Table of Contents

2.0 Site Characteristics 2–4

2.1 Geography and Demography 2–11
2.1.1 Site Location and Description 2–11
2.1.2 Exclusion Area Authority and Control 2–13
2.1.3 Population Distribution 2–15
2.1.4 References 2–21

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

List of Tables

Table 2.0-1—U.S. EPR Site Design Envelope Comparison 2–5
Table 2.0-2—Comparison of Inventory of Radionuclides Which Could Potentially Seep Into the Groundwater. 2–9
Table 2.1-1—{Callaway Plant Unit 1 and 2 and Midpoint Coordinates} 2–23
Table 2.1-2—{Population Projections Within 10 mi (16 km) Radius} 2–24
Table 2.1-3—{Population Projections Within 50 mi (80 km) Radius} 2–25
Table 2.1-4—{Transient Population Facilities - Major Employers Within the 10 mi (16 km) Zone} 2–26
Table 2.1-5—{Transient Population Facilities - Major Recreational Areas and Attractions Within the 10 mi (16 km) Zone} 2–27
Table 2.1-6—{Transient Population Distribution for the 10 mi (16 km) Radius (2000)}. . . 2–28
Table 2.1-7—{County to County Work Flows (2000)} 2–29
Table 2.1-8—{Population Projections Within the LPZ} 2–30
Table 2.1-9—{Special Facilities – Schools Within the 10 mi (16 km) Zone} 2–31
Table 2.1-10—{Other Special Facilities Within the 10 mi (16 km) Zone}. 2–32
Table 2.1-11—{Population of Cities, Towns, and Villages within 50 Miles of the Site}. . . . 2–33

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

List of Figures

Figure 2.1-1—{Site Area Map} 2–36
Figure 2.1-2—{50 Mile (80 km) Surrounding Area} 2–37
Figure 2.1-3—{10 Mile (16 km) Surrounding Area} 2–38
Figure 2.1-4—{Site Boundaries} 2–39
Figure 2.1-5—{Exclusion Area Boundaries} 2–40
Figure 2.1-6—{Enlarged Site Area Map} 2–41
Figure 2.1-7—{Callaway Plant Unit 2 Enlargement} 2–42
Figure 2.1-8—Exclusion Area and Plant Site Area} 2–43
Figure 2.1-9—{10 Mile (16 km) Radius Map} 2–44
Figure 2.1-10—{10 Mile (16 km) 2000 Population Distribution} 2–45
Figure 2.1-11—{10 Mile (16 km) 2010 Population Distribution} 2–46
Figure 2.1-12—{10 Mile (16 km) 2020 Population Distribution} 2–47
Figure 2.1-13—{10 Mile (16 km) 2030 Population Distribution} 2–48
Figure 2.1-14—{10 Mile (16 km) 2040 Population Distribution} 2–49
Figure 2.1-15—{10 Mile (16 km) 2050 Population Distribution} 2–50
Figure 2.1-16—{10 Mile (16 km) 2050 Population Distribution} 2–51
Figure 2.1-17—{50 Mile (80 km) 2000 Vicinity} 2–52
Figure 2.1-18—{50 Mile (80 km) 2000 Population Distribution} 2–53
Figure 2.1-19—{50 Mile (80 km) 2010 Population Distribution} 2–54
Figure 2.1-20—{50 Mile (80 km) 2020 Population Distribution} 2–55
Figure 2.1-21—{50 Mile (80 km) 2030 Population Distribution} 2–56
Figure 2.1-22—{50 Mile (80 km) 2040 Population Distribution} 2–57
Figure 2.1-23—{50 Mile (80 km) 2000 Population Distribution} 2–58
Figure 2.1-24—{50 Mile (80 km) 2060 Population Distribution} 2–59
Figure 2.1-25—{Protected Area, Exclusion Area, Restricted Area, and Low Population Zone} 2–60
Figure 2.1-26—{LPZ and Emergency Planning Evacuation Routes} 2–61
Figure 2.1-27—{10 Mile (16 km) 2057 Population Distribution} 2–62
Figure 2.1-28—{10 Mile (16 km) 2017 Population Distribution} 2–63
Figure 2.1-29—{50 Mile (80 km) 2057 Population Distribution} 2–64
Figure 2.1-30—{50 Mile (80 km) 2017 Population Distribution} 2–65
Figure 2.1-31—{Cumulative Populations} 2–66

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

2.0 SITE CHARACTERISTICS

This Chapter of the U.S. EPR FSAR is incorporated by reference with the following departures and/or supplements.

Chapter 2 describes the geological, seismological, hydrological, and meteorological characteristics of the {Callaway} site and vicinity. The site characteristics are described in conjunction with present and projected population distribution, land use, and site activities and controls. The {Callaway} site characteristics were developed in accordance with the relevant requirements of Title 10 CFR Part 20, Subpart D (CFR, 2007a); Title 10 CFR Part 50 (CFR, 2007b); Title 10 CFR Part 100 (CFR, 2007c); and Regulatory Guide 1.206 (NRC, 2007).

The U.S. EPR FSAR includes the following COL Item in Section 2.0:

> A COL applicant that references the U.S. EPR design certification will compare site-specific data to design parameter data in Table 2.1-1. If the specific data for the site falls within the assumed design parameter data and characteristics in Table 2.1-1, then the U.S. EPR standard design is bounding for the site. For site-specific design parameter data or characteristic that are outside the bounds of the assumptions presented in Table 2.1-1, the COL applicant will confirm that the U.S. EPR design acceptably meets any additional requirements that may be imposed by the more limiting site-specific design parameter data or characteristic, and that the design maintains conformance to the design commitments and acceptance criteria described in this FSAR.

This COL Item is addressed as follows:

The {Callaway Plant Unit 2} site-specific parameters and characteristics have been reviewed and compared to determine if they are within the bounds of the assumed parameters and characteristics for a U.S. EPR. This comparison is provided in Table 2.0-1 and Table 2.0-2. For the {Callaway Plant Unit 2} site-specific parameters or characteristics that are outside the bounds of the conservative limiting assumptions presented in Table 2.0-1 and Table 2.0-2, justification of the acceptability of these conditions is provided in the associated section of Chapter 3, Design of Structures, Components, Equipment and Systems or as specified in the table.

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Table 2.0-1—U.S. EPR Site Design Envelope Comparison

(Page 1 of 4)

	U.S. EPR FSAR Design Parameter Value/Characteristic	{Callaway Plant Unit 2} Design Parameter Value/Characteristic
Precipitation		
Rainfall	<19.4 in/hr	{18.48 in/hr (47 cm/hr)} (See Section 2.4.3)
Snow (design: extreme live load, including 48-hour probable maximum winter precipitation)	<100 psf	{24 psf (117.2 kg/m^2)} (See section 2.3.1)
Seismology		
Horizontal SSE Acceleration	0.3g Peak (CSDRS shapes – See Section 3.7.)	{0.24g} (See Sections 2.5.2 and 3.7)
Vertical SSE Acceleration)	0.3g Peak (CSDRS shapes – See Section 3.7.)	{0.26g} (See Sections 2.5.2 and 3.7)
Fault Displacement Potential	No fault displacement is considered for safety-related SSCs in U.S. EPR design certification.	{No Tectonic Fault Rupture} (See Section 2.5.3)
Soil		
Minimum Bearing Capacity (Static)	22 ksf in localized areas at the bottom of the Nuclear Island basemat and 15 ksf on average across the total area of the bottom of the Nuclear Island basemat.	{22.5 ksf in localized areas of the NI Basemat and 15 ksf on the average across the total area of the bottom of the NI basemat} (See section 2.5.4)
Minimum Shear Wave Velocity (Low strain best estimate average value at bottom of basemat)	1000 fps	{2340 fps (NI Basemat} (See Section 2.5.2.6)
Liquefaction	None	{Not susceptible} (See section 2.5.4)
Slope Failure Potential	No slope failure potential is considered in the design of safety-related SSCs for U.S. EPR design certification.	{No failure potential} (See Section 2.5.5)
Maximum Differential Settlement (across the basemat)	1/2 inch in 50 feet in any direction	{less than ½ inch in 50 ft for NI basemat as well as other buildings} (See Sections 2.5.4, 3.8.5.5.1, 3.8.5.5.2, and 3.8.5.5.3)
Maximum Ground Water	3.3 ft below grade	{17 ft below grade (828' msl)} (See section 2.5.4)

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

FSAR: Section 2.0

Table 2.0-1—U.S. EPR Site Design Envelope Comparison

(Page 2 of 4)

	U.S. EPR FSAR Design Parameter Value/Characteristic	{Callaway Plant Unit 2} Design Parameter Value/Characteristic
Inventory of Radionuclides Which Could Potentially Seep Into the Groundwater		
Bounding Values for Component Radionuclide Inventory	See Table 2.0-2	See Table 2.0-2
Flood Level		
Maximum Flood (or Tsunami)	1 ft below grade	{Plant grade is > 139 ft above PMF elevation on any local creek or stream and > 309 ft above maximum recorded Missouri River elevation.} (See Sections 2.4.1 and 2.4.2, 2.4.10, 3.4.2, 3.4.3.10, 3.8.4.1.11, 3.8.4.3, and 9.2.5)
Wind		
Maximum Sustained Speed	145 mph (Based on 3-sec gust at 33 ft above ground level and factored for 50-yr mean recurrence interval.)	{90 mph} (based on 3 second gust at 33 feet for 50 year recurrence interval) (See Section 2.3.1)
Importance Factor	1.15 (Safety-related structures for 100-year mean recurrence interval.)	{1.2} (safety related structures for 100 year mean recurrence interval) (See Section 2.3.1)
Tornado		
Maximum Pressure Drop	1.2 psi at 0.5 psi/sec	{1.2 psi at 0.5 psi/sec} (See Section 2.3.1)
Maximum Rotational Speed	184 mph	{184 mph} (See Section 2.3.1)
Maximum Translational Speed	46 mph	{46 mph} (See Section 2.3.1)
Maximum Wind Speed	230 mph	{230 mph} (See Section 2.3.1)
Radius of Maximum Rotational Speed	150 ft	{150 feet} (See Section 2.3.1)

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

FSAR: Section 2.0

Table 2.0-1—U.S. EPR Site Design Envelope Comparison

(Page 3 of 4)

	U.S. EPR FSAR Design Parameter Value/Characteristic				{Callaway Plant Unit 2} Design Parameter Value/Characteristic
Missile Spectra	6 in Schedule 40 pipe, 6.625 in diameter x 15 ft long, 287 lb, 34.5 in^2 impact area, impact velocity of 135 ft/sec horizontal and 90 ft/sec vertical.				{6 in Schedule 40 pipe, 6.625 in diameter x 15 ft long, 287 lb, 34.5 in^2 impact area, impact velocity of 135 ft/sec horizontal and 90 ft/sec vertical.} (See Section 2.2 and 3.5)
	Automobile, 16.4 ft x 6.6 ft x 4.3 ft, 4000 lb, 4086.7 in^2 impact area, impact velocity of 135 ft/sec horizontal & 90 ft/sec vertical. (Automobile missile is considered at elevations up to 30.0 ft above grade elevation.)				{Automobile, 16.4 ft x 6.6 ft x 4.3 ft, 4000 lb, 4086.7 in^2 impact area, impact velocity of 135 ft/sec horizontal & 90 ft/sec vertical. (Automobile missile is considered at elevations up to 30.0 ft above all grade elevations within 0.5 miles of the plant structures.} (See Section 2.2 and 3.5)
	Solid steel sphere, 1 in diameter, 0.147 lb, 0.79 in^2 impact area, impact velocity of 26 ft/sec horizontal & 17 ft/sec Vertical.				{Solid steel sphere, 1 in diameter, 0.147 lb, 0.79 in^2 impact area, impact velocity of 26 ft/sec horizontal & 17 ft/sec Vertical.} (See Section 2.2 and 3.5)
Temperature					
Air	0% Exceedance Values	Maximum	115°F Dry Bulb / 80°F Wet Bulb (coincident)		{115°F Dry Bulb /80°F Wet Bulb (coincident)} (See Section 9.2.1)
			81°F Wet Bulb (non-coincident) for UHS Design only		{81°F Wet Bulb (non-coincident) for UHS Design only} (See Section 9.2.1)
		Minimum	-40°F		{-28.3°F for 100 year return period} (See Section 2.3.1)
	1% Exceedance Values	Maximum	100°F Dry Bulb / 77°F Wet Bulb (coincident)		{0% exceedance values bound 1% exceedance values}
			80°F Wet Bulb (non-coincident) for UHS Design only		{0% exceedance values bound 1% exceedance values}
		Minimum	-10°F		{31.4°F see section 2.3.1}
UHS Meteorological Conditions					
Conditions resulting in Maximum Evaporation and Drift Loss of Water from the UHS (Section 2.3.1)			As presented in Table 2.1-3 – Design Values for Maximum Evaporation and Drift Loss of Water from the UHS		{U.S. EPR values are bounding for site specific design.} (See Section 9.2.1.1)
Conditions resulting in Minimum Water Cooling in the UHS (Section 2.3.1)			As presented in Table 2.1-4 – Design Values for Minimum Water Cooling in the UHS.		{U.S. EPR values are bounding for site specific design.} (See Sections 9.2.1.1 and 2.3.1)
Potential for Water Freezing in the UHS Water Storage Facility (Sections 2.4.7 and 9.2.5)			As presented in Section 2.4.7 and 9.2.5		{No potential-See Sections 2.3.1, 2.4.7 and 9.2.5}

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

FSAR: Section 2.0

Table 2.0-1—U.S. EPR Site Design Envelope Comparison

(Page 4 of 4)

	U.S. EPR FSAR Design Parameter Value/Characteristic	{Callaway Plant Unit 2} Design Parameter Value/Characteristic
UHS Design Parameters		
Maximum UHS Evaporative Water Loss	571 gpm	{571 gpm} (See Section 9.2.1.1)
Maximum Drift Water Loss	≤0.005%	{≤0.005%}
Design Cold (outlet) Water Temperature	≤95°F (max ESWS supply design limit)	{≤95 °F} (See Sections 2.3.1 and 9.2.1.1)
Atmospheric Dispersion Factors (χ/Q)		
Maximum Annual Average (0.5 mile - limiting sector)	<4.973E-6 sec/m^3	{2.79E-07 sec/m^3} (See Section 2.3.5)
Accident		
0-2 hr (Exclusion Area Boundary, (EAB), 0.5 miles)	<1E-3 sec/m^3	{3.07E-05 sec/m^3} (See Section 2.3.4)
0-2 hr (Low Population Zone (LPZ, 1.5 miles)	<1.75E-4 sec/m^3	{6.49E-06 sec/m^3} (See Section 2.3.4)
2-8 hr (Low Population Zone (LPZ, 1.5 miles)	<1.35E-4 sec/m^3	{4.24E-06 sec/m^3} (See Section 2.3.4)
8-24 hr (Low Population Zone (LPZ, 1.5 miles)	<1.00E-4 sec/m^3	{3.43E-06 sec/m^3} (See Section 2.3.4)
1-4 day hr (Low Population Zone (LPZ, 1.5 miles)	<5.40E-5 sec/m^3	{2.16E-06 sec/m^3} (See Section 2.3.4)
4-30 day hr (Low Population Zone (LPZ, 1.5 miles)	<2.20E-5 sec/m^3	{1.11E-06 sec/m^3} (See Section 2.3.4)

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

FSAR: Section 2.0

Table 2.0-2—Comparison of Inventory of Radionuclides Which Could Potentially Seep Into the Groundwater (Page 1 of 2)

(Page 1 of 2)

	U.S. EPR FSAR Design Parameter Value/Characteristic	{Callaway Plant Unit 2} Design Parameter Value/Characteristic (See Section 2.4.13)
Nuclide	**Activity (Ci/g)**	**Activity (Ci/g)**
Br-83	3.2E-02	{3.2E-02}
Br-84	1.7E-02	{1.7E-02}
Br-85	2.0E-03	{2.0E-03}
I-129	4.6E-08	{4.6E-08}
I-130	5.0E-02	{5.0E-02}
I-131	7.4E-01	{7.4E-01}
I-132	3.7E-01	{3.7E-01}
I-133	1.3E+00	{1.3E+00}
I-134	2.4E-01	{2.4E-01}
I-135	7.9E-01	{7.9E-01}
Cs-134	1.7E-01	{4.4E-01}
Cs-136	5.3E-02	{1.1E-01}
Cs-137	1.1E-01	{1.7E-01}
Cs-138	2.2E-01	{2.3E-01}
Cr-51	2.0E-03	{2.1E-03}
Mn-54	1.0E-03	{1.1E-03}
Fe-55	7.6E-04	{8.1E-04}
Fe-59	1.9E-04	{2.0E-04}
Co-58	2.9E-03	{3.1E-03}
Co-60	3.4E-04	{3.6E-04}
Na-24	3.7E-02	{3.8E-02}
Zn-65	3.2E-04	{3.4E-04}
W-187	1.8E-03	{1.9E-03}
Rb-88	1.0E+00	{1.0E+00}
Rb-89	4.7E-02	{4.7E-02}
Sr-89	6.3E-04	{6.7E-04}
Sr-90	3.3E-05	{4.6E-05}
Sr-91	1.0E-03	{1.1E-03}
Sr-92	1.7E-04	{1.7E-04}
Y-90	7.7E-06	{1.1E-05}
Y-91m	5.2E-04	{5.4E-04}
Y-91	8.1E-05	{8.6E-05}
Y-92	1.4E-04	{1.4E-04}
Y-93	6.5E-05	{6.7E-05}
Zr-95	9.3E-05	{9.9E-05}
Nb-95	9.3E-05	{9.9E-05}
Mo-99	1.1E-01	{1.3E-01}
Tc-99m	4.6E-02	{5.7E-02}
Ru-103	7.7E-05	{1.1E-04}
Ru-106	2.7E-05	{6.2E-05}
Rh-103m	6.8E-05	{9.4E-05}
Rh-106	2.7E-05	{6.2E-05}
Ag-110m	2.0E-07	{1.0E-06}
Te-127m	4.4E-04	{6.6E-04}
Te-129m	1.5E-03	{1.9E-03}

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Table 2.0-2—Comparison of Inventory of Radionuclides Which Could Potentially Seep Into the Groundwater (Page 2 of 2)

(Page 2 of 2)

	U.S. EPR FSAR Design Parameter Value/Characteristic	{Callaway Plant Unit 2} Design Parameter Value/Characteristic (See Section 2.4.13)
Te-129	2.4E-03	{3.1E-03}
Te-131m	3.7E-03	{4.6E-03}
Te-131	2.6E-03	{3.0E-03}
Te-132	4.1E-02	{5.0E-02}
Te-134	6.7E-03	{6.7E-03}
Ba-137m	1.0E-01	{1.6E-01}
Ba-140	6.2E-04	{7.1E-04}
La-140	1.6E-04	{1.9E-04}
Ce-141	8.9E-05	{9.7E-05}
Ce-143	7.6E-05	{8.3E-05}
Ce-144	6.9E-05	{7.3E-05}
Pr-143	8.8E-05	{9.7E-05}
Pr-144	6.9E-05	{7.3E-05}
Np-239	8.7E-04	{1.5E-03}

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

2.1 GEOGRAPHY AND DEMOGRAPHY

This section of the U.S. EPR FSAR is incorporated by reference with the following supplements.

The U.S. EPR FSAR includes the following COL Item in Section 2.1:

> A COL applicant that references the U.S. EPR design certification will provide site-specific information related to site location and description, exclusion area authority and control, and population distribution.

This COL Item is addressed as follows:

Site specific information related to site location and description is addressed in Section 2.1.1. Exclusion area authority and control is addressed in Section 2.1.2, and population distribution is addressed in Section 2.1.3.

2.1.1 SITE LOCATION AND DESCRIPTION

The U.S. EPR FSAR includes the following COL Item in Section 2.1.1:

> The site location and description is site specific and will be addressed by the COL applicant, including:
>
> - Specific location by longitude and latitude, Universal Transverse Mercator (UTM) coordinates, and political subdivisions; the site's relative location with respect to natural and man-made features of the area such as highways, railways, and waterways; and local population distribution.
> - A map of the site area of suitable scale (with explanatory text as necessary) showing relevant features such as the plant property lines, site and exclusion area boundaries (EAB), location and orientation of principal plant structures within the site area, and highways, railways and waterways that traverse or are adjacent to the site.

The COL Item is addressed as follows:

Sections 2.1.1.1 through 2.1.1.3 are added as a supplement to the U. S. EPR FSAR.

2.1.1.1 Specification of Location

A site area map for the {Callaway Plant Unit 2} site is provided in Figure 2.1-1. The coordinates of the center of the containment building for {Callaway Plant Unit 1, Callaway Plant Unit 2, and the midpoint between the reactors} are provided in Table 2.1-1 for both the Geodetic Latitude/Longitude and the Universal Transverse Mercator (UTM) coordinate systems.

{Figure 2.1-2 and Figure 2.1-3 depict the Callaway Plant Site and the surrounding area within 50 mi (80 km) and 10 mi (16 km), respectively. The Callaway plant property occupies 7,354 acres (2,974 ha) of which Callaway Plant Unit 2 will occupy approximately 530 acres (162 hectares) of the plant site}. With the exception of Callaway Plant Unit 1, no commercial, industrial, institutional, recreational, or residential structures are located within the Callaway Plant Site.

The Callaway Plant Site is located within Callaway County approximately 10 miles southeast of Fulton, Missouri, and 80 miles west of the St. Louis metropolitan area. The Missouri River flows by the site in an easterly direction approximately 5 miles south of the site midpoint at its

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

closest. At this point, the elevations of 530 feet on the north and south sides of the river define the Missouri River flood plain, which is about 2.4 miles wide in this area.

The Callaway Plant Site is located in an area of gently rolling upland, once part of an old glacial till plain. Erosion and downcutting of the Missouri River and its tributary streams have dissected the plain, leaving a nearly isolated plateau of approximately 8 square miles. The plateau has a maximum elevation of 858 feet. The overall drop in elevation between the crest of the plateau and the Missouri River is about 350 feet.

Surface drainage to the east and northeast is to Logan Creek. Mud Creek is a major drainage way from the south and southwestern side of the site. Auxvasse Creek, a major tributary to the Missouri River located about 2 miles west of the site area intercepts surface drainage from the western and northern flanks of the plateau.

Dominant existing land uses within 5 miles of the Callaway Plant Site include Cool Season Grassland (25%), Forest (57%), and Cropland (14%).

Ameren owned property includes the 2,765 acre (1119 hectares) plant site, a peripheral area surrounding the plant site of 2,454 acres (993 hectares), and the approximately 2,135 acre (864 hectares) corridor area, which contains the water intake and blowdown lines.

Callaway County includes seven incorporated places: Auxvasse city, approximately 10 miles (16 km) north-northwest of the site; the County seat, Fulton city, approximately 10 miles (16 km) to the west-northwest; Holts Summit city, approximately 21 miles (34 km) to the west-southwest; Kingdom City village, approximately 16 miles (26 km) to the northwest; Lake Mykee Town village, approximately 20 miles (32 km) to the west-southwest; Mokane city, approximately 7 miles (11 km) to the southwest; and New Bloomfield city, approximately 17 miles (27 km) to the west.

Callaway County in bisected in the east/west direction by Interstate 70 and in the north/south direction by U.S Route 54. State Route 94 runs generally in an east/west direction paralleling the Missouri River. A network of smaller lettered or numbered County roads connects the communities and provides access to the main highways. The most important of these with respect to the Callaway Plant site are County Route D providing access to the site from Interstate 70, County Route O forming much of the northern site boundary, and County Route CC running north/south connecting County Route O to the north with State Route 94 to the south, intersecting County Route 459 which gives access to the site. County Routes CC, 428, 448, 461, and 468 traverse portions of the Ameren property. County Route 459 is entirely on Ameren property.

The metropolitan centers closest to the Callaway Plant site are Fulton, approximately 10 mi (16 km) to the west-northwest; Jefferson City, approximately 25 mi (40 km) to the west-southwest; and Columbia, approximately 30 mi (48 km) to the west-northwest.}

2.1.1.2 Site Area Map

A site area map for the {Callaway Plant} site is provided in Figure 2.1-1. This map shows the following attributes:

- Plant property (site boundary) lines. The area of the plant property is {7,354 acres (2,976 hectares). Plant site, peripheral, and corridor area property lines are shown on Figure 2.1-4. the exclusion area boundary is shown for reference purposes}.

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

- Exclusion Area Boundary (EAB).{Figure 2.1-5 provides an enlarged view of the EAB for Callaway Plant Unit 1, Callaway Plant Unit 2 and the encompassing Callaway Plant site EAB.} Figure 2.1-6 provides an enlarged site area map that provides a scaled plot plan of the exclusion area in 22.5 degree segments centered on the 16 cardinal compass points.

- Location and orientation of principal plant structures within the site area. Figure 2.1-7 shows an enlarged view of {Callaway Plant Unit 2}.

- {Location of Callaway Plant Unit 1 which is the only other commercial structure within the plant site. There are no industrial, military, transportation facilities, institutional, recreational, or residential areas on the Callaway Plant site.}

- True North and Plant North.

- Highways, railways, and waterways that traverse or are adjacent to the site. {This information is shown in more detail on Figure 2.1-4.}

- Prominent natural and man-made features in the site area.

2.1.1.3 Boundary for Establishing Effluent Release Limits

{The Plant Site Area area is considered the restricted area and will be controlled in accordance with 10 CFR 20. No residences or dairying operations are permitted in this area. Development includes public attractions without entry restrictions (Reform Conservation Area). A scaled plan of the exclusion area and plant site (restricted) area showing distances to the restricted area boundary is shown on Figure 2.1-8.}

The exclusion area boundary (EAB) for {the Callaway Plant Site} is a circle with a radius of {4,395 ft (1,340 m) or approximately 0.83 mi (1.3 km) centered at the midpoint between the Callaway Plant Unit 1 and Callaway Plant Unit 2 reactors} as depicted on Figure 2.1-5. {The Callaway Plant site EAB as defined above completely contains the EAB for Callaway Plant Unit 1 and the EAB for Callaway Plant Unit 2.} The EAB establishes a radius of at least {0.5 mi (0.8 km)} from the potential release points. In accordance with 10 CFR 50.34(a)(1)(ii)(D)(1), an individual assumed to be located at any point on the EAB will not receive a radiation dose in excess of 25 rem TEDE over any two hour period following a postulated fission product release into the containment (CFR, 2007b). The EAB is established in accordance with 10 CFR 100.21(a) and 10 CFR 100.3 (CFR, 2007c).

This area will be conspicuously posted and administrative procedures, including security patrols will be imposed to control assess to the area. Section 2.1.2.1 provides additional discussion regarding the control of access to the EAB.

2.1.2 EXCLUSION AREA AUTHORITY AND CONTROL

The U.S. EPR FSAR includes the following COL Item in Section 2.1.2:

> The authority for control of activities in the site exclusion area is site-specific and will be addressed by the COL applicant. This information will describe activities unrelated to plant operation that are permitted within the exclusion area.

The COL Item is addressed as follows:

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

{Sections 2.1.2.1 through 2.1.2.5 are added as a supplement to the U. S. EPR FSAR.

2.1.2.1 Authority

The Exclusion Area encompasses the land area surrounding the plant to a radius of 1,340 meters (4,395 feet) from the centerpoint between the two reactor buildings (see Section 2.1.1). The Exclusion Area lies entirely within the Plant Site Area described in Section 2.1.1. Control of access to the Exclusion Area is by virtue of ownership and is in accordance with 10 CFR 100. All property within the Exclusion Area is within AmerenUE ownership. All plant lands are owned in fee simple and AmerenUE has complete ownership of the minerals on or under the Exclusion Area and Plant Site Area.

2.1.2.2 Control of Activities Unrelated to Plant Operations

Residence within the Exclusion Area is prohibited. No developments attracting uncontrolled public activity in the area are permitted. County Roads 448 and 459 pass through the Exclusion Area and, to a limited extent; access within the Exclusion Area is possible. However, there are administrative measures in place that would warn, evacuate, and control access to the area in the event of a facility emergency, including a radiological release event.

Within the AmerenUE ownership area, outside the Plant Site Area, residence is permitted and development includes public attractions.

In cooperation with Union Electric (now d/b/a AmerenUE), the Missouri Department of Conservation in 1976 prepared a plan for the development and management of the forest, fish, and wildlife resources within the Callaway Plant property. This area was known as the Reform Wildlife Management Area (now the Reform Conservation Area). Because of the need to implement evacuation procedures in the event of postulated accidental radiation releases, the land use programs ultimately recommended for the Callaway Plant site were of a low-intensity nature. Recommendations included the following: forest management, agriculture, research, wildlife management, hunting, fishing, picnicking, vistas and special areas. The plan was developed to be flexible, and recommended activities could be further emphasized or modified to accommodate additional priorities or restrictions.

In 1977, Union Electric (now d/b/a AmerenUE) and the Missouri Conservation Commission entered into an agreement for an initial 5-year management plan that could be self-supporting and less intensive than the 1976 plan. This plan allowed public recreational use on designated lands within the AmerenUE property boundaries; however, camping and use of firearms (firing a single projectile) were not permitted. In 1994 AmerenUE entered into a 10-year Management Agreement for the Public Use of Lands with the Missouri Department of Conservation (MDC) for the management of the Reform Conservation Area (AUE 1994) and continue to operate under the agreement. The agreement "may be renewed in writing as many times as both parties desire". The area is described as containing 4 fishing lakes, 20 fishless ponds, one intermittent stream, and one permanent stream (Logan Creek). Land cover in the area is described as Glade (10 acres (4 hectares)), Savanna (50 acres (20 hectares)), Fishing Lakes/Ponds (15.5 acres (6.3 hectares)), Forest Land (1,900 acres (769 hectares) of managed Oak and Hickory forest), Old Field (1,000 acres (405 hectares)), Grassland (2,700 acres (1,090 hectares)), and Crop Land (1,369 acres (554 hectares) of corn, beans, wheat, and meadow on 2-year rotation) (MDC 2006). The Area may be closed to the public when the National Security Level reaches "orange" or higher. Recent user data on the Reform Conservation Area is given in Section 2.1.3.3.

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

2.1.2.3 Arrangements for Traffic Control

AmerenUE maintains a Radiological Emergency Response Plan (RERP) including procedures for alerting off-site populations, evacuation route maps, and estimates of time to evacuate the resident and transient population from the 10-mile (16 km) radius Plume Exposure Pathway Emergency Planning Zone (EPZ). The RERP and the associated Emergency Implementing Procedures (EIP) recognize the need for coordination and liaison with County, State, and Federal agencies having emergency responsibilities. No substantive changes to the evacuation plan contained in the RERP are anticipated to be required to accommodate the needs of Callaway Plant Unit 2.

2.1.2.4 Abandonment or Relocation of Roads

There are no public roads traversing the Callaway Plant EAB that will have to be abandoned or relocated because of their location.}

2.1.2.5 References

AUE, 1994, Management Agreement for the Public Use of Lands, April, 1994.

MDC, 2006, Missouri Department of Conservation, Conservation Atlas, mdc.mo.gov/. Click on "Atlas", then fill in as follows: Area Name: Reform Conservation Area; County: Callaway. Accessed 5/22/2007.}

2.1.3 POPULATION DISTRIBUTION

The U.S. EPR FSAR includes the following COL Item in Section 2.1.3:

> The distribution of the population in the site vicinity is site-specific and will be addressed by the COL applicant.

This COL Item is addressed as follows:

The population surrounding the site, up to a 50 mi (80 km) radius, was estimated based on the most recent U.S. Census Bureau decennial census data {published by the Missouri Census Data Center (MCDC). (MCDC, 2000a)}. The population distribution was estimated in 10 concentric bands at 0 to 1 mi (0 to 1.6 km), 1 to 2 mi (1.6 to 3.2 km), 2 to 3 mi (3.2 to 4.8 km), 3 to 4 mi (4.8 to 6.4 km), 4 to 5 mi (6.4 to 8.0 km), 5 to 10 mi (8.0 to 16 km), 10 to 20 mi (16 to 32 km), 20 to 30 mi (32 to 48 km), 30 to 40 mi (48 to 64 km), and 40 to 50 mi (64 to 80 km) from the {midpoint of the Callaway Plant} site, and 16 directional sectors, each direction consisting of 22.5 degrees. The populations for years {2010 through 2060} by decade have been projected by calculating a growth rate using state population projections (by county) {between 1990 and 2025} as the base. {(MCDC, 2000b)}

In addition, the same population information was generated for the year of initial plant operation, and the end of plant life. This information is used for comparison against NRC population density criteria. {It is projected that initial plant operation will occur in 2017. The license would expire 40 years after initial operation and, for the purposes of this evaluation, the year 2057 is the end of plant operations.} These populations are included with the decade populations that follow and are addressed in detail in Section 2.1.3.6.

Sections 2.1.3.1 through 2.1.3.6 are added as a supplement to the U. S. EPR FSAR.

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

2.1.3.1 Population Within 10 Mi (16 km)

Figure 2.1-9 shows places of significant population grouping, such as cities and towns, and other features within 10 mi (16 km) of the site. The map includes concentric circles drawn with the {midpoint of the Callaway Plant Site} at the center point, at distances of 1, 2, 3, 4, 5, and 10 mi (1.6, 3.2, 4.8, 6.4, 8.0, and 16 km). The map is divided into 22.5 degree segments with each segment centered on one of the 16 compass points. {As shown, this area includes portions of Callaway, Osage, Gasconade, and Montgomery Counties. The only incorporated communities within 10 miles of the site are Chamois, Mokane, and parts of Fulton and Morrison. According to the 2000 census, Fulton, with a year 2000 population of 12,128, is the largest community parts of which fall within 10 mi (16 km) of the site. Other towns within the 10 mi (16 km) radius include Chamois (year 2000 population of 456), a portion of Morrison (year 2000 population of 123), and Mokane (year 2000 population of 188) (USCB, 2000). No towns or cities lie within 5 mi (8 km) of the Callaway Plant Site.

The resident population distribution within 10 mi (16 km) of the Callaway Plant site was computed by overlaying the 2000 census block points data (the smallest unit of census data) on the grid shown on Figure 2.1-9, and summing the population of the census block points within each sector. SECPOP 2000, a code developed for the NRC by Sandia National Laboratories, was utilized to calculate the resident population by emergency planning zone sectors (NRC, 2003). SECPOP uses 2000 block data from the USCB and overlays it into the sectors in the annuli prescribed by the user. The population projections for the state of Missouri and each county within 50 mi (80 km) of the Callaway Plant site between 1990 and 2025 were obtained from the MCDC (MCDC, 2000b) and used to calculate a growth rate for the state of Missouri and each county within the 50 mi (80 km) radius. The State level growth rate was then used to project future populations (within each sector, taking into account the percent of each sector in a particular county).}

The population distributions (including transient population) and related information were tabulated for all distances and in all sixteen directions. Figure 2.1-10 through Figure 2.1-16 show the cumulative population (i.e., resident plus transient population) for the year {2000}, and projected populations (by decade) through the year {2060}. Tables on each map are keyed to the detailed populations within each radius interval-sector segment. The tables show ring population (one radius interval summed through all sectors) and cumulative population (population within each radius). See Section 2.1.3.6 for similar maps for the year of initial operation and the year of plant shutdown. Each figure also shows totals by direction and by radius. Since little information is available on future growth rates for transient populations, the anticipated growth rate for resident populations was also used for transient populations. The SECPOP 2000 results (with transient population added) were used to produce the 10 mi (16 km) radius population for the year {2000 and the population projections described above were used in development of population estimates for 2010 through 2060 (by decade), the year of initial operation for Callaway Plant Unit 2 (2017), and the year of plant shutdown (2057).} It is required that projected changes in population growth "within about 5 years" after initial site approval be evaluated. Initial site approval should occur in the {2011} time frame. {Plant construction is to begin in 2012. Therefore, the 2010 decade population and the 2017 population for initial operation are suitable for this evaluation.} The detail provided in Figure 2.1-10 through Figure 2.1-16 is summarized in Table 2.1-3.

2.1.3.2 Population Between 10 and 50 Mi (16 and 80 km)

The 50 mi (80 km) radius centered at the {Callaway Plant} site includes {all or parts of 22 counties in Missouri} as detailed in Figure 2.1-17. This figure identifies places of significant population grouping, such as cities and towns, and include concentric circles drawn with the

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

existing {midpoint of the Callaway Plant site} at the center point at 10 mi (16 km) increments (between 10 and 50 mi (16 and 80 km)). The map is divided into 22.5 degree segments with each segment centered on one of the 16 compass points. {Table 2.1-4 lists the 1990 and 2000 census populations for the incorporated communities within 50 miles (80 km) of the Callaway Plant Site (MOA, 2000), (USCB, 2000).} Estimates of the year {2000} resident population between 10 and 50 mi (16 and 80 km) from the site were computed using the same methodology used to develop the 10 mi (16 km) population distribution.

The population grid from 10 to 50 mi (16 to 80 km) is shown on Figure 2.1-17. Transient population was not quantitatively determined for the 10 to 50 mi (16 to 80 km) radii as discussed in Section 2.1.3.3.2. The 50 mi (80 km) population distributions for the years {2000 through 2060 (by decade) and the years of initial operation and plant shutdown for Callaway Plant Unit 2} are shown on Figure 2.1-18 through Figure 2.1-24. Totals populations for each year, including the years of initial operation and plant shutdown are summarized in Table 2.1-5.

2.1.3.3 Transient Population

2.1.3.3.1 Transient Population Within 10 Mi (16 km)

{Major land uses surrounding the Callaway Plant Site include forest, grassland, and agriculture (CARES, 2007), (USGS, 2007). The waters in the vicinity of the Callaway Plant Site are used for waterborne commerce, recreational fishing and boating.

Table 2.1-6 lists major employers in the approximately 10 mi (16 km) radius of the Callaway Plant Site. The table includes the distance and direction from the Callaway Plant site.

Recreational use is considered the primary contributor to the transient population in the area. There are two sources of seasonal or transient population within the Low Population Zone: the Reform Conservation Area and Wildwood.

The Reform Conservation Area was established jointly by MDC and AmerenUE. The area is managed by the Missouri Department of Conservation (MDC) in accordance with a *Management Agreement with AmerenUE* (Ameren, 2004). With the exception of the Owner Controlled Area containing the power generation facilities, the area includes the Exclusion Area and the plant site, as well as plant property in the immediately adjacent land surrounding the plant in all directions.

Permitted activities in specifically designated areas include hunting, fishing, and trapping. Camping is not permitted, and no MDC personnel reside on the area. Those activities which have any potential to interfere with plant operation are excluded. All other activities are reviewed and approved by AmerenUE prior to implementation. The area was opened for public use in November 1977, and early estimates indicated peak use occurs on weekends during the fall hunting season. More recent observations indicated a seasonal daily peak of approximately 40 to 60 hunters using the area.

Wildwood is a private 1,700-acre (688 hectare) recreational vehicle (RV) and trailer park development located approximately 2.2 miles (3.5 km) north of the site. The total number of camper sites planned for Wildwood is 1,720. In January 2007 approximately 1,200 of the sites had been sold. The targeted population for lot sales are RV and tent campers and those interested in building a vacation cabin.

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Approximately 500 - 1,000 people use Wildwood on a typical weekend, while usage is about 100 - 200 people on an average weekday. Maximum usage on a holiday is about 1,000. From December 15 through February 15 there is very little usage (Drake, 2007).

Callaway plant shutdowns occurring approximately every 18 months are a source of transient population. About 300 persons are estimated to stay at RV parks within 5 miles (8 km) during shutdowns.

Harmony Hill Youth Camp is operated by the Harmony Hills Youth Ministries (a ministry within the Churches of God (Holiness)). It offers weeklong camp experiences for youth during the summer and is available for weekend retreats the rest of the year (HHYM, 2007).

Additional Federal or State owned lands providing recreational opportunities within 10 miles (16 km) of the Callaway Plant site are the Katy Trail State Park and the St. Aubert Island Unit of the Big Muddy National Fish and Wildlife Refuge. The Katy Trail State Park is a linear tract built on the former corridor of the Missouri-Kansas-Texas Railroad. It extends for 225 miles (362 km) from St. Charles to Clinton offering recreation, a place to enjoy nature, and an avenue to discover the past (MDNR, 2007). In the site area, the Katy Trail runs north of and roughly parallel to State Route 94. The St. Aubert Island Unit contains 1,124 acres (455 hectares) consisting of about 700 acres (283 hectares) of bottomland and 400 acres (162 hectares) of upland forest and old fields. The unit is not accessible by the public except from the Missouri River. (USFWS, 2007). A list of recreational areas within 10 miles (16 km) of the Callaway Plant Site is shown on Table 2.1-7.

Seasonal and daily variations in transient population result from these land uses. Occupancy of the Wildwood RV park varies substantially between week days and weekends. Day/night employer populations do not vary substantially. The Wildwood RV park and Harmony Hill Youth Camp (when in use) likewise do not display a drop at night. Winter populations are likely to be lower.

Accounting for major employers (other than Callaway Plant Unit 1 and Callaway Plant Unit 2), Department of Corrections inmates, private campgrounds and RV parks within the 10 mi (16 km) radius, a seasonal maximum total transient population of 3,790 is estimated to be present within the 10 mi (16 km) radius. The 10 mi (16 km) transient population was added to the resident distribution and projected for future years as denoted in Figure 2.1-10 through Figure 2.1-16, Figure 2.1-27 and Figure 2.1-28. The baseline (2000) transient population distribution for the 10 mi (16 km) radius is summarized in Table 2.1-8.}

2.1.3.3.2 Transient Population Between 10 and 50 Mi (16 and 80 km)

{A general discussion of transient population for the 10 to 50 mi (16 to 80 km) radius is provided below. A quantitative estimate of the transient population for the 10 to 50 mi (16 to 80 km) radius is not provided for the following reasons:

1. There are no significant centers of transient populations between 10 and 20 mi (16 to 32 km) from the Callaway Plant Site;

2. Jefferson City (25 mi (41 km) from the Callaway Plant Site) and Columbia (30 mi (49 km) from the Callaway Plant Site), despite being significant centers of transient populations (legislators, commuters, and other business travelers), are also resident population centers that dilute the proportion of transients. The Callaway Plant Site is not located in an area where significant population increases due to transient land use, such as recreational or industrial, are expected. Callaway County experiences a daytime net loss

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

of more than 6,000 residents due to commuters traveling between Callaway and surrounding counties as denoted in Table 2.1-8 (MCDC, 2000c, MCDC, 2000d).

No significant transient population is expected in the 30 to 50 mi (48 to 80 km) radius. Only one city within this range has a population exceeding 10,000 people, (Washington in Franklin County, year 2000 population 13,243, ESE / 42 miles (68 km)). There is no major State or National park or attraction that would bring significant numbers of transients to the area.

Seasonal agricultural workers do not make up a significant portion of the transient population in the 10 to 50 mi (16 to 80 km) radius. Only 14 farms in the following Missouri counties that fall wholly or partially in the 50 mi (80 km) radius employ migrant labor (number of farms in parentheses): Franklin (1), Gasconade (1), Lincoln (3), Pike (1), St. Charles (1), and Warren (7)(USDA, 2004).}

2.1.3.4 Low Population Zone

The Low Population Zone (LPZ) for {the Callaway Plant Site is a 2.6 mile (4.2 km) area centered on the midpoint between existing Callaway Plant Unit 1 and Callaway Plant Unit 2. No commercial or industrial facilities are located within the LPZ. No nursing homes, hospitals, prisons, or major employers (other than the existing Callaway Plant Unit 1) are known to exist within the LPZ. It completely contains the LPZ for Callaway Plant Unit 1 which consists of the area falling within a 2.5 mi (4.1 km) radius of Callaway Plant Unit 1. Figure 2.1-25 shows Callaway Plant Unit 1, Callaway Plant Unit 2, and site LPZ.}

The resident and transient population distributions within the existing LPZ for each decade from {2000 through 2060} are denoted as the {3 mi (5 km)} cumulative population on Figure 2.1-10 through Figure 2.1-16. The population within the LPZ including years {2017 and 2057, the expected year of initial operation and the expected year of license expiration for Callaway Plant Unit 2} are summarized in Table 2.1-9. and shown in Figure 2.1-27 and Figure 2.1-28.

{There are no sources of seasonal populations in the LPZ with the exception of Wildwood, nor working-day concentrations which would create a significant transient population.

As noted previously, the Reform Conservation Area attracts hunters and fishermen into the LPZ. The seasonal peak occurs during the fall hunting season. However, peak seasonal use is less than or equal to 60 hunters per day during a fall weekend.}

In accordance with 10 CFR 50.34(a)(1)(ii)(D)(2), an individual located on the outer radius of the LPZ for the course of the postulated accident (assumed to be 30 days) would not receive a radiation dose in excess of 25 rem TEDE (CFR, 2007b). Onsite emergency preparedness personnel have developed an Emergency Planning Zone that extends well beyond the Callaway Plant Site boundary and the site's Radioactive Emergency Plan establishes evacuation routes both onsite and offsite. Under these plans, emergency preparedness personnel would have ample time to take appropriate protective measures to all affected individuals within and beyond the existing LPZ.}

Facilities and institutions in and beyond the LPZ that may require special consideration when evaluating emergency plans are defined out to a distance of 10 mi (16 km). {This 10 mi (16 km) radius includes the LPZ and is equivalent to the Callaway Plant "Plume Exposure Pathway Emergency Planning Zone" (AUE, 2007). Within this zone, evacuation and/or sheltering may be used as immediate protective actions to protect the general public. The principal concern with the Plume Exposure Pathway is that of external exposure and/or exposure to the thyroid due to

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

inhalation and ingestion from a radioactive plume passing over the area (Ameren, 2007b). Schools in the 10 mi (16 km) radius are listed in Table 2.1-10. Other special facilities (Missouri Department of Corrections, hospitals, and nursing homes) in the 10 mi (16 km) radius are listed in Table 2.1-9 and Table 2.1-10. Recreational areas are listed in Table 2.1-6. Figure 2.1-26 shows the LPZ and emergency planning evacuation routes.}

2.1.3.5 Population Center

{The Population Center or city closest to the site with a population greater than 25,000 people is Jefferson City, Missouri, located 25 (41 km) miles west-southwest as shown on Figure 2.1-17. This Population Center distance exceeds one and one-third times the 2.6 miles (4.2 km) radius of the LPZ, which conforms to the guidance in 10 CFR 100 (CFR, 2007c).

In 2000, Jefferson City recorded a population of 40,039 residents, an increase of 12.9% over the 1990 population of 35,481 residents. Jefferson City is expected to remain the population center for the life of the facility. No area closer to the Callaway Plant Site is projected to reach a population of 25,000.}

2.1.3.6 Population Density

This section describes populations and resulting population densities in the years of initial operation and the end of operations. For the purposes of this study, it is assumed that initial operation of {Callaway Plant Unit 2 begins in 2017. It is also assumed that the end of operations is upon license expiration which is currently projected to be the year 2057}, 40 years thereafter.

Figure 2.1-27 and Figure 2.1-28 provide the same detailed population data for {2017 and 2057} in the 10 mi (16 km) vicinity that were provided by Figure 2.1-10 through Figure 2.1-16 for the decades of {2000 through 2060}, respectively. Similarly, Figure 2.1-29 and Figure 2.1-30 provide the 50 mi (80 km) region population data for {2017 and 2057}.

Figure 2.1-31 shows the cumulative population in year {2000} within 30 mi (48 km) of the {Callaway Plant Unit 2} and projected cumulative populations in years {2017} (assumed year of initial operations) and {2057} (assumed year for end of operations). On the same figure, spanning the same radial distances, population curves are calculated for hypothetical densities of 500 persons/mi^2 (200 persons/km^2) and 1,000 persons/mi^2 (400 persons/km^2) to demonstrate that the population density does not exceed 500 persons/mi^2 (200 persons/km^2) at the time of the projected COL approval and within 5 years thereafter consistent with guidance provided in Regulatory Guide 4.7, Position C.4 (NRC, 1998) and Regulatory Guide 1.206 (NRC, 2007).

{For all radial distances (1 mile, 2 miles, 3 miles, 4 miles, 5 miles, 10 miles, 20 miles, 30 miles (1.6 km, 3.2 km, 4.8 km, 6.4 km, 8.0 km, 16 km, 32 km, and 48 km)), the population density at the startup date (2017) is below a population density of 500 persons/mi^2 (200 persons/km^2). The highest population density at startup was at the 30 mile (48 km) radius. Using a land area for the 30 mile (48 km) radius of 2,951 mi^2 (7,643 km^2) and a cumulative population of 184,273, the population density for the 30 mile (48 km) radius is projected to be 57 persons/mi^2 (22 persons/km^2) at startup.

Figure 2.1-31also presents the projected total population at the end of operations date (2057) compared with the total population for the hypothetical density of 1,000 persons per square mile. For all radial distances (1, 2, 3, 4, 5, 10, 20, and 30 mi (1.6, 3.2, 4.8, 6.4, 8.0, 16, 32, and 48 km)), the population is below the 1000 persons/mi^2 (400 persons/km^2) density criterion. The highest population density at the end of operations in 2057 was at the 30 mi (48 km) radius.

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Using a land area for the 30 mi (48 km) radius of 2,951 mi^2 (7,643 km^2) and a cumulative population of 202,878, the population density for the 30 mi (48 km) radius is projected to be 69 persons/mi^2 (27 persons/km^2) at the end of operations.

The densities at expected COL approval in the year 2010 would be far less than the 500 per square mile siting criterion and the maximum density is projected to grow slightly, at approximately 0.5% per year, from 60 persons/mi^2 (23 persons/km^2) in 2010 to 62 persons/mi^2 (24 persons/km^2) in 2017.}

2.1.4 REFERENCES

This section is added as a supplement to the U. S. EPR FSAR.

{**AUE, 2007a**. Callaway Plant, Radiological Emergency Response Plan (RERP), Revision 030a, April 2007.

AREVA, 2007. U. S. EPR Final Safety Analysis Report, December 2007.

CARES, 2007. Area Summary by hydrologic unit from the Center for Agricultural, Resource and Environmental Systems (CARES), www.cares.missouri.edu, Retrieved: March 30, 2007.

CFR, 2007a. Title 10, Code of Federal Regulations, CFR Part 20, Standards for Protection Against Radiation, 2007.

CFR, 2007b. Title 10, Code of Federal Regulations, CFR Part 50, Domestic Licensing of Production and Utilization Facilities, 2007.

CFR, 2007c. Title 10, Code of Federal Regulations, CFR Part 100, Reactor Site Criteria, January 2007.

HHYM, 2007. Harmony Hill Youth Ministries, www.hhyc.net/index.php, Accessed August 1, 2007.

MCDC, 2000a. Missouri Census Data Center, Census 2000: Data Products, Information, and Activities. http://mcdc2.missouri.edu/census2000/ Retrieved December 21, 2006.

MCDC, 2000b. Population Projections by Age and Sex for Missouri and all Counties, http://mcdc2.missouri.edu/pub/data/popest2/mo_projections99.dat, Retrieved December 21, 2006.

MCDC, 2000c. Counts of Workers Commuting From Missouri Counties, Sorted by Residence Geography http://mcdc2.missouri.edu/data/workflow/reports/MissouriRsort, Retrieved June 19, 2007.

MCDC, 2000d. Counts of Workers Commuting From Missouri Counties, Sorted by Work Geography http://mcdc2.missouri.edu/data/workflow/reports/MissouriWsort, Retrieved June 19, 2007.

MOA, 2000. Missouri Population 1900-1990, All Incorporated Places, http://www.sos.mo.gov/library/reference/census/cities1900-1990.pdf, Retrieved January 5, 2007.

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

MDNR, 2007. Missouri Department of Natural Resources, Katy Trail State Park, www.mostateparks.com/katytrail/generalinfo.htm, Retrieved: June 25, 2007.

NRC, 1998. Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Plants, Revision 2, Nuclear Regulatory Commission, April 1998.

NRC, 2007. Combined License Applications for Nuclear Power Plants (LWR Edition), Regulatory Guide 1.206, Revision 0, Nuclear Regulatory Commission, March 2007.

NRC, 2003. SECPOP 2000: Sector Population, Land Fraction, and Economic Estimation Program, Nuclear Regulatory Commission, August 2003.

USCB, 2000. Annual Estimate of the Population for Incorporated Places in Missouri Listed Alphabetically: April 1, 2000 to July 1, 2004, Released June 30, 2005, www.census.gov/popest/cities/tables/SUB-EST2004-04-29.xls, Accessed December 21, 2006.

USDA, 2004. Missouri State and County Data, 2002 Census of Agriculture, Volume 1, Geographic Area Series, Part 25, AC-02-A-25, U.S. Department of Agriculture, National Agricultural Statistics Service, June 2004.

USGS, 2007. U.S. Geological Survey, Columbia Environmental Research Center (CERC), www.cerc.usgs.gov/morap/projects/lilc/lc_hu.asp, Retrieved January 12, 2007.

USFWS, 2007. U.S Fish and Wildlife Service, Big Muddy National Fish and Wildlife Refuge, St. Aubert Island Unit, www.fws.gov/midwest/BigMuddy/st_aubert_island.html, Retrieved: June 25, 2007.}

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Table 2.1-1— {Callaway Plant Unit 1 and 2 and Midpoint Coordinates}

Location	Latitude/Longitude (NAD 27)		Universal Transverse Mercator, (Zone 15N)	
Reactor Building 1	N	38° 45' 40.66"	N	4290786.04 METERS
	W	91° 46' 50.52"	E	605939.67 METERS
Reactor Building 2	N	38° 45' 50.40"	N	4291082.60 METERS
	W	91° 47' 02.16"	E	605654.58 METERS
Midpoint	N	38° 45' 45.53"	N	4290934.32 METERS
	W	91° 46' 56.34"	E	4290934.32 METERS
Reference drawing:				
Ameren Dwg: EPR FOOTPRINT 12-11-06.DGN				

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Table 2.1-2—{Population Projections Within 10 mi (16 km) Radius}

Year	10 mi (16 km) Radius Population
2000	10,094
2010	10,624
2017	10,985
2020	11,122
2030	11,500
2040	11,820
2050	12,007
2057	12,096
2060	12,102

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Table 2.1-3—{Population Projections Within 50 mi (80 km) Radius}

Year	50 mi (80 km) Radius Population
2000	461,854
2010	486,408
2015	503,100
2020	509,528
2030	526,185
2040	540,677
2050	549,972
2055	553,840
2060	554,273

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Table 2.1-4—{Transient Population Facilities - Major Employers Within the 10 mi (16 km) Zone}

Name of Facility	County	Compass Direction/ Distance – mi (km)	Daytime Population	Nighttime Population
Missouri Department of Corrections Fulton Diagnostic and Reception Center	Callaway	WNW / 5 (8)	75	75
Fulton State Hospital	Callaway	NW / 10 (16)	55	55
Riverview Nursing Home	Callaway	SW / 7.5 (12)	7	7
North Callaway County R-1 School District	Callaway	N / 9.6 (16)	24	0
South Callaway County R-2 School District	Callaway	SW / 7.8 (13)	98	0
Osage County R-1 School District	Osage	S / 6 (10)	39	0

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Table 2.1-5—{Transient Population Facilities - Major Recreational Areas and Attractions Within the 10 mi (16 km) Zone}

Name of Facility	County	Compass Direction / mi (km)	Population
Wildwood	Callaway	NW/ 2.2 (4)	1000*
Harmony Hill Youth Camp	Callaway	WNW / 3 (5)	500*
Reform Conservation Area	Callaway	- - -	60*
Katy Trail			
St. Auburn Island Unit			

* Seasonal Maximum

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Table 2.1-6—{Transient Population Distribution for the 10 mi (16 km) Radius (2000)}

Radius mi (km)	Direction	Number of Transients
1-2 (1.6-3.2)	All	60
2-3 (3.2-4.8)	WNW	500
2-3 (3.2-4.8)	NW	1000
4-5 (6.4-8.0)	WNW	1500
5-10 (8.0-16)	N	24
5-10 (8.0-16)	S	39
5-10 (8.0-16)	SW	163
5-10 (8.0-16)	NW	500
	TOTAL	**3,786**

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Table 2.1-7—{County to County Work Flows (2000)}

Counts of Workers Commuting From Missouri Counties Each Flow Represents at Least 0.5% of All Trips Originating in the Missouri County Sorted by Residence Geography					
Work Flows From (County R)	Total work trips Originating in County R	Work Flows into (County W)	Work Flows	% of ALL trips originating in County R ending in County W	% of ALL trips ending in County W originating in County R
Callaway Co.	**19,441**	Callaway Co.	10,015	51.5	75.1
		Cole Co.	5,384	27.7	10.5
		Boone Co.	2,730	14	3.5
		Audrain Co.	608	3.1	5.2
		Montgomery Co.	120	0.6	3.1

Counts of Workers Commuting into Missouri Counties Each Flow Represents at Least 0.5% of All Trips Ending in the Missouri County Sorted by Work Geography					
Work Flows From (County W)	Total work trips Originating in County W	Work Flows from (County R)	Work Flows	% of ALL trips ending in County W Originating in County W	% of ALL trips originating in County R ending in County W
Callaway Co.	**13,333**	Callaway Co.	10,015	75.1	51.5
		Boone Co.	1,154	8.7	1.6
		Cole Co.	1,046	7.8	2.9
		Audrain Co.	340	2.6	3.0
		Montgomery Co.	126	0.9	2.3
		Osage Co.	116	0.9	1.8

(County R) is County of Residence

(County W) is County of Work

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Table 2.1-8—{Population Projections Within the LPZ}

Year	LPZ Population
2000	1,341
2010	1,415
2017	1,461
2020	1,479
2030	1,527
2040	1,569
2050	1,596
2057	1,607
2060	1,609

Includes transients at seasonal maximum values

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Table 2.1-9—{Special Facilities – Schools Within the 10 mi (16 km) Zone}

Name of Facility	County	Compass Direction / mi (km)	Student Enrollment	Staff	Total Population
Williamsburg Elementary	Callaway	N / 9.6 (16)	214	24	238
South Callaway High School	Callaway	SW / 7.8 (13)	291	28	319
South Callaway Middle	Callaway	SW / 7.8 (13)	325	29	354
South Callaway Elementary	Callaway	SW / 7.8 (13)	324	41	365
Chamois High	Osage	S / 6 (10)	113	22	135
Osage County Elementary	Osage	S / 6 (10)	136	17	153

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Table 2.1-10—{Other Special Facilities Within the 10 mi (16 km) Zone}

Name of Facility	County	Compass Direction / mi (km)	Number of Residents Independent / Assisted	Staff Day / Night	Total Population Day / Night
Missouri Department of Corrections Fulton Diagnostic and Reception Center	Callaway	WNW / 5 (8)	1300 / NA	75 /75	1375 / 1375
Fulton State Hospital	Callaway	NW / 10 (16)	460 / NA	55 / 55	515 / 515
Riverview Nursing Home	Callaway	SW / 7.5 (12)	60 / NA	7 / 7	67 / 67

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Table 2.1-11—{Population of Cities, Towns, and Villages within 50 Miles of the Site}

(Page 1 of 3)

LOCATION	2000	1990	PERCENT CHANGE	MILES AND DIRECTION FROM SITE MIDPOINT
Audrain County				
Benton City village	122	139	-12.2	25 N
Farber city	411	418	-1.7	38 NNE
Laddonia city	620	581	6.7	34 NNE
Martinsburg town	326	337	-3.3	24 NNE
Mexico city	11,320	11,290	0.3	28 N
Rush Hill village	130	121	7.4	31 N
Vandalia city (pt.)	2,529	2,683	-5.7	40 NNE
Vandiver village	83	75	10.7	27 N
Boone County				
Ashland city	1,869	1,252	49.3	25 W
Centralia city (pt.)	3,774	3,414	10.5	36 NNW
Columbia city	84,531	69,101	22.3	30 WNW
Hallsville city	978	917	6.7	33 NW
Harrisburg town	184	169	8.9	44 NW
Hartsburg town	108	131	-17.6	38 W
Rocheport city	208	255	-18.4	44 WNW
Sturgeon city	944	838	12.6	41 NW
Callaway County				
Auxvasse city	901	821	9.7	19 NNW
Fulton city	12,128	10,033	20.9	10 WNW
Holts Summit city	2,935	2,292	28.1	21 WSW
Kingdom City village	121	112	8.0	16 NW
Lake Mykee Town village	326	257	26.8	20 WSW
Mokane city	188	186	1.1	7 SW
New Bloomfield city	599	480	24.8	17 W
Cole County				
Centertown town	257	356	-27.8	35 WSW
Jefferson City (pt.)	39,636	35,481	11.7	25 WSW
Lohman city	168	154	9.1	35 WSW
Russellville city	758	869	-12.8	39 WSW
St. Martins city	1,023	717	42.7	33 WSW
St. Thomas town	287	263	9.1	36 SW
Taos city	870	802	8.5	24 SW
Wardsville village	976	513	90.3	28 SW
Eugene City [(1)]	***	141	-100.0	43 SW
Cooper County				
Prairie Home city	220	215	2.3	43 SW
Woolridge village	47	54	-13.0	41 WNW
Franklin County				
Berger city	206	247	-16.6	25 ESE

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Table 2.1-11—{Population of Cities, Towns, and Villages within 50 Miles of the Site}

(Page 2 of 3)

LOCATION	2000	1990	PERCENT CHANGE	MILES AND DIRECTION FROM SITE MIDPOINT
Gerald city	1,171	888	31.9	36 SE
Leslie village	87 1	34	-35.1	38 SE
New Haven city	1,867	1,757	6.3	33 ESE
Oak Grove village	382	402	-5.0	49 SE
Union city	7,757	5,909	31.3	47 ESE
Washington city	13,243	10,704	23.7	42 ESE
Gasconade County				
Bland city (pt.)	565	651	-13.2	32 SSE
Gasconade city	267	253	5.5	15 ESE
Hermann city	2,674	2,754	-2.9	19 ESE
Morrison city	123	160	-23.1	10 SE
Owensville city	2,500	2,325	7.5	32 SSE
Rosebud city	364	380	-4.2	32 SE
Lincoln County				
Hawk Point city	459	472	-2.8	38 ENE
Moscow Mills city	1,742	924	88.5	49 ENE
Silex village	206	197	4.6	47 ENE
Troy city	6,737	3,811	76.8	46 ENE
Maries County				
Belle city (pt.)	1,344	1,218	10.3	34 S
Vienna city	628	611	2.8	40 SSW
Miller County				
Olean town	157	106	48.1	47 WSW
St. Elizabeth village	297	257	15.6	43 SW
Moniteau County				
California city	4,005	3,465	15.6	43 WSW
Clarksburg city	375	358	4.7	49 W
Jamestown town	382	298	28.2	37 W
Lupus town	29	39	-25.6	37 W
Monroe County				
Paris city	1,529	1,486	2.9	50 NNW
Montgomery County				
Bellflower city	427	413	3.4	29 NE
High Hill city	231	204	13.2	23 ENE
Jonesburg city	695	630	10.3	28 ENE
McKittrick town	72	66	9.1	20 E
Middletown town	199	217	-8.3	32 NE
Montgomery City	2,442	2,281	7.1	22 NE
New Florence city	764	801	-4.6	21 ENE
Rhineland town	176	157	12.1	15 E

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Table 2.1-11—{Population of Cities, Towns, and Villages within 50 Miles of the Site}

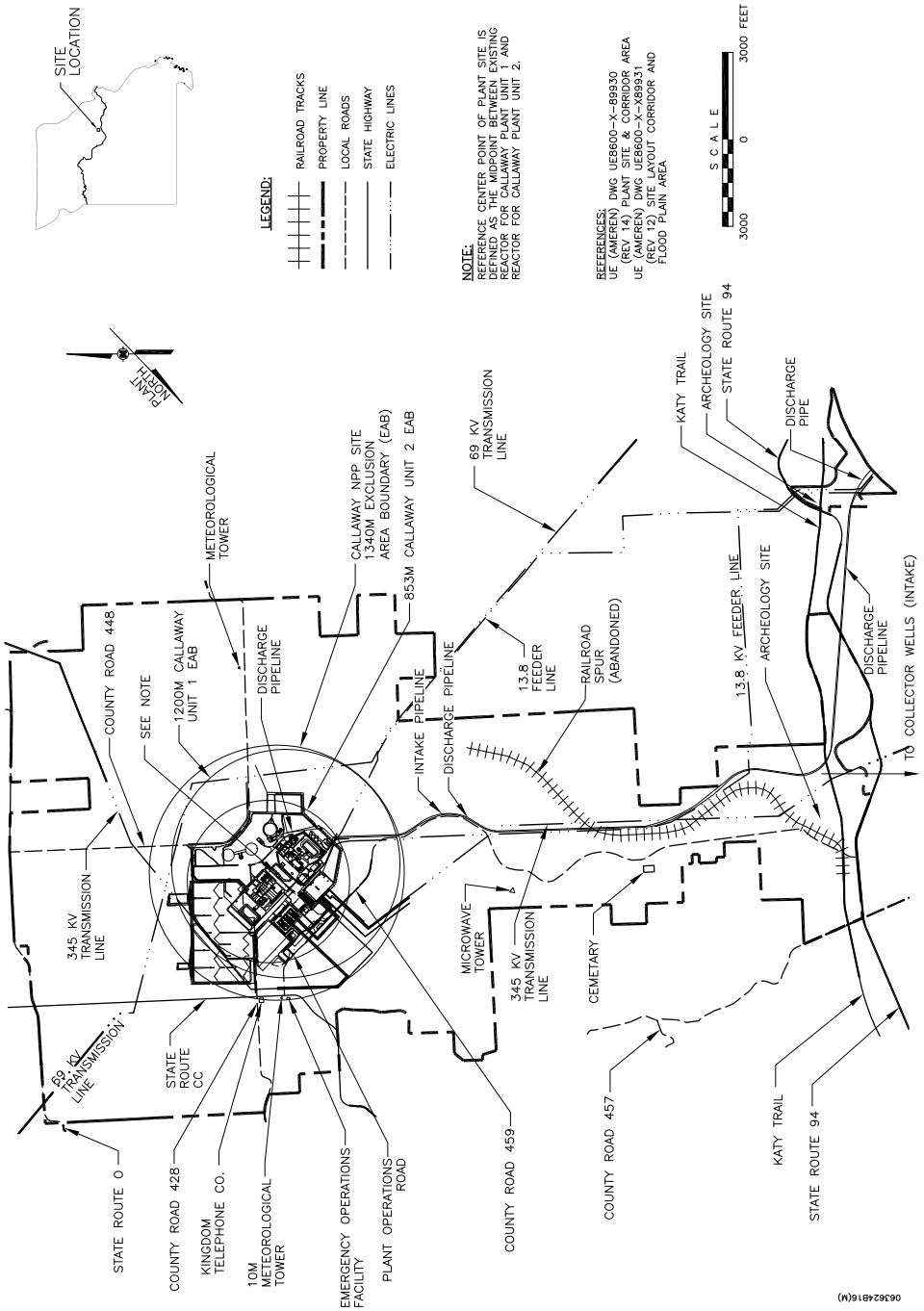
(Page 3 of 3)

LOCATION	2000	1990	PERCENT CHANGE	MILES AND DIRECTION FROM SITE MIDPOINT
Wellsville city	1,423	1,430	-0.5	25 NNE
Osage County				
Argyle town (pt.)	164	178	-7.9	34 SSW
Chamois city	456	449	1.6	6 S
Freeburg village	423	446	-5.2	32 SSW
Linn city	1,354	1,148	17.9	20 S
Meta city	249	249		0.0 37 SW
Westphalia city	320	287	11.5	25 SSW
Pike County				
Bowling Green city	3,260	2,976	9.5	50 NE
Curryville city	251	261	-3.8	47 NNE
Ralls County				
Perry city	666	711	-6.3	46 N
Randolph County				
Clark city	275	257	7.0	47 NW
St. Charles Conty				
Augusta town	218	263	-17.1	50 ESE
Flint Hill City	379	229	65.5	50 E
Foristell City	331	144	129.9	45 E
New Melle Village	124	486	-74.5	48 E
Wentzville city	6,896	5,088	35.5	50 E
Warren County				
Marthasville city	837	674	24.2	41 ESE
Truesdale city	397	285	39.3	37 E
Warrenton city	5,281	3,564	48.2	35 E
Wright City	1,532	1,250	22.6	41 E

1 The town of Eugene was disincorporated by the 2000 Census.

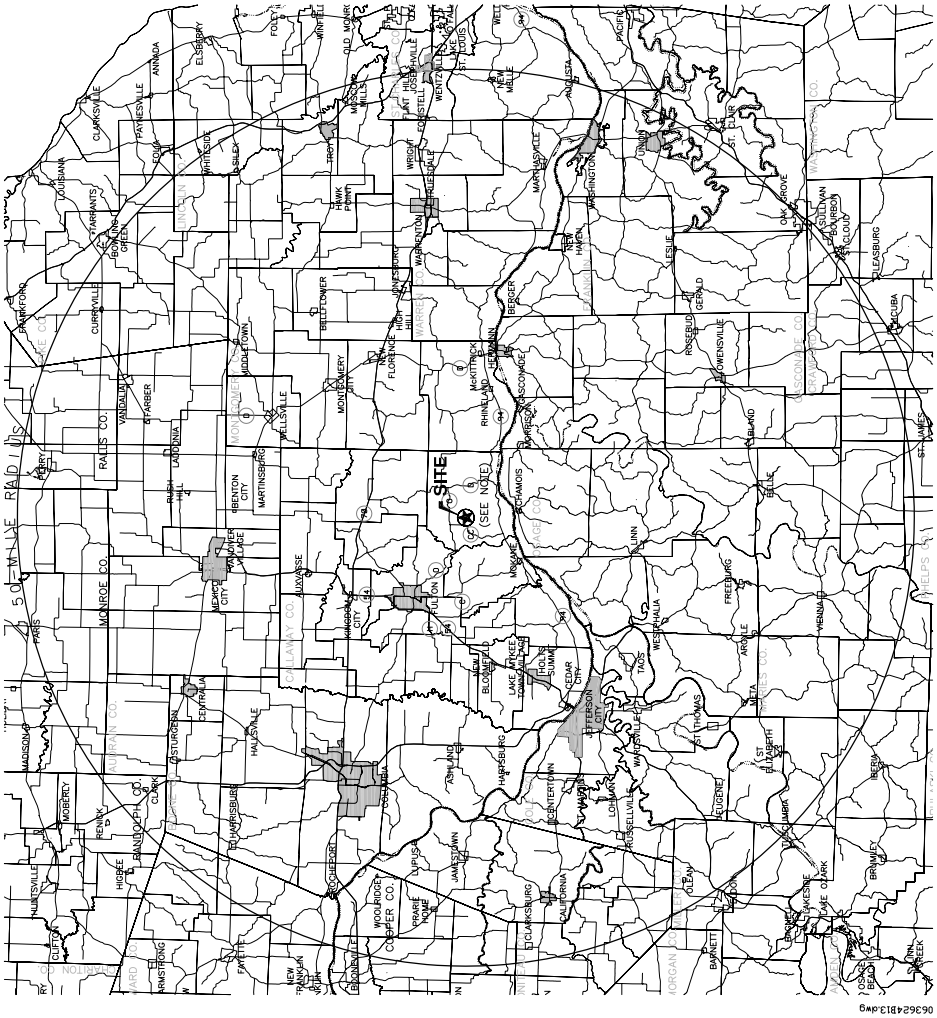
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-1—{Site Area Map}



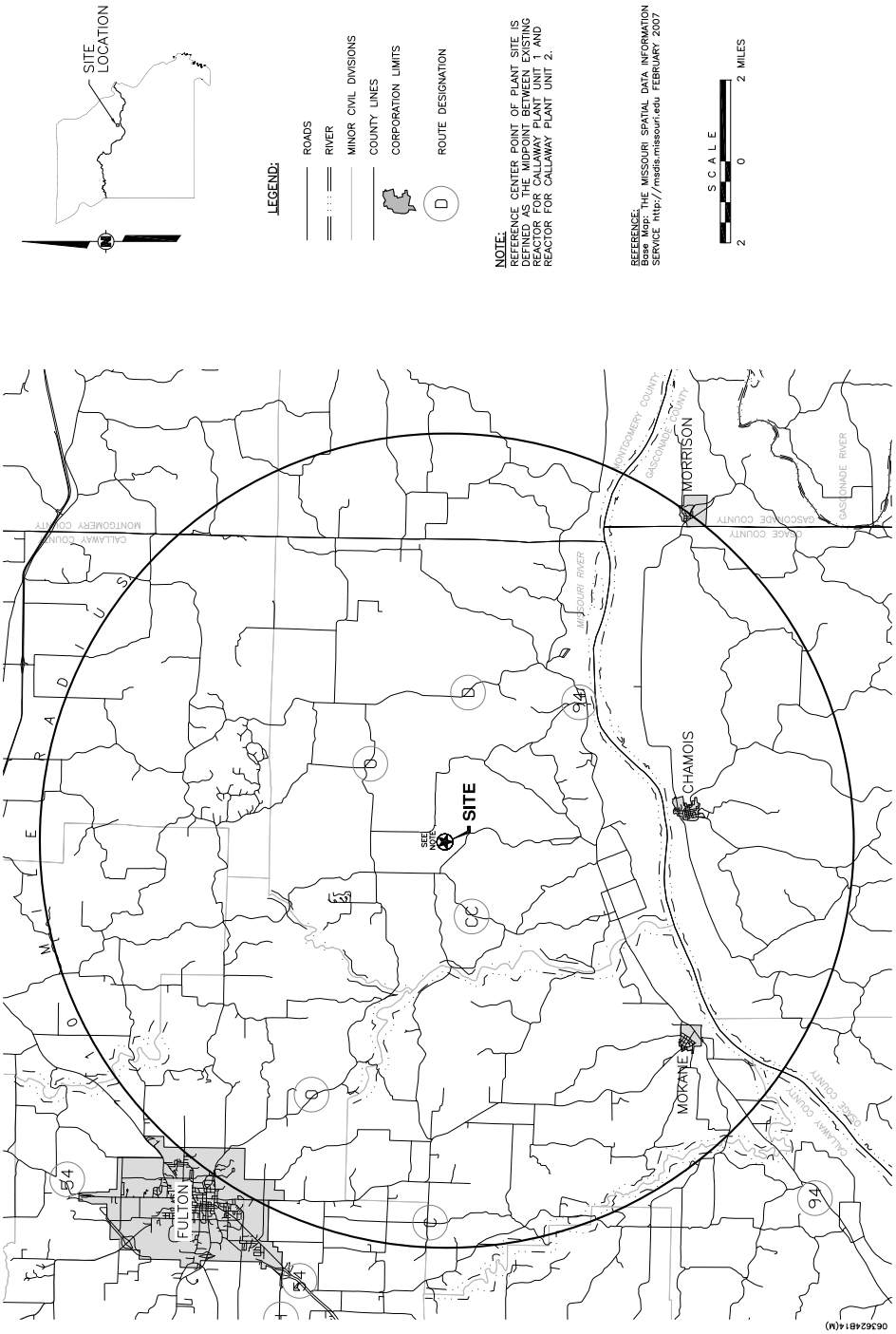
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-2—{50 Mile (80 km) Surrounding Area}



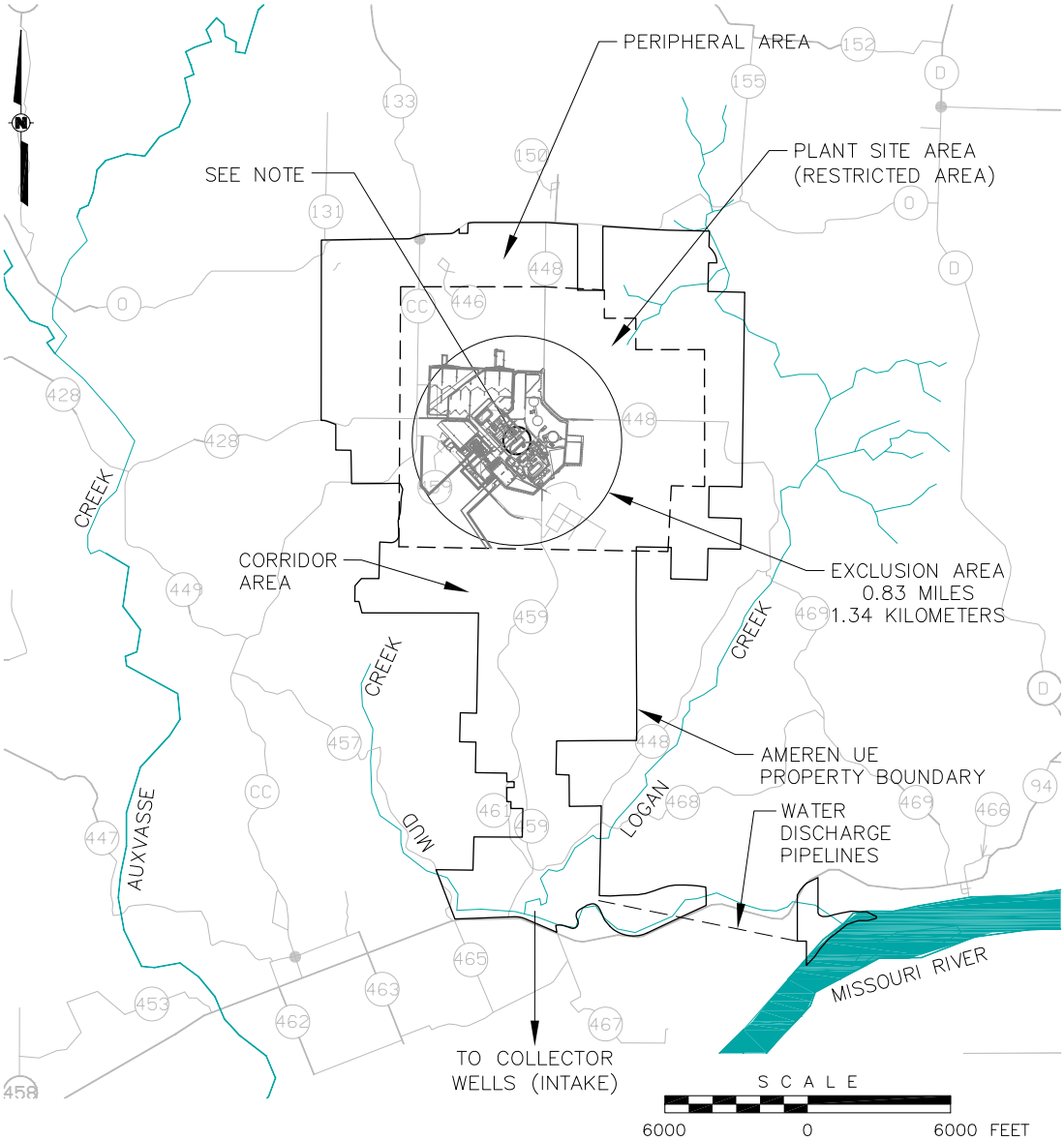
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-3—{10 Mile (16 km) Surrounding Area}



© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-4—{Site Boundaries}



NOTE:
REFERENCE CENTER POINT OF PLANT SITE IS DEFINED AS THE MIDPOINT BETWEEN EXISTING REACTOR FOR CALLAWAY PLANT UNIT 1 AND REACTOR FOR CALLAWAY PLANT UNIT 2.

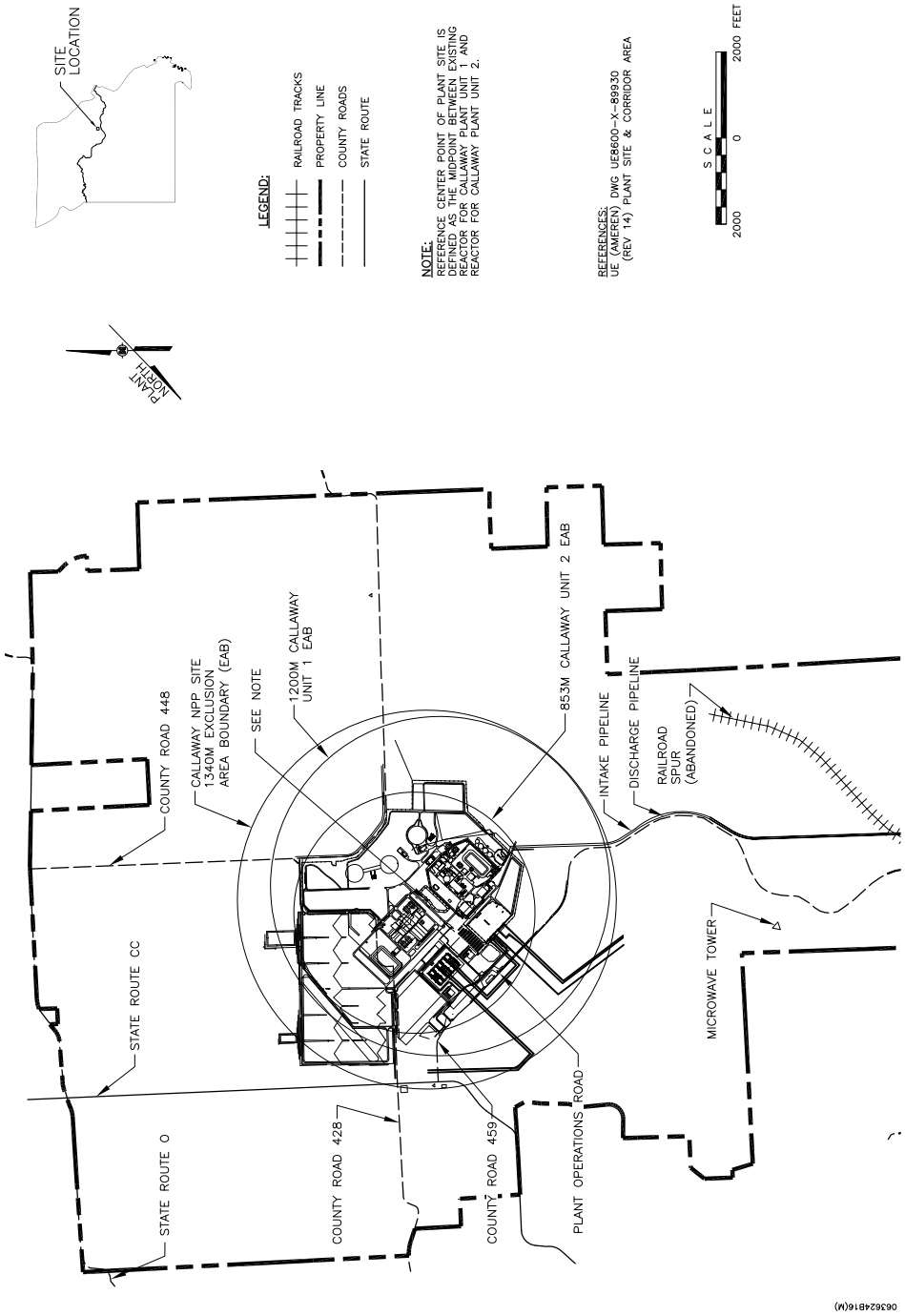
REFERENCE:
AMEREN DRAWING
FMT–001–STATE
DATED 3–12–97

AMEREN UE DWG. UE 8600–X–89930 (REV 14)
AMEREN UE DWG. UE 8600–X–89931 (REV 12)

063624A27

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

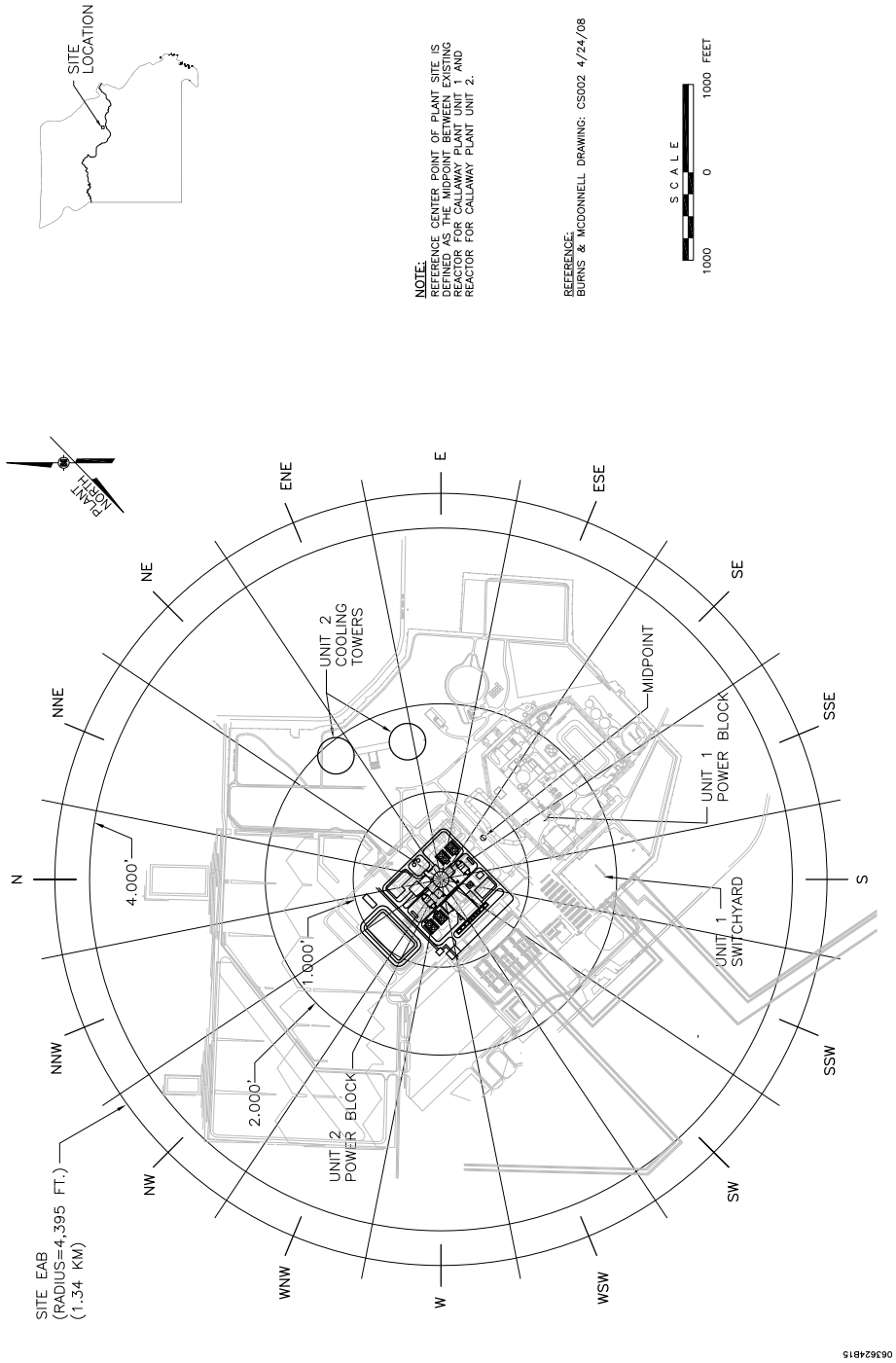
Figure 2.1-5— {Exclusion Area Boundaries}



FSAR: Section 2.1

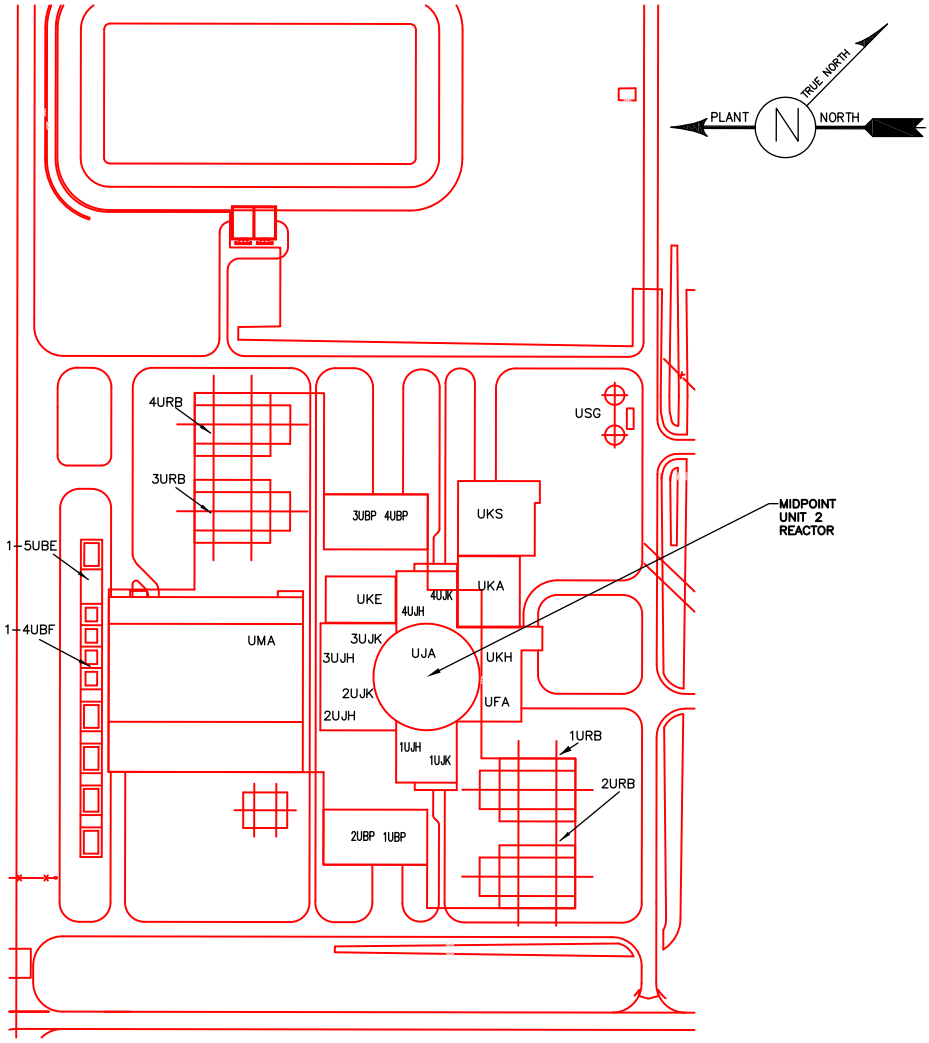
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-6—{Enlarged Site Area Map}



© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-7—{Callaway Plant Unit 2 Enlargement}

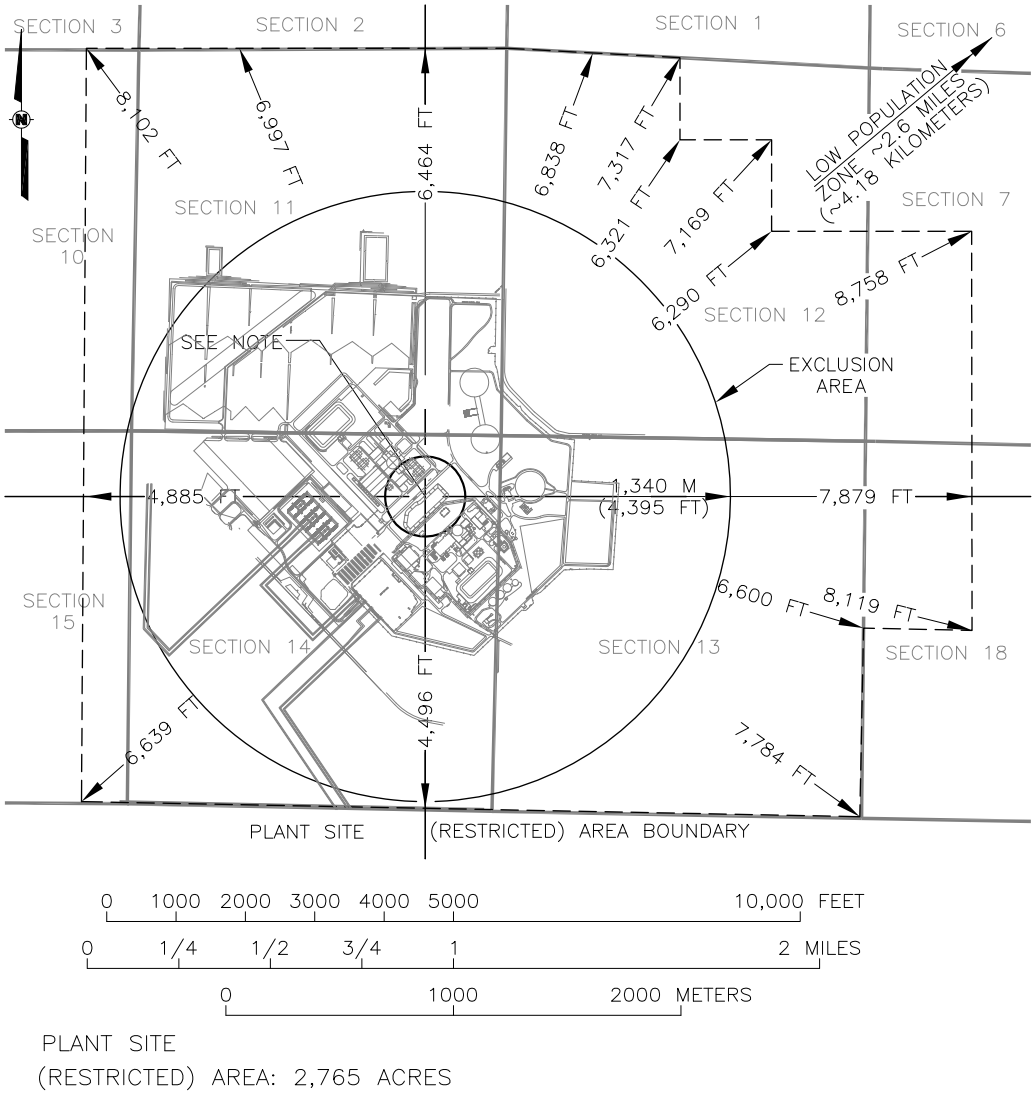


CALLAWAY PLANT UNIT 2 PLANT FACILITIES

1–5	UBE	AUXILIARY POWER TRANSFORMERS
1–4	UBF	GENERATOR TRANSFORMERS
1–4	UBP	EMERGENCY POWER GENERATING BUILDING
	UFA	FUEL BUILDING
1–4	URB	ESSENTIAL SERVICE WATER COOLING TOWER STRUCTURE
	UJA	REACTOR BUILDING
1–4	UJH	SAFEGUARD BUILDINGS MECHANICAL
1–4	UJK	SAFEGUARD BUILDINGS ELECTRICAL
	UKA	NUCLEAR AUXILIARY BUILDING
	UKE	ACCESS BUILDING
	UKH	VENT STACK
	UKS	RADIOACTIVE WASTE PROCESSING BUILDING
	UMA	TURBINE BUILDING
	USG	FIRE PROTECTION STORAGE TANKS AND BUILDING

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-8—Exclusion Area and Plant Site Area}



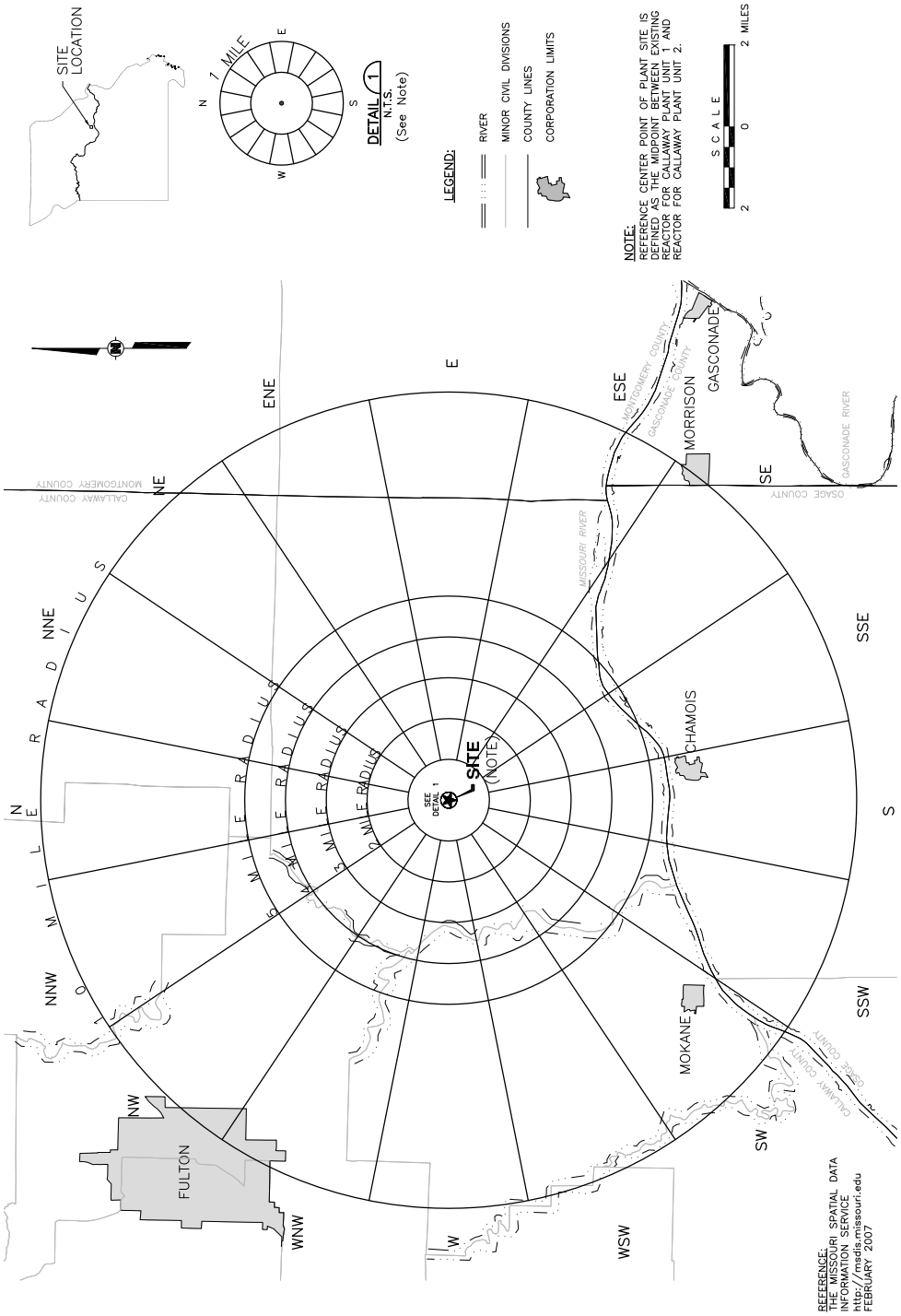
PLANT SITE
(RESTRICTED) AREA: 2,765 ACRES

NOTE:
REFERENCE CENTER POINT OF PLANT SITE IS DEFINED AS THE MIDPOINT BETWEEN EXISTING REACTOR FOR CALLAWAY PLANT UNIT 1 AND REACTOR FOR CALLAWAY PLANT UNIT 2.

REFERENCE:
BASE MAP SECTIONS:
U.S.G.S. MISSOURI TOPOGRAPHICAL QUADRANGLE REFORM. PHOTO REVISED 1985.

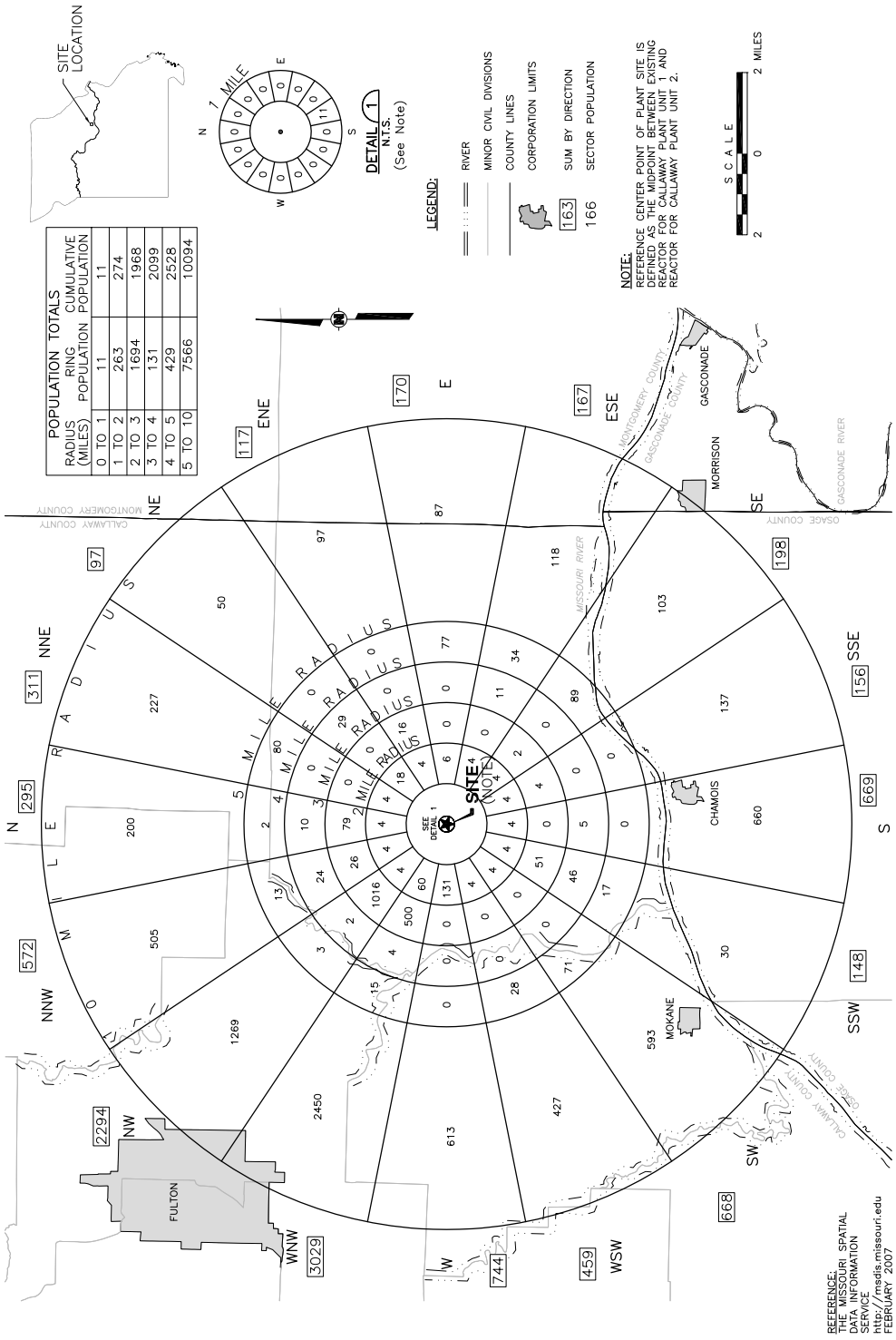
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-9— {10 Mile (16 km) Radius Map}



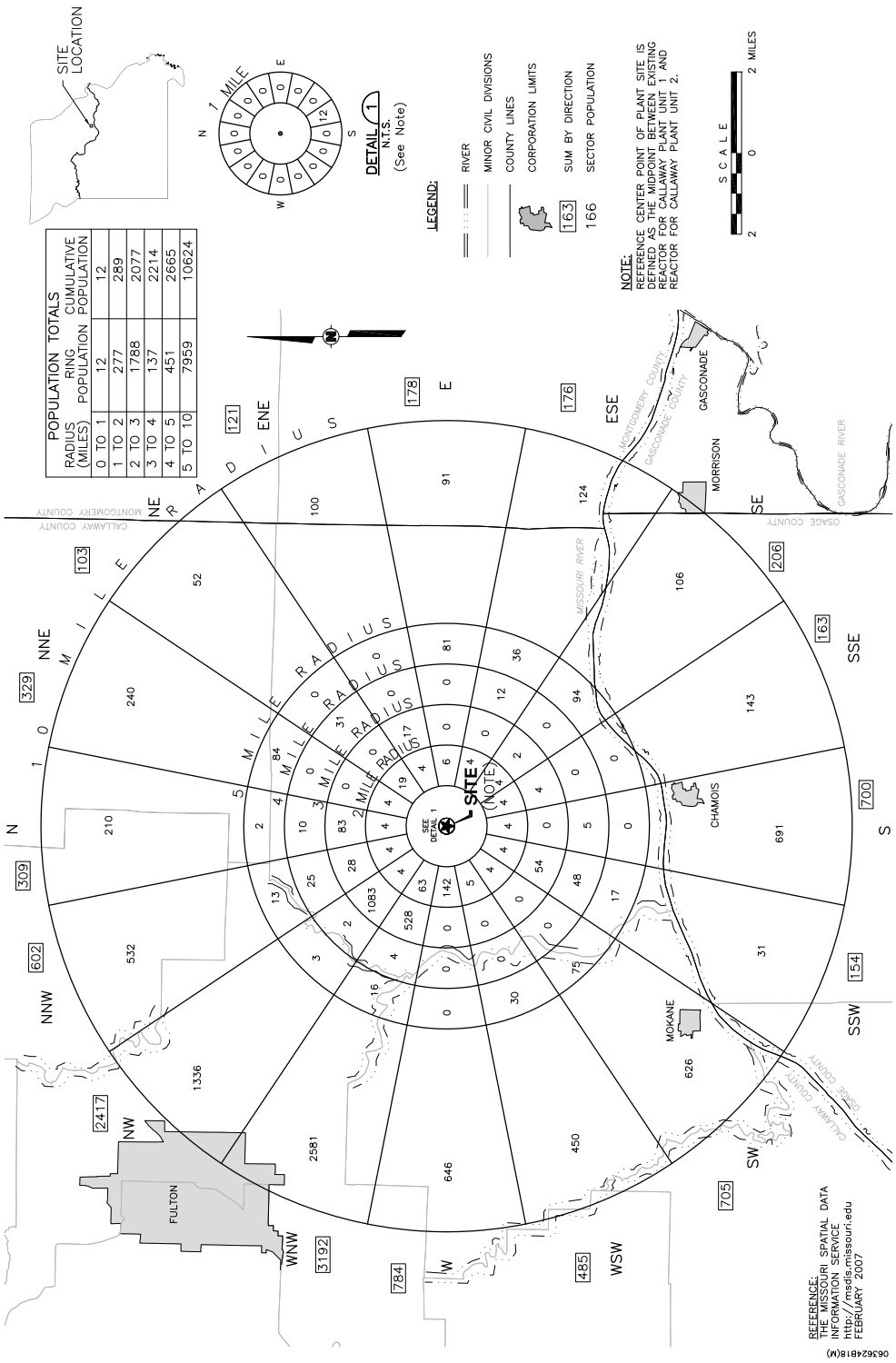
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-10—{10 Mile (16 km) 2000 Population Distribution}



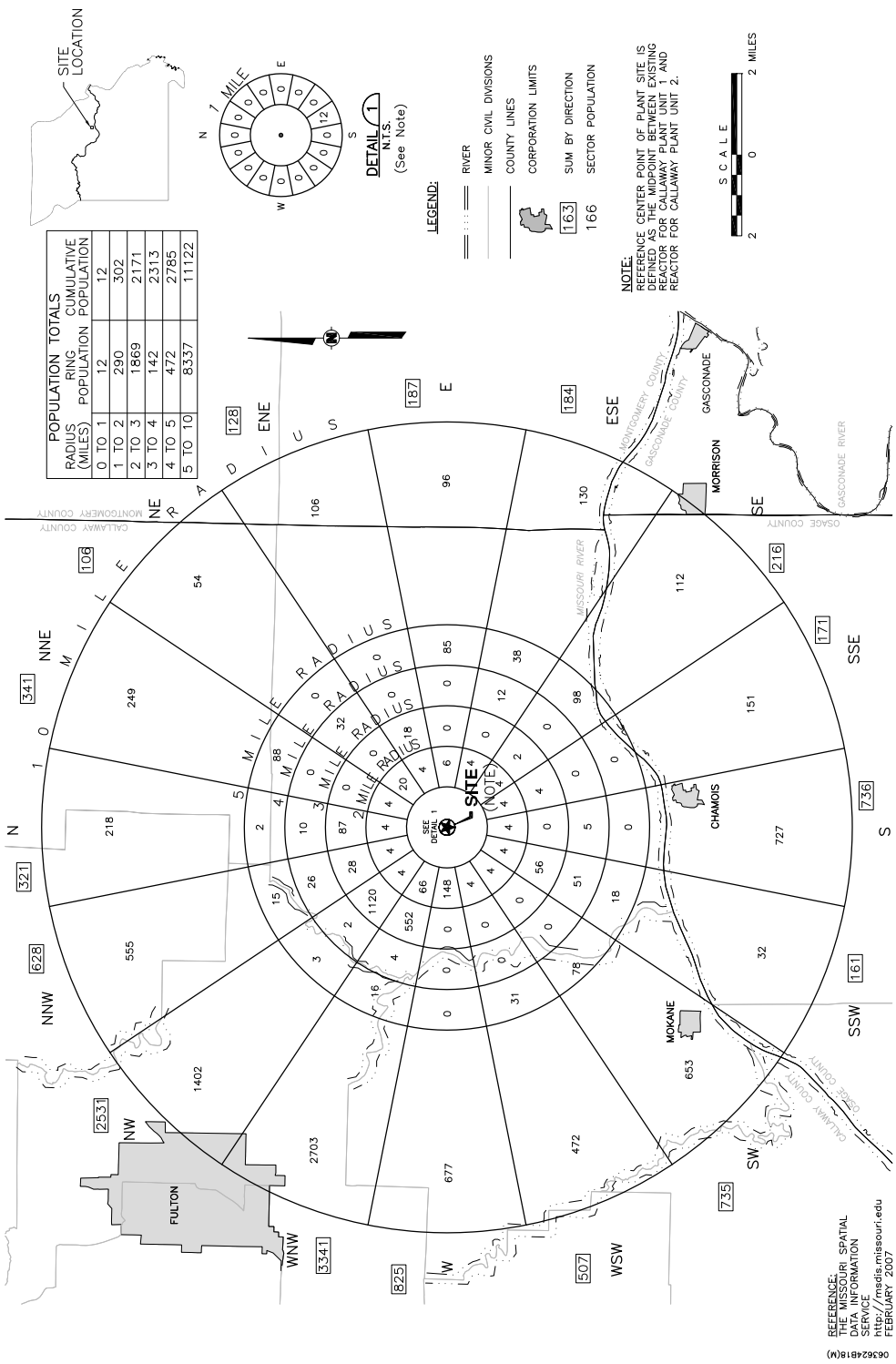
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-11—{10 Mile (16 km) 2010 Population Distribution}



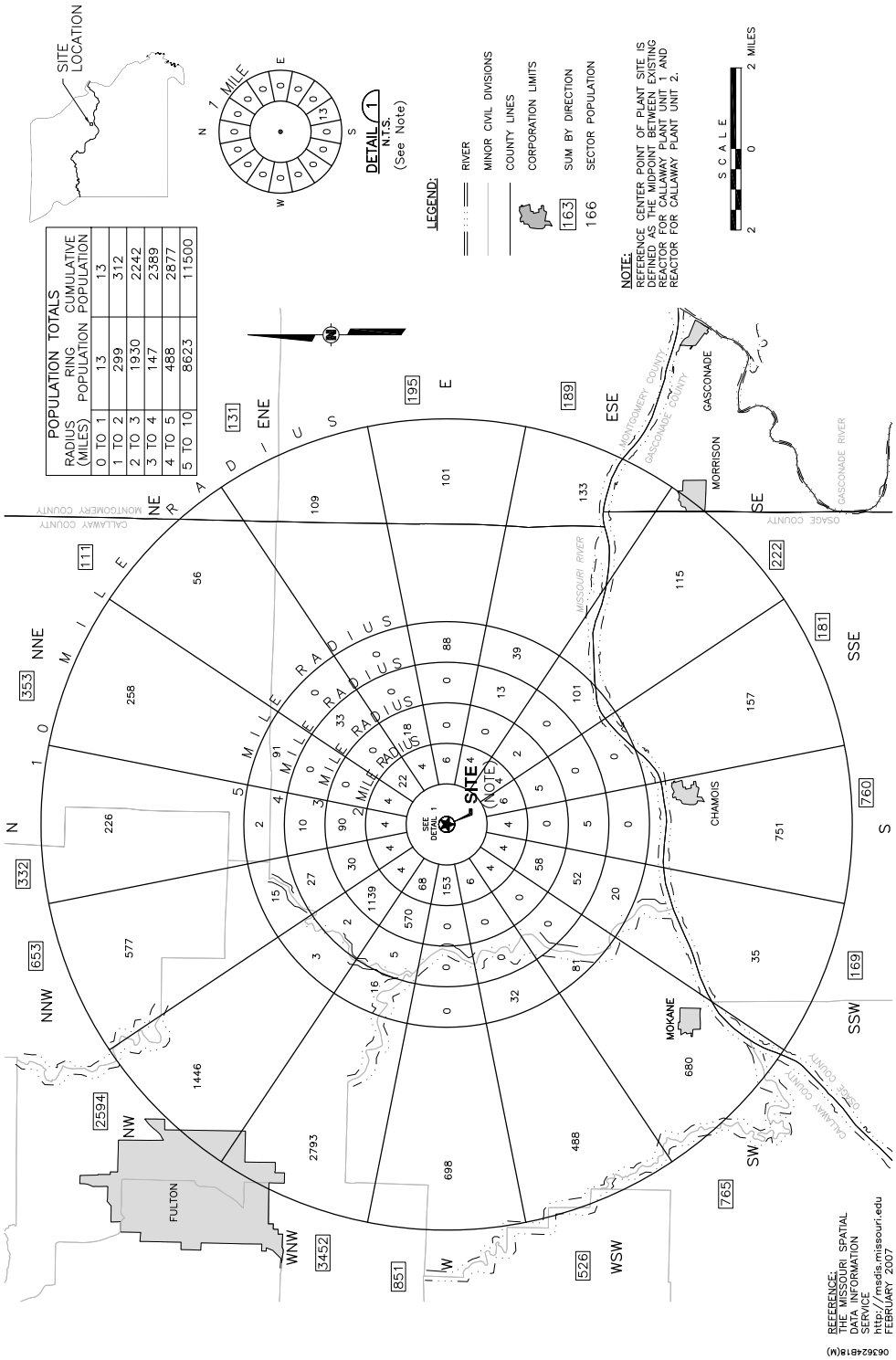
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-12—{10 Mile (16 km) 2020 Population Distribution}



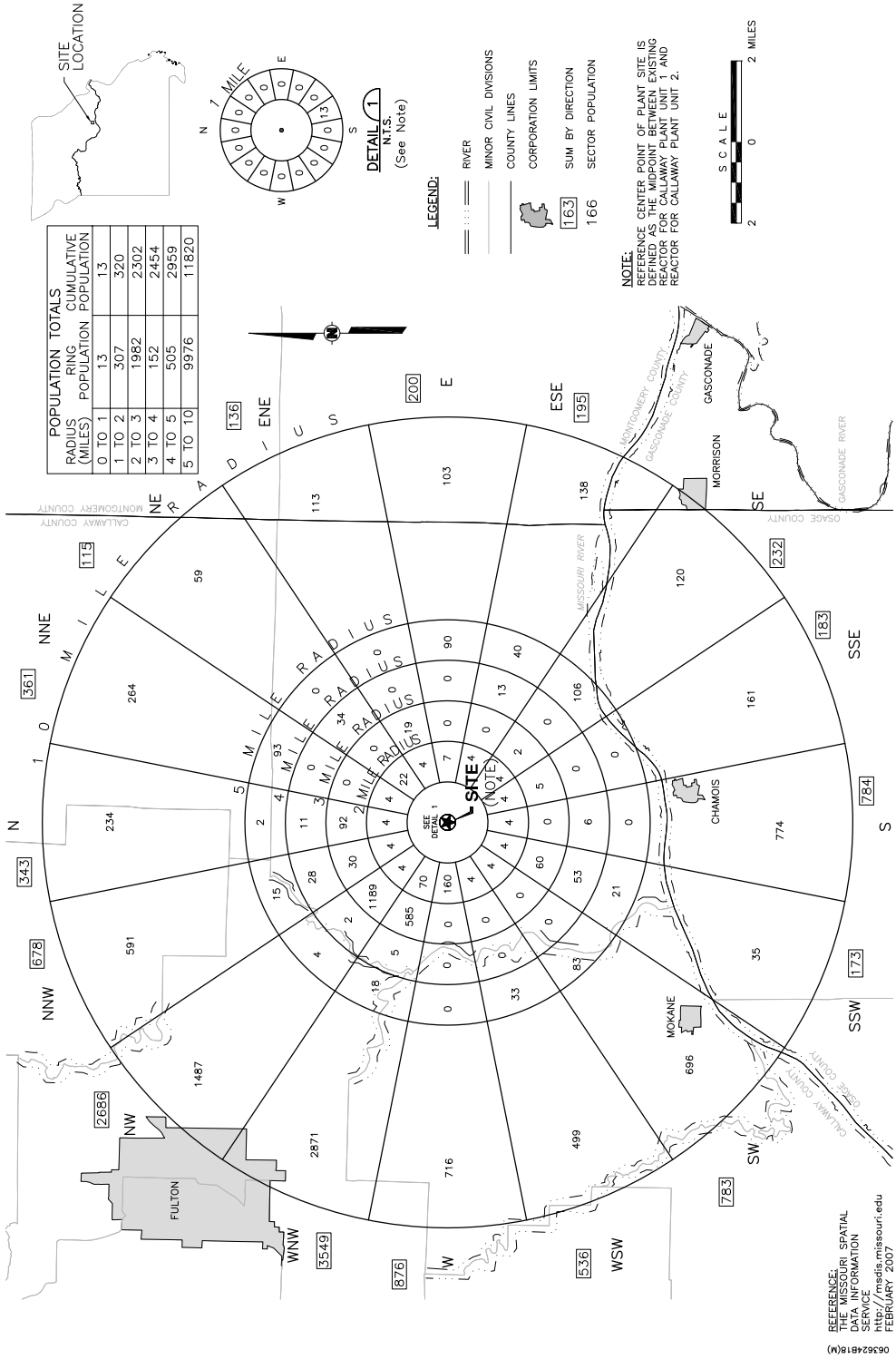
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-13— {10 Mile (16 km) 2030 Population Distribution}



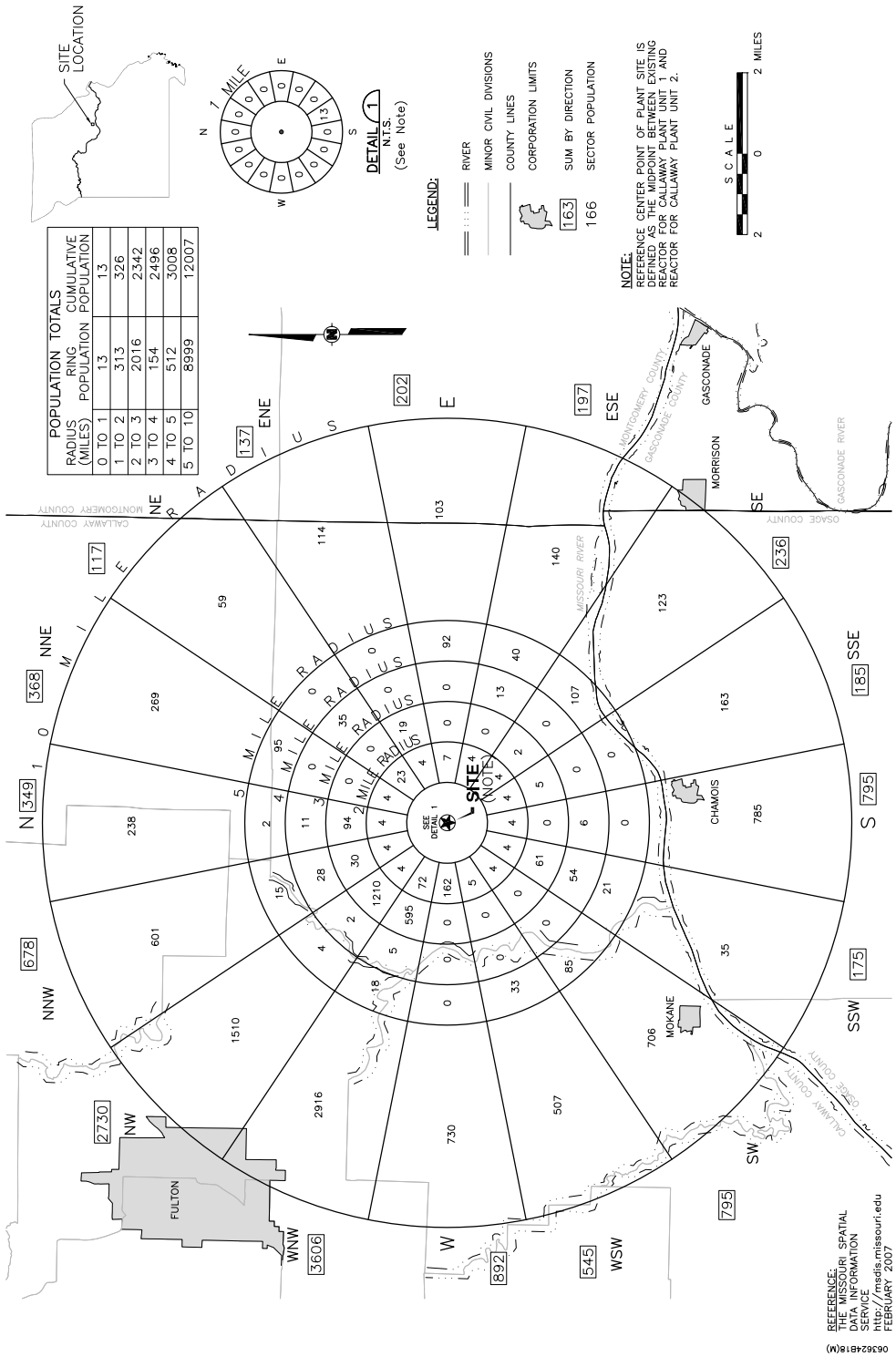
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-14— {10 Mile (16 km) 2040 Population Distribution}



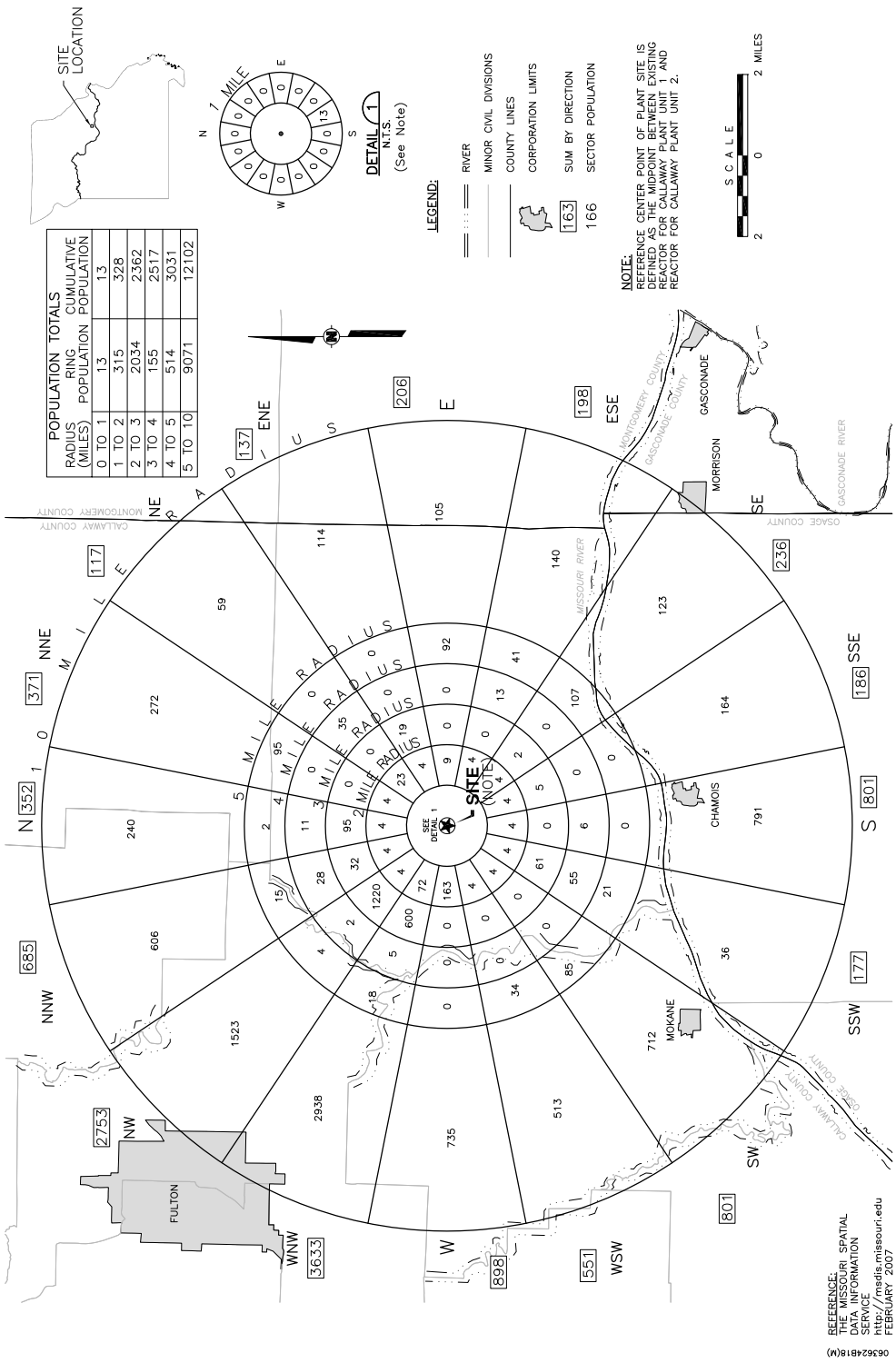
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-15— {10 Mile (16 km) 2050 Population Distribution}



© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-16—{10 Mile (16 km) 2050 Population Distribution}



© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-17—{50 Mile (80 km) 2000 Vicinity}

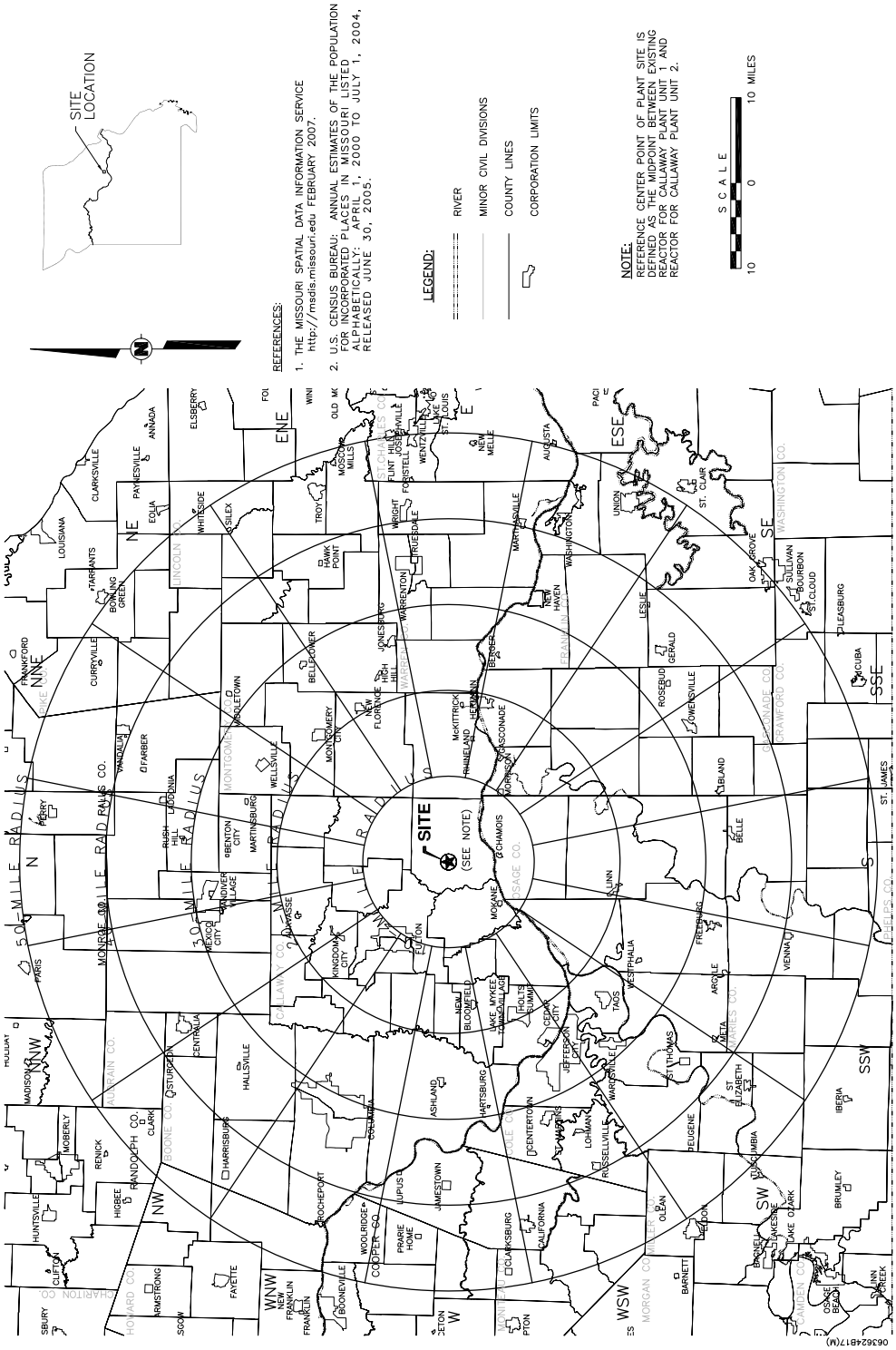
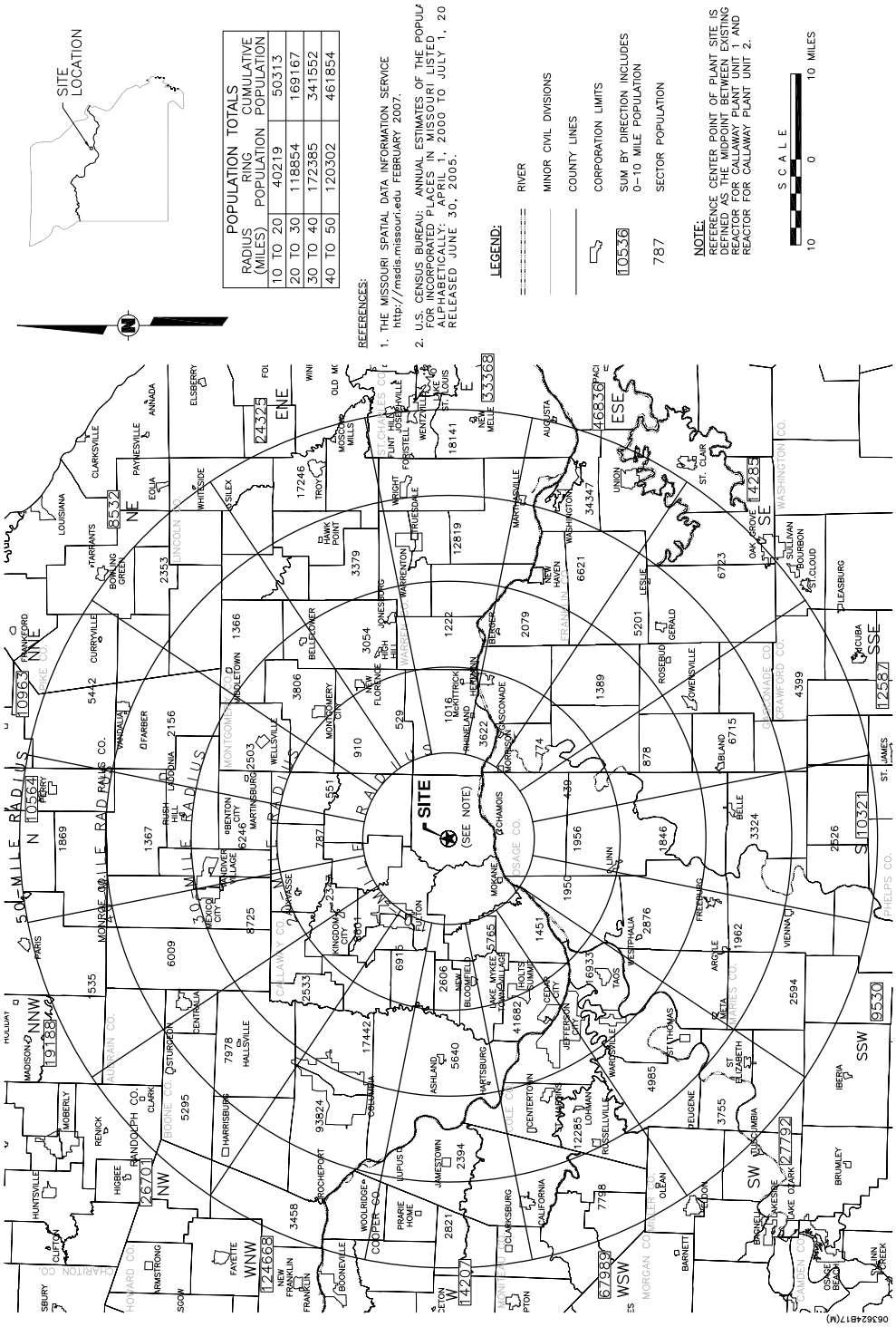
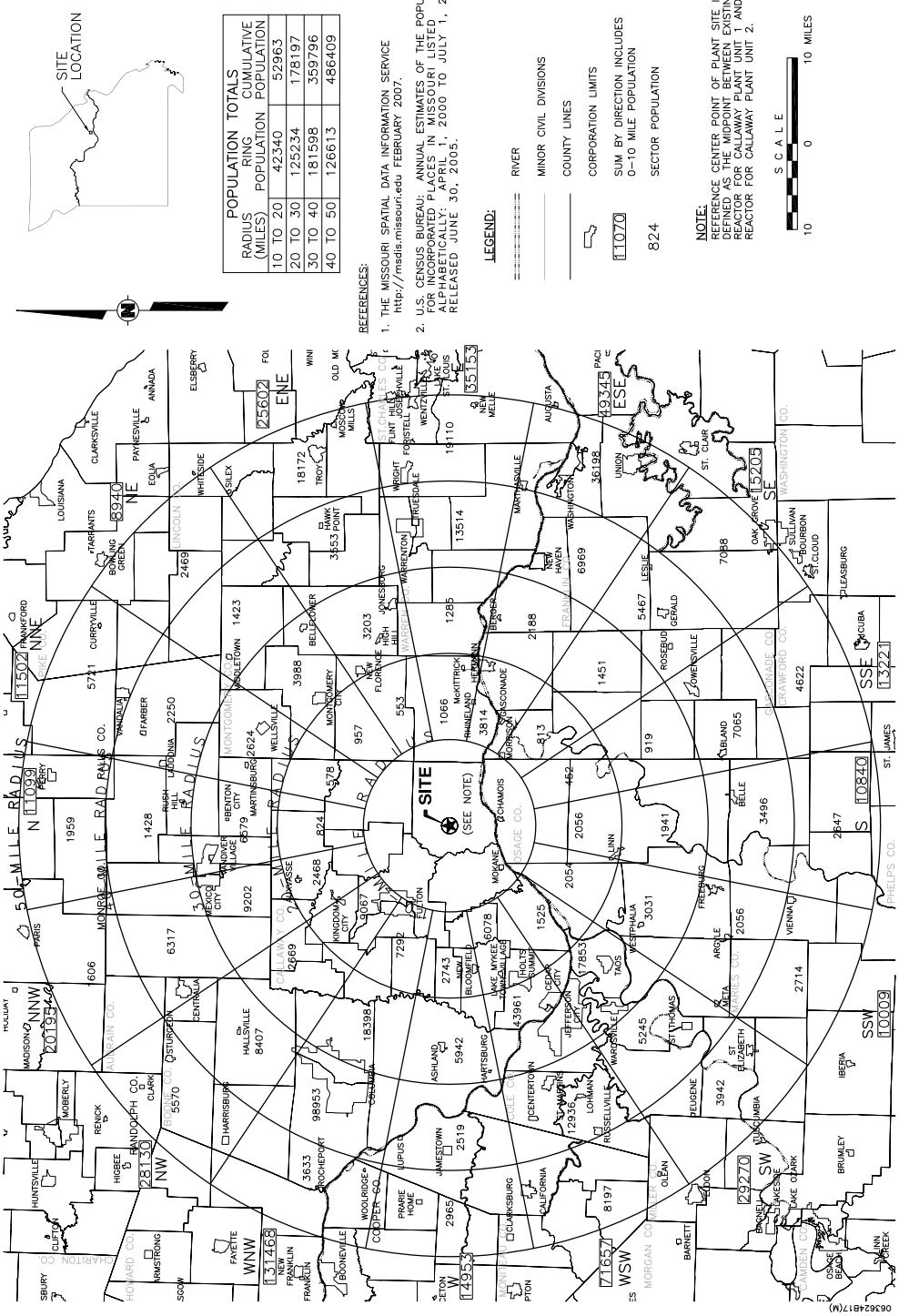

SITE LOCATION
REFERENCES:
1. THE MISSOURI SPATIAL DATA INFORMATION SERVICE http://msdis.missouri.edu FEBRUARY 2007.
2. U.S. CENSUS BUREAU: ANNUAL ESTIMATES OF THE POPULATION FOR INCORPORATED PLACES IN MISSOURI LISTED ALPHABETICALLY: APRIL 1, 2000 TO JULY 1, 2004, RELEASED JUNE 30, 2005.
LEGEND:
RIVER
MINOR CIVIL DIVISIONS
COUNTY LINES
CORPORATION LIMITS
NOTE:
REFERENCE CENTER POINT OF PLANT SITE IS DEFINED AS THE MIDPOINT BETWEEN EXISTING REACTOR FOR CALLAWAY PLANT UNIT 1 AND REACTOR FOR CALLAWAY PLANT UNIT 2.
SCALE
10 0 10 MILES
SITE
(SEE NOTE)
50 MILE RADIUS
10 MILE RADIUS
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
MONROE CO.
MONTGOMERY CO.
CALLAWAY CO.
COOPER CO.
MORGAN CO.
MILLER CO.
CRAWFORD CO.
WASHINGTON CO.
FRANKLIN CO.
GASCONADE CO.
OSAGE CO.
PHELPS CO.
HOWARD CO.
RANDOLPH CO.
BOONE CO.
CHARITON CO.
PARIS
MOBERLY
RENICK
HIGBEE
HUNTSVILLE
CLIFTON
ARMSTRONG
FAYETTE
HALLSVILLE
HARRISBURG
STURGEON
CENTRALIA
BOONVILLE
FRANKLIN
ROCHEPORT
COLUMBIA
WOOLRIDGE
LUPUS
JAMESTOWN
PRAIRIE HOME
ASHLAND
HARTSBURG
CLARKSBURG
CALIFORNIA
CENTERTOWN
JEFFERSON CITY
LOHMAN
RUSSELLVILLE
WARSAW
TAOS
WESTPHALIA
OLEAN
BARNETT
EUGENE
COLUMBIA
ST ELIZABETH
ARGYLE
ST THOMAS
VIENNA
FRUITBURG
BELLE
BLAND
OWENSVILLE
ROSEBUD
GERALD
LESLIE
UNION
ST. CLAIR
OAK GROVE
SULLIVAN
BOURBON
ST. CLOUD
LEASBURG
CUBA
IBERIA
BRUMLEY
LAKESIDE
LAKE OZARK
BAGNELL
BENDA
LAKE MYKEE
CHAMOIS
MOKANE
McKITTRICK
FRANKLAND
HERMANN
BERGER
NEW HAVEN
WASHINGTON
MARTHASVILLE
AUGUSTA
NEW MELLE
FLINT HILL
JOSEPH
FORSTELL
WENTZVILLE
ST. LOUIS
LAKE
WRIGHT CITY
FRUESDALE
WARRENTON
JONESBURG
HIGH HILL
NEW FLORENCE
MONTGOMERY CITY
BELLEFONTAINE
MIDDLETOWN
WELLSVILLE
MARTINSBURG
BENTON CITY
GRANVILLE
MEXICO CITY
RUSH HILL
LAGONDA
PANDALA
FARBER
CURRYVILLE
BOWLING GREEN
FRANKFORD
LOUISIANA
CLARKSVILLE
PAYNESVILLE
ANNADA
ELSBERRY
EOLIA
WHITESIDE
SILEX
TROY
MOSCOW MILLS
HAWK POINT
ST. JAMES
MADISON
HOLLIDAY
STURGEON
CLARK
MOBERLY
RENICK
HIGBEE
HUNTSVILLE
CLIFTON
ARMSTRONG
SCOTT
SBURY
FAYETTE
HALLSVILLE
HARRISBURG
STURGEON
CENTRALIA
BOONVILLE
FRANKLIN
ROCHEPORT
COLUMBIA
WOOLRIDGE
LUPUS
JAMESTOWN
PRAIRIE HOME
ASHLAND
HARTSBURG
CLARKSBURG
CALIFORNIA
CENTERTOWN
JEFFERSON CITY
LOHMAN
RUSSELLVILLE
WARSAW
TAOS
WESTPHALIA
OLEAN
BARNETT
EUGENE
COLUMBIA
ST ELIZABETH
ARGYLE
ST THOMAS
VIENNA
FRUITBURG
BELLE
BLAND
OWENSVILLE
ROSEBUD
GERALD
LESLIE
UNION
ST. CLAIR
OAK GROVE
SULLIVAN
BOURBON
ST. CLOUD
LEASBURG
CUBA
IBERIA
BRUMLEY
LAKESIDE
LAKE OZARK
BAGNELL
BENDA
LAKE MYKEE
CHAMOIS
MOKANE
McKITTRICK
FRANKLAND
HERMANN
BERGER
NEW HAVEN
WASHINGTON
MARTHASVILLE
AUGUSTA
NEW MELLE
FLINT HILL
JOSEPH
FORSTELL
WENTZVILLE
ST. LOUIS
LAKE
WRIGHT CITY
FRUESDALE
WARRENTON
JONESBURG
HIGH HILL
NEW FLORENCE
MONTGOMERY CITY
BELLEFONTAINE
MIDDLETOWN
WELLSVILLE
MARTINSBURG
BENTON CITY
GRANVILLE
MEXICO CITY
RUSH HILL
LAGONDA
PANDALA
FARBER
CURRYVILLE
BOWLING GREEN
FRANKFORD
LOUISIANA
CLARKSVILLE
PAYNESVILLE
ANNADA
ELSBERRY
EOLIA
WHITESIDE
SILEX
TROY
MOSCOW MILLS
HAWK POINT
ST. JAMES
PARIS

Figure 2.1-18— {50 Mile (80 km) 2000 Population Distribution}



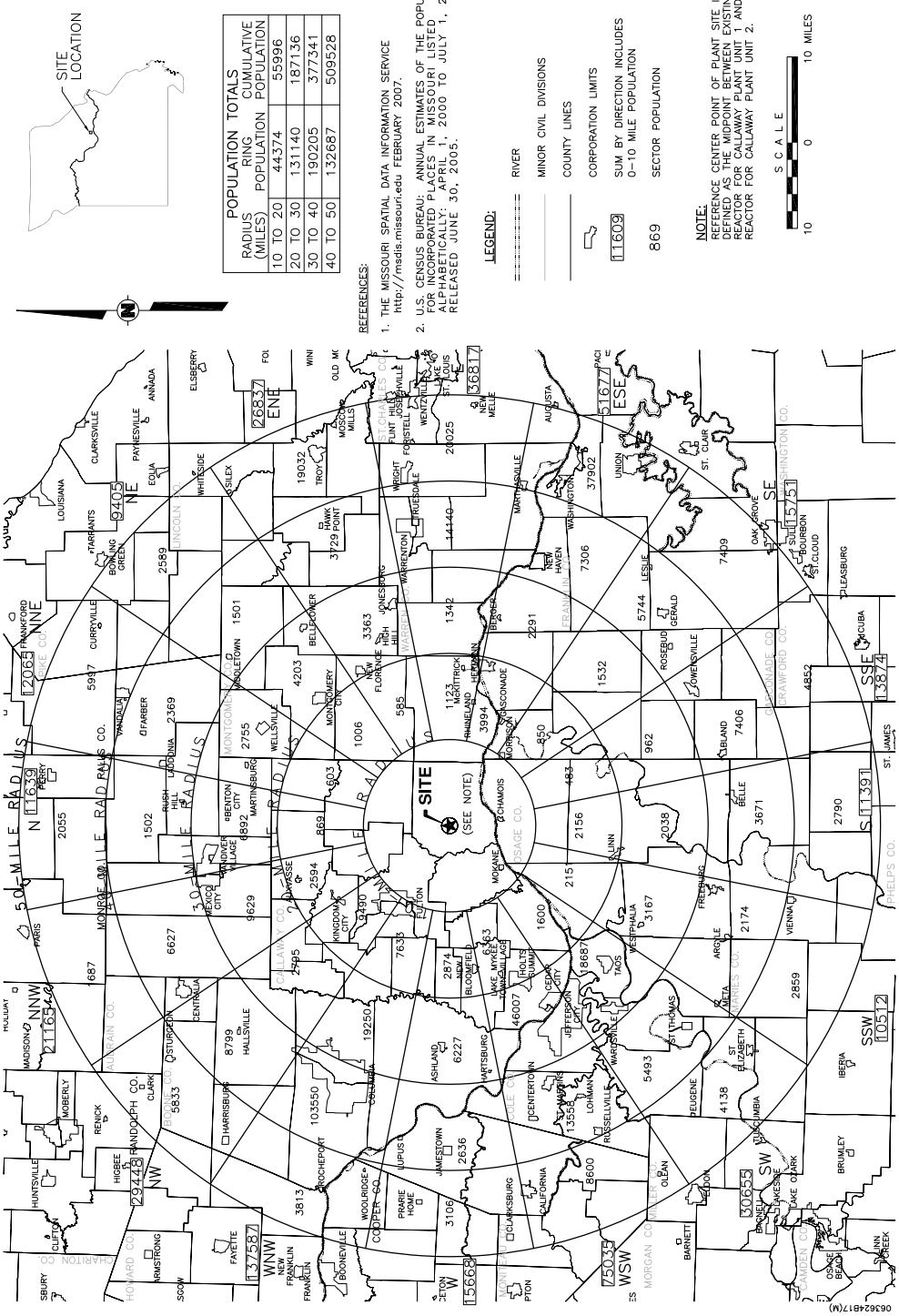
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-19— {50 Mile (80 km) 2010 Population Distribution}



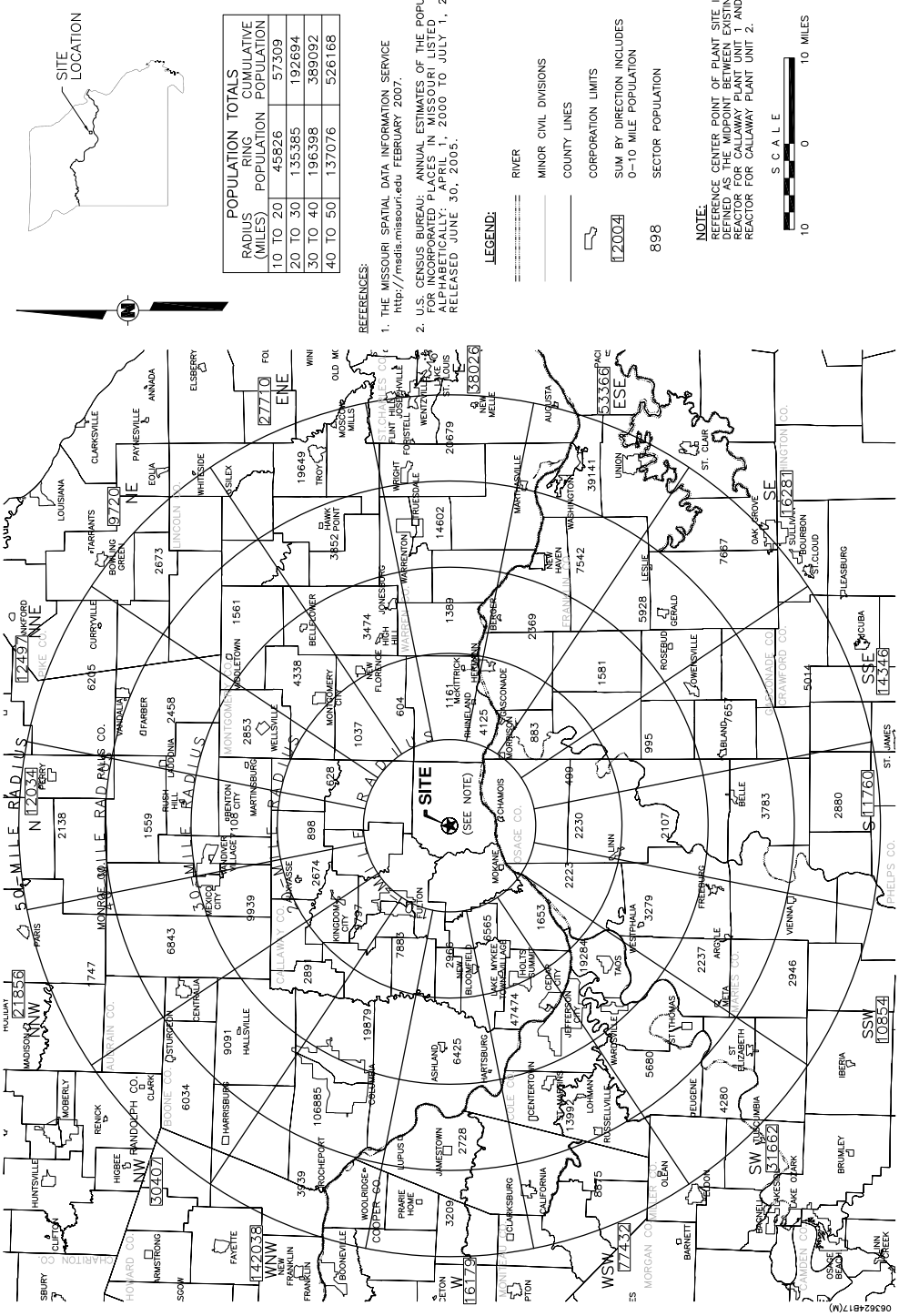
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-20—{50 Mile (80 km) 2020 Population Distribution}



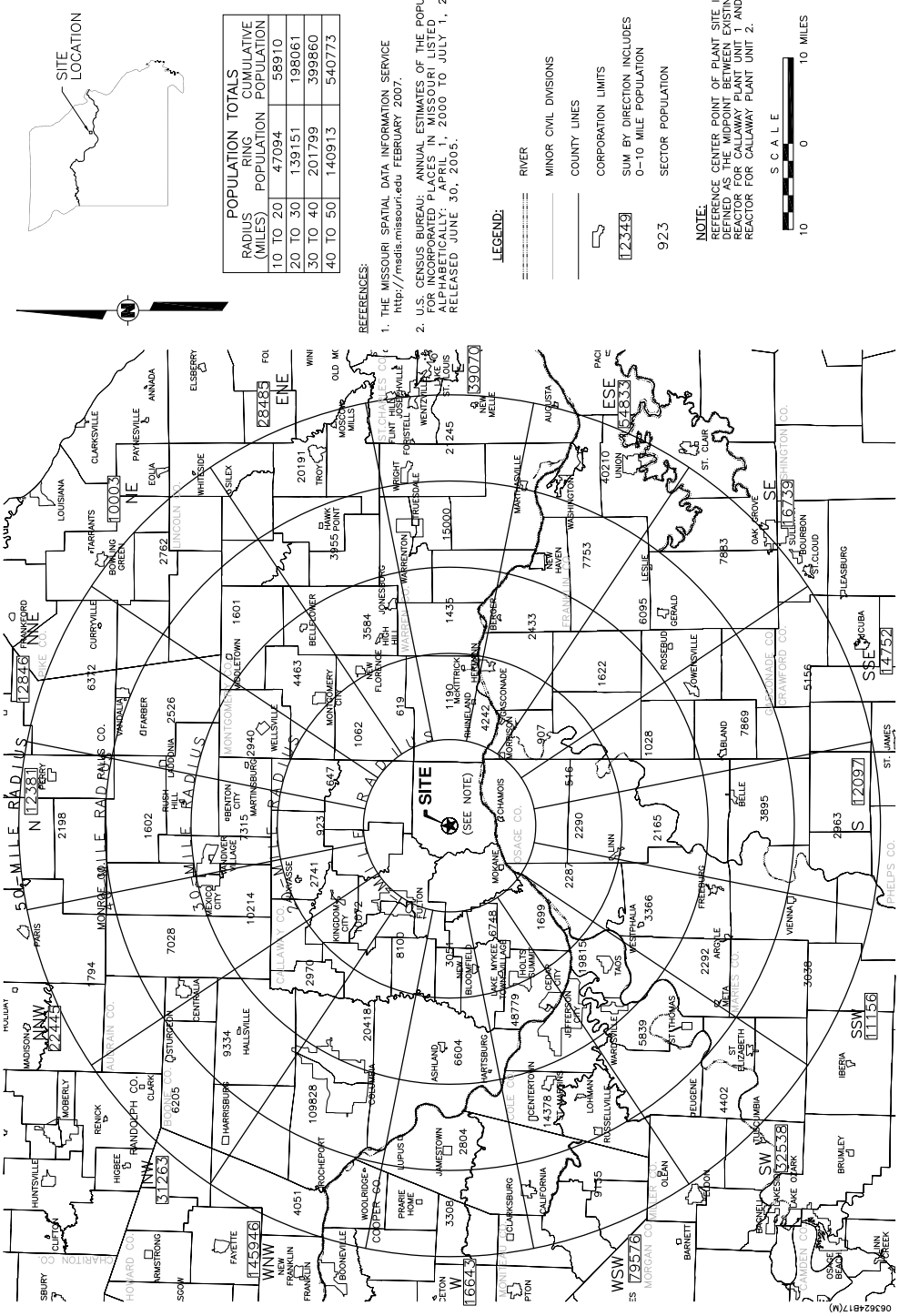
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-21 — {50 Mile (80 km) 2030 Population Distribution}



© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

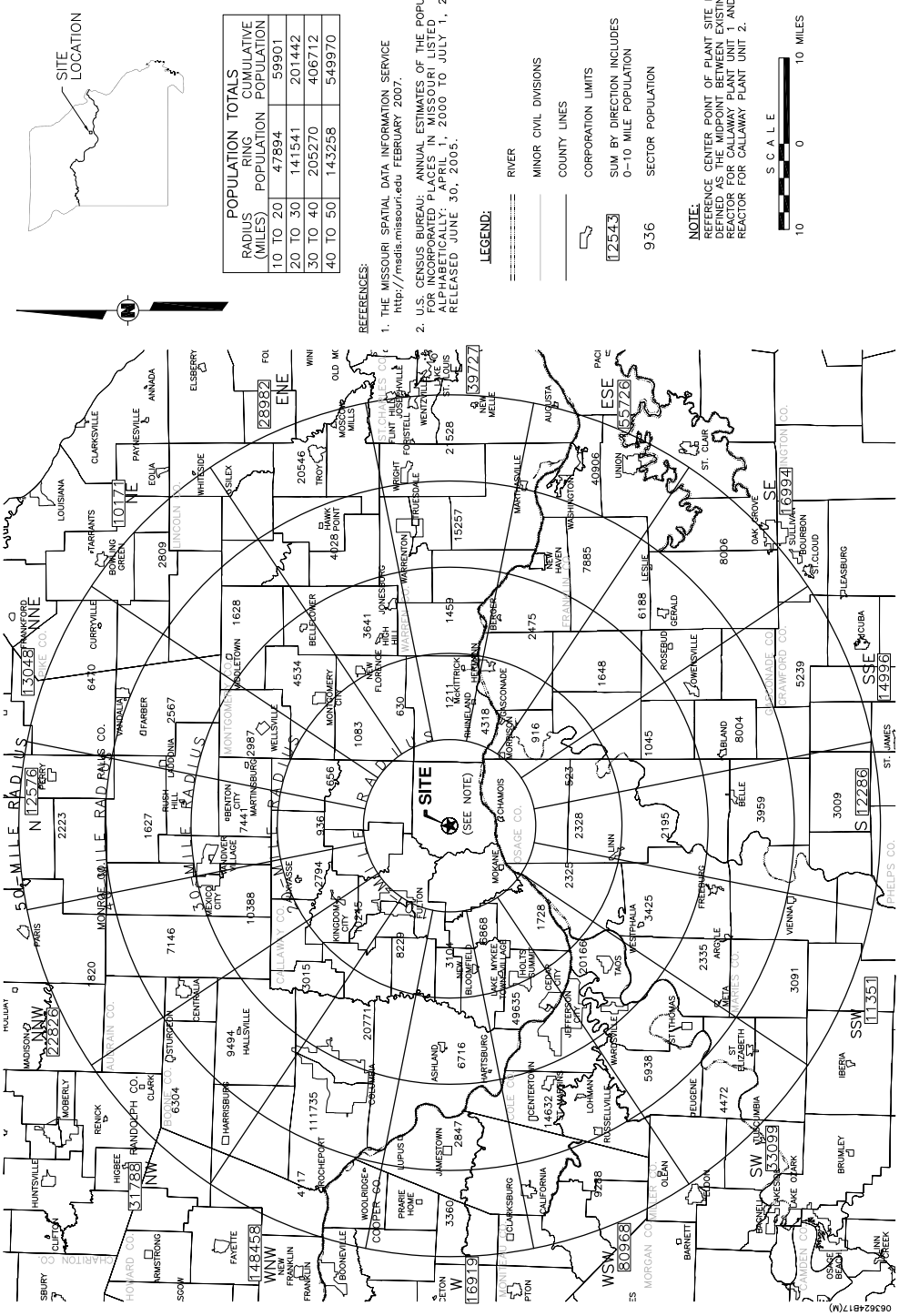
Figure 2.1-22—{50 Mile (80 km) 2040 Population Distribution}



FSAR: Section 2.1

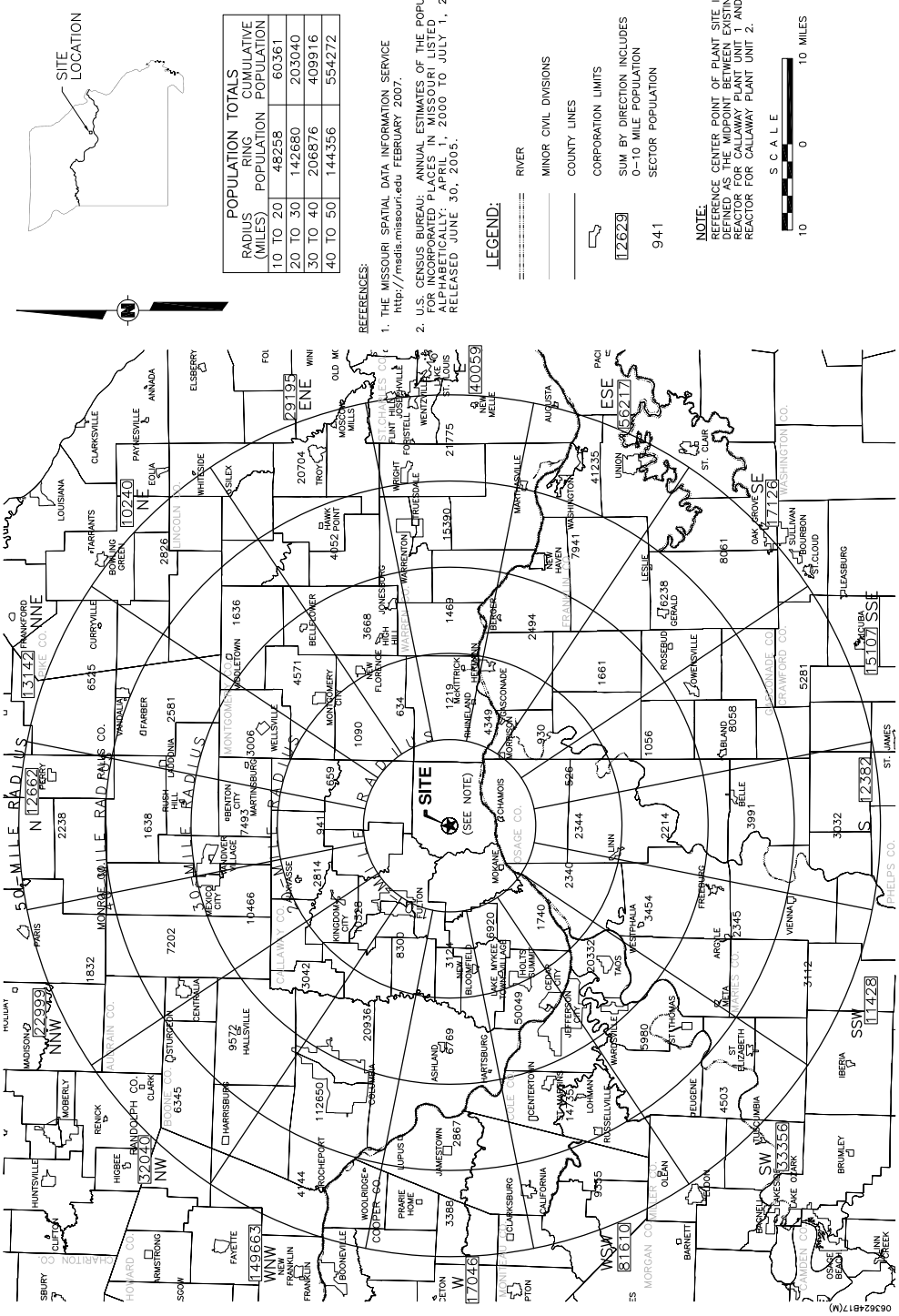
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-23— {50 Mile (80 km) 2000 Population Distribution}



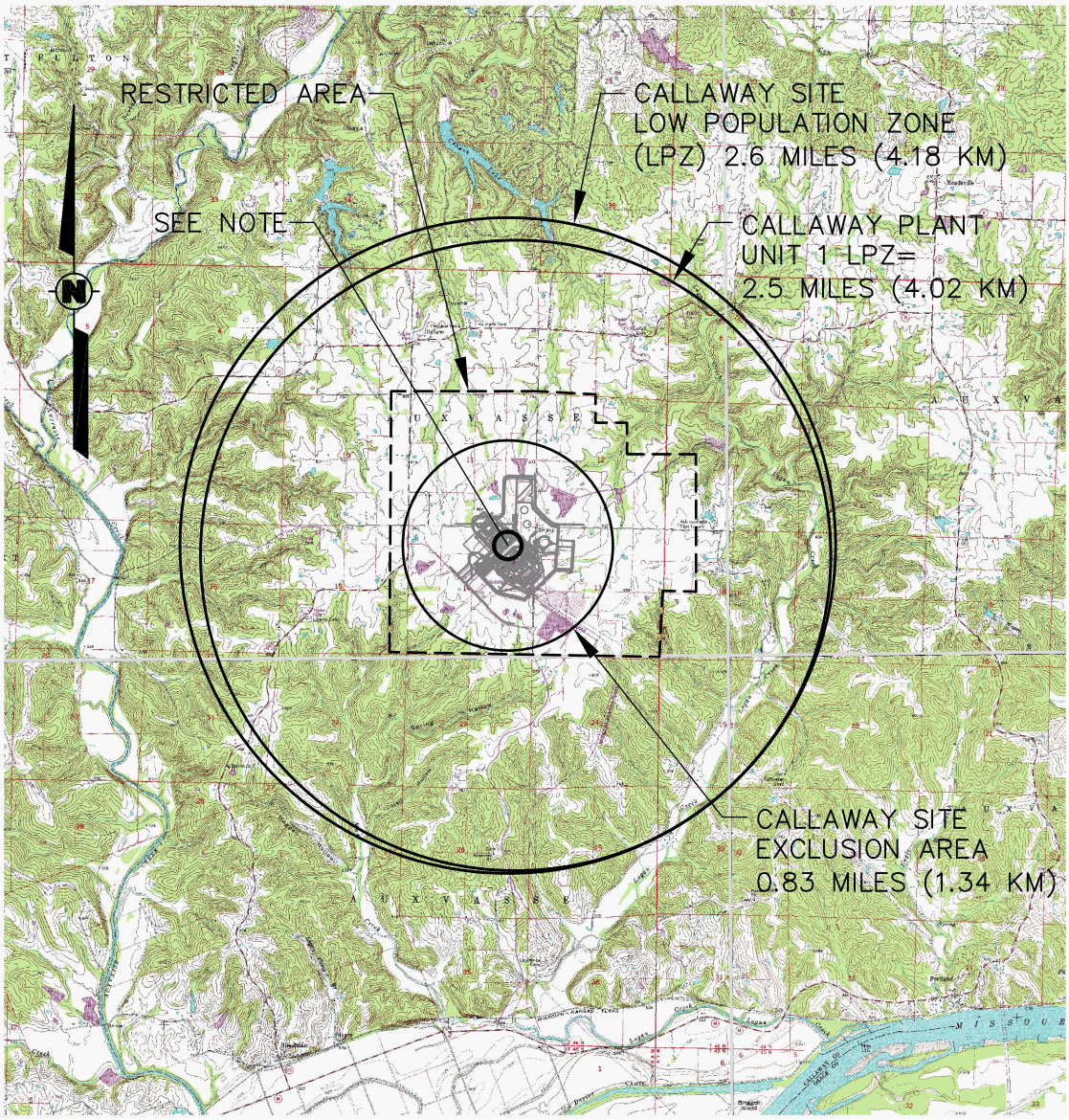
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-24—{50 Mile (80 km) 2060 Population Distribution}



© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-25—{Protected Area, Exclusion Area, Restricted Area, and Low Population Zone}



NOTE:
REFERENCE CENTER POINT OF PLANT SITE IS DEFINED AS THE MIDPOINT BETWEEN EXISTING REACTOR FOR CALLAWAY PLANT UNIT 1 AND REACTOR FOR CALLAWAY PLANT UNIT 2.

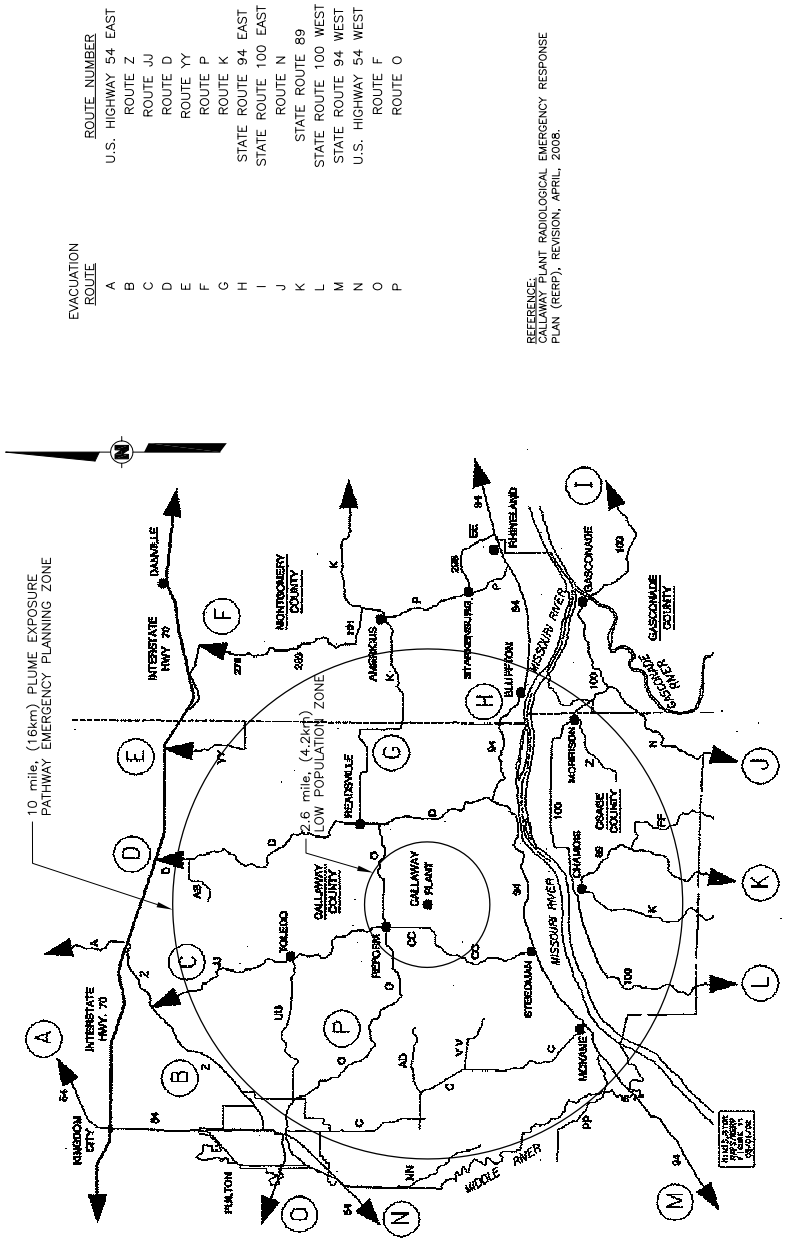
SCALE
6000 0 6000 FEET

REFERENCE:
BASED ON PORTIONS OF USGS 7.5 MIN. TOPOGRAPHIC MAP ADVANCE PRINTS:
REFORM, MISSOURI QUADRANGLE (1985)
MOKANE EAST, MISSOURI QUADRANGLE (1985)
READVILLE, MISSOURI QUADRANGLE (1985)
MORRISON, MISSOURI QUADRANGLE (1985)

AMEREN DWG.: EPR FOOTPRINT 12–11–06.DWG

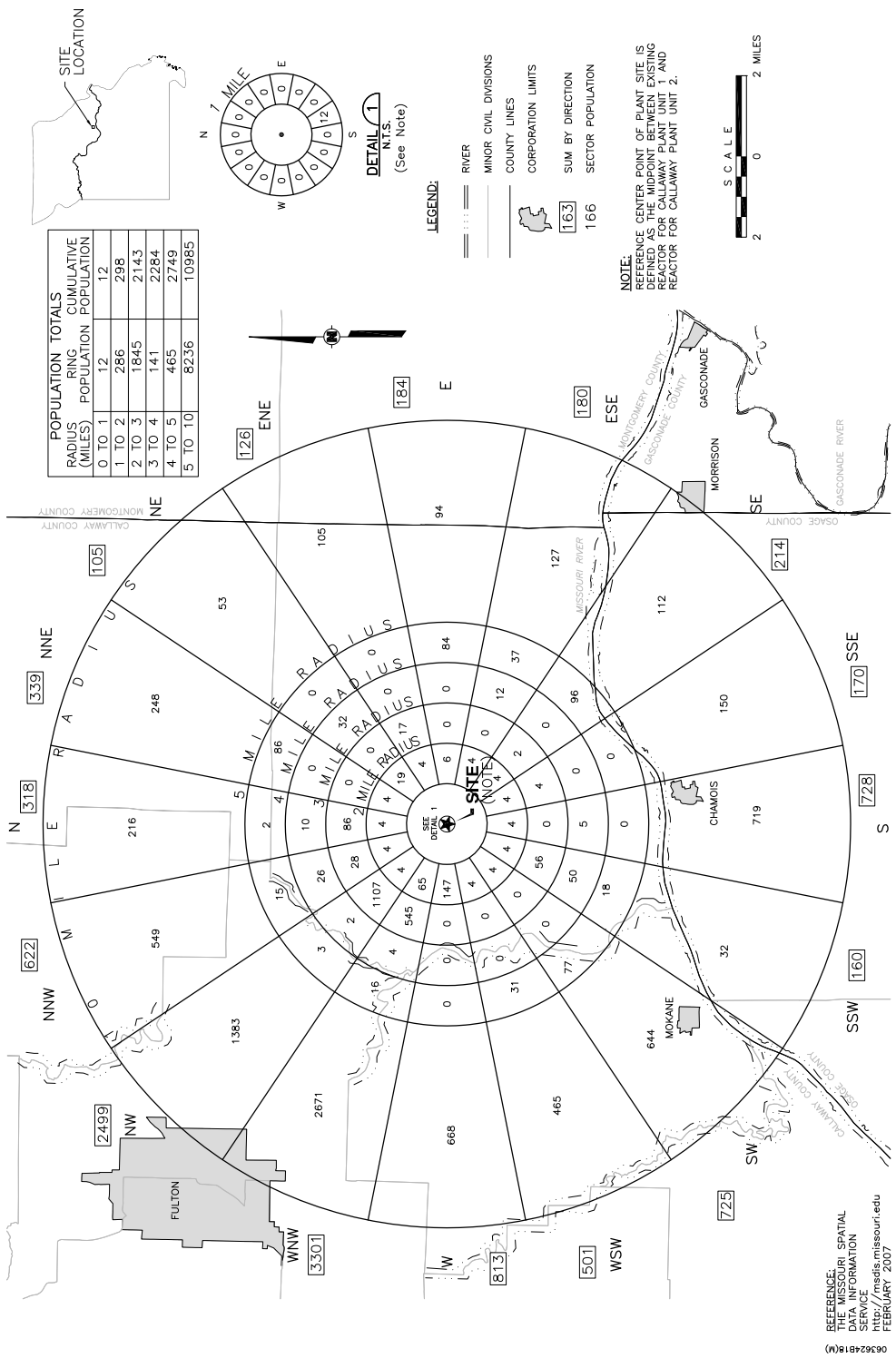
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-26— {LPZ and Emergency Planning Evacuation Routes}



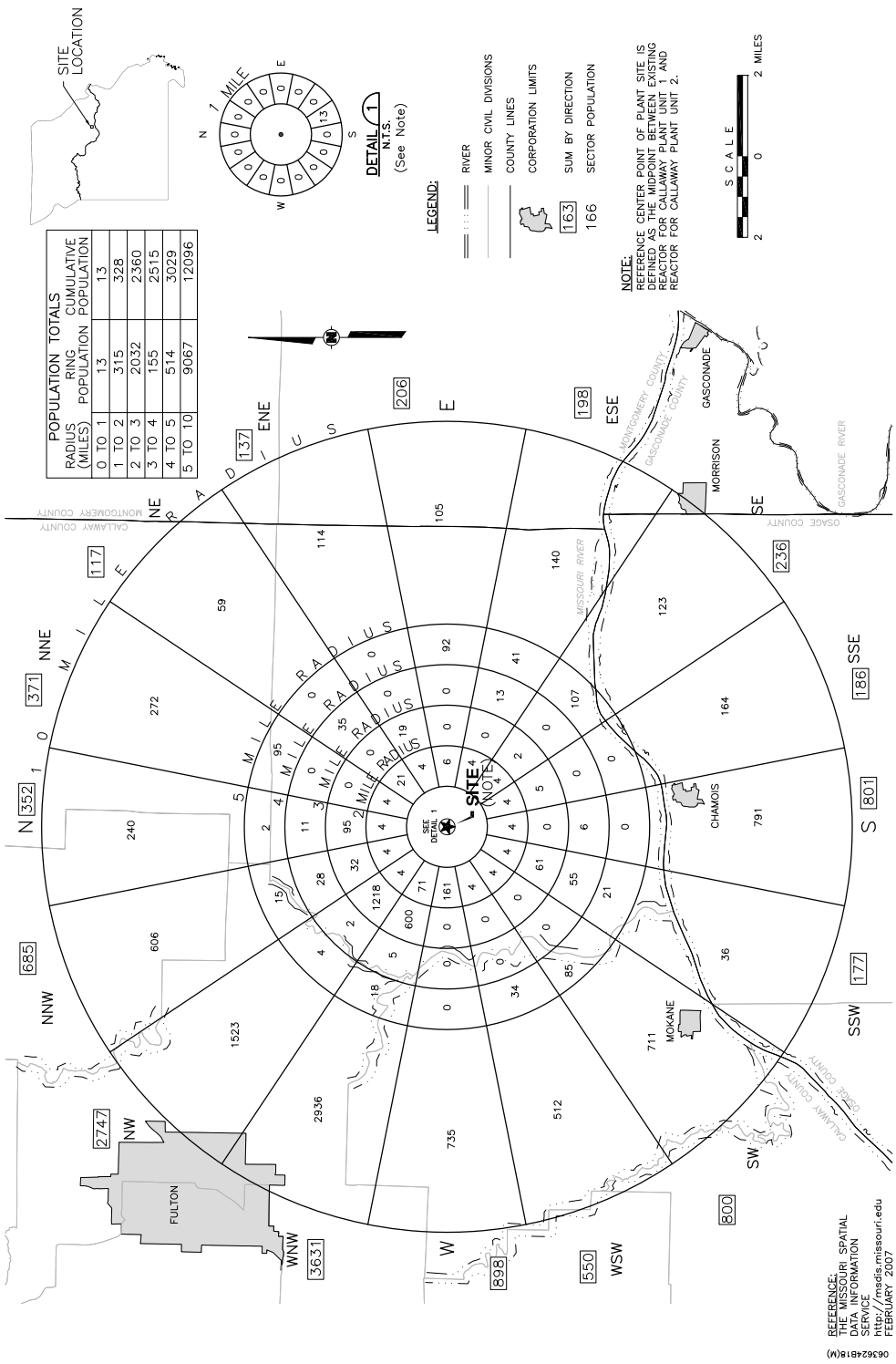
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-27— {10 Mile (16 km) 2057 Population Distribution}



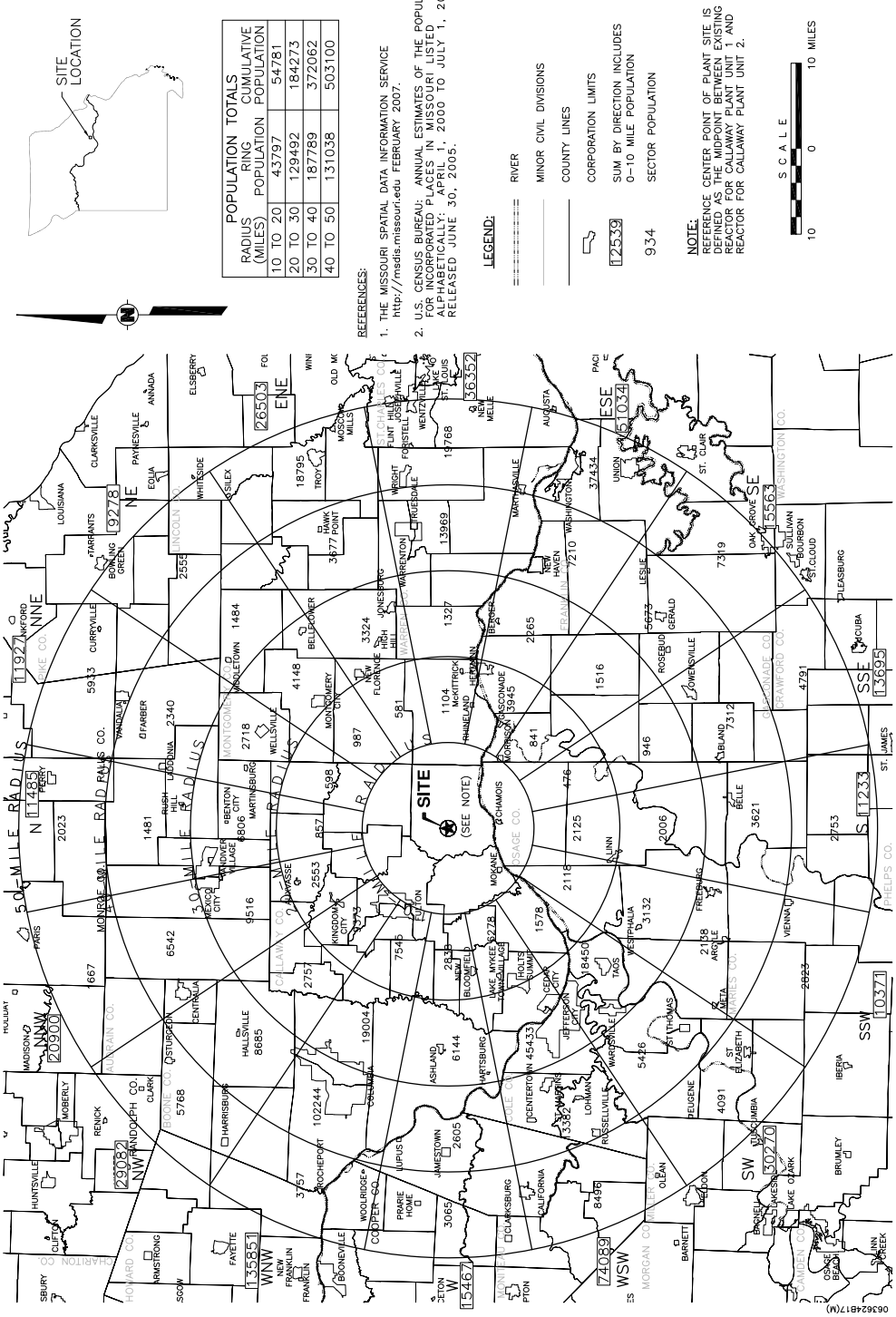
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-28— {10 Mile (16 km) 2017 Population Distribution}



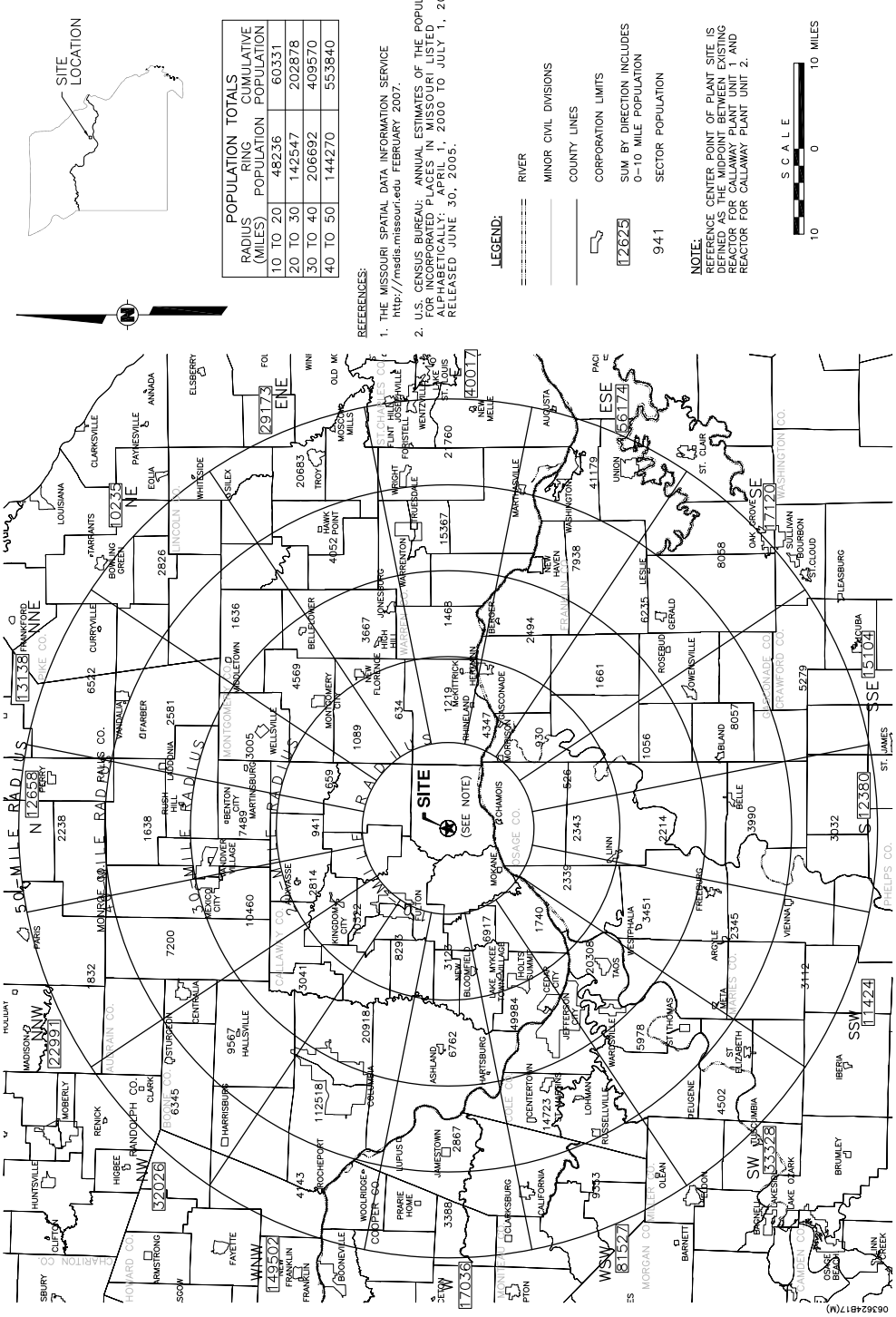
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-29— {50 Mile (80 km) 2057 Population Distribution}



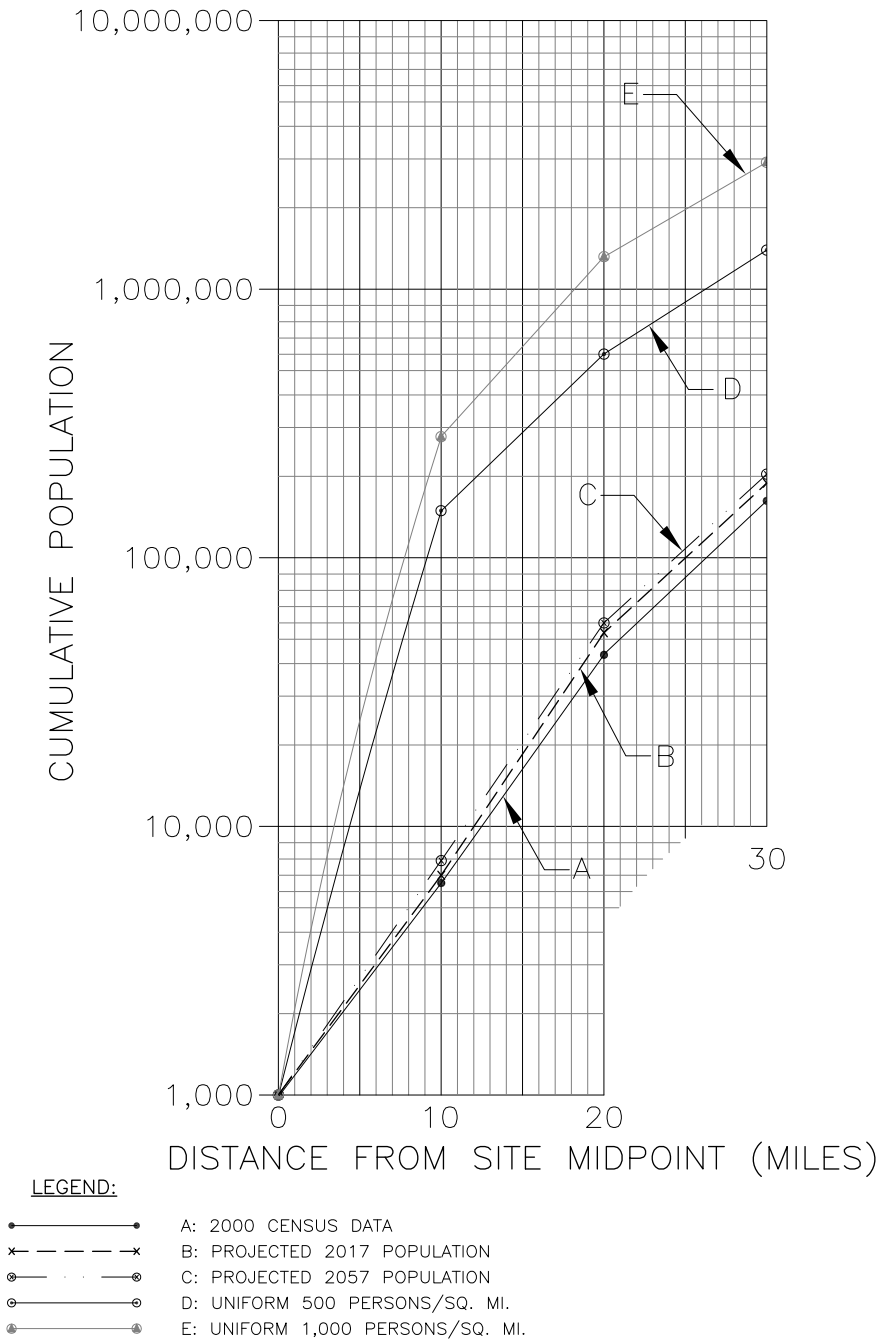
© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-30—{50 Mile (80 km) 2017 Population Distribution}



© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED

Figure 2.1-31— {Cumulative Populations}



063624A29

© 2007-2008 UniStar Nuclear Services, LLC in and to the Reference COLA, namely all text not in brackets
© 2007-2008 Union Electric Company d/b/a AmerenUE in and to all Callaway site specific and
AmerenUE specific COLA material, namely all text in brackets.
All rights reserved. COPYRIGHT PROTECTED