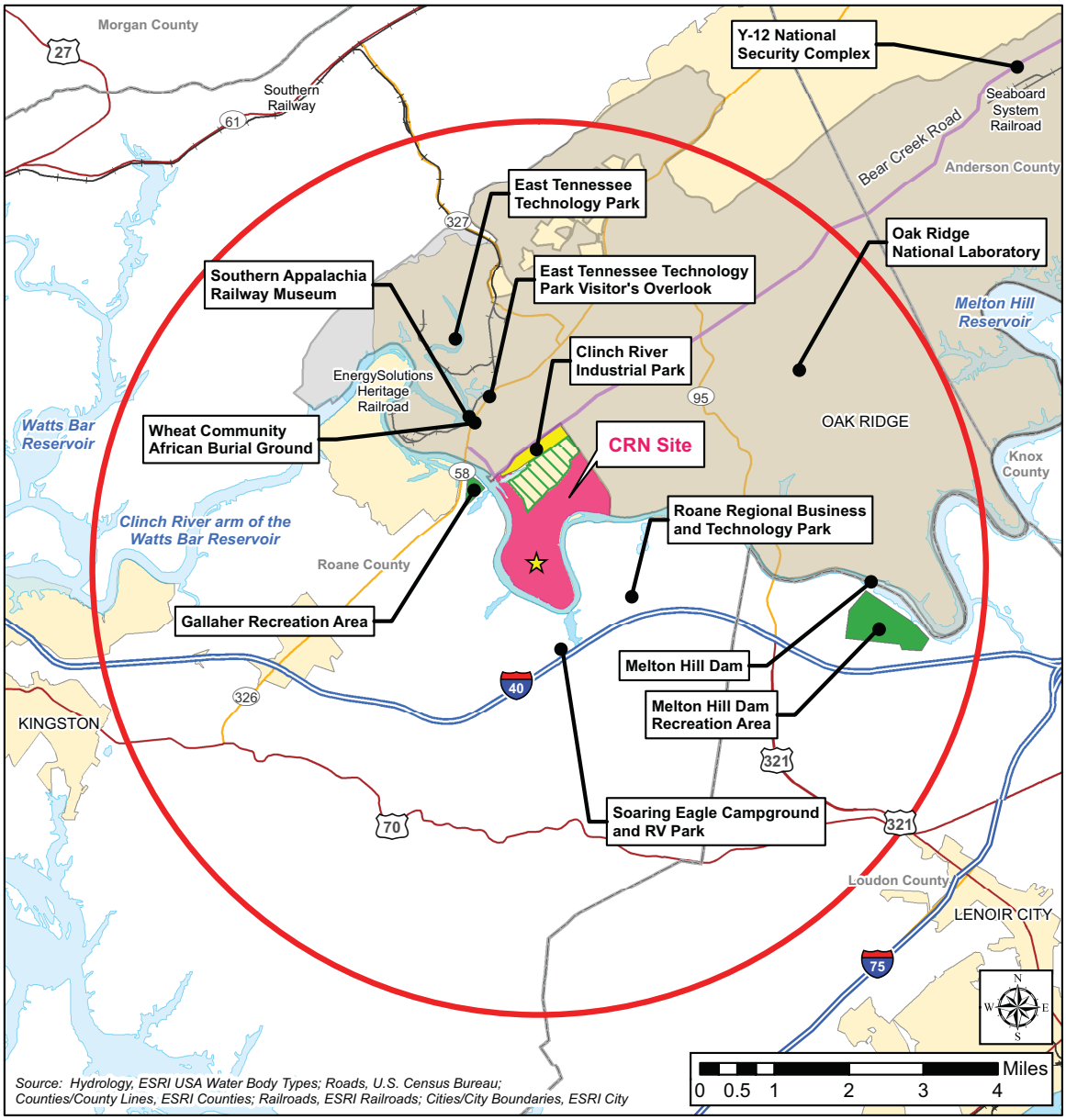


Figure 2.1-1. CRN Site 50-Mile Regional Map



Legend

- CRN Site Center Point
- 6-Mile Radius
- CRN Site
- Town/City Boundaries
- Counties
- Rivers and Lakes
- Grassy Creek Habitat Protection Area
- Recreation Areas
- Oak Ridge Reservation Boundary
- Clinch River Industrial Area
- Railroad
- Interstate
- Highway
- Major Road
- Bear Creek Road

Figure 2.1-2. CRN Site 6-Mile Vicinity Map

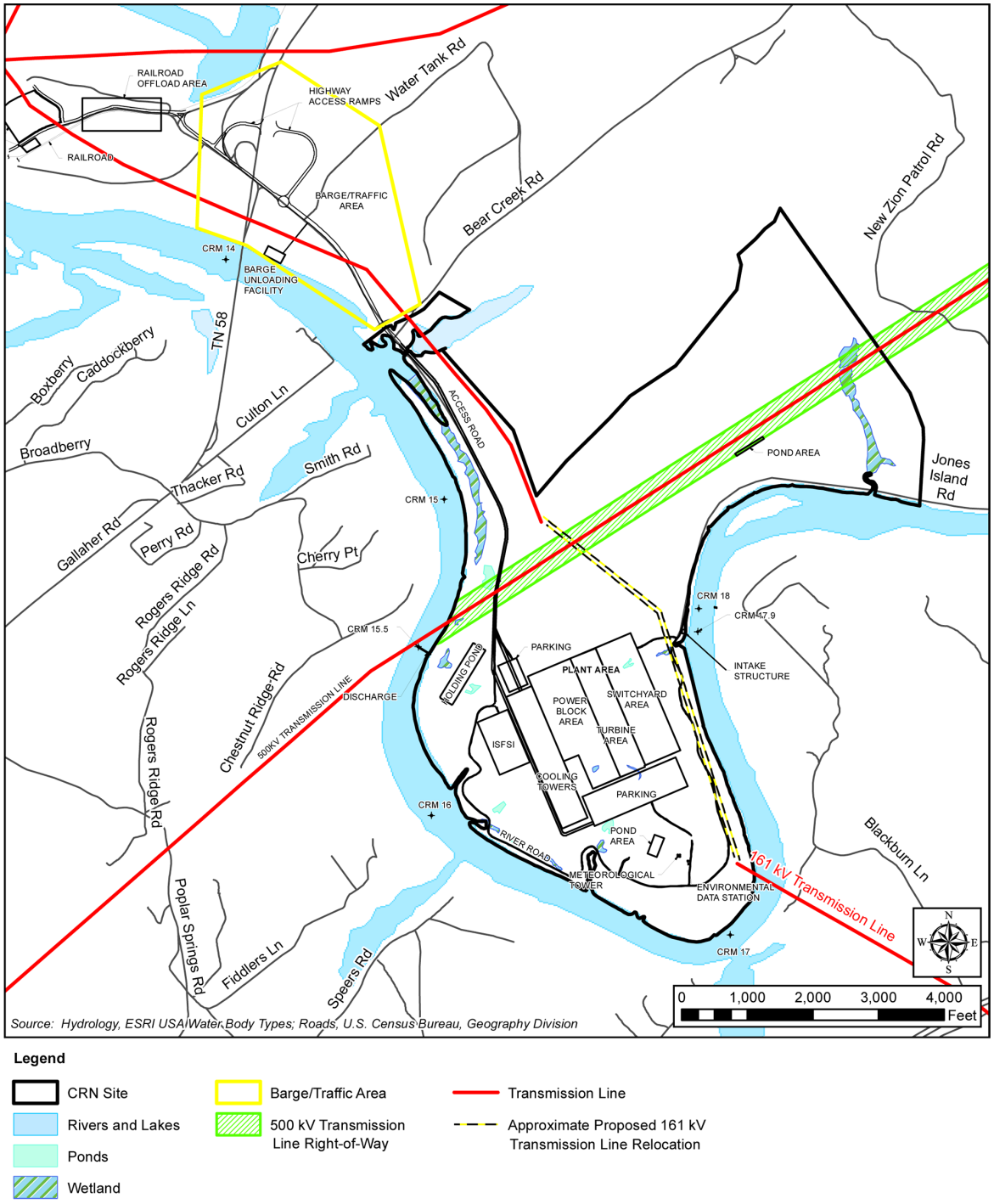


Figure 2.1-3. CRN Site Layout