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2.0 SITE CHARACTERISTICS

2.1 GEOGRAPHY AND DEMOGRAPHY

2.1.1 Site Location and Description

2.1.1.1 Specification of Location

The Watts Bar Nuclear Plant is located on a tract of approximately 1770 acres in Rhea County on the west bank of the Tennessee River at river mile 528. The site is approximately 1-1/4 miles south of the Watts Bar Dam and approximately 31 miles north-northeast of the Sequoyah Nuclear Plant.

The 1770 acre reservation is owned by the United States and is in the custody of TVA. Also located within the reservation are the Watts Bar Dam and Hydro-Electric Plant, the Watts Bar Steam Plant, the TVA Central Maintenance Facility, and the Watts Bar Resort Area.

The resort area buildings and improvements have been sold to private individuals and the associated land mass leased to the Watts Bar Village Corporation, Inc. Due to this sale and leasing arrangement no services are provided to the resort area from the Watts Bar Nuclear Plant.

The location of each reactor is given below:

LONGITUDE AND LATITUDE (degrees/minutes/seconds)	
UNIT 1 35°36' 10.430" N	84°47' 24.267" W
UNIT 2 35°36' 10.813" N	84°47' 21.398" W

UNIVERSAL TRANSVERSE MERCATOR (Meters)	
Northing	**Easting**
UNIT 1 N3, 941,954.27	E 700,189.94
UNIT 2 N3, 941,967.71	E 700,261.86

2.1.1.2 Site Area Map

Figure 2.1-1 is a map of the TVA area showing the location of all power plants. Figure 2.1-2 shows the Watts Bar site location with respect to prominent geophysical and political features of the area. This map is used to correlate with the population distribution out to 50 miles. The population density within 10 miles is keyed to Figure 2.1-3. This map shows greater detail of the site area. Figures 2.1-4a and 2.1-4b are maps of the Watts Bar Site Area. The Watts Bar reservation boundary and the exclusion area boundary are boldly outlined. Details of the site and the plant structures may be found on Figure 2.1-5.

2.1.1.3 Boundaries for Establishing Effluent Limits

The boundary on which limits for the release of radioactive effluents are based is the site boundary shown in Figure 2.1-4b.

2.1.2 Exclusion Area Authority And Control

Due to the large size of the Watts Bar site, the exclusion area boundary is smaller than, and is completely within, the site boundary. The exclusion area is determined by a circle of radius 1200 meters centered on a point 20 feet from the north wall of the turbine building along the building centerline. The exclusion area boundary will be clearly marked on all access roads. The exclusion area is shown on Figure 2.1-4b.

2.1.2.1 Authority

All of the land inside the exclusion area is owned by the United States and in the custody of TVA. TVA controls all activities within the reservation.

2.1.2.2 Control of Activities Unrelated to Plant Operation

There will be no residences, unauthorized commercial operations, or recreational areas within the exclusion area. No public highways or railroads transverse the exclusion area. A portion of the Tennessee River does, however, cross the eastern portion of the exclusion area. This portion of the river is accessible for fishing, pleasure boating, and commercial transportation.

2.1.2.3 Arrangements for Traffic Control

Arrangements have been made and formalized through the Tennessee Multi-jurisdictional Radiological Emergency Plan to establish traffic control responsibilities on the portion of the Tennessee river within the exclusion zone as follows:

(a) Non-commercial traffic - Tennessee Wildlife Resources Agency (TWRA).

(b) Commercial traffic - U.S. Coast Guard (USCG).

2.1.2.4 Abandonment or Relocation of Roads

No public roads cross the exclusion area.

2.1.3 Population Distribution

Historical and projected population information is contained in this section. Both resident and transient populations are included. For 2000, population was based on data from the U.S. Census Bureau, Census of Population, 2000, including block group, block, and census track data. Projections were based on county projections by Woods & Poole.

Economic Analysis Division, Bureau of Economic Analysis, U.S. Department of Commerce, 1992. Subcounty population estimates were prepared using a constant share of the 1990 county total. County Census maps and 1:250,000 topographic maps were used to disegregate sub-county population data into the annular segments.

Considerations included municipal limits, topography, road system, land ownership (e.g., National Forest), and land use (e.g., strip mines).

Transient population consists of two components - recreation visitation and school enrollments. Peak hour visitation to recreation facilities is based on the maximum capacity of the facility plus some overflow. School enrollments for 2008 are from the Tennessee Department of Education Report Card 2008 (http://www.state.tn.us/education/). Projected enrollments are based on projected population growth in the respective counties.

2.1.3.1 Population Within 10 Miles

About 18,900 people lived within 10 miles of the Watts Bar site in 2000, with more than 75% of them between five and 10 miles from the site. Two small towns, Spring City and Decatur, which in 2007 had populations of 2,002 and 1,456 respectively, are located between five and 10 miles from the site. Decatur is south of the site, while Spring City is northwest and north-northwest. Most of the remainder of the area is sparsely populated, especially within five miles of the site. The pattern is expected to continue.

Tables 2.1-1 through 2.1-7 show the estimated and projected population distribution within ten miles of the site for 2000, 2010, 2020, 2030, 2040, 2050, and 2060. Figure 2.1-3 shows the area within ten miles of the site overlaid by circles and sixteen compass sectors.

2.1.3.2 Population Between 10 and 50 Miles

The area between 10 and 50 miles from the site lies mostly in the lower and middle portions of east Tennessee, with small areas in southwestern North Carolina and in northern Georgia. The population of this area is projected to increase by about 62%, or 660,000 persons, between 2000 and 2060. About 71% of this total increase is expected to be in the area between 30 and 50 miles from the site.

The largest urban concentration between 10 and 50 miles is the city of Chattanooga, located to the southwest and south-southwest. This city had a population in 2007 of 169,884; about 80% of this population is located between 40 and 50 miles from the site, while the rest is located beyond 50 miles. The city of Knoxville is located to the east-northeast of the site and is slightly larger than Chattanooga. However, only a small share, less than 10 percent, of its population of 183,546, is located between 40 and 50 miles of the site with the remainder beyond 50 miles.

There are three smaller urban concentrations in this area with population greater than 20,000. The city of Oak Ridge, which had a 2007 population of 27,514, is located about 40 miles to the northeast. The twin cities of Alcoa and Maryville, which had a combined population in 2007 of about 35,300, are located between 45 to 50 miles to the east-northeast. Cleveland, with a 2007 population of 39,200, is located about 30 miles to the south. Most of the population growth is expected to occur around these and the larger population centers.

There are, in addition, a number of smaller communities dispersed throughout the area, surrounded by low-density rural areas.

Tables 2.1-8 through 2.1-14 contain the 2000, 2010, 2020, 2030, 2040,2050, and 2060 population distribution at various distances and directions from the site out to 50 miles. Figure 2.1-2 shows the area within 50 miles of the site overlaid by the circles and 16 compass sectors.

2.1.3.3 Transient Population

Transient population consists of visitors to recreation sites and students in schools. There are no major active industrial facilities or other major employers in the vicinity of the plant.

Recreation--Estimated and projected peak hour visitation to recreation facilities within 10 miles of the plant are contained in Tables 2.1-15 through 2.1-21. The visitation is based on the maximum capacity of facilities plus some overflow. Capacities are based on the TVA data base of recreation facilities in the area. There are no recreation facilities beyond 10 miles which are large enough to cause significant variations in the total population within any annular segment.

Schools--Eight schools are currently located within ten miles of Watts Bar Nuclear Plant. In 2008, these schools served 4,155 students, distributed as shown in Table 2.1-22. Enrollments for 2008 are from the Tennessee Department of Education Report Card 2008 (http://www.state.tn.us/education/). Enrollments at these schools are projected based on county population projections by Woods & Poole.

2.1.3.4 Low Population Zone

The low population zone (LPZ) distance as defined in 10 CFR 100 has been chosen to be three miles (4828 meters). The population of this area (2976 in 2010) and the population density (105 people per square mile in 2010) are both low. Population includes permanent residents (759) and transients (2217) estimates for 2010. Transients are "Peak Hour Recreation Visitors". In addition, this area is of such size that in the unlikely event of a serious accident there is a reasonable probability that appropriate measures could be taken to protect the health and safety of the residents. Specific provisions for the protection of this area are considered in the development of the Watts Bar Nuclear Plant site emergency plan. The present and projected population figures for this area are included in Tables 2.1-1 through 2.1-14. Features of the area within the low population zone distances are shown on Figure 2.1-3.

2.1.3.5 Population Center

The nearest population center (as defined by 10 CFR 100) is Cleveland, Tennessee, which had a 2007 population of 39,200. Cleveland is located approximately 30 miles south of the Watts Bar site.

2.1.3.6 Population Density

Cumulative population around the site out to 30 miles is plotted on Figures 2.1-20 and 2.1-21 for 2010 and 2060 . Also plotted on Figure 2.1-20 is the cumulative population

that would result from a uniform population density of 500 persons per square mile. Figure 2.1-21 contains a similar plot except that it is for a uniform density of 1,000 persons per square mile. For all distances for both years the population around the site is significantly smaller than that based on the uniform population density.

REFERENCES

None.

Table 2.1-1 Watts Bar
2000 Population Distribution
Within 10 Miles of the Site
(Sheet 1 of 1)

	Distance From Site (Miles)						
Direction	**0-1**	**1-2**	**2-3**	**3-4**	**4-5**	**5-10**	**0-10**
N	0	9	0	0	66	1,674	1,749
NNE	0	0	9	200	90	862	1,161
NE	0	0	9	150	140	403	702
ENE	0	0	9	150	140	242	541
E	0	4	210	150	300	1,553	2,217
ESE	0	0	0	13	20	377	410
SE	4	0	0	14	19	406	443
SSE	10	0	0	120	201	614	945
S	8	0	0	0	966	1,863	2,837
SSW	0	0	10	0	0	266	276
SW	0	0	0	0	0	727	727
WSW	0	4	25	41	87	492	649
W	0	10	15	70	62	491	648
WNW	0	0	15	87	55	339	496
NW	0	75	230	260	364	1,837	2,766
NNW	0	0	0	120	85	2,156	2,361
TOTAL	22	102	532	1,375	2,595	14,302	18,928

Table 2.1-2 Watts Bar
2010 Population Distribution
Within 10 Miles Of The Site
(Sheet 1 of 1)

Direction	Distance From Site Miles 0-1	1-2	2-3	3-4	4-5	5-10	0-10
N	0	10	0	0	73	1,863	1,946
NE	0	0	10	223	100	959	1,292
NE	0	0	11	184	171	494	860
ENE	0	0	11	184	171	296	662
E	0	5	257	184	367	1,902	2,715
ESE	0	0	0	16	24	462	502
SE	5	0	0	17	23	497	542
SSE	12	0	0	147	246	752	1,157
S	10	0	0	0	1,183	2,282	3,475
SSW	0	0	12	0	0	326	338
SW	0	0	0	0	0	809	809
WSW	0	4	28	46	97	548	723
W	0	11	17	78	69	546	721
WNW	0	0	17	97	61	377	552
NW	0	83	256	289	405	2,044	3,077
NNW	0	0	0	134	95	2,399	2,628
TOTAL	27	113	619	1,599	3,085	16,556	21,999

Table 2.1-3 Watts Bar
2020 Population Distribution
Within 10 Miles Of The Site
(Sheet 1 of 1)

Direction	Distance From Site Miles 0-1	1-2	2-3	3-4	4-5	5-10	0-10
N	0	11	0	0	81	2,064	2,157
NNE	0	0	11	247	111	1,063	1,432
NE	0	0	14	235	219	630	1,098
ENE	0	0	14	235	219	379	846
E	0	6	329	235	469	2,430	3,468
ESE	0	0	0	20	31	590	641
SE	6	0	0	22	30	635	693
SSE	16	0	0	188	314	961	1,478
S	13	0	0	0	1,511	2,914	4,438
SSW	0	0	16	0	0	416	432
SW	0	0	0	0	0	896	896
WSW	0	5	31	51	107	607	800
W	0	12	18	86	76	605	799
WNW	0	0	18	107	68	418	612
NW	0	92	284	321	449	2,265	3,411
NNW	0	0	0	148	105	2,658	2,911
TOTAL	35	126	735	1,895	3,790	19,531	26,112

Table 2.1-4 Watts Bar
2030 Population Distribution
Within 10 Miles Of The Site
(Sheet 1 of 1)

Direction	Distance From Site Miles 0-1	1-2	2-3	3-4	4-5	5-10	0-10
N	0	12	0	0	90	2,284	2,386
NNE	0	0	12	273	123	1,176	1,584
NE	0	0	17	287	268	770	1,342
ENE	0	0	17	287	268	463	1,035
E	0	8	401	287	574	2,969	4,239
ESE	0	0	0	25	38	721	784
SE	8	0	0	27	36	776	847
SSE	19	0	0	229	384	1,174	1,806
S	15	0	0	0	1,847	3,561	5,423
SSW	0	0	19	0	0	509	528
SW	0	0	0	0	0	992	992
WSW	0	5	34	56	119	671	885
W	0	14	20	96	85	670	885
WNW	0	0	20	119	75	463	677
NW	0	102	314	355	497	2,507	3,775
NNW	0	0	0	164	116	2,942	3,222
TOTAL	42	141	854	2,205	4,520	22,648	30,410

Table 2.1-5 Watts Bar
2040 Population Distribution
Within 10 Miles Of The Site
(Sheet 1 of 1)

Direction	Distance From Site Miles 0-1	1-2	2-3	3-4	4-5	5-10	0-10
N	0	13	0	0	96	2,432	2,541
NNE	0	0	13	291	131	1,252	1,687
NE	0	0	20	326	304	875	1,525
ENE	0	0	20	326	304	525	1,175
E	0	9	456	326	651	3,370	4,812
ESE	0	0	0	28	43	818	889
SE	9	0	0	30	41	881	961
SSE	22	0	0	260	436	1,333	2,051
S	17	0	0	0	2,096	4,043	6,156
SSW	0	0	22	0	0	577	599
SW	0	0	0	0	0	1,056	1,056
WSW	0	6	36	60	126	715	943
W	0	15	22	102	90	713	942
WNW	0	0	22	126	80	492	720
NW	0	109	334	378	529	2,669	4,019
NNW	0	0	0	174	123	3,132	3,429
TOTAL	48	152	945	2,427	5,050	24,883	33,505

Table 2.1-6 Watts Bar
2050 Population Distribution
Within 10 Miles Of The Site
(Sheet 1 of 1)

Direction	Distance From Site Miles 0-1	1-2	2-3	3-4	4-5	5-10	0-10
N	0	14	0	0	103	2,616	2,733
NNE	0	0	14	313	141	1,347	1,815
NE	0	0	22	370	346	995	1,733
ENE	0	0	22	370	346	597	1,335
E	0	10	518	370	740	3,833	5,471
ESE	0	0	0	32	49	931	1,012
SE	10	0	0	35	47	1,002	1,094
SSE	25	0	0	296	496	1,516	2,333
S	20	0	0	0	2,384	4,598	7,002
SSW	0	0	25	0	0	657	682
SW	0	0	0	0	0	1,136	1,136
WSW	0	6	39	64	136	769	1,014
W	0	16	23	109	97	767	1,012
WNW	0	0	23	136	86	530	775
NW	0	117	359	406	569	2,871	4,322
NNW	0	0	0	188	133	3,369	3,690
TOTAL	55	163	1,045	2,689	5,673	27,534	37,159

Table 2.1-7 Watts Bar
2060 Population Distribution
Within 10 Miles Of The Site
(Sheet 1 of 1)

Direction	Distance From Site Miles 0-1	1-2	2-3	3-4	4-5	5-10	0-10
N	0	15	0	0	110	2,800	2,925
NNE	0	0	15	335	151	1,442	1,943
NE	0	0	25	415	387	1,115	1,942
ENE	0	0	25	415	387	669	1,496
E	0	11	581	415	830	4,296	6,133
ESE	0	0	0	36	55	1,043	1,134
SE	11	0	0	39	53	1,123	1,226
SSE	28	0	0	332	556	1,698	2,614
S	22	0	0	0	2,672	5,154	7,848
SSW	0	0	28	0	0	736	764
SW	0	0	0	0	0	1,216	1,216
WSW	0	7	42	69	146	823	1,087
W	0	17	25	117	104	821	1,084
WNW	0	0	25	146	92	567	830
NW	0	125	385	435	609	3,073	4,627
NNW	0	0	0	201	142	3,607	3,950
TOTAL	61	175	1,151	2,955	6,294	30,183	40,819

Table 2.1-8 Watts Bar
2000 Population Distribution
Within 50 Miles Of The Site
(Sheet 1 of 1)

Direction	0-10	10-20	20-30	30-40	40-50	Total
N	1,749	1,259	1,602	3,132	4,475	12,217
NNE	1,161	9,604	15,206	10,307	1,790	38,068
NE	702	2,941	13,742	22,022	55,634	95,041
ENE	541	2,493	16,128	36,931	154,413	210,506
E	2,217	7,598	11,798	16,630	23,599	61,842
ESE	410	4,782	13,201	3,306	2,247	23,946
SE	443	15,239	11,527	2,936	3,353	33,498
SSE	945	6,871	10,259	2,397	26,218	46,690
S	2,837	3,164	29,107	38,758	11,403	85,269
SSW	276	2,789	34,031	37,215	92,251	166,562
SW	727	9,365	12,610	52,880	97,063	172,645
WSW	649	8,946	2,067	2,031	2,744	16,437
W	648	2,409	4,083	2,270	4,300	13,710
WNW	496	1,515	3,055	4,424	15,262	24,752
NW	2,766	1,874	10,487	6,066	11,383	32,576
NNW	2,361	900	19,046	6,533	4,450	33,290
TOTAL	18,928	81,749	207,949	247,838	510,585	1,067,049

Table 2.1-9 Watts Bar
2010 Population Distribution
Within 50 Miles Of The Site
(Sheet 1 of 1)

Direction	0-10	10-20	20-30	30-40	40-50	Total
N	1,947	1,499	1,733	3,388	4,841	13,407
NNE	1,292	10,080	15,960	10,818	1,936	40,087
NE	860	3,087	14,423	23,114	60,063	101,547
ENE	663	3,075	19,892	45,550	175,297	244,276
E	2,716	8,191	13,656	19,249	28,719	72,531
ESE	502	5,155	15,280	3,827	2,601	27,365
SE	543	16,1428	13,342	3,398	3,427	37,138
SSE	1,158	7,407	11,059	2,584	29,017	51,225
S	3,475	3,411	32,214	42,895	12,620	94,615
SSW	338	2,867	31,982	38,255	94,830	171,272
SW	809	10,423	12,962	54,358	110,380	188,932
WSW	722	9,956	2,351	2,310	3,120	18,459
W	721	2,601	4,210	2,340	4,433	14,306
WNW	552	1,636	3,150	4,561	16,614	26,513
NW	3,078	2,231	11,416	6,603	12,391	35,720
NNW	2,628	1,072	22,678	7,779	4,929	39,084
TOTAL	22,003	89,118	229,308	271,030	565,218	1,176,677

Table 2.1-10 Watts Bar
2020 Population Distribution
Within 50 Miles Of The Site
(Sheet 1 of 1)

	Distance From Site Miles					
Direction	**0-10**	**10-20**	**20-30**	**30-40**	**40-50**	**Total**
N	2,157	1736	1931	3,776	5,395	14,995
NNE	1,432	10,671	16,895	11,452	2,158	42,608
NE	1,098	3,268	15,269	24,469	67,259	111,362
ENE	846	3,696	23,913	54,758	198,719	281,932
E	3,468	8,684	14,840	20,918	34,692	82,602
ESE	641	5,465	16,605	4,158	2,826	29,696
SE	693	17,416	14,499	3,693	3,630	39,931
SSE	1,478	7,853	11,725	2,739	32,182	55,978
S	4,438	3,616	35,728	47,575	13,997	105,355
SSW	432	2,979	36,346	39,747	98,527	178,030
SW	896	11,547	13,468	56,477	114,879	197,268
WSW	800	11,031	2,446	2,404	3,248	19,929
W	799	2,773	4,534	2,521	4,775	15,401
WNW	612	1,744	3,392	4,912	17,849	28,509
NW	3,411	2,584	12,265	7,094	13,313	38,666
NNW	2,911	1,241	26,262	9,008	5,293	44,716
TOTAL	26,113	96,304	250,119	295,702	618,741	1,286,979

Table 2.1-11 Watts Bar
2030 Population Distribution
Within 50 Miles Of The Site
(Sheet 1 of 1)

Direction	0-10	10-20	20-30	30-40	40-50	Total
N	2,387	1,990	2,148	4,199	5,999	16,723
NNE	1,584	11,347	17,966	12,178	2,400	45,475
NE	1,342	3,475	16,236	26,019	75,084	122,156
ENE	1,034	4,358	28,195	64,563	244,050	322,200
E	4,238	9,269	16,170	22,793	41,046	93,516
ESE	784	5,834	18,093	4,531	3,080	32,322
SE	847	18,590	15,799	4,024	3,871	43,131
SSE	1,807	8,382	12,515	2,924	35,644	61,272
S	5,423	3,860	39,571	52,692	15,502	117,048
SSW	528	3,124	38,123	41,689	103,342	186,806
SW	992	12,779	14,126	59,238	120,676	207,811
WSW	886	12,207	2,570	2,525	3,412	21,600
W	884	2,975	4,907	2,728	5,167	16,661
WNW	677	1,871	3,671	5,316	19,479	31,014
NW	3,774	2,962	13,385	7,742	14,528	42,391
NNW	3,222	1,422	30,099	10,324	5,715	50,782
TOTAL	30,409	104,445	273,574	323,485	678,995	1,410,908

Table 2.1-12 Watts Bar
2040 Population Distribution
Within 50 Miles Of The Site
(Sheet 1 of 1)

Direction	0-10	10-20	20-30	30-40	40-50	Total
N	2,541	2,218	2,281	4,460	6,373	17,873
NNE	1,687	11,747	18,599	12,607	2,549	47,189
NE	1,524	3,597	16,808	26,935	80,896	129,760
ENE	1,174	4,918	31,814	72,849	244,656	355,411
E	4,811	9,773	17,518	24,692	46,384	103,178
ESE	890	6,151	19,601	4,909	3,336	34,887
SE	961	19,601	17,155	4,359	3,985	46,021
SSE	2,051	8,838	13,196	3,083	38,513	65,681
S	6,157	4,070	42,757	56,934	16,750	126,668
SSW	599	3,215	39,231	42,901	106,346	192,292
SW	1,056	13,605	14,537	60,959	127,447	217,604
WSW	943	12,996	2,714	2,667	3,603	22,923
W	941	3,150	4,984	2,771	5,249	17,095
WNW	721	1,981	3,729	5,400	19,945	31,776
NW	4,018	3,302	13,705	8,129	14,875	44,029
NNW	3,430	1,586	33,560	11,512	6,092	56,180
TOTAL	33,504	110,748	292,149	345,167	726,999	1,508,567

Table 2.1-13 Watts Bar
2050 Population Distribution
Within 50 Miles Of The Site
(Sheet 1 of 1)

Direction	0-10	10-20	20-30	30-40	40-50	Total
N	2,733	2,457	2,452	4,795	6,851	19,288
NNE	1,814	12,275	19,435	13,174	2,740	49,438
NE	1,733	3,759	17,564	28,147	87,451	138,654
ENE	1,335	5,522	35,726	81,809	267,271	391,663
E	5,472	10,308	18,878	26,610	52,132	113,400
ESE	1,012	6,488	21,123	5,290	3,569	37,509
SE	1,093	20,674	18,445	4,698	4,151	49,061
SSE	2,333	9,322	13,918	3,252	41,612	70,437
S	7,002	4,293	46,197	61,515	18,098	137,105
SSW	681	3,325	40,575	44,371	109,989	198,941
SW	1,136	14,635	15,035	63,048	134,126	227,980
WSW	1,014	13,980	2,865	2,807	3,792	24,449
W	1,013	3,335	5,204	2,893	5,480	17,925
WNW	775	2,097	3,894	5,638	21,002	33,406
NW	4,323	3,658	14,431	8,560	16,063	47,035
NNW	3,690	1,757	37,176	12,752	6,490	61,865
TOTAL	37,159	117,885	312,909	369,359	780,844	1,618,156

Table 2.1-14 Watts Bar
2060 Population Distribution
Within 50 Miles Of The Site
(Sheet 1 of 1)

Direction	0-10	10-20	20-30	30-40	40-50	Total
N	2,926	2,696	2,624	5,129	7,329	20,704
NNE	1,942	12,804	20,272	13,741	2,931	51,690
NE	1,942	3,921	18,320	29,359	94,005	147,547
ENE	1,497	6,127	39,639	90,768	289,886	427,917
E	6,133	10,843	20,239	28,528	57,880	123,623
ESE	1,134	6,824	22,646	5,671	3,855	40,130
SE	1,225	21,748	19,774	5,037	4,317	52,101
SSE	2,614	9,806	14,641	3,421	44,711	75,193
S	7,848	4,515	49,638	66,097	19,446	147,544
SSW	763	3,435	41,919	45,841	113,633	205,591
SW	1,216	15,666	15,533	65,136	140,806	238,357
WSW	1,086	14,965	2,999	2,946	3,981	25,977
W	1,084	3,519	5,424	3,016	5,712	18,755
WNW	830	2,213	4,058	5,877	22,060	35,038
NW	4,627	4,014	15,544	8,991	16,872	50,048
NNW	3,949	1,928	40,792	13,992	6,888	67,549
TOTAL	40,816	125,024	334,062	393,550	834,312	1,727,764

Table 2.1-15 Watts Bar
2009 Estimated Peak Recreation Visitation
Within 10 Miles Of The Site
(Sheet 1 of 1)

	Distance Miles						
Direction	**0-1**	**1-2**	**2-3**	**3-4**	**4-5**	**5-10**	**0-10**
N	450	0	0180	0	0	0	630
NNE	130	0	175	0	125	630	1,060
NE	125	0	180	0	1,250	1,702	3,257
ENE	125	125	290	120	120	0	780
E	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	115	0	0	140	0	0	255
SSW	0	40	0	0	110	480	630
SW	0	115	110	0	0	115	340
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	2,125	2,125
NNW	0	0	0	0	0	1,032	1,032
TOTAL	945	280	935	260	1,605	6,084	10,109

Table 2.1-16 Watts Bar
2010 Estimated Peak Recreation Visitation
Within 10 Miles Of The Site
(Sheet 1 of 1)

	Distance Miles						
Direction	**0-1**	**1-2**	**2-3**	**3-4**	**4-5**	**5-10**	**0-10**
N	462	0	185	0	0	0	647
NNE	133	0	180	0	128	646	1,087
NE	128	0	185	0	1,282	1,746	3,341
ENE	128	128	298	123	123	0	800
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	118	0	0	144	0	0	262
SSW	0	41	0	0	113	492	646
SW	0	118	113	0	0	118	349
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	2,180	2,180
NNW	0	0	0	0	0	1,059	1,059
TOTAL	969	287	961	267	1,646	6,241	10,371

Table 2.1-17 Watts Bar
2020 Estimated Peak Recreation Visitation
Within 10 Miles Of The Site
(Sheet 1 of 1)

Direction	Distance Miles 0-1	1-2	2-3	3-4	4-5	5-10	0-10
N	508	0	203	0	0	0	711
NNE	147	0	198	0	141	712	1,198
NE	141	0	203	0	1,412	1,923	3,679
ENE	141	141	328	136	136	0	882
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	130	0	0	158	0	0	288
SSW	0	45	0	0	124	542	711
SW	0	130	124	0	0	130	384
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	2,401	2,401
NNW	0	0	0	0	0	1,166	1,166
TOTAL	1,067	316	1,056	294	1,813	6,874	11,420

Table 2.1-18 Watts Bar
2030 Estimated Peak Recreation Visitation
Within 10 Miles Of The Site
(Sheet 1 of 1)

Direction	Distance Miles 0-1	1-2	2-3	3-4	4-5	5-10	0-10
N	560	0	224	0	0	0	784
NNE	162	0	218	0	156	784	1,320
NE	156	0	224	0	1,556	2,119	4,055
ENE	156	156	361	149	149	0	971
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	143	0	0	174	0	0	317
SSW	0	50	0	0	137	598	785
SW	0	143	137	0	0	143	423
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	2,645	2,645
NNW	0	0	0	0	0	1,285	1,285
TOTAL	1,177	349	1,164	323	1,998	7,574	12,585

Table 2.1-19 Watts Bar
2040 Estimated Peak Recreation Visitation
Within 10 Miles Of The Site
(Sheet 1 of 1)

Direction	Distance Miles 0-1	1-2	2-3	3-4	4-5	5-10	0-10
N	581	0	232	0	0	0	813
NNE	168	0	226	0	161	813	1,368
NE	161	0	232	0	1,614	2,197	4,204
ENE	161	161	374	155	155	0	1,006
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	148	0	0	181	0	0	329
SSW	0	52	0	0	142	620	814
SW	0	148	142	0	0	148	438
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	2,743	2,743
NNW	0	0	0	0	0	1,332	1,332
TOTAL	1,219	361	1,206	336	2,072	7,853	13,047

Table 2.1-20 Watts Bar
2050 Estimated Peak Recreation Visitation
Within 10 Miles Of The Site
(Sheet 1 of 1)

	Distance Miles						
Direction	**0-1**	**1-2**	**2-3**	**3-4**	**4-5**	**5-10**	**0-10**
N	621	0	248	0	0	0	869
NNE	179	0	241	0	172	869	1,461
NE	172	0	248	0	1,724	2,347	4,491
ENE	172	172	400	166	166	0	1,076
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	159	0	0	193	0	0	352
SSW	0	55	0	0	152	662	869
SW	0	159	152	0	0	159	470
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	2,931	2,931
NNW	0	0	0	0	0	1,423	1,423
TOTAL	1,303	386	1,289	359	2,214	8,391	13,942

Table 2.1-21 Watts Bar
2060 Estimated Peak Recreation Visitation
Within 10 Miles Of The Site
(Sheet 1 of 1)

	Distance Miles						
Direction	**0-1**	**1-2**	**2-3**	**3-4**	**4-5**	**5-10**	**0-10**
N	661	0	264	0	0	0	925
NNE	191	0	257	0	184	926	1,558
NE	184	0	264	0	1,837	2,501	4,786
ENE	184	184	426	176	176	0	1,146
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	169	0	0	206	0	0	375
SSW	0	59	0	0	162	705	926
SW	0	169	162	0	0	169	500
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	3,122	3,122
NNW	0	0	0	0	0	1,516	1,516
TOTAL	1,389	412	1,373	382	2,359	8,939	14,854

Table 2.1-22 School Enrollments Within 10 Miles of Watts Bar Nuclear Plant

School Name	Location	Enrollment						
		2008	2010	2020	2030	2040	2050	2060
Meigs South Elementary	S 5-10	418	442	565	691	784	892	999
Meigs North Elementary	S 5-10	437	463	591	772	820	932	1045
Meigs Middle	S 5-10	399	422	539	659	748	851	954
Meigs County High	S 5-10	534	565	722	882	1001	1139	1276
Rhea County High	WSW 5-10	1,405	1,434	1,589	1758	1872	2014	2156
Spring City Elementary	NW 5-10	633	646	716	792	843	907	971
Spring City Middle	NW 5-10	309	315	349	387	412	443	474
Evensville Center	WSW 5-10	20	20	23	25	27	29	31
Total		4,155	4,307	5,094	5,916	6,507	7,207	7,906

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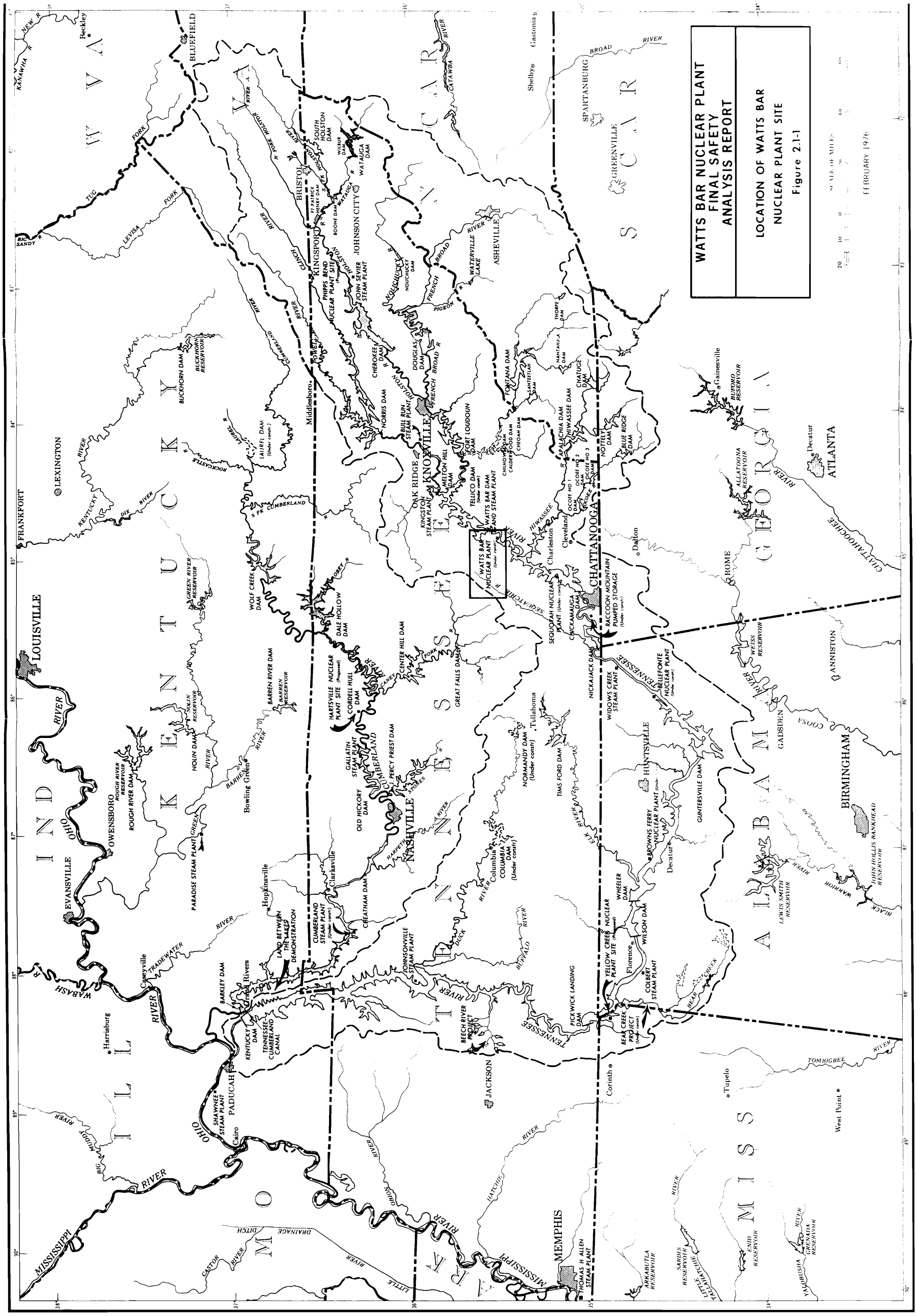

Figure 2.1-1 Location of Watts Bar Nuclear Plant Site

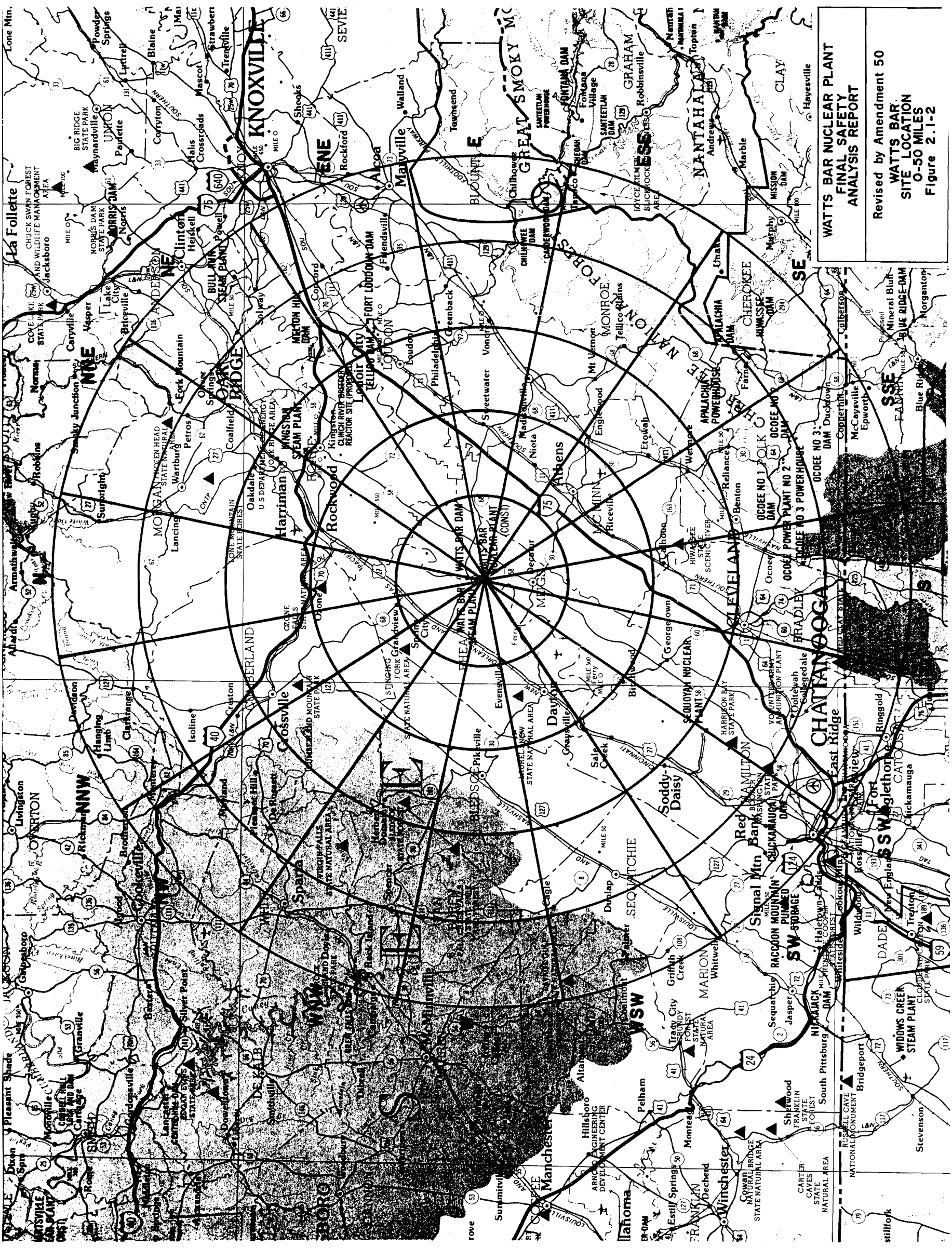

Figure 2.1-2 Watts Bar Site Location 0-50 Miles

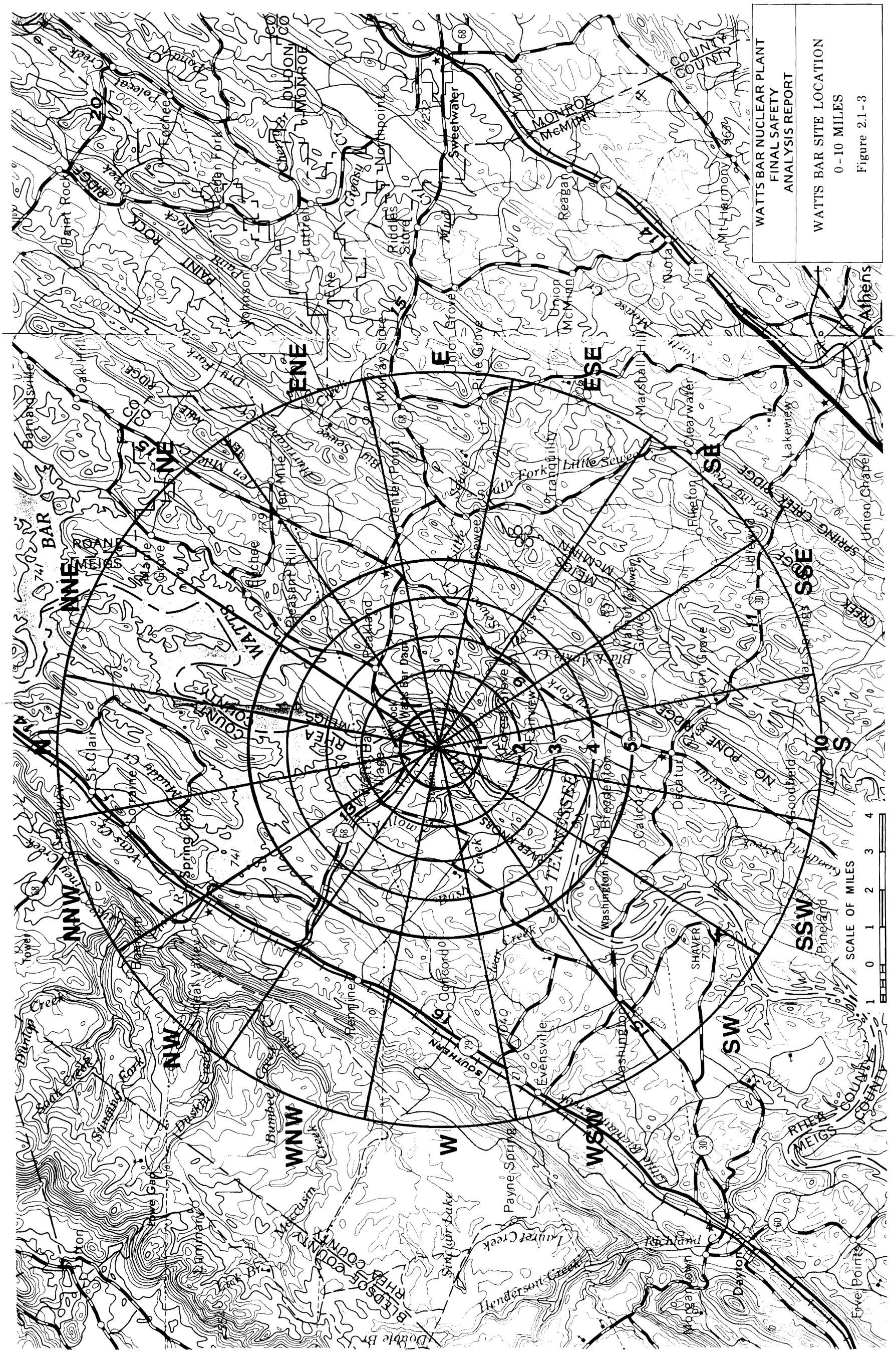

Figure 2.1-3 Watts Bar Site Location 0-10 Miles

Figure 2.1-4a Watts Bar Topographic Map & Reservation Boundary

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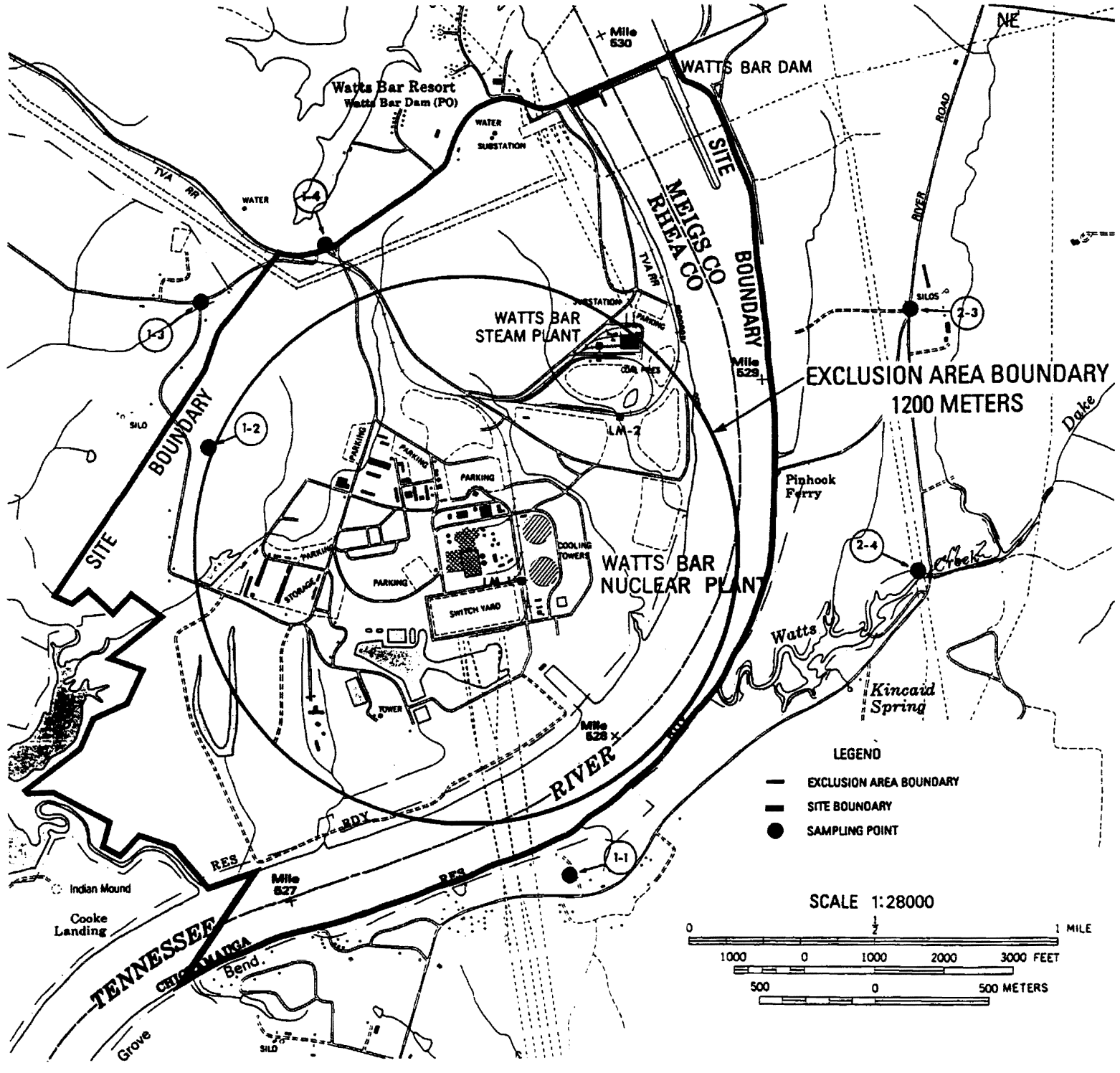
WATTS BAR NUCLEAR PLANT



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WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SITE BOUNDARY/
EXCLUSION AREA BOUNDARY
FIGURE 2.1-4b

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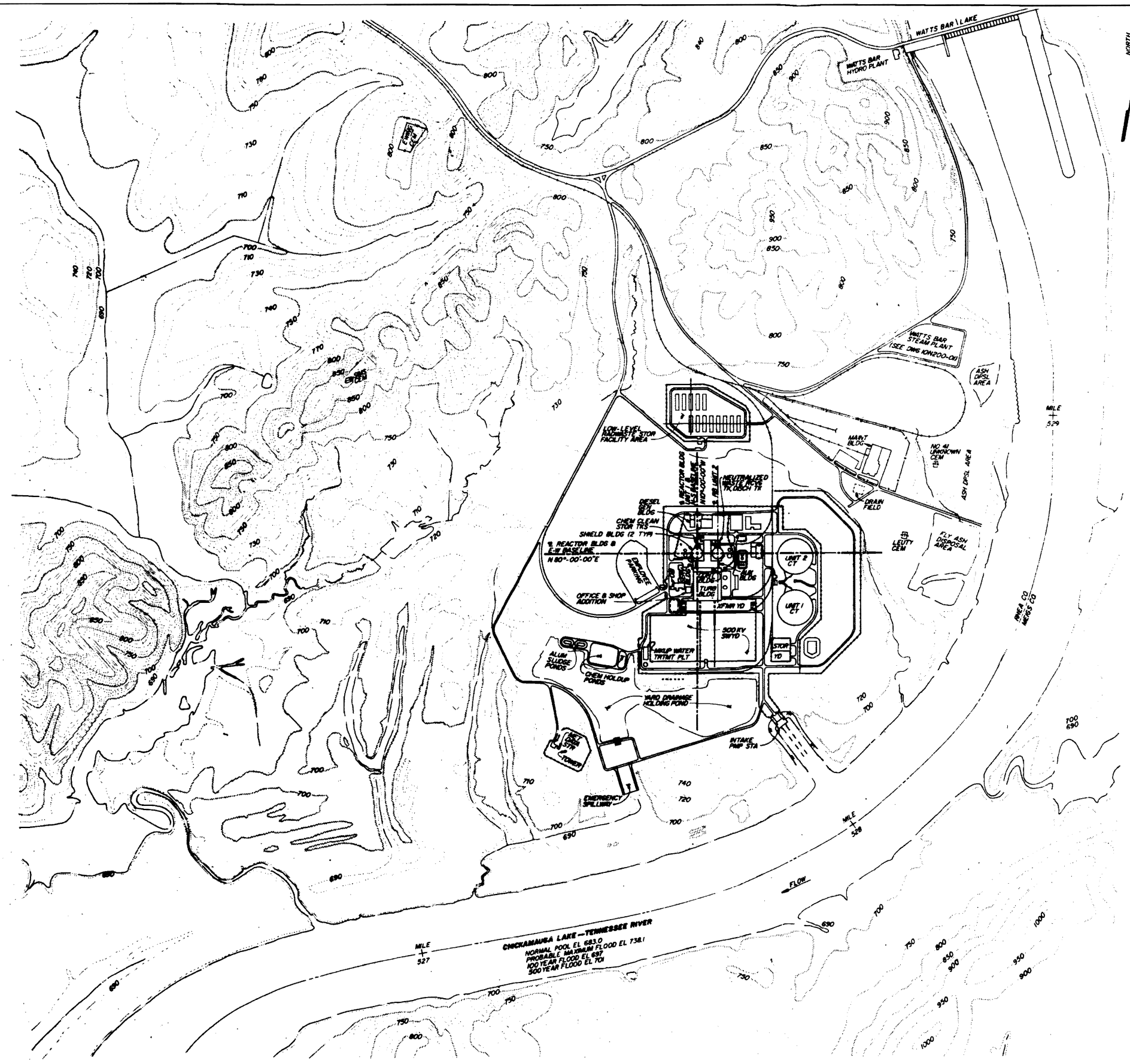
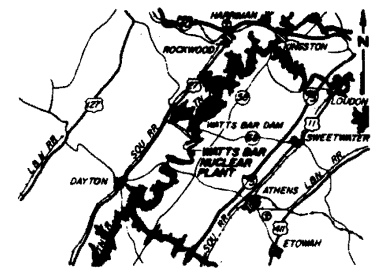
Figure 2.1-4b Site Boundary / Exclusion Area Boundary





LOCALITY MAP

1"=10 MILE 0 10 20

NOTES:

1. TOPOGRAPHY TRACED FROM REDUCED KELSH PLOTTED FROM FEBURARY 1980 AERIAL PHOTOGRAPHS AND USGS-TVA 7.5 MINUTE QUADRANGLE, I I8-SE (DECATUR, TN). CONTOUR INTERVAL SHOWN IS 10 FEET.
2. THE TENNESSEE STATE RECTANGULAR COORDINATES AT THE INTERSECTION OF THE N-S AND E-W BASELINES ARE NORTH 443,000.00 AND EAST 2,159,680.00.
3. FOR TEMPORARY AND PROPOSED FEATURES SEE DWG 10N209-01.
4. SHIELD BLDG IS EQUIVALENT TO REACTOR BLDG.

REVISED BY AMENDMENT 72

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

MAIN PLANT
GENERAL PLAN
TVA DWG NO. 10E200-01
FIGURE 2.1-5

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Figure 2.1-5 Main Plant General Plan

Figure 2.1-6 Deleted by Amendment 63

Figure 2.1-7 Deleted by Amendment 63

Figure 2.1-8 Deleted by Amendment 63

Figure 2.1-9 Deleted by Amendment 63

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Figure 2.1-13 Deleted by Amendment 63

Figure 2.1-14 Deleted by Amendment 63

Figure 2.1-15 Deleted by Amendment 63

Figure 2.1-16 Deleted by Amendment 63

Figure 2.1-17 Deleted by Amendment 63

Figure 2.1-18 Deleted by Amendment 63

Figure 2.1-19 Deleted by Amendment 63

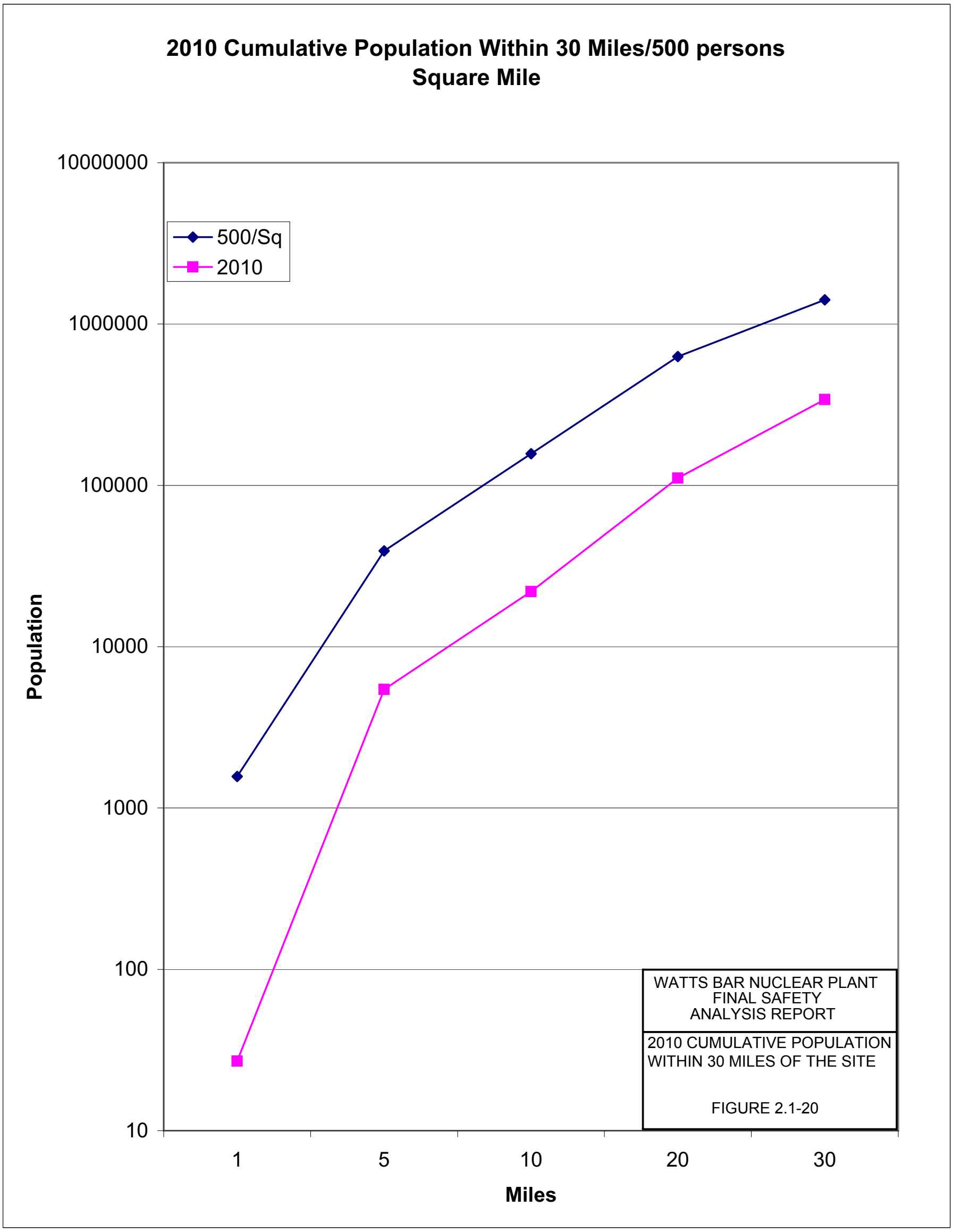

Figure 2.1-20 2010 Cumulative Population Within 30 Miles/ 500 persons per Square Mile

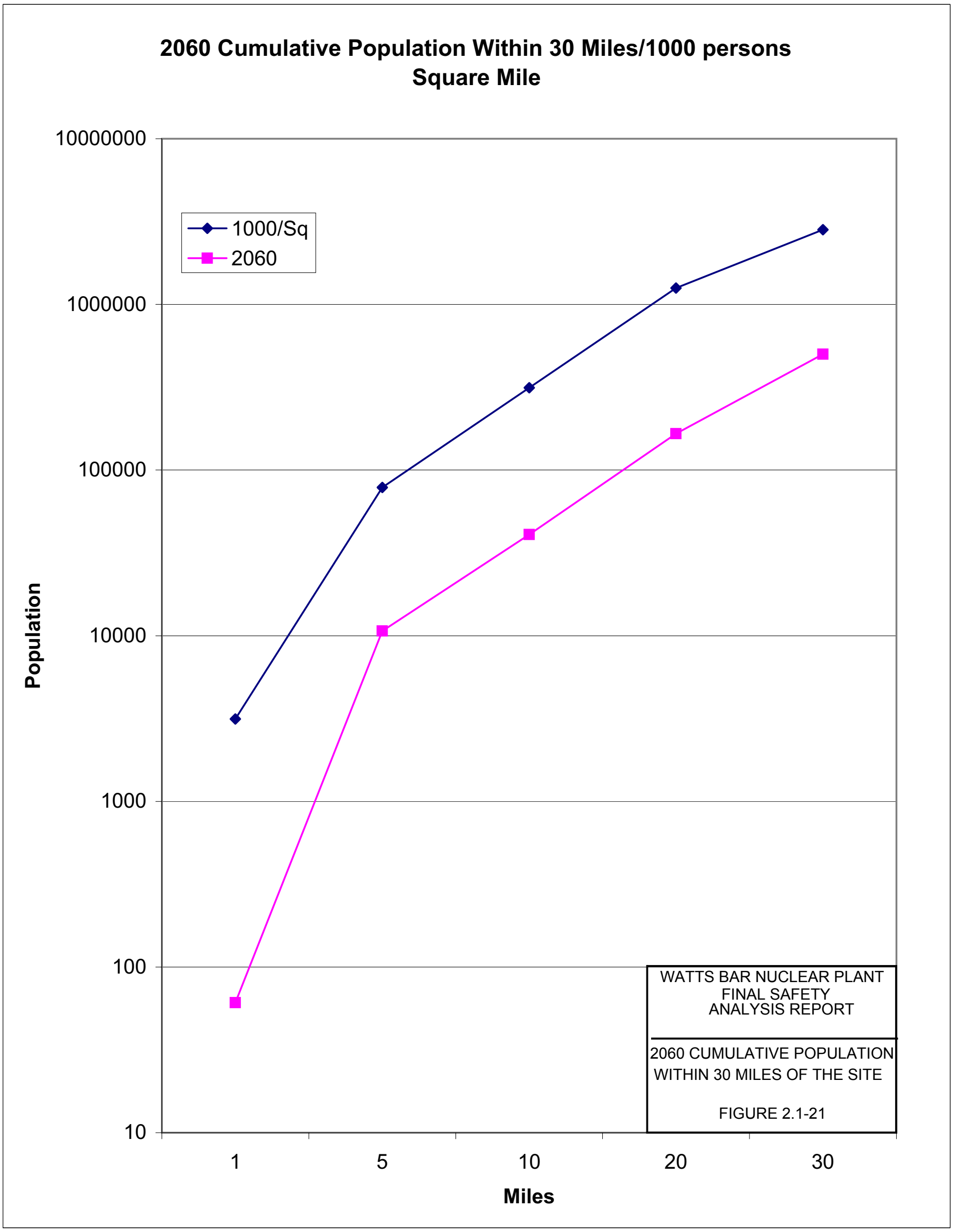

Figure 2.1-21 2060 Cumulative Population Within 30 Miles/ 1000 persons per Square Mile

2.2 NEARBY INDUSTRIAL, TRANSPORTATION, AND MILITARY FACILITIES

2.2.1 Location and Route

Maps showing the area are found on Figures 2.1-2 and 2.1-3. The only significant nearby industrial facility is the Watts Bar Steam Plant.

The nearest land transportation route is State Route 68, about one mile north of the Site. The Tennessee River is navigable past the site.

A main line of the CNO&TP (Norfolk Southern Corporation) is located approximately 7 miles west of the site. A TVA railroad spur track connects with this main line and serves the Watts Bar Steam Plant and Watts Bar Nuclear Plant. The spur has fallen into disuse and would need to be repaired prior to use.

No other significant industrial land use, military facilities, or transportation routes are in the vicinity of the nuclear plant.

2.2.2 Descriptions

2.2.2.1 Description of Facilities

The Watts Bar Steam Plant is a coal-fired electric generating facility with a total capacity of 240,000 kW which during normal operation has about 100 employees. The plant is not currently operating, but could be reactivated in the future.

The Tennessee River is a major barge route in which a 9-foot navigation channel is maintained.

2.2.2.2 Description of Products and Materials

Table 2.2-1 shows the total amount of certain hazardous materials shipped past the Watts Bar Nuclear Plant from 2002 to 2007 on a yearly basis. Total traffic past the site was 670,716 tons in 2008 compared to 1,294,959 tons in 1990 and to 760,000 tons in 1975.

Traffic on the TVA railroad spur consisted of heavy components for the nuclear plant. If Watts Bar Steam Plant were reactivated, the spur would also be used for the delivery of heavy components and coal to it.

2.2.2.3 Pipelines

No pipelines carrying petroleum products are located in the vicinity of the nuclear plant.

2.2.2.4 Waterways

The Watts Bar Nuclear Plant site is located on a 9-foot navigable channel on Chickamauga Reservoir. Its intake structure is located approximately two miles downstream of Watts Bar Lock and Dam. Watts Bar lock is located on the left bank of the Tennessee River with dimensions of 60' wide x 360' long. Towboat sizes vary from 1500 to 1800 horsepower for this section of the Tennessee River (Chattanooga to

Knoxville). The most common type barge using the water way is the 35'x 195' jumbo barge with 1,500 ton capacity. There were also numerous liquid cargo (tank) barges of varying size with capacity to 3,000 tons.

2.2.2.5 Airports

No airports are located within 10 miles of the site. Mark Anton airport is the nearest, 11 to 12 miles southwest of the site. Its longest runway is 4,500 feet and is hard surfaced. It has no commercial facilities. Lovell Field about 45 miles south-southwest is the nearest airfield with commercial facilities. The annual number of movements per year is about 62,000 for Lovell Field and about 4,000 at Mark Anton of which 1,300 are student pilots executing "touch and go's".

Figures 2.2-1 and 2.2-2 show the plant in relation to civilian and military airways, respectively. Traffic on airway V51 totals fewer than 2,000 flights per year based on 2008 data.

2.2.2.6 Projections of Industrial Growth

Within five miles of the Watts Bar Nuclear Plant are two major potential industrial sites. Three-to-five miles southwest of the plant is a 3,000 acre tract and about 3 miles north is a 200 acre tract. The 3,000 acre site is currently under the ownership of the Mead Corporation. A site impact analysis for the possible development of a paper plant has been performed on the site. However, the Mead Corporation has withdrawn its application to build the plant and there are no immediate or future plans for development. The 200 acre tract is still undeveloped and there are no immediate or future plans for development of the site.

2.2.3 Evaluation of Potential Accidents

None of the activities being performed in the vicinity of the site are considered to be a potential hazard to the plant.

A study of the products and materials transported past the site by barge reveals that no potential explosion hazard exists. The worst potential condition for onsite essential safety features other than the intake pumping station arising from an accident involving the products transported near the site (coal, fuel oil, asphalt, tar and pitches) would be the generation of smoke by the burning of these products. The hazard to the Main Control Room from the generation of smoke from these products is covered in Section 6.4.4.2.

Gasoline supply to Knoxville is via pipeline. As specified in Section 2.2.2.3, this pipeline is not in the vacinity of the Watts Bar Nuclear Plant. As of 1974, with the pipeline in full operation, no future gasoline barge shipments past the Watts Bar Nuclear Plant site are expected. The potential for damage to the Watts Bar Nuclear Plant from a gasoline barge explosion is therefore negligible.

Fuel oil is shipped by barge past the Watts Bar Nuclear Plant Site. In case of a fuel oil barge accident, fire and dense smoke may result. Neither fire or dense smoke will effect plant safety, however.

The intake pumping station is protected against fire by virtue of design and location. Pump suction is taken from the bottom of the channel. All pumps and essential cables and instruments are protected from fire by being enclosed within concrete walls. Also, the embayment is just downstream of the Watts Bar Dam, which is locked on the opposite side of the Tennessee River. Consequently, any oil released to the river would be swept by the current past the embayment that leads to the intake pumping station due to the fact that the embayment is located on the inside of a bend in the Tennessee River.

Even if fuel oil from a spill should enter the embayment and reach the intake pumping station, the oil would have no significant effect on the water intake system or the systems it serves. Entry of oil in the intake is unlikely since the oil will float on water. A concrete skimmer wall exists at the pumping station and the pumps take suction approximately 20 feet below the minimum normal water level. The pump suction would be approximately 10 feet below the water surface even in the event of failure of the downstream dam. Any oil that did enter the pumps would be highly diluted and in such a state would have a minor effect on system piping losses and heat exchanger capabilities.

2.2.3.1 References

None.

Table 2.2-1 Waterborne Hazardous Material Traffic (Tons)
(U.S. Army Corps of Engineers)
2002-2007
Sheet 1 of 1)

COMMODITIES	2002	2003	2004	2005	2006	2007
Ammonium Nitrate Fertilizers			3110			
Carbon (Including Carbon Black), NEC	15232	7605	1348	1518		
Ethyl Alcohol (Not Denatured) 80% or More Alcohol	137147	118594	137464	133412	76993	8947
Fuel Oils, NEC			3400			7209
Lubrication Petroleum Oils from Petrol & Bitum Mineral				12732		
Other Light Oils from Petroleum & Bitum Minerals						9120
Petro.Bitumen, Petro.Coke, Asphalt, Butumen mixes, NEC	1531	12708	25183	11437	3148	71061
Petroleum Oils/Oils from Bituminous Minerals, Crude				6674		
Pitch & Pitch Coke from Coal Tar/Other Mineral Tars	248986	258584	236716	254001	235381	164752
Vermiculite, Perlite, Chlorites			1642		1643	
Grand Total	402896	397491	408863	419774	317165	261089

Table 2.2-2 Deleted by Amendment 94

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Figure 2.2-1 Airways in the Area of the Plant

Figure 2.2-2 Military Airways in the Area of the Plant

2.3 METEOROLOGY

2.3.1 Regional Climate

2.3.1.1 Data Sources

Most of the climatic data summaries and other publications used in describing the site region meteorology are included in the list of references for Section 2.3. Those used in a general way not specifically referenced are the following: (1) U.S. Department of Commerce, Normal Weather Charts for the Northern Hemisphere, U. S. Weather Bureau, Technical Paper No. 21, October 1952, and (2) U.S. Department of Commerce, Climatic Atlas of the United States, Environmental Science Services Administration, Environmental Data Service, June 1968.

2.3.1.2 General Climate

The Watts Bar site is in the eastern Tennessee portion of the southern Appalachian region. This area is dominated much of the year by the Azores-Bermuda anticyclonic circulation shown in the annual normal sea level pressure distribution (Figure 2.3-1).[1] This dominance is most pronounced in late summer and early fall and is accompanied by extended periods of fair weather and widespread atmospheric stagnation. [2] In winter and early spring, the normal circulation becomes diffuse over the region as eastward moving migratory high- or low-pressure systems, identified with the mid-latitude westerly upper air circulation, bring alternately cold and warm air masses into the Watts Bar site area with resultant changes in wind, atmospheric stability, precipitation, and other meteorological elements. In the summer and early fall, the migratory systems are less frequent and less intense. Frequent incursions of warm, moist air from the Gulf of Mexico and occasionally from the Atlantic Ocean are experienced in the summer.

The site is primarily influenced by cyclones from the Southwest and Gulf Coast that translate toward the Northeast U.S. Coast by passing along either the west side or the east side of the Appalachian chain and by cyclones from the Plains or Midwest that move up the Ohio Valley. Topography around the site strongly influences the local climate. Mountain ranges located both northwest and southeast of the site, which is in the upper Tennessee River Valley, are oriented generally northeast-southwest and rise 3,000 to 4,000 feet MSL and, in places, 5,000 to 6,000 feet MSL. The latter elevations are in the Great Smoky Mountains to the east and southeast. They provide an orographic barrier that reduces the low-level atmospheric moisture from the Atlantic Ocean brought into the area by winds from the East. However, considerable low-level atmospheric moisture from the Gulf of Mexico is often brought into the area by winds from the south, southwest, or west.

The predominant air masses affecting the site area may be described as interchangeably continental and maritime in the winter and spring, maritime in the summer, and continental in the fall. Temperature patterns generally conform to the seasonal trends typical of continental, humid subtropical climates. Precipitation is normally well distributed throughout the year, but monthly amounts are generally

largest in the winter and early spring and smallest in the late summer and fall. The primary maximum occurs in March and is associated with cyclones passing through or near the region. A secondary maximum of precipitation occurs in July and is characteristically the result of diurnal thunderstorms occurring most frequently in the afternoon and evening. The minimum monthly precipitation normally occurs in October. Snow and sleet usually occur only during the period November through March and generally result from cold air pushing southward through the area against relatively warm, moist air.

2.3.1.3 Severe Weather

Severe storms are relatively infrequent in east Tennessee, being east of the area of major tornadic activity, south of nearly all storms producing blizzard conditions, and too far inland to be affected often by the remnants of intense tropical cyclones. Damage from such remnants of tropical cyclones is rare, occurring only about once every 18 years, and is generally restricted to flood effects from heavy rains.[3]

The probability that a tornado will strike the Watts Bar site is low. During the period 1950-2009 (when climatological records are fairly complete) there were 38 tornadoes within 30 miles of the Watts Bar site, including 12 tornadoes F3/EF3 or greater [aa,bb]. The probability of a tornado striking the site can be calculated using the following equations according to NUREG/CR-4461, Rev. 2 [cc]. Using the principle of geometric probability described by H. C. S. Thom, [8] the probability of a tornado striking any point in the one degree latitude by one degree longitude square containing the plant site may be calculated. Thom's equations are the following:

$$P = \frac{\bar{z}\dot{t}}{A} \qquad (1)$$

$$R = \frac{1}{P} \qquad (2)$$

P = mean probability of a tornado striking a point in any year in a one-degree square.

$\bar{Z}$ = mean path area of a tornado (mi^2)

$\dot{t}$ = mean number of tornadoes per year.

A = area of one-degree latitude, one-degree longitude square = 3887 mi^2 for the one-degree square containing the Watts Bar site (84°W to 85°W by 35°N to 36°N).

R = mean recurrence interval for a tornado striking a point in the one- degree square (years).

For $\bar{z}$ = 2.8209 mi^2 (from H. C. S. Thom [8]) and $\bar{t}$ = 1.02 tornadoes per year (55 tornadoes from NUREG/CR-4461 divided by 54 years of record), the probability is 7.40 x 10^{-4} with a recurrence interval of 1351 years. For consideration in station blackout criteria, the annual expectation of tornadoes with winds exceeding 113 mph (F2/EF2 or greater) is 3.77 x 10^{-4} per square mile (t = 0.52, based on 28 tornadoes F2 and above 54 years).

Windstorms are relatively infrequent, but may occur several times a year. Strong winds are usually associated with thunderstorms that occur about 50 times per year based on records for Chattanooga and Knoxville (Table 2.3-1). Moderate and occasionally strong winds sometimes accompany migrating cyclones and air mass fronts. Wind records for Chattanooga exist for 1945-2009 (65 years)[dd], for Knoxville during 1943–2009 (67 years)[ee], and for Watts Bar meteorological tower during 1973-2009 (37 years). The extreme wind speed cases have been converted to 3-second gust equivalents for comparison (Table 2.3-1A). The highest observed wind speeds (3–second equivalent) are 102 mph on March 24, 1947 at Chattanooga, 88 mph on July 15, 1961 at Knoxville, and 59 mph on March 25, 1975 at Watts Bar meteorological tower. During 1950-2009, winds > 50 knots (> 57 mph) were reported an average of 16.33 times per year for Rhea County (which contains Watts Bar Nuclear Plant) and the 6 surrounding counties[ff] combined (Table 2.3-1B).

During 1950-2009, hail 3/4 inch in diameter or larger has been reported an average of 6.98 times per year for Rhea County and the 6 surrounding counties[ff] combined (Table 2.3-1B).The likelihood of hail (any size) for a specific location in the area is less than once per year, based on a 52-year record (1879-1930) at Chattanooga and a 60-year record (1871-1930) at Knoxville. [gg]

Annual lightning strike density is estimated to be 7.7 flashes to ground per km^2 according to NUREG/CR-3759 [hh]. Based on thunderstorm day frequencies observed at Chattanooga (Table 2.3-1) the seasonal densities of flashes to ground per km^2 are estimated to be 0.55 (winter), 2.17 (spring), 4.02 (summer), and 0.96 (fall). These seasonal densities were estimated by calculating the percent of the annual thunderstorm days during the season and multiplying by the annual lightning density value. For example, winter has 3.9 thunderstorm days out of the 55.1 annual total, or 7.1%. Applying 7.1% to the 7.7 annual flashes values results in the 0.55 seasonal flashes value for the winter season.

Relative potential for air pollution is indicated by the seasonal distribution of atmospheric stagnation cases of four days or more analyzed by Korshover.[15]In a 35-year period (1936-1970), there were about one case in the winter, 11 cases in the spring, 24 cases in the summer, and 34 cases in the fall. According to Holzworth [16] there were about 35 forecast-days of high meteorological potential for air pollution in a 5-year period based on data collected in the 1960s and early 1970 (Figure 2.3-2). On the average, about seven air pollution forecast-days per year can be expected, with significantly greater probability in the summer and fall than in the winter and spring.

Frost penetration depth is important for protection of water lines and other buried structural features that are subject to freeze damage. The average depth for the 1899

through 1938 period was about six inches, and the extreme depth during the 1909 through 1939 period was about 14 inches.[17]

Estimations of regional glaze probabilities have been made by Tattelman, et al. [18] For Region V, which contains Tennessee, point probabilities for glaze icing 5.0 cm or more thick and 2.5 cm or more thick in any one year are about 1.0×10^{-4} and 4.0×10^{-4}, respectively. These probabilities correspond to recurrences of about once in 10,000 years and about once in 2,500 years. Ice thicknesses of 2.0, 1.8, 1.7, and 1.5 cm correspond to return periods of 100, 50, 25, and 10 years.

All ice storms with glaze thicknesses 2.5 cm or greater that were analyzed were accompanied by maximum wind gusts 10 m/sec or greater. However, only one had maximum gusts 20 m/sec or greater, and that storm had ice thicknesses less than 5.0 cm.

The point probabilities for lesser ice thicknesses are about 0.20 for > 1.25 cm and 0.37 for $\geq$ 0.63 cm, and the respective recurrence intervals are once in five years and once in three years. However, glaze ice thicknesses 1.25 cm or less generally result in little structural damage, except for above-ground utility wires when strong winds are combined with the storms. The major impact of storms which produce these lesser ice thicknesses is a hazard to travel in the affected areas.

Snowfall records for Chattanooga NWS (1937-2009) show maximum 24-hour and monthly snowfall amounts of 20.0 and 20.0 inches [dd]. Snowfall records for Knoxville NWS (1951-2009) show maximum 24-hour and monthly snowfall amounts of 18.2 and 23.3 inches [ee]. Older records for Knoxville before the NWS station was established show a maximum single storm of 22.5 inches [19]. The total snow load was calculated by assuming that the maximum single snowfall falls on the maximum snowpack. For the Watts Bar Site area, the weight of the 100-year return period snow pack is estimated to be about 14 pounds per square foot.[20]Assuming that the 22.5 inches of snow that fell at Knoxville on December 4-6, 1886, had the water equivalency ratio of 1:7, or 0.14 inch per inch of snow, the weight would be about 17 pounds per square foot. The combined weight of the existing snowpack, plus the new snow would be about 31 pounds per square foot on a flat surface. For conservatism, the weight of the maximum single storm snowfall recorded in Tennessee during the 1871 through 1970 period was estimated. This 28-inch snowfall occurred on February 19-21, 1960 at Westbourne, on the Cumberland Plateau in northeastern Tennessee.[21] A more conservative water equivalency ratio of 1:6 was used to give an estimated weight of about 24 pounds per square foot. The total snow load for this case would be about 38 pounds per square foot. Design loading considerations, including the snow load, for the reactor shield building and other Category I structures are presented in Sections 3.8.1 and 3.8.4, respectively.

No meteorological parameters were used in evaluating the performance of the ultimate heat sink, which consists of a once-through cooling system utilizing the Chickamauga Reservoir on the Tennessee River. A demonstration of adequate water flow past the site is used in the design bases. This is discussed in Section 2.4.11.

The initial design conditions assumed for the Watts Bar Nuclear Plant reactor shield building (and other safety-related structures) are the following:

(1)	300 mph	=	Rotational Speed
(2)	60 mph	=	Translational Speed
(3)	360 mph	=	Maximum Wind Speed
(4)	3 psi	=	Pressure Drop
(5)	1psi/sec	=	Rate of Pressure Drop (3 psi/3 sec is assumed)

For the additional Diesel Generator Building and structures initiated after July 1979, the design basis tornado parameters are as follows:

(1)	290 mph	=	Rotational Speed
(2)	70 mph	=	Translational Speed
(3)	360 mph	=	Maximum Wind Speed
(4)	3 psi	=	Pressure Drop
(5)	2 psi/sec	=	Rate of Pressure Drop (3 psi/1.5 sec is assumed)

These requirements have been recently updated by NRC. As defined in Regulatory Guide-1.76 (revision 1), the site is located on Region I for Design Basis Tornado considerations [ii]. The design conditions assumed for the Watts Bar Nuclear Plant reactor shield building (and other safety-related structures) are the following:

(1)	184 mph	=	Rotational Speed
(2)	46 mph	=	Translational Speed
(3)	230 mph	=	Maximum Wind Speed
(4)	1.2 psi	=	Pressure Drop
(5)	0.5 psi/sec	=	Rate of Pressure Drop (1.2 psi/2.4 sec is assumed)

These and tornado-driven missile criteria are discussed in Sections 3.3 and 3.5. The fastest mile of wind at 30 feet above ground is about 95 mph for a 100-year return period in the site area.[22] The vertical distribution of horizontal wind speeds at 50, 100, and 150 feet above ground is 102, 113, and 120 mph on the basis of the speed at 30 feet and a power law exponent of 1/7. A gust factor of 1.3 is often used at the 30-foot level, but this would be conservative for higher levels. The wind load for the Shield Building is based on 95 mph for that level, as discussed in Section 3.3. Estimates of the probable maximum precipitation (PMP) and the design considerations for the PMP are discussed in Section 2.4.

2.3.2 Local Meteorology

2.3.2.1 Data Sources

Short-term site-specific meteorological data from the TVA meteorological facility at the Watts Bar Nuclear Plant site are the basis for dispersion meteorology analysis. Data representative of the site or indicative of site conditions for temperature, precipitation, snowfall, humidity, fog, or wind were also obtained from climatological records for Chattanooga, Dayton, Decatur, Knoxville, Oak Ridge, and Watts Bar Dam, all in Tennessee. Short-term records for the Sequoyah Nuclear Plant site were used. These data source locations are shown relative to the plant site in Figure 2.3-3.

2.3.2.2 Normal and Extreme Values of Meteorological Parameters

Temperature data from Dayton [13] and Chattanooga[dd] are presented in Tables 2.3-2 and 2.3-3, respectively. The Chattanooga and Dayton mean daily data are provided as reasonably representative and recent (1971-2000) temperature information. Normal mean dry-bulb temperatures range from 36.2-39.4°F in the winter to 76.9-79.6°F in the summer. Normal daily maximum temperatures range from 45.9-49.9°F in winter to 87.7-89.6°F in summer. Normal daily minimum temperatures range from 26.5-31.1°F in winter to 66.1-69.0°F in summer. The extreme maxima recorded for the respective data periods (46 years for Dayton and 70 years for Chattanooga) were 107°F at Dayton and 106°F at Chattanooga, while the extreme minima recorded were -15°F and -10°F, respectively. Temperature data from Decatur (Table 2.3.2), for 60 years prior to data collection at Dayton, reported an extreme maximum temperature of 108°F and an extreme minimum temperature of -20°F.

Precipitation data are presented in Table 2.3-4. These data are from two different rain gauges near Watts Bar Nuclear Plant, one at Watts Bar Dam (1939-1975) and one at the Watts Bar Nuclear Plant meteorological tower (1974-2008). Precipitation has fallen an average of 110-111 days per year, with an annual average of 45.43 inches at the meteorological tower and 52.57 inches at Watts Bar Dam. The maximum monthly rainfall ranged from 6.52 inches to 14.78 inches. The minimum monthly amount was 0,00. The maximum rainfall in 24 hours was 5.31 inches at Watts Bar Dam in January 1946. The maximum in 24 hours at the meteorological tower was 4.77 inches on September 17, 1994. Mean monthly data reveal the wettest period as late fall through early spring, with March normally the wettest month of the year. Thunderstorm activity is most predominant in the spring and summer seasons, and the maximum frequency of thunderstorm days (Table 2.3-1) is normally in July.

Appreciable snowfall is relatively infrequent in the area. Snowfall data are summarized in Table 2.3-5 for Dayton[13] and in Table 2.3-6 for Chattanooga[dd] and Knoxville.[ee] The Dayton, Chattanooga and Knoxville records provide current information and offer a complete picture of the pattern of snowfall in the Tennessee River Valley from Chattanooga to Knoxville. Mean annual snowfall has ranged from 4.4 inches at Dayton to about 10 inches at Knoxville. Dayton, about halfway between those locations, averaged about 4 inches annually for an earlier period of record. Generally, significant snowfalls are limited to November through March. For the data periods presented in the tables, respective 24-hour maximum snowfalls have been 20.0, 8.0, and 18.2

inches at Chattanooga, Dayton, and Knoxville. Severe ice storms of freezing rain (or glaze) are infrequent, as discussed in the regional climatology section.

Atmospheric water vapor content is generally rather high in the site area, as was indicated in the discussion of the regional climatology. Long-term relative humidity and absolute humidity data for Chattanooga are presented in Tables 2.3-7 through 2.3-9.[dd,25] The relative humidity for selected hours in Table 2.3-7 has been updated to a more current period of record. Tables 2.3-8 and 2.3-9 cannot be easily updated, but are still valid since the information in Table 2.3-7 show no major changes in humidity characteristics. Humidity data based on measurements at the onsite meteorological facility are summarized in Tables 2.3-10 and 2.3-11 for comparison with the data in Tables 2.3-8 and 2.3-9. A typical diurnal variation is apparent in Table 2.3-7. Relative humidity and absolute humidity are normally greatest in the summer.

Fog data for Chattanooga,[dd] Knoxville,[ee] and Oak Ridge,[26] Tennessee, and from Hardwick [27] are presented in Table 2.3-12. These data indicate that heavy fog at the Watts Bar site likely occurs on about 35 days per year with the fall normally the foggiest season. Sources of data on fogs with visibilities significantly less than 1/4 mile and on durations of fogs which can be considered representative of the site have not been identified.

Wind direction patterns are strongly influenced by the northeast-southwest orientation of the major topographic features, as evidenced in the onsite data, Sequoyah Nuclear Plant data[28], and the records for Knoxville[ee] and Oak Ridge.[26] The Watts Bar wind direction and wind speed data are summarized in Tables 2.3-13 and 2.3-14 (annual at 10 and 46 meters); Tables 2.3-15 and 2.3-16 (directional persistence at 10 and 46 meters); and Tables 2.3-17 through 2.3-40 (monthly at 10 and 46 meters). The annual wind roses for each level are shown in Figures 2.3-4 and 2.3-5.

The most frequent wind direction at 10 meters has been from south-southwest (about 16%). The next highest frequencies (about 8%) are from the north-northeast and northwest wind. The data in Table 2.3-41 and the data in Table 2.3-13 show a predominance of wind from the north-northwest and northwest, respectively, for wind speeds less than about 3.5 mph. More discussion of this very light wind speed pattern is contained in Section 2.3.3.3. It is very significant that the frequencies of calms differ so markedly between the two sets of onsite data. It appears that the higher frequency of calm conditions is primarily a consequence of the location of the temporary meteorological facility in a "sink." The maximum wind direction persistence period at 10 meters is shown in Table 2.3-15 as 44 hours from the south-southwest direction. The monthly summaries show some minor variation in the wind direction patterns, but the upvalley-downvalley primary and secondary frequency maxima generally are fully evident.

In the summary tables for 46 meters, the upvalley-downvalley wind direction pattern is very clear and dominant. The two highest frequencies are 19% from the south-southwest wind direction and 11% from the north-northeast wind direction. The maximum wind direction persistence (Table 2.3-16) during the 17-year period was 48 hours from the south-southwest.

Wind speed is normally lower than for most parts of the United States. The other data sources referenced in the discussion of wind direction patterns also reflect this condition. Annually, the onsite data show about 53% of the hourly average wind speeds at 10 meters were less than 3.5 mph and about 85% were less than 7.5 mph. At 46 meters, the respective frequencies show the wind speeds are relatively lighter in summer and early fall and relatively stronger in late fall, winter, and spring.

Mean mixing height data for the United States have been researched by Holzworth.[16] However, his analysis has utilized data to estimate morning mixing heights (after sunrise) and mid afternoon mixing heights. Night-time mixing heights are not addressed. Average daily mixing heights are likely to be reasonably similar to the mean morning mixing heights. The seasonal and annual estimates of these mixing heights are the following: winter, about 500 meters; spring, about 530 meters; summer, about 430 meters; fall, about 350 meters; and annual, about 450 meters.

Low-level inversion frequencies in the eastern Tennessee area have been studied by Hosler.[29] His seasonal frequencies indicate inversions in the Watts Bar area about 40% of the time in winter, 30% in spring, 45% in summer, and 45% in fall. The annual frequency is about 40%. The monthly and annual percent frequencies of hours with inversions measured at the Watts Bar onsite meteorological facility for the 20-year period, 1974 through 1993, are presented in Table 2.3-42. In comparison to Hosler's seasonal and annual values, the winter, summer, and fall values are slightly lower and the spring value is higher and has the greatest departure. The highest monthly frequency in Table 2.3-42 is about 44% in October and the lowest is about 30% in January, with an annual average of about 39%. Monthly and annual frequencies of Pasquill stability classes A-G are also presented in the same table and indicate that the most stable time of year is the fall. Korshover's statistics on atmospheric stagnation cases[15] discussed under "General Climate," provide the same indication.

Table 2.3-44 presents a summary of onsite inversion persistence data, with a breakdown by stability class, for the same 20-year period discussed above. Persistence in this case is defined as two or more consecutive hours with vertical temperature gradient (ΔT) values > 0 degrees Celsius. However, the individual classes are allowed one-hour departures among themselves. The data analyzed correspond to the ΔT interval between 10 and 46 meters above the ground. The longest periods of inversion were 45 hours in January 1982 and 42 hours in December 1989. Other long periods, up to 21 hours, occurred in winter. A combination of cold, dry air masses with the shorter length of the solar day in that half of the year and fresh snow on the ground surface can increase the probability for inversion durations greater than 14 hours in that time of year. The unusual case of 45 hours of inversion persistence at this site occurred from January 19 to 21, 1982 at the end of a 10-day period of very cold weather. Persistent fog and low overcast with a synoptic pattern of warm air advection above an initially frozen, snow-covered ground surface and very light, variable winds at the 10-meter level created this condition.[30,31,32] The unusual case of 42 hours of inversion persistence occurred from December 29-31, 1989 during a period in which a cold front stalled to the west of the site. All of Eastern Tennessee (including the Watts Bar site) was covered by heavy fog with occasional light rain and drizzle.[33, 34, 35]

Distributions of stability classes A-G are presented in Figures 2.3-6A and 2.3-6B. The average diurnal variations of stability class frequencies are quite evident, with the neutral (class D) and unstable (A, B, and C) lapse conditions predominant in the daytime and the stable classes (E, F, and G) predominant through the nighttime.

2.3.2.3 Potential Influence of the Plant and Its Facilities on Local Meteorology

The Watts Bar site is about 45 miles north-northeast of Chattanooga. It is located on the west shore of Chickamauga Lake on the Tennessee River, which flows generally southwesterly through eastern Tennessee. The site (about 700 feet MSL) is near the center of a northeast-southwest aligned valley, 10 to 15 miles wide, flanked to the west by Walden Ridge (900 to 1,800 feet MSL,) and to the east by a series of ridges reaching elevations of 800 to 1,000 feet MSL. Figure 2.1-3 consists of a map of the topographic features (as modified by the plant) of the site area for 10 miles in all directions from the plant. Profiles of maximum elevation versus distance from the center of the plant are shown in Figures 2.3-14 through 2.3-29 for the sixteen compass point sectors (keyed to true north) to a radial distance of 10 miles.

The only plant systems which may have any pragmatic effects on the local climatic patterns of meteorological parameters discussed in the preceding section are the two natural draft cooling towers and their blowdown discharge system. During their operation, some small increase in ambient atmospheric moisture and temperature can be expected from the vapor plumes discharged from the tower tops. Also, some increase in the surface water temperature of Chickamauga Lake will be associated with the discharge of heated water from the plant (primarily the cooling tower blowdown). The vapor plumes may produce some additional localized fog on rare occasions on top of Walden Ridge (about eight miles, at its closest point, to the west-northwest). The increased lake surface temperature will likely increase the frequency of river steam fog slightly over a relatively small area of the reservoir downstream from the plant. No significant environmental impacts are expected from these effects. Discontinuities in ambient thermal structure of the atmosphere related to differential surface temperatures between land and water should produce no detectable effect on the local wind patterns or stability conditions. The physical plant structures will alter wind and stability somewhat in the immediate lee of the structures by mechanical turbulence factors produced in the building wake(s). However, these effects are expected to be generally insignificant beyond the first one or two thousand feet downwind.

2.3.2.4 Local Meteorological Conditions for Design and Operating Bases

All design basis meteorological parameters are discussed or referenced in Section 2.3.1.3.

2.3.3 Onsite Meteorological Measurements Program

2.3.3.1 Preoperational Program

Onsite meteorological facilities have been in operation since 1971 when a temporary 40-meter (130-foot) instrumented tower was installed. It was located about 760 meters (0.5 mile) west-southwest of the unit 1 Reactor Building and had a base elevation of

2 meters (8 feet) below plant grade. The temporary facility collected wind speed, wind direction, and temperature data at the 10-meter (33-foot) and 40-meter levels until it was decommissioned in September 1973. Since the FSAR dispersion meteorology data base was collected exclusively by the permanent facility, only that facility is described in detail in this section.

Permanent Meteorological Facility

The permanent meteorological facility consists of a 91-meter (300-foot) instrumented tower for wind and temperature measurements, a separate 10-meter (33-foot) tower for dewpoint measurements, a ground-based instrument for rainfall measurements, and an environmental data station (EDS), which houses the data processing and recording equipment. A system of lightning and surge protection circuitry and proper grounding is included in the facility design. This facility is located approximately 760 meters south-southwest of the Unit 1 Reactor Building and has a base elevation of 4 meters (11 feet) below plant grade.

Data collected included: (1) wind direction and wind speed at 10, 46, and 91 meters; (2) temperature at 10, 46, and 91 meters; (3) dewpoint at 10 meters and (4) rainfall at 1 meter (3 feet). More exact measurement heights for the wind and temperature parameters are given in the EDS manual.[37] Elsewhere in the text of this document, temperature and wind sensor heights are given as 10, 46, and 91 meters.

Data collection at the permanent facility began May 23, 1973, with measurements of wind speed and wind direction at 10 and 93 meters (305 feet), temperature at 1, 10, 46, and 91 meters and dewpoint, and rainfall at 1 meter. Measurements of 46-meter wind speed and wind direction and 10-meter dewpoint began September 16, 1976. Measurements of 1-meter dew point were discontinued September 30, 1977. Wind Sensors at 93-meter (actual height was 93.3 meters) were moved to their present height on May 18, 1978. Measurements of 1-meter temperature were discontinued on April 2, 1981. The 10-meter dewpoint sensor was removed from the meteorological tower and a new dewpoint sensor was installed on a separate tower 24 meters to the northwest on April 11, 1994.

Instrument Description

A description of the meteorological sensors follows. More detailed sensor specifications are included in the EDS Manual. Replacement sensors, which may be of a different manufacturer or model, will satisfy the Regulatory Guide (RG)1.23 (Revision 1) specifications.[36]

Sensor	Height (Meters)	Description
Wind Direction and Wind Speed	10, 46, and 91	Ultrasonic wind sensor.
Temperature	10, 46, and 91	Platinum wire resistance temperature detector (RTD) with aspirated radiation shield.
Dewpoint	10	Capacitive humidity sensor.
Rainfall	1	Tipping bucket rain gauge.

Data Acquisition System

The previous data collection system, which included a NOVA minicomputer, was replaced by a new system on March 2, 1989. This data acquisition system is located at the EDS and consists of meteorological sensors and a computer. These devices send meteorological data to the plant, to the Central Emergency Control Center (CECC) and to an offsite computer that enables callup for data validation and archiving.

System Accuracies

The meteorological data collection system is designed and replacement components are chosen to meet or exceed specifications for accuracy identified in RG 1.23.

The meteorological data collection system satisfies the RG 1.23 accuracy requirements. A detailed listing of error sources for each parameter is included in the EDS manual.

Data Recording and Display

The data acquisition is under control of the computer program. The output of each meteorological sensor is scanned periodically, scaled, and the data values are stored.

Meteorological sensor outputs are measured at the following rates: horizontal wind direction and wind speed, every five seconds (720 per hour); temperature and dewpoint, every minute (60 per hour); and rainfall, every hour (one per hour). Prior to February 1, 1975, only one reading of temperature and dewpoint was made each hour. Software data processing routines within the computer accumulate output and perform data calculations to generate 15-minute and hourly average of wind speed and temperature, 15-minute and hourly vector wind speed and direction, hourly average of dewpoint, hourly horizontal wind direction sigmas, and hourly total precipitation. Prior to February 11, 1987, a prevailing wind direction calculation method was used. Subsequently, vector wind speed and direction have been calculated along with arithmetic average wind speed.

Selected data each 15 minutes and all data each hour are stored for remote data access.

Data sent to the plant control room every minute includes 10-, 46-, and 91-meter values for wind direction, wind speed, and temperature.

Data sent to the CECC computer every 15 minutes includes 10-, 46-, and 91-meter wind direction, wind speed, and temperature values. These data are available from the CECC computer to other TVA and the State emergency centers in support of the Radiological Emergency Plan, including the Technical Support Center at Watts Bar. Remote access of meteorological data by the NRC is available through the CECC computer.

Data are sent from the EDS to an offsite computer for validation, reporting, and archiving.

Equipment Servicing, Maintenance, and Calibration

The meteorological equipment at the EDS is kept in proper operating condition by staff that are trained and qualified for the necessary tasks.

Most equipment is calibrated or replaced at least every six months of service. The methods for maintaining a calibrated status for the components of the meteorological data collection system (sensors, electronics, data logger, etc.) include field checks, field calibration, and/or replacement by a laboratory calibrated component. More frequent calibration and/or replacement intervals for individual components may be conducted, on the basis of the operational history of the component type. Procedures and processes such as appropriate maintenance processes (procedures, work order/work request documents, etc.) are used to calibrate and maintain meteorological and station equipment.

2.3.3.2 Operational Meteorological Program

The operational phase of the meteorological program includes those procedures and responsibilities related to activities beginning with the initial fuel loading and continuing through the life of the plant. This phase of the meteorological data collection program will be continuous without major interruptions. The meteorological program has been developed to be consistent with the guidance given in RG 1.23 (Revision 1) and the reporting procedure in RG 1.21 (Revision 1).[40] The basic objective is to maintain data collection performance to assure at least 90% joint recoverability and availability of data needed for assessing the relative concentrations and doses resulting from accidental or routine releases.

The restoration of the data collection capability of the meteorological facility in the event of equipment failure or malfunction will be accomplished by replacement or repair of affected equipment. A stock of spare parts and equipment is maintained to minimize and shorten the periods of outages. Equipment malfunctions or outages are detected by maintenance personnel during routine or special checks. Equipment outages that affect the data transmitted to the plant can be detected by review of data displays in the reactor control room. Also, checks of data availability to the emergency

centers are performed each work day. When an outage of one or more of the critical data items occurs, the appropriate maintenance personnel will be notified.

In the event that the onsite meteorological facility is rendered inoperable, or there is an outage of the communication or data access systems; there is no fully representative offsite source of meteorological data for identification of atmospheric dispersion conditions. Therefore, TVA has prepared objective backup procedures to provide estimates for missing or garbled data. These procedures incorporate available onsite data (for a partial loss of data), offsite data, and conditional climatology. The CECC meteorologist will apply the appropriate backup procedures.

2.3.3.3 Onsite Data Summaries of Parameters for Dispersion Meteorology

Annual joint frequency distributions of wind speed by wind direction for Pasquill atmospheric stability classes A-G, based on the onsite data for January 1974 through December 1993 are presented in Tables 2.3-45 through 2.3-52. These tables are summaries of hourly data for the wind at 10 meters and vertical temperature difference (ΔT) between 10 and 46 meters (in the form of stability classes A-G). Tables 2.3-53 through 2.3-60 were prepared from the hourly data for the wind at 46 meters and ΔT between 10 and 46 meters (as stability classes A-G) for January 1977 through December 1993. The frequency distributions in Tables 2.3-45 through 2.3-51 are also displayed in Figures 2.3-7 through 2.3-13.

The upvalley-downvalley primary wind pattern at 46 meters exists for all seven stability classes. The 10-meter wind level also shows upvalley-downvalley wind direction patterns. However, for classes E-G, the flow patterns become progressively more diffuse, with peaks from the northwest which become primary maxima in classes F and G (Tables 2.3-50 and 2.3-51). These directional peaks for the stable classes are most pronounced in the lighter wind speed ranges. The combination of these very light winds with the more stable conditions near the earth's surface indicate that very poor atmospheric dispersion conditions for ground-level plant releases of air-borne effluent occur most frequently at night and with the northwest wind direction.

The period of record for the joint frequency tables for the 46-meter wind measurement level is three years shorter than the record used for the 10-meter wind level. Collection of wind data at the 46-meter level began in September 1976. Tables 2.3-53 through 2.3-60 were originally prepared with 93-meter wind data and 10- to 91-meter ΔT data for the July 1973-June 1975 period. The 46-meter wind level is near the height of the reactor building; and the 10- to 46-meter ΔT interval is more representative than the 10- to 91-meter interval for stability classification, particularly for poorer dispersion conditions. The 10-meter wind level is applicable to design accident analysis and to semiannual reports on routine plant operations. The 46-meter wind level is used in radiological emergency dispersion and transport calculations.

The 20-year period for the tables with 10-meter wind data and the 17-year period for the tables with 46-meter wind data reasonably represent long-term dispersion conditions at the site. The length of the record is an important factor, and patterns of unusually wet weather in the 1970s and unusually dry weather in the 1980s are included in this data base. The dispersion meteorology varied during the 20-year

period, but the period is climatologically representative of long-term conditions. An increase in the frequency of 10-meter level calm winds (values less than 0.6 mi/hr) occurred in the early 1990s. The calm wind frequency increased from 1.6% for 1974-1988 to about 3.0% for 1974-1993. Consistent with the increase in calms, average wind speed decreased from 4.2 mi/hr for 1974-1988 to 4.1 mi/hr for 1974-1993.

Potential climate change associated with a global warming of the earth's lower atmosphere may occur in the Watts Bar site area. Should that occur during the life of this nuclear plant, the dispersion meteorology will be evaluated for any significant changes and consequent impacts on plant design and operation.

2.3.4 Short-Term (Accident) Diffusion Estimates

2.3.4.1 Objective

Revised estimates of atmospheric diffusion expressed as dispersion factors (X/Q) have been calculated for accident releases considered as ground-level releases from the Watts Bar Nuclear Plant for specified time intervals and distances. The revised X/Q values are based on an updated onsite meteorological data base for 1974 through 1993 and RG 1.145 calculation methodology.[41] The original FSAR calculations were based on data collected at the Watts Bar onsite meteorological facility for the period July 1, 1973 through June 30, 1975 and R.G. 1.4 methodology.[42] All data used include wind direction and wind speed at 10 meters above ground and vertical temperature difference (ΔT) between 10 and 46 meters above ground. The revised X/Q values at the exclusion area boundary and at the outer boundary of the low population zone (LPZ) were calculated as stated below.

Nomenclature for RG 1.145 Method

X/Q = centerline ground-level relative concentration (sec/m^3)

Σ_y = lateral plume spread with meander and building wake effects (m), as a function of atmospheric stability, wind speed «$_{10}$, and distance (for distances greater than 800 meters, $\Sigma_y = (M-1)\sigma_y 800_m + \sigma_y$).

σ_y = lateral plume spread as a function of atmospheric stability and distance (m).

σ_z = vertical plume spread as a function of atmospheric stability and distance (m).

x = distance from effluent release point to point at which atmospheric dispersion factors (X/Q values) are computed (m).

$\bar{U}_{10}$ = mean hourly horizontal wind speed at 10 meters (m/sec)

M = σ_y correction factors for stability classes D, E, F, and G from Figure 3 in RG 1.145.

A = minimum containment and Auxiliary Building cross-sectional area (m^2).

Atmospheric dispersion factors (X/Q values) were calculated for a 1-hour averaging period and assumed to apply to the 2-hour period immediately following an accident. The following equations were used to determine these values:

$$X/Q = \frac{1}{\bar{U}_{10}(\pi\sigma_y\sigma_z + A/2)} \quad (1)$$

$$X/Q = \frac{1}{\bar{U}_{10}(3\pi\sigma_y\sigma_z)} \quad (2)$$

$$X/Q = \frac{1}{\bar{U}_{10}\pi\Sigma_y\sigma_z} \quad (3)$$

For stability classes D, E, F, or G and windspeeds less than 6 meters per second (m/s), the higher value from equations (1) and (2) was compared to the value from equation (3). The lower of these compared values was selected for the X/Q distributions. For wind speeds greater than 6 m/s in these classes and for all wind speeds in stability classes A, B, and C, the higher of the values from equations (1) and (2) was selected.

The minimum cross-sectional area, A, for Watts Bar Nuclear plant is 1630 m^2. The exclusion boundary distance is 1200 m, as shown in Figure 2.1-4b. However, to avoid possible nonconservative accident X/Qs, the distance that was used to calculate the X/Qs is 1100 m, which is the minimum distance from the outer edge of the release zone to the exclusion area boundary. The assumed release zone is a 100-m radius circular envelope, which contains all of the structures that are potential sources of accidental releases of airborne radioactive materials. A distance of three miles (4828 m) was used as the low population zone (LPZ) outer boundary distance.

The 1-hour X/Q values for the exclusion boundary distance were distributed in the downwind 22.5-degree compass-point sectors (plume sectors) based on wind direction. Calm wind speeds (less than 0.6 mi/hr) were distributed based on the wind direction frequencies for non-calm wind speeds less than 3.5 mi/hr. The 0.5th and 5th percentile values for each sector and for all sectors combined were identified. For the LPZ distance, the 0.5th percentile and 5th percentile 1-hour values for each sector, the annual average values for each sector, and the 0.5th and 5th percentile 1-hour values for all sectors combined were determined. The annual average X/Qs were calculated from hourly average data according to guidance in Regulatory Guide 1.111 for constant mean wind direction models.[43] All calculations used an assumed wind speed of 0.6 mile per hour (0.268 m/s), which is the starting threshold of the anemometer, for hours with values less than that and thus defined as calms. Site-specific adjustment factors for terrain confinement and recirculation effects on concentrations at the LPZ distance were calculated and applied to the initial annual

average X/Qs. The method used to develop these adjustment factors is the same as that discussed in the offsite dose calculation manual for Watts Bar Nuclear Plant. The 16 sector adjustment factors are the following:

N	NNE	NE	ENE	E	ESE	SE	SSE
1.36	1.65	2.01	1.61	1.58	1.81	1.28	1.49

S	SSW	SW	WSW	W	WNW	NW	NNW
1.81	1.77	1.86	1.47	1.00	1.49	1.00	1.00

LPZ distance X/Qs for 8-hour, 16-hour, 3-day, and 26-day averaging periods were obtained by logarithmic interpolation between 1-hour values used for the 2-hour averaging period and annual average values. Sector values were interpolated between the 0.5th percentile 1-hour values assumed for the 2-hour time period and the annual average values for the respective sectors (e.g., between southeast sector 0.5th percentile 2-hour X/Q and southeast sector annual average X/Q). The 5th percentile overall site X/Q values were interpolated between the 5th percentile 1-hour value (assumed for the 2-hour time period) for all sectors combined and the maximum sector annual average value selected from the 16 sector annual average values.

2.3.4.2 Calculation Results

The 1-hour sector-specific and overall (all directions combined) atmospheric dispersion factors (X/Q) for the exclusion boundary are presented in Table 2.3-61 based on the 15-year data set of 1974-1988 and Table 2.3.61a based on the 20-year data set of 1974-1993. The maximum 0.5th and 5th percentile X/Q values are from the 15-year data set and are 6.040×10^{-4} sec/m^3 and 5.323×10^{-4} sec/m^3, respectively. The maximum 0.5th and 5th percentile X/Q values from the 20-year data sets (6.070×10^{-4} sec/m^3 and 5.263×10^{-4} sec m^3, respectively) are essentially unchanged from the 15-year values.

The 1-hour 0.5th percentile, 1-hour 5th percentile, and annual average X/Q values for each of the 16 plume sectors and the 1-hour overall 0.5th and 5th percentile X/Q values for the low population zone distance are presented in Table 2.3-62 based on the 15-year data set of 1974-1988 and Table 2.3-62a based on the 20-year set of 1974-1993. Only minor differences exist between the two sets of values.

For 8-hour, 16-hour, 3-day, and 26-day averaging periods, the X/Qs were obtained by logarithmic interpolation between the 1-hour and annual average X/Q values. The 5th percentile overall site 1-hour X/Q and the maximum sector annual average X/Q were used to produce the values given in Table 2.3-63 (1974-1988) and Table 2.3-63a (1974-1993).

The 0.5th percentile 1-hour X/Q and annual average X/Q for each sector were used to produce the values given in Table 2.3-64 (1974-1988) and Table 2.3-65 (1974-1993). The maximum sector set corresponds to the southeast plume sector. The respective values are:

Period	1974-1988	1974-1993
8-hour	6.765×10^{-5}	6.677×10^{-5}
16-hour	4.629×10^{-5}	4.592×10^{-5}
3-day	2.032×10^{-5}	2.039×10^{-5}
26-day	6.230×10^{-6}	6.353×10^{-6}

In Section 2.3.3.3, the representativeness of the onsite data summarized in the joint frequency distributions of wind direction and wind speed by atmospheric stability class was discussed. Topographic effects have been mentioned previously, but some expansion relative to the 10-meter wind data is necessary. There is a predominance of northwest wind direction frequencies for a combination of very light wind speeds and quite stable atmospheric stability conditions. The terrain at the site has a general, gradual downward slope toward the south and southeast. Apparently, this is influencing the air flow over the site during periods with very light winds and stable conditions.

Dispersion meteorology used in accident analyses in Chapter 15 include X/Q values in Table 2.3-66 and 1/U values in Table 2.3-67. These values were based on the 15-year data set for 1974-1988. Table 2.3-66a and 2.3-67a present the same information based on the 20-year data set for 1974-1993. The original FSAR values are presented with the updated bases for comparison.

2.3.5 Long-Term (Routine) Diffusion Estimates

The X/Qs and D/Qs and the respective calculation methodologies are presented in the Offsite Dose Calculation Manual for Watts Bar Nuclear Plant.

The joint frequency distributions of wind speed and wind direction by stability class in Tables 2.3-45 through 2.3-51 form the basis for Offsite Dose Calculation Manual estimation of long-term X/Qs. RG 1.111 methodology is used to calculate these X/Qs from the onsite meteorological data base. Additional information is provided in the Offsite Dose Calculation Manual.

The long-term representativeness of the 20-year onsite meteorological data base is discussed in Sections 2.3.3.3 and 2.3.4.2.

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(bb) Morristown NWS web site (http://www.srh.noaa.gov/mrx/?n=mrx_tornado_db) for Bledsoe, Hamilton, McMinn, Meigs, Rhea, and Roane Counties [Accessed May 12, 2010].

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Table 2.3-1 Thunderstorm Day Frequencies

	Chattanooga[1]	Knoxville[2]
December	0.6	0.7
January	1.3	0.8
February	2.0	1.4
Winter	3.9	2.9
March	3.6	3.2
April	4.8	4.5
May	7.1	6.9
Spring	15.5	14.6
June	9.0	8.5
July	11.1	9.9
August	8.8	6.9
Summer	28.8	25.3
September	4.0	3.0
October	1.4	1.3
November	1.5	1.1
Autumn	6.9	5.4
Annual	55.1	48.2

1 National Oceanic and Atmospheric Administration, 2009 Local Climatological Data Annual Summary with Comparative Data; Chattanooga, TN (KCHA) -- period of record 62 years.

2 National Oceanic and Atmospheric Administration, 2009 Local Climatological Data Annual Summary with Comparative Data; Knoxville, TN (KTYS) -- period of record 62 years.

Table 2.3-1A Extreme Wind Speeds
(Page 1 of 2)

This table lists the highest wind speeds observed at Chattanooga NWS, Knoxville NWS, and Watts Bar Nuclear Plant site for different time periods. Because the wind averaging periods varied, all observations were converted to 3-second gusts for comparison (based on ANSI/TIA-222-G, Annex L.[a])

Chattanooga, Tennessee (National Weather Service Airport Station)

Period of Record = 1945-2009 (65 years).

Period	Data Source (s)	Date of Occurence	Observed value (averaging period)	Max 3-sec gust equivalent
1945-1975	Chattanooga (CHA) Local Climatological Data (LCD), 1975 Annual and CHA LCD, March 1947.[b]	March 24, 1947	82 mph (fastest mile)	102 mph
1976-1995	CHA LCD, 1995 Annual and CHA LCD, November 1995.[b]	November 11, 1995.	38 mph (2-min average) 47 mph (5-sec average)	48 mph
1996-2009	CHA LCD, 2009 Annual and CHA LCD, June 2009.[b]	June 11, 2009	63 mph (3 second gust)	63 mph

Maximum wind speed (3-second gust equivalent) = 102 mph on March 24, 1947.

Knoxville, Tennessee (National Weather Service Airport Stations)

Period of Record = 1943-2009 (67 years).

Period	Data Source (s)	Date of Occurence	Observed value (averaging period)	Max 3-sec gust equivalent
1943-1974	Knoxville (TYS) LCD, 1974 Annual and TYS LCD, July 1961.[b]	July 15, 1961	73 mph (fastest mile)	88 mph
1975-1995	TYS LCD, 1995 Annual and TYS LCD, November 1995.[b]	November 11, 1995.	45 mph (2-min average) 54 mph (5-sec average)	56 mph
1996-2009	TYS LCD, 2009 Annual and TYS LCD, June 2009.[b]	April 20, 1996	76 mph (3 second gust)	76 mph

Maximum wind speed (3-second gust equivalent) = 88 mph on July 15, 1961.

Table 2.3-1A Extreme Wind Speeds
(Page 2 of 2)

Watts Bar Meteorological Tower

Period of Record = 1973-2009 (37 years).

Period	Data Source (s)	Date of Occurence	Observed value (averaging period)	Max 3-sec gust equivalent
1973-2009	TVA wind observations for 10- and 91-meter wind sensors	Mar 25, 1975	39 mph (hourly average)	59 mph

Maximum wind speed (3-second gust equivalent) = 59 mph on March 25, 1975.

a. ANSI/TIA-222-G, Structural Standard for Antenna Supporting Structures and Antennas", effective January 1, 2006.

The relevant portion of Annex L, "Wind Speed Conversions" is provided below:

3-sec gust (mph)	Fastest Mile		10-min average (mph)	Hourly mean (mph)
	Wind Speed (mph)	Averaging Period (sec)		
60	50	72	42	40
70	58	62	49	46
80	66	55	56	53
85	70	51	59	56
90	75	48	62	60
95	78	46	66	63
100	80	45	69	66
105	85	42	73	70

Intermediate values are determined by interpolation.

b. Annual and Monthly Local Climatological Data reports (for applicable cities and time periods) from the NOAA National Climatic Data Center, Asheville, North Carolina.

Table 2.3-1B
Storm Events for Rhea and Surronding Counties
(Page 1 of 2)

These tables list the storm events for Rhea and surrounding counties from the National Climatic Data Center (NCDC) Storm Event database for 1950-2009 (http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms). Accessed August 20, 2010.

Listed counties are adjacent to Rhea county and/or have potions of the county within 10 miles of Watts Bar Nuclear Plant. Number of occurrences is for the entire county.

High winds:

Search Settings (except county): Begin Date = 01/01/1950

End Date = 12/31/2009

Event type = All

High Wind Speed of at Least 50 Knots

All other search settings default.

County	Total Number of Occurrences	Average Occurrences per Year *
Rhea (including Watts Bar)	122	2.03
Bledsoe	103	1.72
Cumberland	91	1.52
Hamilton	275	4.58
McMinn	163	2.72
Meigs	82	1.36
Roane	144	2.40
TOTAL EVENTS	980	16.33

Table 2.3-1B
Storm Events for Rhea and Surronding Counties
(Page 2 of 2)

Large Hail:

Search Settings (except county): Begin Date = 01/01/1950

End Date = 12/31/2009

Event type = Hail

Hail, Size of at Least 0.75 Inches

All other search settings default.

County	Total Number of Occurrences	Average Occurrences per Year *
Rhea (including Watts Bar)	53	0.88
Bledsoe	48	0.80
Cumberland	48	0.80
Hamilton	130	2.17
McMinn	74	1.23
Meigs	33	0.55
Roane	33	0.55
TOTAL EVENTS	419	6.98

* Total Number of Occurrences/60 years

Table 2.3-2 Temperature Data
Dayton and Decatur, Tennessee Coopertive Observer Data[a]
(Data in °F)

Month	Daily Average[b]		Average Daily Maximum[b]		Average Daily Minimum[b]		Extreme Maximum[c]		Extreme Minimum[c]	
	Dayton	Decatur	Dayton	Decatur	Dayton	Decatur	Dayton	Decatur	Dayton	Decatur
Jan	36.2	40.0	45.9	50.6	26.5	29.4	75	76	-15[f]	-9
Feb	40.5	41.6	51.6	53.0	29.3	30.3	79	78	-4	-20[g]
Mar	48.8	50.5	60.8	63.0	36.7	38.1	85	91	3	2
Apr	57.4	58.5	70.3	72.0	44.4	45.0	92	94	22	20
May	65.4	67.1	77.3	80.8	53.5	53.5	94	99	30	30
Jun	73.3	74.6	84.7	87.2	61.8	62.0	100	103	40	40
Jul	76.9	77.6	87.7	89.8	66.1	65.3	107[d]	108[e]	49	48
Aug	76.0	76.9	86.9	89.3	65.0	64.5	104	107	49	49
Sep	70.1	71.9	81.0	85.1	59.1	58.7	100	106	30	34
Oct	58.3	60.0	70.4	74.1	46.1	45.9	90	96	23	19
Nov	48.1	48.4	58.8	61.3	37.3	35.5	83	82	9	7
Dec	39.3	40.3	49.0	50.8	29.6	29.9	76	76	-5	-4
Annual	57.5	59.0	68.7	71.4	46.3	46.5	107[d]	108[e]	-15[f]	-20[g]

a. Cooperative Observer Stations
   - [Dayton, Tennessee] Climatography of the United States No. 20 1971-2000 (Station - Dayton 2 SE, TN; COOP ID = 402360), National Climate Data Center, Ashville, NC.
   - [Decatur, Tennessee] Climatography of the United States No. 10-77, "Climatic Summary of the United States - Eastern Tennessee," U.S. Department of Commerce, Weather Bureau, revised 1957 and Annual NCDC Tennessee Climatological Data for individual years during 1896-1956.

b. Period of Record:
   Dayton = 1971-2000 (30 years).
   Decatur = 1896-1930 (35 years)

c. Period of Record:
   Dayton = 1956-2001 (46 years).
   Decatur = 1896-1945, 1952-1956 (60 years).

d. July 16, 1980.

e. July 28, 1930 and July 29, 1952.

f. January 21, 1985

g. Date unknown. According to Climatography of the United States No. 10-77, Decatur reported a low temperature of -20°F during 1896-1930. However, the specific date cannot be identified in the Annual NCDC Tennessee Climatological Data reports for the period. Coldest temperature for a known date was -19°F on January 26, 1940.

Table 2.3-3
Temperature Data
Chattanooga, Tennessee National Weather Service[a]
(Data in °F)

Month	Normal Dry Bulb[b]	Mean Daily Maximum[c]	Mean Daily Minimum[c]	Extreme Maximum[d]	Extreme Minimum[d]
January	39.4	49.9	31.1	78	-10[e]
February	43.4	52.8	32.5	79	1
March	51.4	62.3	40.0	88	8
April	59.6	71.7	47.8	93	25
May	67.7	80.0	56.7	99	34
June	75.4	86.3	64.4	104	41
July	79.6	89.6	69.0	106[f]	51
August	78.5	89.0	68.2	105	50
September	72.1	82.6	61.2	102	36
October	60.4	73.0	49.2	94	22
November	50.3	60.6	38.8	84	4
December	42.4	51.8	32.8	78	-2
Annual	60.0	70.8	49.3	106[f]	-10[e]

a. National Oceanic and Atmospheric Administration, 2009 Local Climatological Data Annual Summary with Comparative Data; Chattanooga, TN (KCHA).
b. Period of Record = 1971-2000 (30 years).
c. Period of Record = 1928-2009 (82 Years).
d. Period of Record = 1940-2009 (70 Years).
e. January 1985.
f. July 1952.

Table 2.3-4 Precipitation Data
Watts Bar Nuclear Plant and Watts Bar Dam Precipitation Data (Inches)
(Data in Inches)

	Average No. of Days 0.01 Inch or More[a]		Average[b]		Extreme Maximum[c]		Extreme Minimum[c]		24-hour Maximum[c]	
Month	WBN*	Dam*	WBN	Dam	WBN	Dam	WBN	Dam	WBN	Dam
Jan	11	11	4.39	5.30	9.89	11.67	0.80	0.93	3.31	5.31[d]
Feb	10	10	4.12	5.34	12.28	9.79	0.37	0.74	3.56	3.50
Mar	11	11	4.50	5.62	12.33[e]	11.75	1.43	1.32	3.49	5.00
Apr	9	10	3.52	4.56	8.72	8.66	0.41	0.80	3.69	3.10
May	10	9	4.00	3.57	11.94	10.94	0.73	0.56	4.26	3.20
Jun	9	9	3.42	3.81	10.29	12.30	0.13	0.03	4.44	3.73
Jul	10	10	3.86	5.14	11.41	12.50	0.25	0.50	3.70	4.80
Aug	8	9	2.96	3.20	7.91	7.13	0.02	0.52	3.61	3.19
Sep	7	7	3.45	3.69	8.55	14.78[f]	0.46	0.45	4.77[g]	4.50
Oct	7	6	2.59	2.90	6.52	7.91	0.00	0.00	3.09	3.05
Nov	9	8	4.30	4.13	8.85	14.06	0.73	0.94	2.64	4.63
Dec	11	10	4.31	5.31	11.92	12.08	1.32	0.30	4.72	4.15
Annual	111	110	45.43	52.57						

* WBN = Watts Bar Nuclear Plant Meteorological tower. The meteorological facility is located 0.8 km south-southwest of Watts Bar Nuclear Plant. The rain gauge is 1 meter above ground.

Dam = TVA rain gauge station 421 at Watts Bar Dam. The Dam is located 1.9 km north of Watts Bar Nuclear Plant. The rain gauge is located on the roof of the Control Building at Watts Bar Dam.

** Annual totals do not equal the sum of monthly values due to rounding.

a. Period of record = 1974-2008 for Watts Bar Nuclear Plant and 1940-1975 for Watts Bar Dam.
b. Period of record = 1974-2008 for Watts Bar Nuclear Plant and 1941-1970 for Watts Bar Dam.
c. Period of record = 1974-2008 for Watts Bar Nuclear Plant and September 1939-September 1989 for Watts Bar Dam.
d. January 1946.
e. March 1975.
f. September 1957.
g. September 17, 1994.

Table 2.3-5
Snowfall Data (Inches)
Dayton, Tennessee
(Data in Inches)

Month	Average[a,b]	Maximum Monthly[a,c]	Highest Daily[a,c]
January	1.8	9.7	7.2
February	1.6	13.3[d]	7.5
March	0.8	8.0	8.0[e]
April	0.1	2.7	2.7
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	Trace	Trace	Trace
December	0.1	1.1	1.0
Annual	4.4		

a. Climatography of the United States, No. 20, 1971-2000 (COOP ID = 402360).
b. Derived from Snow Climatology and 1971-2000 daily data.
c. Derived from 1971-2000 daily data.
d. February 1979
e. March 13, 1993.

Table 2.3-6
Snowfall Data
Chattanooga and Knoxville, Tennessee NWS
(Data in Inches)

	Normal[c]		Maximum Monthly[d]		Maximum in 24 Hrs.[d]	
Month	**Chattanooga**	**Knoxville**	**Chattanooga**	**Knoxville**	**Chattanooga**	**Knoxville**
January	2.0	3.7	10.2	15.1	10.2	12.0
February	1.3	3.0	10.4	23.3	8.7	17.5
March	1.2	1.6	20.0	20.2	20.0	14.1
April	0.2	0.8	2.8	10.7	2.8	10.7
May	0	0	trace	trace	trace	trace
June	0	0	trace	trace	trace	trace
July	0	0	0	0	0	0
August	0	0	0	trace	0	trace
September	0	0	trace	trace	trace	trace
October	*	*	trace	trace	trace	trace
November	*	0.1	2.8	18.2	2.8	18.2
December	0.1	0.7	9.1	12.2	8.9	8.9
Annual	4.8	9.9	20.0	23.3[e]	20.0	18.2

* Value is between 0.00 and 0.05.

a. Local Climatological Data, Annual Summary with Comparative Data, 1983 and 2009, Chattanooga, Tennessee, U.S. Department of Commerce, NOAA, NCDC, Asheville, N.C.

b. Local Climatological Data, Annual Summary with Comparative Data, 1983 and 2009, Knoxville, Tennessee, U.S. Department of Commerce, NOAA, NCDC, Asheville, N.C.

c. Period of record for monthly normal is 30 years (1971-2000).

d. Period of record for maximum monthly and maximum 24 hour events is 72 years for Chattanooga and 65 years for Knoxville.
   - For Chattanooga, the maximum monthly and maximum 24-hour event was 20.0 inches during March 1993.
   - For Knoxville, the maximum monthly event was 23.3 inches during February 1960 and the maximum 24-hour event was 18.2 inches during November 1952.

e. Another site had the highest maximum monthly event for the Knoxville locality -- 25.7 inches in February 1895.

Table 2.3-7 Average Relative Humidity Data (Percent) - Selected Hours
Chattanooga, Tennessee*
(Eastern Standard Time)

	Updated Data (1971-2000)[1]				Original Date (1931/41-1974)[2]			
Month	Hour 0100	Hour 0700	Hour 1300	Hour 1900	Hour 0100	Hour 0700	Hour 1300	Hour 1900
January	79	81	63	66	80	82	63	68
February	77	82	58	58	78	80	57	60
March	76	82	55	53	77	81	53	56
April	78	85	49	49	78	81	49	52
May	87	89	55	58	86	85	51	56
June	87	90	57	60	88	85	54	60
July	87	90	57	62	89	89	57	64
August	88	92	58	64	90	91	57	66
September	89	92	59	66	89	90	55	66
October	88	91	55	68	88	89	52	67
November	83	86	59	68	82	84	55	65
December	80	83	62	68	82	83	62	70
Annual	83	87	57	62	84	85	55	63

1. Local Climatological Data, Annual Summary with Comparative Data, 1983 and 2009, Chattanooga, Tennessee, U.S. Department of Commerce, NOAA, NCDC, Asheville, N.C. (Period of Record = 1971-2000).
2. Local Climatological Data, Annual Summary with Comparative Data, 1974, Chattanooga, Tennessee, U.S. Department of Commerce, NOAA, NCDC, Asheville, N.C. (Period of Record = 1941-1974 for hour 0100 and 1931-1974 for hours 0700, 1300, and 1900).

Table 2.3-8 Relative Humidity (Percent)
National Weather Service Station
Chattanooga, Tennessee*
January 1965-December 1971

Month	Average	Avg. Max.	Avg. Min.	Extreme Max.	Extreme Min.
December	75.3	83.6	67.7	100.0	10.7
January	72.3	74.6	69.5	100.0	18.6
February	67.0	76.8	58.0	100.0	12.1
Winter	71.5	78.3	65.1	100.0	10.7
March	64.1	71.4	55.0	100.0	13.8
April	64.6	72.3	56.9	100.0	12.8
May	71.1	77.1	65.0	100.0	19.0
Spring	66.6	73.6	58.9	100.0	12.8
June	72.3	77.4	68.3	100.0	23.1
July	75.5	80.1	71.2	100.0	26.9
August	78.4	82.9	75.3	100.0	32.5
Summer	75.4	80.1	71.6	100.0	23.1
September	79.7	84.0	75.2	100.0	26.0
October	76.6	83.0	71.1	100.0	18.2
November	72.6	79.7	66.2	100.0	16.1
Fall	76.3	82.2	70.8	100.0	16.1
Annual	72.5	78.6	66.6	100.0	10.7

* Analysis based on data tapes obtained from National Climatic Data Center, Asheville, North Carolina. Observations recorded on tape are for 3-hourly synoptic times.

Table 2.3-9
Absolute Humidity
Chattanooga, Tennessee NWS
(Data in gm/m^3)

January 1965-December 1971*

Month	Average	Avg. Max.	Avg. Min.	Extreme Max.	Extreme Min.
December	5.8	7.2	4.5	16.1	0.9
January	4.8	5.3	4.5	14.0	0.4
February	4.5	5.8	3.4	14.1	0.8
Winter	5.0	6.1	4.1	16.1	0.4
March	5.9	7.2	4.6	16.6	1.1
April	8.6	10.3	7.0	20.1	2.4
May	11.4	12.8	9.9	19.6	3.4
Spring	8.6	10.1	7.1	20.1	1.1
June	14.7	15.9	13.5	22.7	4.9
July	16.7	17.7	15.6	24.2	8.6
August	17.0	18.2	16.0	25.8	9.6
Summer	16.1	17.3	15.0	25.8	4.9
September	14.8	16.2	13.6	23.6	4.2
October	10.0	11.6	8.5	20.8	3.0
November	6.5	7.9	5.1	17.8	1.2
Fall	10.4	11.9	9.1	23.6	1.2
Annual	10.0	11.4	8.8	25.8	0.4

* Analysis based on data tapes obtained from National Climatic Data Center, Asheville, North Carolina. Observations recorded on tape are for 3-hourly synoptic times.

Table 2.3-10
Relative Humidity
Watts Bar Nuclear Plant Meteorological Facility
(Sheet 1 of 2)
(Data in Percent)
July 1, 1973 - June 30, 1975 *

Month	Average	Average Maximum	Average Minimum	Extreme Maximum	Extreme Minimum
December	71.2	85.1	53.8	100.0	30.2
January	73.6	87.5	54.5	100.0	10.4
February	70.3	87.5	50.9	100.0	21.4
Winter	71.7	86.7	53.1	100.0	10.4
March	69.9	88.4	49.8	100.0	22.6
April	64.5	87.8	38.6	100.0	11.2
May	78.3	94.1	56.9	100.0	28.3
Spring	70.9	90.1	48.5	100.0	11.2
June	75.2	91.6	55.0	100.0	34.6
July	76.2	93.4	48.4	100.0	10.1
August	78.7	93.6	55.1	100.0	36.7
Summer	76.7	92.9	52.9	100.0	10.1
September	77.9	91.8	56.8	100.0	29.3
October	71.5	89.9	43.2	100.0	19.7
November	69.0	87.0	47.4	96.5	26.9
Fall	72.8	89.6	49.1	100.0	19.7
Annual	73.0				

* Data were collected at the Watts Bar Meteorological tower located 0.8 km SSW of Watts Bar Nuclear Plant. Temperature and dewpoint instruments at 4 feet above ground.

Table 2.3-10
Relative Humidity
Watts Bar Nuclear Plant Meteorological Facility
(Sheet 2 of 2)
(Data in Percent)
January 1, 1976 - December 31, 2008 *

Month	Average	Average Maximum	Average Minimum	Extreme Maximum	Extreme Minimum
December	71.2	89.7	52.7	100.0	18.1
January	68.7	87.6	51.1	100.0	14.3
February	66.0	87.8	46.5	100.0	11.6
Winter	68.6	88.4	50.1	100.0	11.6
March	64.0	88.3	43.0	100.0	10.4
April	64.5	91.2	42.1	100.0	11.2
May	72.5	95.5	50.5	100.0	18.3
Spring	67.0	91.7	45.2	100.0	10.4
June	75.0	95.9	53.1	100.0	20.0
July	76.8	95.9	55.1	100.0	19.6
August	76.4	95.6	54.0	100.0	25.6
Summer	76.1	95.8	54.1	100.0	19.6
September	75.9	94.7	53.2	100.0	18.8
October	73.5	94.4	49.9	100.0	15.5
November	71.3	91.7	50.3	100.0	12.0
Autumn	73.6	93.6	51.1	100.0	12.0
Annual	71.3				

* Data were collected at the Watts Bar Meteorological tower located 0.8 km SSW of Watts Bar Nuclear Plant. Temperature and dewpoint instruments are 10 meters (33 feet) above ground.

Relative Humidity (RH) is calculated from simultaneous 10-m temperature (T) and 10-m dewpoint (T_d) using equations from El Paso NWS website (http://www.srh.noaa.gov/epz/?n=wxcalc).

$$RH = \left(\frac{e}{e_s}\right)*100 \quad \text{where:} \quad e = 6.11 * 10^{\left(\frac{7.5*T_d}{237.6+T_d}\right)}$$

$$e_s = 6.11 * 10^{\left(\frac{7.5*T_d}{237.6+T}\right)}$$

units: RH = percent (%)
T, T_d = degrees celsius (°C)
e, e_s = millibars (mb)

Table 2.3-11 Absolute Humidity
Watts Bar Nuclear Plant Meteorological Facility
(Sheet 1 of 2)
(Data in gm/m^3)

July 1, 1973 - June 30, 1975 *

Month	Average	Average Maximum	Average Minimum	Extreme Maximum	Extreme Minimum
December	5.2	6.6	4.0	14.5	1.5
January	6.1	7.8	4.3	13.2	1.0
February	5.7	7.3	4.3	15.1	1.5
Winter	5.7	7.2	4.2	15.1	1.0
March	7.1	8.9	5.3	14.7	1.8
April	8.3	10.3	6.4	17.7	2.0
May	13.7	15.9	11.6	21.5	4.9
Spring	9.7	11.7	7.8	21.5	1.8
June	14.7	17.2	12.4	22.1	7.8
July	17.1	19.3	13.7	22.7	1.8
August	16.7	18.9	14.9	24.4	10.1
Summer	16.2	18.4	13.7	24.4	1.8
September	14.4	16.5	12.5	21.9	4.9
October	9.2	11.0	7.7	17.7	3.1
November	7.0	8.7	5.4	16.6	2.1
Fall	10.2	12.1	8.5	21.9	2.1
Annual	10.4				

* Data were collected at the Watts Bar Meteorological tower located 0.8 km SSW of Watts Bar Nuclear Plant. Temperature and dewpoint instruments at 4 feet above ground.

Table 2.3-11 Absolute Humidity
Watts Bar Nuclear Plant Meteorological Facility
(Sheet 2 of 2)
(Data in gm/m^3)

January 1, 1976 - December 31, 2008 *

Month	Average	Average Maximum	Average Minimum	Extreme Maximum	Extreme Minimum
December	5.1	6.5	4.2	16.5	0.5
January	4.4	5.7	3.6	14.7	0.4
February	4.7	6.1	3.9	14.2	0.6
Winter	4.8	6.1	3.9	16.5	0.4
March	6.1	7.8	5.0	17.6	0.8
April	8.3	10.3	6.8	18.8	1.6
May	11.9	14.0	10.4	24.0	3.1
Spring	8.8	10.7	7.4	24.0	0.8
June	15.4	17.5	13.6	24.8	5.3
July	17.5	19.5	15.6	27.1	7.1
August	16.9	19.0	15.1	27.6	7.2
Summer	16.6	18.7	14.8	27.6	5.3
September	14.0	16.0	12.3	21.9	3.8
October	9.7	11.5	8.3	21.9	1.7
November	6.9	8.4	5.7	19.0	1.2
Autumn	10.2	11.9	8.7	21.2	1.2
Annual	10.1				

* Data were collected at the Watts Bar Meteorological tower located 0.8 km SSW of Watts Bar Nuclear Plant. Temperature and dewpoint instruments are 10 meters (33 feet) above ground.

Absolute Humidity (AH) is calculated from simultaneous 10-m temperature (T) and 10-m vapor pressure (Pw = e from Table 2.3-10) using equation from User's Guide - Vaisala HUMICAP® Humidity and Temperature Transmitter Series HMT330.

$$AH = 216.68 * \left(\frac{Pw}{T}\right)$$

units: AH = grams/cubic meter (g/m^3)
T = degrees kelvin (°K)
P_w = millibars (mb)

Table 2.3-12 Fog Data*

Month	Chat.[a]	Knox.[b]	Oak R.[c]	Est. from Hardwick[d]
January	2.8	2.6	2.5	1
February	1.5	1.8	1.3	2
March	1.2	1.7	1.8	1
April	1.3	1.3	1.7	1
May	2.2	2.2	5.5	2
June	1.6	1.8	4.8	2
July	1.5	2.1	5.8	2
August	1.9	3.5	5.2	3
September	3.3	3.8	7.5	4
October	4.8	4.3	7.8	6
November	3.3	2.9	4.5	4
December	2.4	2.4	4.3	3
Annual	27.8	30.4	52.7	33

* Mean number of days with heavy fog, which is defined by horizontal visibility 1/4 mile or less.

a. Local Climatological Data, Annual Summary with Comparative Data, 2009, Chattanooga, Tennessee, U.S. Department of Commerce, NOAA, NCDC, Asheville, North Carolina. Period of record = 46 years.

b. Local Climatological Data, Annual Summary with Comparative Data, 2009, Knoxville, Tennessee, U.S. Department of Commerce, NOAA, NCDC, Asheville, North Carolina. Period of record = 46 years.

c. Local Climatological Data, Annual Summary with Comparative Data, 2009, Oak Ridge, Tennessee, U.S. Department of Commerce, NOAA, NCDC, Asheville, North Carolina. Period of record = 10 years.

d. Hardwick, W. C. "Monthly Fog Frequency in the Continental United States", Monthly Weather Review, Volume 101, October 1973, pages 763-766.

Table 2.3-13
Joint Percentage Frequencies of Wind Speed By Wind Direction Disregarding Stability Class
Watts Bar Nuclear Plant
Jan 1, 1974 - Dec 31, 1993

WIND DIRECTION	WIND SPEED(MPH)									
	CALM	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	TOTAL
N	0.125	0.707	1.399	1.677	1.445	1.578	0.074	0.000	0.000	7.004
NNE	0.124	0.615	1.407	2.043	1.956	2.127	0.112	0.000	0.000	8.446
NE	0.160	0.728	1.957	1.783	1.051	0.695	0.011	0.001	0.000	6.386
ENE	0.242	1.112	2.944	1.296	0.425	0.150	0.002	0.000	0.000	6.170
E	0.151	0.992	1.540	0.583	0.138	0.045	0.002	0.000	0.000	3.451
ESE	0.059	0.438	0.546	0.192	0.028	0.013	0.001	0.000	0.000	1.277
SE	0.086	0.609	0.834	0.319	0.076	0.048	0.014	0.000	0.000	1.985
SSE	0.145	0.892	1.540	0.598	0.176	0.141	0.037	0.003	0.000	3.532
S	0.222	1.106	2.621	1.844	0.869	0.732	0.204	0.021	0.001	7.620
SSW	0.281	1.209	3.504	4.017	3.001	3.115	0.611	0.048	0.000	15.786
SW	0.237	1.479	2.506	1.516	0.756	0.470	0.072	0.004	0.001	7.040
WSW	0.239	1.888	2.135	0.666	0.372	0.317	0.082	0.004	0.000	5.702
W	0.235	2.104	1.843	0.646	0.546	0.653	0.090	0.008	0.002	6.127
WNW	0.212	2.052	1.505	0.637	0.597	0.821	0.086	0.005	0.000	5.915
NW	0.266	2.455	2.061	0.765	0.722	1.026	0.102	0.002	0.000	7.354
NNW	0.168	1.354	1.463	0.975	0.921	1.242	0.082	0.001	0.000	6.205
SUBTOTAL	2.951	19.738	29.823	19.554	13.081	13.172	1.583	0.095	0.003	100.00

TOTAL HOURS OF VALID W IND OBSERVATIONS169102
TOTAL HOURS OF OBSERVATIONS175320
RECOVERABILITY PERCENTAGE96.5
TOTAL HOURS CALM4990

METEOROLOGICAL FACILITY: W ATTS BAR NUCLEAR PLANT
W IND SPEED AND DIRECTION M EASURED AT 9.72 M ETER LEVEL
M EAN W IND SPEED = 4.07Date Printed: 29-NOV-94
NOTE: TOTALS AND SUBTOTALS ARE OBTAINED FROM UNROUNDED NUM BERS

Table 2.3-14 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant Jan 1, 74 - Dec 31, 93

Wind Direction	(Wind Speed(Mph) Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.109	0.561	1.284	1.176	1.327	2.822	0.419	0.019	0.000	7.788
NNE	0.189	0.809	2.381	2.260	2.104	2.940	0.437	0.008	0.000	11.128
NE	0.272	1.144	3.460	2.490	1.633	1.555	0.126	0.002	0.000	10.682
ENE	0.215	1.013	2.622	1.257	0.579	0.393	0.024	0.000	0.000	6.203
E	0.109	0.774	1.061	0.488	0.195	0.087	0.008	0.000	0.000	2.722
ESE	0.056	0.418	0.526	0.279	0.059	0.026	0.002	0.001	0.000	1.367
SE	0.061	0.387	0.642	0.334	0.103	0.093	0.024	0.008	0.000	1.652
SSE	0.112	0.574	1.313	0.671	0.217	0.240	0.097	0.018	0.000	3.242
S	0.191	0.765	2.456	1.791	0.887	0.875	0.314	0.093	0.013	7.386
SSW	0.237	0.745	3.261	4.368	3.484	4.555	1.901	0.355	0.032	18.939
SW	0.140	0.584	1.787	2.080	1.732	2.366	0.714	0.103	0.015	9.521
WSW	0.085	0.448	0.981	0.747	0.514	0.764	0.294	0.073	0.017	3.922
W	0.068	0.428	0.721	0.428	0.396	0.859	0.327	0.049	0.007	3.282
WNW	0.056	0.390	0.549	0.416	0.450	1.243	0.438	0.031	0.001	3.573
NW	0.062	0.388	0.661	0.486	0.650	1.398	0.391	0.027	0.001	4.065
NNW	0.065	0.387	0.710	0.622	0.714	1.554	0.457	0.021	0.001	4.530
Subtotal	2.026	9.813	24.413	19.894	15.143	21.770	6.045	0.808	0.087	100.000

Total Hours Of Valid Wind Observations 142902
Total Hours Of Observations 149016
Recoverability Percentage 95.9
Total Hours Calm 2895
Meteorological Facility: Watts Bar Nuclear Plant
Wind Speed And Direction Measured At 46.36 Meter Level
Mean Wind Speed = 5.6981
Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Date Printed: 29-NOV-94

Table 2.3-15 Wind Direction Persistence Data
Disregarding Stability,
Watts Bar Nuclear Plant
Jan 1, 74 - Dec 31, 93 (Sheet 1 of 2)

	Wind Direction																		ACC.	ACC.
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM	TOTAL	TOTAL	FREQUENCY
2	860	887	906	938	487	134	208	462	1085	1242	1030	782	879	783	988	802	344	12817	28445	100.00
3	360	465	388	428	201	44	77	196	496	697	392	328	353	328	481	373	186	5793	15628	54.94
4	241	298	253	220	71	9	27	77	275	531	219	132	182	179	255	212	113	3294	9835	34.58
5	159	169	146	122	30	1	11	30	174	417	130	67	114	127	162	114	72	2045	6541	23.00
6	112	160	89	64	18	0	5	21	102	289	46	42	61	68	99	81	61	1318	4496	15.81
7	74	93	70	37	7	0	3	4	50	269	38	20	20	34	63	52	45	879	3178	11.17
8	75	78	39	20	2	0	0	5	29	187	26	20	34	18	56	25	29	643	2299	8.08
9	36	42	20	11	0	0	0	2	18	139	17	5	9	17	22	30	23	391	1656	5.82
10	29	54	14	12	0	0	0	2	14	123	8	6	9	8	12	13	20	324	1265	4.45
11	25	30	9	4	0	0	0	0	13	99	5	4	6	12	11	11	9	238	941	3.31
12	15	19	3	1	0	0	3	1	11	79	1	0	3	2	2	7	4	151	703	2.47
13	14	16	4	2	0	0	0	0	3	62	2	2	2	2	4	6	5	124	552	1.94
14	5	13	4	0	0	0	0	0	2	49	3	0	1	2	0	3	6	88	428	1.50
15	5	14	0	1	0	0	0	0	2	42	3	1	1	0	1	6	2	78	340	1.20
16	4	8	3	1	1	0	0	0	0	21	0	1	1	1	2	2	0	45	262	0.92
17	4	9	1	0	0	0	0	0	1	20	1	0	0	0	1	2	0	39	217	0.76
18	3	6	2	0	0	0	0	1	0	22	1	1	0	0	1	0	0	37	178	0.63
19	3	8	0	0	0	0	0	0	0	19	0	0	1	1	2	1	0	35	141	0.50
20	4	6	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	20	106	0.37
21	1	5	0	0	0	0	0	0	0	2	1	0	0	0	1	3	0	13	86	0.30
22	1	7	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	14	73	0.26
23	1	0	0	0	0	0	0	0	1	6	0	0	0	0	1	1	0	10	59	0.21
24	0	5	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	9	49	0.17
25	1	0	0	0	0	0	0	0	1	3	0	0	0	0	0	1	0	6	40	0.14
26	0	1	1	0	0	0	0	0	0	6	0	0	0	0	2	0	0	10	34	0.12
27	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	4	24	0.08
28	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	4	20	0.07
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0.06
30	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4	16	0.06
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0.04
32	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	12	0.04
>32	0	3	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	10	10	0.04
TOTAL	2032	2396	1952	1861	817	188	334	801	2277	4362	1923	1411	1676	1582	2167	1747	919	28445		

Table 2.3-15 Wind Direction Persistence Data
Disregarding Stability,
Watts Bar Nuclear Plant
Jan 1, 74 - Dec 31, 93 (Sheet 2 of 2)

	Wind Direction																		ACC.	ACC.
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM	TOTAL	TOTAL	FREQUENCY
Maximum Persistence (Hours)	25	40	26	16	16	5	12	18	25	44	21	18	19	19	27	28	15			
50.0%	3	3	3	2	2	2	2	2	3	4	2	2	2	3	3	3	3			
80.0%	6	6	5	4	3	3	3	3	4	8	4	4	4	4	5	5	6			
90.0%	8	9	6	5	4	3	4	4	6	11	5	5	5	6	6	6	8			
99.0%	16	20	11	10	7	4	7	8	11	21	10	10	10	11	11	15	13			
99.9%	22	37	18	15	16	5	12	18	17	34	18	16	16	16	26	25	15			

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At The 9.72 Meter Level

Table 2.3-16 Wind Direction Persistence Data
Disregarding Stability,
Watts Bar Nuclear Plant
Jan 1, 77 - Dec 31, 93 (Sheet 1 of 2)

Persistence	Wind Direction																		ACC.	ACC.
(Hours)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM	TOTAL	TOTAL	FREQUENCY
2	772	1014	1137	822	323	145	174	414	1015	1244	1088	489	370	367	412	491	245	10522	24808	100.00
3	348	503	539	353	102	32	60	134	438	735	503	148	123	171	205	247	128	4769	14286	57.59
4	227	360	403	200	45	16	19	65	212	577	344	87	82	124	106	120	73	3060	9517	38.36
5	168	182	275	98	12	4	11	28	124	391	191	45	47	64	77	79	38	1834	6457	26.03
6	122	165	169	59	4	0	7	10	79	285	130	26	33	55	50	49	40	1283	4623	18.64
7	77	128	122	31	3	0	0	6	34	249	77	13	13	31	37	31	18	870	3340	13.46
8	54	73	70	18	2	0	1	5	21	175	58	8	14	14	17	31	11	572	2470	9.96
9	47	59	57	7	0	0	2	1	9	148	43	8	10	14	21	17	8	451	1898	7.65
10	27	46	35	8	0	0	0	2	11	124	16	1	5	6	14	8	1	304	1447	5.83
11	20	36	18	4	0	0	0	1	8	99	13	3	1	7	6	11	5	232	1143	4.61
12	20	36	31	1	0	0	0	0	3	81	10	2	3	3	6	10	1	207	911	3.67
13	11	23	14	1	0	0	0	1	2	60	10	2	3	0	6	2	0	135	704	2.84
14	18	15	10	0	0	0	0	0	0	64	6	1	2	2	3	4	1	126	569	2.29
15	10	23	10	0	0	0	0	0	0	54	3	2	1	1	5	1	0	110	443	1.79
16	5	16	4	0	0	0	0	0	0	31	0	0	2	2	1	2	0	63	333	1.34
17	4	7	2	0	0	0	0	0	0	29	1	0	0	0	2	1	0	46	270	1.09
18	2	9	3	0	0	0	0	1	0	31	1	0	0	0	1	1	0	49	224	0.90
19	3	8	1	0	0	0	0	0	0	16	1	0	0	1	0	1	0	31	175	0.71
20	0	7	1	0	0	0	0	0	0	17	3	1	0	0	1	0	0	30	144	0.58
21	1	5	2	0	0	0	0	0	0	5	2	0	0	0	0	1	0	16	114	0.46
22	2	6	1	0	0	0	0	0	0	14	1	0	0	0	1	0	0	25	98	0.40
23	1	3	0	0	0	0	0	0	0	9	2	0	0	0	0	0	0	15	73	0.29
24	0	1	0	0	0	0	0	0	0	5	0	0	0	0	0	0	1	7	58	0.23
25	0	3	0	0	0	0	0	0	0	5	2	0	0	0	0	0	0	10	51	0.21
26	0	0	2	0	0	0	0	0	0	3	0	0	0	0	0	0	0	5	41	0.17
27	1	2	2	0	0	0	0	0	0	2	1	0	0	0	0	0	0	8	36	0.15
28	1	0	0	0	0	0	0	0	0	5	0	0	0	0	1	0	0	7	28	0.11
29	0	1	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	8	21	0.08

Table 2.3-16 Wind Direction Persistence Data
Disregarding Stability,
Watts Bar Nuclear Plant
Jan 1, 77 - Dec 31, 93 (Sheet 2 of 2)

Persistence	Wind Direction																		ACC.	ACC.
(Hours)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	CALM	TOTAL	TOTAL	FREQUENCY
30	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	13	0.05
31	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	12	0.05
32	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	10	0.04
>32	0	1	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	9	9	0.04
TOTAL	1941	2733	2908	1602	491	197	274	668	1956	4475	2507	836	709	862	972	1107	570	24808		
MAXIMUM PERSISTENCE (HOURS)	**28**	**33**	**27**	**13**	**8**	**5**	**9**	**18**	**13**	**48**	**32**	**20**	**16**	**19**	**28**	**21**	**24**			
50.0%	3	3	3	2	2	2	2	2	2	4	3	2	2	3	3	3	3			
80.0%	6	6	5	4	3	3	3	3	4	8	5	4	4	5	5	5	5			
90.0%	8	9	7	5	4	4	4	4	5	12	7	5	6	6	7	7	6			
99.0%	16	20	14	9	7	5	8	8	10	23	13	11	13	12	15	13	11			
99.9%	27	29	26	12	8	5	9	18	13	34	25	20	16	19	28	19	24			

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At The 46.36 Meter Level

Table 2.3-17 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant January (74-93)

Wind Direction	Wind Speed(MPH) CALM	0.6-1.4	1.5-3.4	3.5-5.	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.123	0.767	1.411	1.555	1.795	2.158	0.075	0.000	0.000	7.883
NNE	0.136	0.527	1.891	2.418	2.377	2.151	0.110	0.000	0.000	9.609
NE	0.181	0.870	2.343	1.884	1.069	0.548	0.000	0.000	0.000	6.894
ENE	0.238	1.117	3.110	1.110	0.356	0.110	0.000	0.000	0.000	6.040
E	0.130	0.829	1.486	0.370	0.151	0.096	0.000	0.000	0.000	3.062
ESE	0.043	0.329	0.432	0.123	0.034	0.021	0.000	0.000	0.000	0.981
SE	0.060	0.336	0.740	0.144	0.027	0.000	0.000	0.000	0.000	1.307
SSE	0.116	0.658	1.411	0.329	0.103	0.014	0.027	0.021	0.000	2.678
S	0.130	0.555	1.754	1.130	0.706	0.432	0.178	0.014	0.000	4.897
SSW	0.211	0.836	2.911	3.569	2.466	2.850	0.569	0.021	0.000	13.431
SW	0.150	0.849	1.822	1.514	0.870	0.555	0.151	0.000	0.000	5.911
WSW	0.179	1.144	2.041	1.240	0.877	0.733	0.315	0.007	0.000	6.536
W	0.188	1.445	1.904	0.980	1.185	1.329	0.288	0.014	0.000	7.333
WNW	0.168	1.459	1.521	0.959	1.089	1.623	0.158	0.000	0.000	6.976
NW	0.208	1.692	2.007	1.144	1.260	1.904	0.212	0.000	0.000	8.428
NNW	0.164	1.144	1.767	1.288	1.480	2.048	0.144	0.000	0.000	8.034
SUBTOTAL	2.425	14.556	28.550	19.755	15.844	16.570	2.226	0.075	0.000	100.000

Total Hours Of Valid Wind Observations 14599

Total Hours Of Observations 14880

Recoverability Percentage 98.1

Total Hours Calm 354

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 9.72 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 4.57

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-18 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant January (77-93)

Wind Direction	Wind Speed (MPH)									
	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.086	0.372	1.510	1.147	1.446	3.400	0.678	0.000	0.000	8.639
NNE	0.140	0.565	2.504	2.496	2.617	3.473	0.557	0.000	0.000	12.352
NE	0.170	0.687	3.045	2.722	1.971	1.745	0.057	0.000	0.000	10.395
ENE	0.136	0.678	2.310	1.018	0.533	0.226	0.000	0.000	0.000	4.901
E	0.085	0.598	1.260	0.218	0.057	0.024	0.000	0.000	0.000	2.241
ESE	0.030	0.315	0.339	0.089	0.016	0.000	0.000	0.000	0.000	0.789
SE	0.036	0.380	0.420	0.073	0.073	0.016	0.000	0.008	0.000	1.006
SSE	0.065	0.372	1.058	0.331	0.137	0.024	0.008	0.000	0.000	1.995
S	0.104	0.525	1.769	1.171	0.509	0.428	0.121	0.065	0.016	4.708
SSW	0.142	0.412	2.714	3.497	2.859	4.038	1.381	0.291	0.032	15.367
SW	0.090	0.485	1.486	1.688	1.672	2.811	0.743	0.105	0.032	9.112
WSW	0.066	0.428	1.018	0.767	0.670	1.373	0.517	0.178	0.065	5.082
W	0.050	0.291	0.808	0.420	0.775	1.615	0.759	0.218	0.032	4.969
WNW	0.041	0.363	0.541	0.614	0.905	2.367	0.880	0.057	0.000	5.768
NW	0.042	0.258	0.670	0.743	1.220	2.609	0.953	0.065	0.000	6.560
NNW	0.050	0.307	0.792	0.775	1.074	2.423	0.695	0.000	0.000	6.116
SUBTOTAL	1.333	7.035	22.244	17.769	16.533	26.573	7.350	0.985	0.178	100.000

Total Hours Of Valid Wind Observations 12381

Total Hours Of Observations 12648

Recoverability Percentage 97.9

Total Hours Calm 165

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed and Direction Measured at 46.36 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 6.34

Note: Totals and Subtotals are Obtained From Unrounded Numbers

Table 2.3-19 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant February (74-93)

Wind Direction	Wind Speed (MPH)									
	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.120	0.693	1.701	1.807	1.634	2.319	0.083	0.000	0.000	8.357
NNE	0.128	0.745	1.807	2.492	2.499	2.868	0.151	0.000	0.000	10.691
NE	0.170	0.896	2.477	2.078	1.250	0.896	0.030	0.000	0.000	7.796
ENE	0.258	1.536	3.584	1.250	0.354	0.128	0.000	0.000	0.000	7.108
E	0.118	0.858	1.491	0.467	0.196	0.083	0.008	0.000	0.000	3.220
ESE	0.035	0.331	0.361	0.098	0.045	0.000	0.000	0.000	0.000	0.871
SE	0.049	0.474	0.497	0.196	0.038	0.060	0.000	0.000	0.000	1.314
SSE	0.069	0.519	0.851	0.339	0.136	0.128	0.038	0.008	0.000	2.087
S	0.116	0.625	1.679	0.994	0.474	0.550	0.294	0.023	0.000	4.753
SSW	0.166	0.806	2.492	2.989	2.612	3.433	1.242	0.053	0.000	13.792
SW	0.138	0.866	1.882	1.558	1.001	1.084	0.173	0.008	0.000	6.711
WSW	0.152	1.084	1.935	0.986	0.647	0.798	0.256	0.008	0.000	5.866
W	0.147	1.302	1.611	0.858	0.768	1.182	0.188	0.008	0.000	6.064
WNW	0.117	1.137	1.189	0.715	0.949	1.438	0.256	0.023	0.000	5.824
NW	0.180	1.724	1.844	1.024	1.287	1.777	0.196	0.000	0.000	8.032
NNW	0.123	1.031	1.415	1.340	1.235	2.198	0.173	0.000	0.000	7.516
SUBTOTAL	2.085	14.628	26.816	19.190	15.125	18.942	3.087	0.128	0.000	100.000

Total Hours Of Valid Wind Observations 13283

Total Hours Of Observations 13560

Recoverability Percentage 98.0

Total Hours Calm 277

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 9.72 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 4.84

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-20 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant February (77-93)

Wind Direction	Wind Speed (MPH)									
	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.073	0.380	1.396	1.228	1.926	3.825	0.821	0.035	0.000	9.684
NNE	0.139	0.654	2.729	3.074	2.526	3.842	0.707	0.000	0.000	13.672
NE	0.203	0.760	4.160	3.118	2.261	1.926	0.274	0.000	0.000	12.702
ENE	0.137	0.830	2.491	1.316	0.742	0.389	0.035	0.000	0.000	5.940
E	0.056	0.503	0.848	0.397	0.132	0.053	0.035	0.000	0.000	2.025
ESE	0.026	0.256	0.371	0.159	0.018	0.000	0.000	0.000	0.000	0.830
SE	0.026	0.203	0.433	0.168	0.035	0.071	0.009	0.000	0.000	0.945
SSE	0.040	0.300	0.680	0.344	0.088	0.106	0.097	0.035	0.000	1.692
S	0.076	0.380	1.457	0.839	0.486	0.627	0.424	0.115	0.009	4.413
SSW	0.086	0.336	1.749	2.562	2.208	4.107	2.129	0.627	0.053	13.857
SW	0.067	0.336	1.281	1.952	1.625	2.835	1.086	0.194	0.026	9.403
WSW	0.044	0.274	0.804	0.768	0.530	1.157	0.530	0.159	0.035	4.302
W	0.040	0.318	0.662	0.495	0.477	1.334	0.592	0.150	0.009	4.077
WNW	0.031	0.318	0.424	0.459	0.601	2.005	0.804	0.088	0.000	4.730
NW	0.033	0.238	0.556	0.415	1.042	2.579	0.698	0.044	0.000	5.606
NNW	0.045	0.318	0.768	0.839	0.954	2.252	0.874	0.071	0.000	6.122
SUBTOTAL	1.122	6.404	20.811	18.134	15.652	27.109	9.116	1.519	0.132	100.000

Total Hours Of Valid Wind Observations 11321

Total Hours Of Observations 11520

Recoverability Percentage 98.3

Total Hours Calm 127

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed and Direction Measured at 46.36 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 6.68

Note: Totals and Subtotals are Obtained From Unrounded Numbers

Table 2.3-21 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant March (74-93)

Wind Direction	Wind Speed (MPH) Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.097	0.546	1.596	1.659	1.484	2.331	0.189	0.000	0.000	7.903
NNE	0.103	0.770	1.498	1.806	1.729	2.576	0.112	0.000	0.000	8.595
NE	0.142	0.924	2.212	1.421	1.001	1.113	0.028	0.000	0.000	6.842
ENE	0.223	1.365	3.563	1.029	0.504	0.175	0.014	0.000	0.000	6.874
E	0.112	0.903	1.575	0.511	0.161	0.035	0.000	0.000	0.000	3.298
ESE	0.042	0.392	0.546	0.154	0.070	0.021	0.007	0.000	0.000	1.233
SE	0.059	0.581	0.714	0.280	0.119	0.168	0.105	0.000	0.000	2.026
SSE	0.075	0.609	1.043	0.553	0.217	0.406	0.133	0.000	0.000	3.036
S	0.101	0.658	1.568	1.316	0.658	1.344	0.588	0.091	0.007	6.332
SSW	0.137	0.721	2.303	3.402	3.171	5.419	1.911	0.063	0.000	17.128
SW	0.121	0.868	1.806	1.624	1.155	1.043	0.189	0.000	0.007	6.814
WSW	0.138	1.169	1.883	0.679	0.469	0.574	0.105	0.014	0.000	5.032
W	0.127	1.519	1.288	0.693	0.539	1.099	0.210	0.063	0.021	5.560
WNW	0.109	1.246	1.155	0.651	0.616	1.330	0.161	0.028	0.000	5.296
NW	0.142	1.533	1.603	1.036	0.882	1.890	0.266	0.021	0.000	7.374
NNW	0.092	0.847	1.190	1.008	1.253	2.051	0.210	0.007	0.000	6.659
SUBTOTAL	1.820	14.653	25.546	17.824	14.030	21.577	4.229	0.287	0.035	100.000

Total Hours of Valid Wind Observations 14284

Total Hours of Observations 14880

Recoverability Percentage 96.0

Total Hours Calm 260

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed and Direction Measured At 9.72 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 5.17

Note: Totals and Subtotals Are Obtained From Unrounded Numbers

Table 2.3-22 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant March (77-93)

Wind Direction	Wind Speed (MPH) Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.106	0.449	1.379	1.246	1.346	3.879	0.797	0.066	0.000	9.269
NNE	0.172	0.581	2.376	2.401	1.653	3.315	0.498	0.000	0.000	10.996
NE	0.264	0.930	3.614	2.368	1.288	1.894	0.199	0.000	0.000	10.556
ENE	0.157	0.606	2.093	0.972	0.573	0.498	0.058	0.000	0.000	4.958
E	0.077	0.515	0.814	0.515	0.282	0.150	0.017	0.000	0.000	2.370
ESE	0.049	0.282	0.557	0.241	0.075	0.042	0.000	0.008	0.000	1.253
SE	0.033	0.183	0.390	0.332	0.116	0.174	0.150	0.066	0.000	1.445
SSE	0.068	0.216	0.955	0.557	0.191	0.557	0.432	0.033	0.000	3.009
S	0.111	0.449	1.462	1.213	0.706	1.205	0.831	0.316	0.058	6.349
SSW	0.128	0.432	1.778	2.725	2.475	5.076	3.780	0.972	0.058	17.423
SW	0.089	0.349	1.180	1.570	1.886	3.157	1.595	0.307	0.042	10.173
WSW	0.056	0.282	0.689	0.714	0.565	0.905	0.515	0.125	0.017	3.869
W	0.051	0.316	0.565	0.407	0.341	1.097	0.640	0.075	0.025	3.515
WNW	0.040	0.249	0.432	0.474	0.507	1.545	0.764	0.083	0.017	4.110
NW	0.054	0.324	0.606	0.557	0.822	2.019	0.756	0.066	0.008	5.213
NNW	0.050	0.241	0.615	0.565	0.872	2.093	0.989	0.058	0.008	5.491
SUBTOTAL	1.504	6.405	19.505	16.855	13.698	27.604	12.020	2.176	0.233	100.000

Total Hours Of Valid Wind Observations 12038

Total Hours Of Observations 12648

Recoverability Percentage 95.2

Total Hours Calm 181

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 46.36 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 7.13

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-23 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class,
Watts Bar Nuclear Plant
April (74-93)

Wind Direction	Wind Speed (MPH) Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.074	0.651	0.984	1.281	1.230	1.476	0.130	0.000	0.000	5.828
NNE	0.075	0.528	1.129	1.788	1.621	2.128	0.181	0.000	0.000	7.450
NE	0.113	0.832	1.657	1.100	1.013	0.738	0.022	0.000	0.000	5.476
ENE	0.168	1.223	2.468	0.970	0.528	0.232	0.000	0.000	0.000	5.588
E	0.122	1.122	1.563	0.767	0.224	0.058	0.000	0.000	0.000	3.856
ESE	0.056	0.608	0.630	0.355	0.022	0.007	0.000	0.000	0.000	1.677
SE	0.059	0.695	0.601	0.391	0.145	0.043	0.000	0.000	0.000	1.933
SSE	0.101	0.782	1.433	0.796	0.275	0.297	0.145	0.007	0.000	3.835
S	0.134	1.136	1.816	1.592	0.905	1.100	0.579	0.094	0.000	7.356
SSW	0.178	1.028	2.888	3.495	3.597	5.797	1.578	0.282	0.000	18.842
SW	0.166	1.389	2.258	1.534	0.890	0.695	0.174	0.036	0.000	7.142
WSW	0.177	1.918	1.976	0.789	0.420	0.536	0.159	0.014	0.000	5.988
W	0.160	1.744	1.773	0.745	0.644	1.020	0.232	0.007	0.000	6.326
WNW	0.126	1.585	1.201	0.709	0.637	1.426	0.224	0.000	0.000	5.909
NW	0.152	1.715	1.643	0.832	0.825	1.744	0.232	0.007	0.000	7.151
NNW	0.101	1.078	1.158	0.876	0.861	1.462	0.109	0.000	0.000	5.645
SUBTOTAL	1.961	18.034	25.177	18.020	13.837	18.758	3.763	0.449	0.000	100.000

Total Hours Of Valid Wind Observations 13818

Total Hours Of Observations 14400

Recoverability Percentage 96.0

Total Hours Calm 271

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 9.72 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 4.87

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-24 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class,
Watts Bar Nuclear Plant
April (77-93)

Wind Direction	Wind Speed (MPH)									Wind Total
	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	
N	0.087	0.401	0.959	0.820	0.968	2.467	0.462	0.009	0.000	6.173
NNE	0.157	0.706	1.735	1.656	1.674	2.642	0.645	0.009	0.000	9.224
NE	0.228	0.846	2.711	1.500	1.177	1.447	0.209	0.000	0.000	8.118
ENE	0.192	0.750	2.241	0.942	0.619	0.514	0.009	0.000	0.000	5.266
E	0.075	0.392	0.776	0.488	0.288	0.227	0.009	0.000	0.000	2.255
ESE	0.047	0.262	0.471	0.340	0.139	0.026	0.000	0.000	0.000	1.285
SE	0.045	0.218	0.480	0.384	0.174	0.166	0.017	0.000	0.000	1.483
SSE	0.092	0.453	0.985	0.820	0.323	0.480	0.253	0.087	0.000	3.493
S	0.158	0.584	1.883	1.691	1.055	1.107	0.575	0.288	0.070	7.412
SSW	0.198	0.610	2.467	3.470	3.862	6.164	3.662	0.828	0.157	21.418
SW	0.119	0.418	1.439	1.953	1.883	3.025	1.412	0.314	0.052	10.616
WSW	0.075	0.340	0.828	0.750	0.671	1.142	0.567	0.192	0.061	4.626
W	0.065	0.384	0.636	0.584	0.471	1.194	0.645	0.070	0.017	4.067
WNW	0.044	0.305	0.384	0.453	0.453	1.857	1.020	0.052	0.000	4.569
NW	0.058	0.279	0.619	0.549	1.003	2.014	0.610	0.087	0.000	5.219
NNW	0.050	0.279	0.506	0.567	0.689	1.901	0.750	0.035	0.000	4.776
SUBTOTAL	1.691	7.228	19.119	16.966	15.449	26.373	10.846	1.970	0.357	100.000

Total Hours Of Valid Wind Observations 11470

Total Hours Of Observations 12240

Recoverability Percentage 93.7

Total Hours Calm 194

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 46.36 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 6.93

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-25 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant May (74-93)

Wind Direction	Wind Speed (MPH) Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.109	0.618	1.237	1.606	1.293	1.208	0.050	0.000	0.000	6.121
NNE	0.099	0.426	1.265	1.748	1.571	1.606	0.057	0.000	0.000	6.773
NE	0.143	0.633	1.798	1.883	1.094	0.796	0.000	0.000	0.000	6.347
ENE	0.225	0.988	2.836	1.407	0.682	0.284	0.007	0.000	0.000	6.429
E	0.183	1.329	1.791	0.768	0.213	0.028	0.007	0.000	0.000	4.320
ESE	0.081	0.682	0.696	0.306	0.028	0.014	0.000	0.000	0.000	1.808
SE	0.117	0.931	1.066	0.583	0.142	0.057	0.000	0.000	0.000	2.896
SSE	0.178	1.237	1.791	0.725	0.156	0.156	0.014	0.000	0.000	4.257
S	0.256	1.315	3.042	2.168	1.080	0.874	0.178	0.000	0.000	8.912
SSW	0.327	1.578	3.980	4.307	3.440	3.397	0.448	0.007	0.000	17.482
SW	0.281	1.940	2.843	1.812	0.746	0.561	0.050	0.000	0.000	8.234
WSW	0.256	2.409	1.940	0.441	0.320	0.149	0.014	0.000	0.000	5.529
W	0.254	2.459	1.869	0.561	0.434	0.362	0.014	0.000	0.000	5.954
WNW	0.165	1.578	1.237	0.633	0.497	0.590	0.021	0.000	0.000	4.721
NW	0.211	1.940	1.656	0.540	0.441	0.696	0.014	0.000	0.000	5.499
NNW	0.149	1.222	1.308	0.760	0.505	0.739	0.036	0.000	0.000	4.718
SUBTOTAL	3.035	21.285	30.353	20.247	12.643	11.520	0.910	0.007	0.000	100.000

Total Hours Of Valid Wind Observations 14071

Total Hours Of Observations 14880

Recoverability Percentage 94.6

Total Hours Calm 427

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 9.72 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 3.87

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-26 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant May (77-93)

Wind Direction	Wind Speed (MPH) Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.114	0.504	1.123	1.098	1.245	2.099	0.382	0.016	0.000	6.581
NNE	0.220	0.944	2.213	1.912	1.757	2.253	0.366	0.000	0.000	9.665
NE	0.324	1.318	3.319	2.310	1.432	1.464	0.089	0.000	0.000	10.256
ENE	0.266	1.163	2.644	1.155	0.838	0.700	0.049	0.000	0.000	6.814
E	0.119	0.610	1.090	0.700	0.203	0.114	0.000	0.000	0.000	2.836
ESE	0.068	0.268	0.708	0.488	0.065	0.049	0.008	0.000	0.000	1.654
SE	0.080	0.325	0.822	0.439	0.203	0.220	0.000	0.000	0.000	2.089
SSE	0.141	0.635	1.383	0.797	0.212	0.260	0.081	0.016	0.000	3.525
S	0.241	0.748	2.709	2.017	1.131	1.180	0.374	0.065	0.000	8.465
SSW	0.296	0.822	3.425	4.417	3.474	5.255	2.595	0.456	0.016	20.755
SW	0.189	0.610	2.099	2.253	2.001	2.628	0.773	0.106	0.000	10.658
WSW	0.112	0.553	1.058	0.683	0.537	0.716	0.212	0.033	0.000	3.903
W	0.093	0.496	0.838	0.399	0.317	0.667	0.236	0.000	0.000	3.046
WNW	0.066	0.382	0.569	0.415	0.358	0.879	0.220	0.008	0.000	2.897
NW	0.072	0.366	0.659	0.439	0.447	0.968	0.268	0.000	0.000	3.220
NNW	0.081	0.415	0.740	0.578	0.635	0.984	0.187	0.016	0.000	3.635
SUBTOTAL	2.481	10.160	25.397	20.101	14.854	20.434	5.841	0.716	0.016	100.000

Total Hours Of Valid Wind Observations 12293

Total Hours Of Observations 12648

Recoverability Percentage 97.2

Total Hours Calm 305

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 46.36 Meter Level 1-DEC-94

Mean Wind Speed = 5.53

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-27 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant June (74-93)

Wind Direction	Wind Speed (MPH) Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.078	0.403	1.023	1.801	1.174	0.994	0.050	0.000	0.000	5.525
NNE	0.077	0.403	1.001	1.679	1.477	1.830	0.166	0.000	0.000	6.633
NE	0.097	0.454	1.304	1.304	0.627	0.483	0.000	0.000	0.000	4.268
ENE	0.185	0.850	2.521	1.527	0.490	0.137	0.007	0.000	0.000	5.718
E	0.158	1.102	1.765	0.605	0.173	0.014	0.000	0.000	0.000	3.817
ESE	0.068	0.605	0.627	0.180	0.050	0.029	0.007	0.000	0.000	1.566
SE	0.113	0.951	1.102	0.461	0.043	0.000	0.007	0.000	0.000	2.678
SSE	0.174	1.390	1.765	0.720	0.245	0.086	0.000	0.000	0.000	4.381
S	0.294	1.599	3.753	2.637	1.297	0.713	0.029	0.000	0.000	10.323
SSW	0.376	1.643	5.187	5.619	4.005	3.112	0.158	0.000	0.000	20.100
SW	0.319	2.305	3.487	2.183	1.001	0.317	0.007	0.000	0.000	9.619
WSW	0.265	2.377	2.449	0.483	0.202	0.072	0.000	0.000	0.000	5.849
W	0.218	2.240	1.722	0.555	0.382	0.195	0.014	0.000	0.000	5.326
WNW	0.185	1.844	1.520	0.569	0.612	0.418	0.007	0.000	0.000	5.156
NW	0.193	2.082	1.426	0.526	0.497	0.360	0.014	0.000	0.000	5.099
NNW	0.111	0.994	1.016	0.778	0.576	0.439	0.029	0.000	0.000	3.943
SUBTOTAL	2.910	21.245	31.669	21.627	12.852	9.200	0.497	0.000	0.000	100.000

Total Hours Of Valid Wind Observations 13381

Total Hours Of Observations 14400

Recoverability Percentage 96.4

Total Hours Calm 404

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 9.72 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 3.62

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-28 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant June (77-93)

Wind Direction	Wind Speed (MPH)									
	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.107	0.792	1.163	1.137	1.196	1.988	0.219	0.008	0.000	6.612
NNE	0.174	0.944	2.224	2.056	1.592	2.334	0.388	0.008	0.000	9.720
NE	0.231	1.340	2.881	1.938	1.053	0.994	0.017	0.008	0.000	8.463
ENE	0.195	1.078	2.477	1.331	0.767	0.447	0.008	0.000	0.000	6.303
E	0.109	0.784	1.213	0.615	0.261	0.126	0.000	0.000	0.000	3.109
ESE	0.054	0.371	0.615	0.329	0.076	0.034	0.000	0.008	0.000	1.486
SE	0.068	0.472	0.775	0.514	0.076	0.034	0.008	0.000	0.000	1.947
SSE	0.133	0.716	1.702	0.977	0.329	0.194	0.008	0.000	0.000	4.059
S	0.225	0.927	3.185	2.603	1.255	0.876	0.135	0.008	0.000	9.215
SSW	0.254	0.767	3.859	6.471	4.870	5.771	1.297	0.042	0.017	23.347
SW	0.149	0.725	1.997	2.898	2.182	2.755	0.480	0.008	0.000	11.195
WSW	0.091	0.463	1.188	0.893	0.371	0.615	0.110	0.000	0.000	3.730
W	0.066	0.463	0.741	0.379	0.354	0.607	0.051	0.017	0.000	2.678
WNW	0.065	0.573	0.615	0.396	0.404	0.767	0.051	0.000	0.000	2.871
NW	0.050	0.421	0.497	0.354	0.404	0.581	0.042	0.008	0.000	2.359
NNW	0.058	0.447	0.615	0.463	0.514	0.699	0.110	0.000	0.000	2.906
SUBTOTAL	2.030	11.281	25.748	23.355	15.705	18.822	2.924	0.118	0.017	100.000

Total Hours Of Valid Wind Observations 11869

Total Hours Of Observations 12240

Recoverability Percentage 97.0

Total Hours Calm 241

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 46.36 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 4.98

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-29 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class,
Watts Bar Nuclear Plant
July (74-93)

Wind Direction	Wind Speed (MPH)									
	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.062	0.414	1.056	1.388	0.808	0.373	0.000	0.000	0.000	4.100
NNE	0.058	0.387	1.001	1.643	1.719	1.070	0.021	0.000	0.000	5.899
NE	0.068	0.373	1.243	1.747	1.084	0.366	0.014	0.000	0.000	4.893
ENE	0.126	0.656	2.347	1.574	0.614	0.138	0.000	0.000	0.000	5.456
E	0.118	1.049	1.760	0.884	0.166	0.055	0.000	0.000	0.000	4.032
ESE	0.060	0.518	0.918	0.394	0.055	0.000	0.000	0.000	0.000	1.945
SE	0.104	0.870	1.609	0.670	0.076	0.035	0.007	0.000	0.000	3.369
SSE	0.169	1.415	2.603	1.084	0.214	0.124	0.000	0.000	0.000	5.609
S	0.246	1.664	4.211	2.996	1.042	0.504	0.014	0.000	0.000	10.678
SSW	0.310	1.885	5.516	5.647	3.238	1.685	0.076	0.000	0.000	18.357
SW	0.268	2.168	4.225	1.843	0.683	0.249	0.000	0.000	0.000	9.436
WSW	0.223	2.575	2.748	0.587	0.193	0.069	0.000	0.000	0.000	6.395
W	0.182	2.154	2.195	0.580	0.338	0.200	0.000	0.000	0.000	5.650
WNW	0.158	1.899	1.878	0.663	0.373	0.166	0.007	0.000	0.000	5.143
NW	0.161	1.892	1.947	0.456	0.407	0.269	0.007	0.000	0.000	5.139
NNW	0.095	1.091	1.174	0.677	0.545	0.311	0.007	0.000	0.000	3.899
SUBTOTAL	2.409	21.008	36.431	22.831	11.557	5.613	0.152	0.000	0.000	100.000

Total Hours Of Valid Wind Observations 14485

Total Hours Of Observations 14880

Recoverability Percentage 97.3
Total Hours Calm 349

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 9.72 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 3.32

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-30 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class,
Watts Bar Nuclear Plant
July (77-93)

Wind Direction	Wind Speed (MPH) Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.088	0.833	1.468	1.237	1.064	0.940	0.041	0.000	0.000	5.673
NNE	0.122	0.899	2.302	1.873	1.947	1.980	0.132	0.008	0.000	9.263
NE	0.161	1.279	2.929	2.062	1.477	0.973	0.016	0.000	0.000	8.897
ENE	0.120	0.883	2.252	1.526	0.982	0.429	0.025	0.000	0.000	6.216
E	0.071	0.602	1.262	0.800	0.363	0.074	0.000	0.000	0.000	3.173
ESE	0.034	0.256	0.635	0.462	0.132	0.066	0.000	0.000	0.000	1.585
SE	0.050	0.256	1.064	0.817	0.173	0.049	0.025	0.000	0.000	2.434
SSE	0.104	0.627	2.095	1.171	0.256	0.198	0.025	0.000	0.000	4.476
S	0.165	0.874	3.448	2.854	1.279	0.998	0.066	0.000	0.000	9.685
SSW	0.219	0.866	4.867	7.095	4.917	4.290	0.643	0.041	0.000	22.938
SW	0.120	0.544	2.607	3.003	2.079	1.881	0.355	0.008	0.000	10.597
WSW	0.059	0.610	0.940	0.932	0.610	0.544	0.099	0.008	0.000	3.804
W	0.051	0.470	0.874	0.652	0.437	0.454	0.082	0.000	0.000	3.021
WNW	0.042	0.478	0.610	0.346	0.412	0.553	0.025	0.008	0.000	2.475
NW	0.050	0.495	0.808	0.561	0.388	0.454	0.107	0.000	0.000	2.863
NNW	0.046	0.454	0.759	0.495	0.487	0.635	0.016	0.008	0.000	2.901
SUBTOTAL	1.501	10.427	28.923	25.887	17.002	14.519	1.658	0.082	0.000	100.000

Total Hours Of Valid Wind Observations 12122

Total Hours Of Observations 12648

Recoverability Percentage 95.8
Total Hours Calm 182

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 46.36 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 4.62

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-31 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant August (74-93)

Wind Direction	Wind Speed(MPH) Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.132	0.672	1.428	1.934	1.130	0.770	0.014	0.000	0.000	6.081
NNE	0.101	0.367	1.241	1.907	2.004	1.414	0.035	0.000	0.000	7.069
NE	0.153	0.471	1.955	1.913	0.887	0.492	0.007	0.000	0.000	5.879
ENE	0.278	0.915	3.494	2.045	0.499	0.250	0.000	0.000	0.000	7.481
E	0.185	1.109	1.823	0.991	0.139	0.049	0.000	0.000	0.000	4.296
ESE	0.080	0.499	0.776	0.354	0.014	0.014	0.000	0.000	0.000	1.737
SE	0.120	0.749	1.165	0.506	0.125	0.090	0.000	0.000	0.000	2.755
SSE	0.226	1.199	2.392	1.026	0.277	0.111	0.000	0.000	0.000	5.232
S	0.349	1.754	3.792	2.940	1.075	0.603	0.007	0.000	0.000	10.520
SSW	0.409	1.865	4.638	4.368	2.662	1.456	0.021	0.000	0.000	15.419
SW	0.342	2.156	3.279	1.220	0.263	0.069	0.000	0.000	0.000	7.330
WSW	0.310	2.558	2.371	0.395	0.076	0.007	0.000	0.000	0.000	5.718
W	0.258	2.385	1.712	0.333	0.187	0.014	0.000	0.000	0.000	4.889
WNW	0.242	2.302	1.539	0.444	0.153	0.076	0.000	0.000	0.000	4.755
NW	0.307	2.808	2.073	0.451	0.257	0.097	0.007	0.000	0.000	5.999
NNW	0.189	1.359	1.636	0.638	0.624	0.381	0.014	0.000	0.000	4.840
SUBTOTAL	3.681	23.170	35.316	21.464	10.372	5.893	0.104	0.000	0.000	100.000

Total Hours Of Valid Wind Observations 14424

Total Hours Of Observations 14880

Recoverability Percentage 96.9

Total Hours Calm 531

Meteorological Facility: Watts Bar Nuclear Plant

Date Printed: 1-DEC-94

Wind Speed And Direction Measured At 9.72 Meter Level

Mean Wind Speed = 3.20

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-32 98Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant August (77-93)

Wind Direction	Wind Speed (MPH)									
	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.134	0.737	1.483	1.424	1.206	1.625	0.142	0.000	0.000	6.752
NNE	0.241	1.131	2.848	2.161	2.111	2.186	0.109	0.008	0.000	10.796
NE	0.346	1.474	4.247	2.622	1.659	0.963	0.067	0.000	0.000	11.379
ENE	0.275	1.332	3.209	2.237	0.888	0.511	0.050	0.000	0.000	8.501
E	0.140	0.972	1.349	0.880	0.285	0.151	0.008	0.000	0.000	3.784
ESE	0.077	0.528	0.746	0.578	0.101	0.059	0.008	0.000	0.000	2.096
SE	0.086	0.461	0.955	0.570	0.159	0.151	0.008	0.000	0.000	2.389
SSE	0.153	0.737	1.784	1.081	0.402	0.226	0.017	0.000	0.000	4.400
S	0.277	1.072	3.502	2.957	1.198	0.871	0.042	0.000	0.000	9.919
SSW	0.356	1.014	4.867	5.831	4.071	3.301	0.352	0.008	0.000	19.799
SW	0.191	0.771	2.379	2.212	1.374	0.930	0.117	0.000	0.000	7.973
WSW	0.088	0.486	0.963	0.670	0.218	0.193	0.025	0.000	0.000	2.643
W	0.069	0.461	0.679	0.302	0.159	0.201	0.008	0.000	0.000	1.878
WNW	0.066	0.394	0.704	0.352	0.209	0.226	0.025	0.000	0.000	1.976
NW	0.086	0.528	0.888	0.352	0.268	0.285	0.084	0.000	0.000	2.490
NNW	0.082	0.519	0.829	0.662	0.469	0.586	0.075	0.000	0.000	3.223
SUBTOTAL	2.664	12.616	31.432	24.889	14.778	12.465	1.139	0.017	0.000	100.000

Total Hours Of Valid Wind Observations 11937

Total Hours Of Observations 12648

Recoverability Percentage 94.4

Total Hours Calm 318

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 46.36 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 4.24

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-33 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class,
Watts Bar Nuclear Plant
September (74-93)

Wind Direction	Wind Speed (MPH) Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.188	0.890	1.780	2.091	1.664	1.158	0.029	0.000	0.000	7.800
NNE	0.155	0.550	1.657	2.554	2.352	3.169	0.130	0.000	0.000	10.567
NE	0.186	0.601	2.048	2.677	1.368	0.984	0.022	0.007	0.000	7.892
ENE	0.274	0.999	2.902	1.512	0.347	0.145	0.000	0.000	0.000	6.178
E	0.166	0.818	1.548	0.695	0.080	0.036	0.000	0.000	0.000	3.343
ESE	0.059	0.268	0.579	0.159	0.022	0.022	0.000	0.000	0.000	1.109
SE	0.088	0.391	0.861	0.224	0.072	0.014	0.014	0.000	0.000	1.665
SSE	0.171	0.912	1.520	0.651	0.174	0.058	0.000	0.000	0.000	3.485
S	0.307	1.397	2.981	2.113	1.143	0.767	0.029	0.000	0.000	8.737
SSW	0.348	1.418	3.531	3.944	2.598	1.382	0.058	0.000	0.000	13.278
SW	0.281	1.737	2.265	1.165	0.355	0.072	0.000	0.000	0.000	5.874
WSW	0.271	2.178	1.686	0.326	0.065	0.014	0.000	0.000	0.000	4.541
W	0.290	2.489	1.643	0.326	0.195	0.072	0.000	0.000	0.000	5.015
WNW	0.327	2.967	1.693	0.470	0.268	0.166	0.000	0.000	0.000	5.892
NW	0.430	3.813	2.315	0.535	0.434	0.355	0.000	0.000	0.000	7.883
NNW	0.278	2.055	1.903	1.035	0.673	0.796	0.000	0.000	0.000	6.740
SUBTOTAL	3.821	23.480	30.912	20.478	11.809	9.211	0.282	0.007	0.000	100.000

Total Hours Of Valid Wind Observations 13820

Total Hours Of Observations 14400

Recoverability Percentage 96.0

Total Hours Calm 528

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 9.72 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 3.51

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-34 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class,
Watts Bar Nuclear Plant
September (77-93)

Wind Direction	Wind Speed(MPH) Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.129	0.604	1.261	1.501	1.403	2.646	0.169	0.000	0.000	7.712
NNE	0.256	0.968	2.744	2.753	2.690	3.871	0.657	0.018	0.000	13.957
NE	0.388	1.545	4.067	3.312	2.060	2.131	0.240	0.018	0.000	13.760
ENE	0.299	1.438	2.895	1.598	0.666	0.444	0.027	0.000	0.000	7.367
E	0.148	1.128	1.012	0.426	0.186	0.044	0.000	0.000	0.000	2.945
ESE	0.089	0.613	0.675	0.364	0.053	0.036	0.009	0.000	0.000	1.838
SE	0.094	0.586	0.781	0.249	0.080	0.062	0.027	0.009	0.000	1.888
SSE	0.169	0.844	1.607	0.915	0.275	0.231	0.000	0.000	0.000	4.041
S	0.277	1.083	2.930	2.060	0.861	1.048	0.124	0.009	0.000	8.393
SSW	0.336	1.243	3.623	4.466	3.570	3.818	0.719	0.062	0.000	17.838
SW	0.169	0.790	1.652	1.900	1.438	1.279	0.044	0.000	0.000	7.272
WSW	0.104	0.488	1.021	0.551	0.240	0.195	0.018	0.000	0.000	2.617
W	0.072	0.462	0.577	0.329	0.222	0.240	0.044	0.000	0.000	1.945
WNW	0.074	0.417	0.657	0.284	0.204	0.479	0.044	0.000	0.000	2.161
NW	0.080	0.444	0.710	0.364	0.293	0.657	0.036	0.000	0.000	2.584
NNW	0.085	0.506	0.719	0.586	0.648	1.021	0.115	0.000	0.000	3.681
SUBTOTAL	2.770	13.159	26.931	21.657	14.891	18.203	2.273	0.115	0.000	100.000

Total Hours Of Valid Wind Observations 11262

Total Hours Of Observations 12240

Recoverability Percentage 92.0

Total Hours Calm 312

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 46.36 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 4.74

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-35 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class,
Watts Bar Nuclear Plant
October (74-93)

Wind Direction	Wind Speed (MPH)									
	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.269	1.027	1.805	1.861	1.937	2.055	0.049	0.000	0.000	9.002
NNE	0.225	0.847	1.527	2.194	1.923	2.298	0.146	0.000	0.000	9.160
NE	0.262	0.798	1.965	1.937	1.222	0.757	0.000	0.000	0.000	6.941
ENE	0.374	1.326	2.617	1.222	0.340	0.118	0.000	0.000	0.000	5.998
E	0.195	0.909	1.146	0.396	0.111	0.076	0.000	0.000	0.000	2.833
ESE	0.069	0.389	0.333	0.083	0.000	0.021	0.000	0.000	0.000	0.895
SE	0.103	0.562	0.528	0.118	0.049	0.028	0.000	0.000	0.000	1.388
SSE	0.197	0.757	1.319	0.292	0.160	0.069	0.021	0.000	0.000	2.814
S	0.333	1.125	2.388	1.673	0.833	0.639	0.062	0.000	0.000	7.054
SSW	0.369	1.083	2.805	3.076	2.312	2.083	0.153	0.000	0.000	11.880
SW	0.308	1.354	1.888	1.062	0.444	0.194	0.007	0.000	0.000	5.258
WSW	0.383	2.083	1.958	0.458	0.208	0.104	0.007	0.000	0.000	5.202
W	0.472	3.082	1.895	0.410	0.299	0.368	0.000	0.000	0.000	6.526
WNW	0.510	3.686	1.687	0.673	0.569	0.660	0.021	0.000	0.000	7.806
NW	0.696	4.638	2.701	0.660	0.576	0.618	0.035	0.000	0.000	9.923
NNW	0.350	1.993	1.701	1.125	0.868	1.264	0.021	0.000	0.000	7.321
SUBTOTAL	5.117	25.660	28.263	17.238	11.851	11.351	0.521	0.000	0.000	100.000

Total Hours Of Valid Wind Observations 14404

Total Hours Of Observations 14880

Recoverability Percentage 96.8

Total Hours Calm 737

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 9.72 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 3.56

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-36 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant October (77-93)

Wind Direction	Wind Speed (MPH) Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.163	0.562	1.221	1.025	1.660	3.768	0.602	0.000	0.000	9.002
NNE	0.317	0.855	2.613	2.450	2.197	2.962	0.285	0.000	0.000	11.679
NE	0.487	1.595	3.728	2.588	1.628	1.717	0.065	0.000	0.000	11.808
ENE	0.456	1.579	3.410	1.001	0.619	0.236	0.024	0.000	0.000	7.325
E	0.235	1.514	1.058	0.350	0.163	0.090	0.016	0.000	0.000	3.426
ESE	0.118	0.863	0.431	0.163	0.016	0.000	0.000	0.000	0.000	1.591
SE	0.119	0.724	0.578	0.195	0.049	0.057	0.008	0.000	0.000	1.731
SSE	0.207	0.944	1.318	0.480	0.155	0.244	0.057	0.000	0.000	3.406
S	0.328	1.164	2.417	1.587	0.798	0.822	0.252	0.033	0.000	7.400
SSW	0.410	1.017	3.467	3.996	3.280	3.841	1.465	0.098	0.000	17.575
SW	0.241	0.830	1.807	1.620	1.367	1.563	0.358	0.024	0.000	7.810
WSW	0.138	0.570	0.944	0.619	0.415	0.464	0.138	0.000	0.000	3.288
W	0.132	0.610	0.830	0.244	0.277	0.570	0.179	0.000	0.000	2.842
WNW	0.082	0.366	0.529	0.350	0.439	1.213	0.317	0.008	0.000	3.305
NW	0.098	0.480	0.586	0.383	0.578	1.099	0.179	0.000	0.000	3.402
NNW	0.089	0.399	0.578	0.521	0.676	1.701	0.439	0.008	0.000	4.411
Subtotal	3.622	14.072	25.515	17.571	14.316	20.347	4.387	0.171	0.000	100.000

Total Hours Of Valid Wind Observations 12287

Total Hours Of Observations 12648

Recoverability Percentage 97.1

Total Hours Calm 445

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 46.36 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 5.03

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-37 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant November (74-93)

Wind Direction	Wind Speed (MPH)									
	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.190	1.041	1.378	1.636	1.493	1.737	0.151	0.000	0.000	7.626
NNE	0.241	1.091	1.974	2.261	2.153	2.089	0.072	0.000	0.000	9.880
NE	0.254	0.969	2.268	1.694	1.062	0.488	0.007	0.000	0.000	6.743
ENE	0.329	1.292	2.892	0.976	0.179	0.043	0.000	0.000	0.000	5.712
E	0.190	1.019	1.400	0.359	0.014	0.007	0.000	0.000	0.000	2.989
ESE	0.058	0.366	0.366	0.065	0.000	0.007	0.000	0.000	0.000	0.861
SE	0.071	0.402	0.495	0.136	0.050	0.065	0.029	0.000	0.000	1.248
SSE	0.114	0.452	0.998	0.416	0.108	0.194	0.043	0.000	0.000	2.325
S	0.228	0.746	2.153	1.199	0.660	0.761	0.230	0.000	0.000	5.977
SSW	0.289	0.804	2.871	3.560	2.727	3.223	0.646	0.036	0.000	14.155
SW	0.242	1.077	2.002	1.170	0.782	0.323	0.043	0.000	0.000	5.639
WSW	0.305	1.644	2.239	0.754	0.452	0.416	0.065	0.000	0.000	5.875
W	0.368	2.476	2.203	0.739	0.725	0.897	0.036	0.000	0.000	7.445
WNW	0.359	2.792	1.773	0.545	0.560	0.775	0.072	0.000	0.000	6.876
NW	0.425	3.172	2.239	1.019	0.883	1.041	0.086	0.000	0.000	8.866
NNW	0.278	1.931	1.601	1.234	1.191	1.471	0.079	0.000	0.000	7.785
SUBTOTAL	3.940	21.273	28.852	17.764	13.041	13.536	1.557	0.036	0.000	100.000

Total Hours Of Valid Wind Observations 13933

Total Hours Of Observations 14400

Recoverability Percentage 96.8

Total Hours Calm 549

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 9.72 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 3.99

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-38 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant November (77-93)

Wind Direction	Wind Speed (MPH) Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.116	0.573	1.306	1.096	1.290	3.253	0.725	0.034	0.000	8.392
NNE	0.201	0.952	2.309	2.056	2.309	2.857	0.396	0.008	0.000	11.090
NE	0.326	1.180	4.121	2.756	1.787	1.795	0.126	0.000	0.000	12.092
ENE	0.273	1.180	3.253	1.129	0.497	0.160	0.000	0.000	0.000	6.493
E	0.133	0.944	1.222	0.270	0.084	0.000	0.000	0.000	0.000	2.653
ESE	0.054	0.548	0.337	0.067	0.008	0.000	0.000	0.000	0.000	1.015
SE	0.062	0.514	0.489	0.143	0.067	0.093	0.025	0.000	0.000	1.393
SSE	0.104	0.531	1.155	0.320	0.160	0.253	0.160	0.042	0.000	2.725
S	0.187	0.725	2.318	1.306	0.750	0.809	0.539	0.126	0.000	6.761
SSW	0.227	0.716	2.967	3.767	2.958	4.560	2.200	0.371	0.017	17.782
SW	0.142	0.641	1.660	1.896	1.433	2.158	0.725	0.051	0.008	8.713
WSW	0.102	0.405	1.256	0.767	0.615	0.818	0.464	0.110	0.008	4.544
W	0.072	0.489	0.674	0.379	0.430	1.037	0.346	0.017	0.000	3.443
WNW	0.052	0.346	0.506	0.430	0.379	1.155	0.396	0.000	0.000	3.264
NW	0.073	0.455	0.733	0.506	0.573	1.525	0.303	0.000	0.000	4.169
NNW	0.085	0.455	0.927	0.716	0.784	2.014	0.480	0.008	0.000	5.471
Subtotal	2.208	10.653	25.234	17.606	14.126	22.486	6.886	0.767	0.034	100.000

Total Hours Of Valid Wind Observations 11865

Total Hours Of Observations 12240

Recoverability Percentage 96.9

Total Hours Calm 262

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 46.36 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 5.73

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-39 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant December (74-93)

Wind Direction	Wind Speed (MPH)									
	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.098	0.759	1.390	1.511	1.709	2.390	0.071	0.000	0.000	7.928
NNE	0.110	0.752	1.667	2.050	2.064	2.411	0.170	0.000	0.000	9.223
NE	0.144	0.929	2.234	1.766	0.950	0.709	0.007	0.000	0.000	6.740
ENE	0.187	1.106	3.014	0.908	0.199	0.035	0.000	0.000	0.000	5.450
E	0.090	0.851	1.135	0.177	0.028	0.000	0.007	0.000	0.000	2.289
ESE	0.025	0.270	0.270	0.021	0.000	0.000	0.000	0.000	0.000	0.585
SE	0.043	0.355	0.589	0.106	0.021	0.014	0.007	0.000	0.000	1.135
SSE	0.092	0.745	1.277	0.227	0.050	0.057	0.028	0.000	0.000	2.475
S	0.133	0.674	2.241	1.312	0.546	0.504	0.277	0.035	0.000	5.721
SSW	0.167	0.816	2.851	4.163	3.206	3.667	0.539	0.121	0.000	15.528
SW	0.149	1.014	2.262	1.511	0.908	0.511	0.078	0.000	0.000	6.433
WSW	0.174	1.475	2.362	0.858	0.539	0.355	0.064	0.000	0.000	5.827
W	0.191	1.915	2.277	0.979	0.865	1.128	0.099	0.000	0.000	7.453
WNW	0.169	2.085	1.638	0.610	0.858	1.213	0.121	0.007	0.000	6.701
NW	0.234	2.426	2.709	0.965	0.943	1.603	0.156	0.000	0.000	9.035
NNW	0.144	1.496	1.674	0.957	1.248	1.787	0.170	0.000	0.000	7.477
Subtotal	2.149	17.667	29.589	18.121	14.135	16.383	1.794	0.163	0.000	100.000

Total Hours Of Valid Wind Observations 14100

Total Hours Of Observations 14880

Recoverability Percentage 94.8

Total Hours Calm 303

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 9.72 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 4.39

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-40 Joint Percentage Frequencies Of Wind Speed By Wind Direction Disregarding Stability Class, Watts Bar Nuclear Plant December (77-93)

Wind Direction	Wind Speed (MPH) Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.074	0.514	1.128	1.169	1.186	3.973	0.836	0.058	0.000	8.940
NNE	0.112	0.506	1.982	2.281	2.206	3.658	0.547	0.033	0.000	11.325
NE	0.158	0.763	2.762	2.621	1.841	1.650	0.174	0.000	0.000	9.970
ENE	0.127	0.647	2.190	0.887	0.431	0.166	0.000	0.000	0.000	4.448
E	0.068	0.713	0.796	0.199	0.033	0.000	0.008	0.000	0.000	1.818
ESE	0.039	0.456	0.423	0.066	0.008	0.000	0.000	0.000	0.000	0.993
SE	0.037	0.315	0.514	0.116	0.025	0.025	0.017	0.008	0.000	1.057
SSE	0.068	0.506	1.004	0.274	0.083	0.116	0.033	0.008	0.000	2.091
S	0.135	0.639	2.364	1.178	0.605	0.547	0.299	0.100	0.800	5.874
SSW	0.178	0.713	3.260	4.023	3.243	4.462	2.604	0.489	0.041	19.014
SW	0.103	0.498	1.800	2.015	1.825	3.351	0.896	0.124	0.017	10.628
WSW	0.068	0.456	1.053	0.846	0.705	1.037	0.340	0.075	0.017	4.596
W	0.050	0.365	0.738	0.547	0.481	1.286	0.340	0.041	0.000	3.848
WNW	0.049	0.481	0.605	0.406	0.506	1.858	0.722	0.066	0.000	4.693
NW	0.043	0.365	0.589	0.597	0.763	2.007	0.647	0.050	0.008	5.069
NNW	0.044	0.307	0.672	0.705	0.763	2.331	0.763	0.050	0.000	5.634
Subtotal	1.352	8.244	21.879	17.931	14.705	26.466	8.228	1.103	0.091	100.000

Total Hours Of Valid Wind Observations 12057

Total Hours Of Observations 12648

Recoverability Percentage 95.3

Total Hours Calm 163

Meteorological Facility: Watts Bar Nuclear Plant

Wind Speed And Direction Measured At 46.36 Meter Level

Date Printed: 1-DEC-94

Mean Wind Speed = 6.36

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

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Table 2.3-41 Percent Occurrence Of Wind Speed* For All Wind Directions
July 1, 1971 - June 28, 1972 Annual

Wind	Wind Speed (MPH)**					
Direction	1-3	4-7	8-12	13-18	> 19	Total
N	4.33	1.07	0.14	0.03	-	5.57
NNE	4.16	2.11	0.29	0.01	-	6.57
NE	5.26	4.12	0.49	-	-	9.87
ENE	3.9	2.07	0.23	0.01	-	6.21
E	1.64	0.5	0.04	-	-	2.18
ESE	1.11	0.45	0.25	-	-	1.81
SE	1.72	0.5	0.33	-	-	2.55
SSE	2.27	0.81	0.16	-	-	3.24
S	2.94	2.83	0.68	0.15	-	6.6
SSW	2.54	4.69	1.8	0.33	-	9.36
SW	2.54	3.08	0.62	0.04	-	6.28
WSW	2.07	1.08	0.2	0.03	-	3.38
W	2.18	1.26	1.02	0.09	-	4.55
WNW	2.38	1.21	0.9	0.01	-	4.5
NW	4.97	1.74	0.73	0.06	-	7.5
NNW	5.71	2.13	0.29	0.05	-	8.18
Total	49.72	29.65	8.17	0.81	-	88.35

Calm = 11.64

All columns and calm total 100 percent of net valid observations, which represent 91 percent of total record.

* Watts Bar temporary meteorological facility. Wind instruments 10 meters aboveground.

** Wind speed class 1-3 mph includes values 0.6-3.5 mph; class 4-7 mph includes values 3.6-7.5 mph; etc.

Table 2.3-42 Percent Occurrences Of Inversion Conditions And Pasquill Stability Classes A-G*
Watts Bar Nuclear Plant
Jan 1, 74 - Dec 31, 93

		STABILITY CLASS					
	INVERSIONS	A	B	C	D	E	F	G
JANUARY	31.0	2.2	2.2	4.5	47.0	26.5	11.5	6.1
FEBRUARY	34.3	3.7	3.6	5.4	42.5	23.3	11.9	9.5
MARCH	36.3	5.4	4.1	6.1	37.5	23.7	11.9	11.3
APRIL	39.9	5.2	4.2	7.3	33.0	22.6	13.2	14.5
MAY	40.3	4.4	4.1	7.1	33.3	26.2	16.8	8.1
JUNE	40.7	5.6	4.7	7.9	30.9	27.3	17.6	5.9
JULY	39.6	5.8	4.5	7.9	31.5	29.4	16.5	4.6
AUGUST	40.7	5.0	4.4	7.2	30.8	32.5	17.0	3.0
SEPTEMBER	40.7	5.0	4.2	6.6	31.8	30.9	17.4	4.0
OCTOBER	44.3	4.3	3.9	6.3	32.1	24.1	20.9	8.5
NOVEMBER	41.2	1.8	2.2	4.5	38.5	26.8	15.4	10.8
DECEMBER	36.1	1.6	1.8	4.6	44.0	27.1	13.6	7.3
ANNUAL	38.8	4.2	3.7	6.3	36.1	26.7	15.3	7.8

* Inversion Conditions Distributed Within Total Hours With Valid Vertical Temperature Difference Data. Stability Classes Distributed Within Total Hours With Valid Wind Direction, Wind Speed, And Vertical Temperature Difference Data.

Meteorological Facility Located 0.8 Km Ssw Of Watts Bar Nuclear Plant. Temperature Difference Between 9.51 And 45.63 Meters And Wind Direction And Wind Speed At 9.72 Meter Level.

Table 2.3-43 Deleted By Amendment 63

Table 2.3-44 Inversion Persistence Data
Watts Bar Nuclear Plant
Jan 1, 74 - Dec 31, 93 (Delta-T Given In Degrees Celsius) (Page 1 of 2)

					DISREGARDING INVERSION
NO. HOURS	E 0.0<DELTA-T<=1.5	F 1.5<DELTA-T<=4.0	G DELT A-T>4.0	F AND G DELT A-T>1.5	STRENGTH DELTA-T>0.0
2	2027	1091	527	377	842
3	993	728	337	309	549
4	709	597	302	312	393
5	483	530	286	286	349
6	340	513	189	305	314
7	224	399	159	299	271
8	151	291	103	307	277
9	94	220	118	350	270
10	72	164	89	399	298
11	64	132	87	477	419
12	42	60	53	414	773
13	19	31	40	357	731
14	10	17	34	213	595
15	7	3	6	168	468
16	4	1	2	50	272
17	1	0	0	8	98
18	0	0	0	1	25
19	0	1	0	2	8
20	0	0	0	1	0
21	0	0	0	1	1
22	0	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
25	0	0	0	0	0
26	0	0	0	0	0
27	0	0	0	0	0
28	0	0	0	0	0
29	0	0	0	0	0
30	0	0	0	0	0
31	0	0	0	0	0
32	0	0	0	0	0
>=32	0	0	0	0	2*

Table 2.3-44 Inversion Persistence Data
Watts Bar Nuclear Plant
Jan 1, 74 - Dec 31, 93 (Delta-T Given In Degrees Celsius) (Continued) (Page 2 of 2)

					DISREGARDING INVERSION
NO. HOURS	E 0.0<DELTA-T<=1.5	F 1.5<DELTA-T<=4.0	G DELT A-T>4.0	F AND G DELT A-T>1.5	STRENGTH DELTA-T>0.0
TOTAL	5420	4778	2332	4636	6955
Maximum Hours of Persistence	17	19	16	21	45

Meteorological Facility Located 0.8 Km SSW Of Watts Bar Nuclear Plant Temperature Instruments Located 45.63 And 9.51 Meters Above Ground

*January 1982 and December 1989

Table 2.3-45 Joint Percentage Frequencies Of Wind Speed By Wind Direction For Stability Class A (Delta T<=-1.9 C/100 M), Watts Bar Nuclear Plant Jan 1, 74 - Dec 31, 93

Wind	Wind Speed (MPH)									
Direction	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.000	0.001	0.008	0.021	0.036	0.060	0.003	0.000	0.000	0.129
NNE	0.000	0.001	0.012	0.054	0.074	0.141	0.004	0.000	0.000	0.285
NE	0.000	0.000	0.035	0.088	0.078	0.089	0.000	0.000	0.000	0.289
ENE	0.000	0.001	0.037	0.079	0.071	0.032	0.000	0.000	0.000	0.220
E	0.000	0.002	0.037	0.041	0.015	0.005	0.000	0.000	0.000	0.100
ESE	0.000	0.000	0.016	0.016	0.002	0.001	0.000	0.000	0.000	0.035
SE	0.000	0.001	0.021	0.027	0.005	0.001	0.001	0.000	0.000	0.055
SSE	0.000	0.001	0.042	0.055	0.020	0.013	0.002	0.000	0.000	0.133
S	0.000	0.002	0.058	0.139	0.127	0.129	0.018	0.001	0.000	0.473
SSW	0.000	0.001	0.046	0.257	0.476	0.743	0.113	0.005	0.000	1.639
SW	0.000	0.000	0.018	0.093	0.118	0.102	0.012	0.000	0.000	0.343
WSW	0.000	0.000	0.006	0.016	0.017	0.063	0.021	0.002	0.000	0.125
W	0.000	0.000	0.004	0.010	0.014	0.064	0.014	0.001	0.000	0.106
WNW	0.000	0.000	0.001	0.004	0.007	0.033	0.005	0.000	0.000	0.050
NW	0.000	0.000	0.003	0.005	0.010	0.029	0.006	0.000	0.000	0.052
NNW	0.000	0.001	0.007	0.021	0.035	0.057	0.011	0.000	0.000	0.131
SUBTOTAL	0.001	0.008	0.350	0.925	1.102	1.563	0.210	0.008	0.000	4.166

Total Hours Of Valid Stability Observations	167789
Total Hours Of Stability Class A	6970
Total Hours Of Valid Wind Direction-Wind Speed-Stability Class A	6849
Total Hours Of Valid Wind Direction-Wind Speed-Stability Observations	164406
Total Hours Calm	1

Meteorological Facility: Watts Bar Nuclear Plant

Stability Based On Delta-T Between 9.51 And 45.63 Meters

Wind Speed And Direction Measured At 9.72 Meter Level

Mean Wind Speed = 7.21

Date Printed: 20-SEP-94

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-46 Joint Percentage Frequencies Of Wind Speed By Wind Direction For Stability Class B (-1.9< Delta T<=-1.7 C/100 M), Watts Bar Nuclear Plant Jan 1, 74 - Dec 31, 93

Wind	Wind Speed (MPH)									
Direction	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.000	0.000	0.021	0.055	0.052	0.080	0.007	0.000	0.000	0.213
NNE	0.000	0.001	0.040	0.108	0.112	0.186	0.012	0.000	0.000	0.458
NE	0.000	0.000	0.069	0.123	0.107	0.086	0.002	0.000	0.000	0.387
ENE	0.000	0.001	0.052	0.101	0.071	0.024	0.000	0.000	0.000	0.249
E	0.000	0.001	0.061	0.055	0.015	0.002	0.000	0.000	0.000	0.133
ESE	0.000	0.002	0.021	0.024	0.002	0.001	0.000	0.000	0.000	0.049
SE	0.000	0.000	0.030	0.028	0.003	0.002	0.001	0.000	0.000	0.064
SSE	0.000	0.001	0.046	0.046	0.013	0.005	0.000	0.000	0.000	0.111
S	0.000	0.001	0.052	0.128	0.077	0.054	0.012	0.002	0.000	0.326
SSW	0.000	0.000	0.068	0.211	0.289	0.238	0.046	0.003	0.000	0.855
SW	0.000	0.000	0.027	0.114	0.080	0.029	0.003	0.000	0.000	0.252
WSW	0.000	0.000	0.007	0.024	0.026	0.023	0.007	0.000	0.000	0.085
W	0.000	0.000	0.005	0.010	0.023	0.049	0.012	0.001	0.000	0.099
WNW	0.000	0.000	0.005	0.005	0.019	0.060	0.007	0.000	0.000	0.097
NW	0.000	0.000	0.007	0.013	0.023	0.063	0.005	0.001	0.000	0.112
NNW	0.000	0.000	0.008	0.027	0.033	0.081	0.010	0.001	0.000	0.161
Subtotal	0.000	0.006	0.519	1.072	0.944	0.982	0.123	0.007	0.000	3.654

Total Hours Of Valid Stability Observations 167789

Total Hours Of Stability Class B 6109

Total Hours Of Valid Wind Direction-Wind Speed-Stability Class B 6007

Total Hours Of Valid Wind Direction-Wind Speed-Stability Observations 166406

Total Hours Calm 0

Meteorological Facility: Watts Bar Nuclear Plant

Stability Based On Delta-T Between 9.51 And 45.63 Meters

Wind Speed And Direction Measured At 9.72 Meter Level

Mean Wind Speed = 6.38

Date Printed: 20-SEP-94

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-47 Joint Percentage Frequencies Of Wind Speed By Wind Direction For Stability Class C (-1.7< Delta T<=-1.5 C/100 M), Watts Bar Nuclear Plant Jan 1, 74 - Dec 31, 93

Wind	Wind Speed (MPH)									
Direction	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.000	0.001	0.041	0.099	0.117	0.154	0.008	0.000	0.000	0.419
NNE	0.000	0.001	0.099	0.205	0.221	0.292	0.019	0.000	0.000	0.837
NE	0.000	0.002	0.130	0.234	0.163	0.128	0.001	0.000	0.000	0.658
ENE	0.000	0.001	0.117	0.172	0.082	0.027	0.001	0.000	0.000	0.400
E	0.000	0.004	0.101	0.126	0.022	0.005	0.001	0.000	0.000	0.258
ESE	0.000	0.002	0.041	0.040	0.004	0.000	0.000	0.000	0.000	0.088
SE	0.000	0.001	0.055	0.056	0.008	0.001	0.002	0.000	0.000	0.123
SSE	0.000	0.001	0.085	0.109	0.029	0.012	0.004	0.000	0.000	0.238
S	0.000	0.001	0.116	0.245	0.114	0.068	0.017	0.001	0.000	0.561
SSW	0.000	0.001	0.099	0.418	0.375	0.268	0.062	0.004	0.000	1.227
SW	0.000	0.001	0.049	0.193	0.103	0.036	0.007	0.000	0.000	0.388
WSW	0.000	0.001	0.021	0.057	0.037	0.023	0.009	0.000	0.000	0.148
W	0.000	0.001	0.018	0.027	0.050	0.060	0.011	0.002	0.000	0.169
WNW	0.000	0.000	0.011	0.022	0.038	0.113	0.018	0.000	0.000	0.201
NW	0.000	0.000	0.020	0.040	0.051	0.144	0.015	0.001	0.000	0.270
NNW	0.000	0.000	0.024	0.056	0.081	0.129	0.011	0.000	0.000	0.301
Subtotal	0.000	0.015	1.027	2.097	1.494	1.460	0.184	0.009	0.000	6.286

Total Hours Of Valid Stability Observations 167789

Total Hours Of Stability Class C 10556

Total Hours Of Valid Wind Direction-Wind Speed-Stability Class C 10335

Total Hours Of Valid Wind Direction-Wind Speed-Stability Observations 164406

Total Hours Calm 0

Meteorological Facility: Watts Bar Nuclear Plant

Stability Based On Delta-T Between 9.51 And 45.63 Meters

Wind Speed And Direction Measured At 9.72 Meter Level

Mean Wind Speed = 6.06

Date Printed: 20-SEP-94

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-48 Joint Percentage Frequencies Of Wind Speed By Wind Direction For Stability Class D (-1.5< Delta T<=-0.5 C/100 M), Watts Bar Nuclear Plant Jan 1, 74 - Dec 31, 93

Wind	Wind Speed (MPH)									
Direction	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.005	0.046	0.502	0.875	0.967	1.190	0.046	0.000	0.000	3.631
NNE	0.006	0.043	0.584	1.226	1.348	1.457	0.063	0.000	0.000	4.728
NE	0.008	0.067	0.727	1.043	0.615	0.355	0.009	0.001	0.000	2.824
ENE	0.010	0.108	0.859	0.585	0.159	0.052	0.001	0.000	0.000	1.773
E	0.007	0.135	0.568	0.260	0.064	0.016	0.000	0.000	0.000	1.050
ESE	0.003	0.070	0.245	0.082	0.013	0.007	0.000	0.000	0.000	0.420
SE	0.005	0.078	0.378	0.151	0.029	0.023	0.007	0.000	0.000	0.670
SSE	0.007	0.130	0.591	0.256	0.052	0.046	0.018	0.002	0.000	1.102
S	0.011	0.133	0.991	0.816	0.339	0.294	0.100	0.011	0.001	2.697
SSW	0.014	0.106	1.259	1.837	1.071	1.119	0.246	0.021	0.000	5.671
SW	0.009	0.129	0.784	0.742	0.249	0.151	0.018	0.001	0.001	2.084
WSW	0.006	0.083	0.498	0.335	0.170	0.121	0.029	0.001	0.000	1.242
W	0.005	0.095	0.408	0.336	0.347	0.409	0.044	0.002	0.000	1.647
WNW	0.004	0.098	0.325	0.359	0.436	0.571	0.055	0.003	0.000	1.851
NW	0.004	0.080	0.341	0.398	0.530	0.748	0.069	0.001	0.000	2.171
NNW	0.004	0.048	0.369	0.526	0.626	0.903	0.047	0.000	0.000	2.523
SUBTOTAL	0.108	1.450	9.428	9.828	7.014	7.463	0.751	0.042	0.002	36.085

Total Hours Of Valid Stability Observations 167789

Total Hours Of Stability Class D 60302

Total Hours Of Valid Wind Direction-Wind Speed-Stability Class D 59326

Total Hours Of Valid Wind Direction-Wind Speed-Stability Observations 164406

Total Hours Calm 177

Meteorological Facility: Watts Bar Nuclear Plant

Stability Based On Delta-T Between 9.51 And 45.63 Meters

Wind Speed And Direction Measured At 9.72 Meter Level

Mean Wind Speed = 5.37

Date Printed: 20-SEP-94

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-49 Joint Percentage Frequencies Of Wind Speed By Wind Direction For Stability Class E (-0.5< Delta T<= 1.5 C/100 M), Watts Bar Nuclear Plant Jan 1, 74 - Dec 31, 93

Wind	Wind Speed (MPH)									
Direction	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.030	0.164	0.499	0.599	0.274	0.083	0.002	0.000	0.000	1.650
NNE	0.025	0.138	0.415	0.422	0.213	0.070	0.003	0.000	0.000	1.286
NE	0.030	0.156	0.513	0.266	0.088	0.030	0.000	0.000	0.000	1.085
ENE	0.057	0.280	0.988	0.290	0.040	0.009	0.001	0.000	0.000	1.663
E	0.034	0.304	0.461	0.083	0.016	0.010	0.001	0.000	0.000	0.910
ESE	0.013	0.148	0.147	0.028	0.007	0.002	0.001	0.000	0.000	0.347
SE	0.019	0.208	0.209	0.049	0.030	0.021	0.004	0.000	0.000	0.539
SSE	0.039	0.341	0.519	0.114	0.059	0.066	0.014	0.001	0.000	1.152
S	0.067	0.450	1.037	0.478	0.206	0.186	0.061	0.007	0.000	2.492
SSW	0.090	0.505	1.499	1.117	0.743	0.751	0.148	0.016	0.000	4.869
SW	0.071	0.566	1.008	0.300	0.176	0.131	0.021	0.002	0.000	2.274
WSW	0.063	0.651	0.764	0.178	0.106	0.071	0.010	0.001	0.000	1.844
W	0.059	0.671	0.645	0.222	0.111	0.067	0.008	0.000	0.000	1.783
WNW	0.055	0.626	0.595	0.214	0.091	0.037	0.002	0.001	0.000	1.622
NW	0.059	0.652	0.664	0.256	0.111	0.049	0.002	0.000	0.000	1.793
NNW	0.039	0.349	0.512	0.308	0.146	0.075	0.002	0.000	0.000	1.430
SUBTOTAL	0.748	6.208	10.478	4.925	2.415	1.658	0.280	0.028	0.000	26.739

Total Hours Of Valid Stability Observations 167789

Total Hours Of Stability Class E 44969

Total Hours Of Valid Wind Direction-Wind Speed-Stability Class E 43961

Total Hours Of Valid Wind Direction-Wind Speed-Stability Observations 164406

Total Hours Calm 1229

Meteorological Facility: Watts Bar Nuclear Plant

Stability Based On Delta-T Between 9.51 And 45.63 Meters

Wind Speed And Direction Measured At 9.72 Meter Level

Mean Wind Speed = 3.28

Date Printed: 20-SEP-94

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-50 Joint Percentage Frequencies Of Wind Speed By Wind Direction For Stability Class F (1.5< Delta T<= 4.0 C/100 M), Watts Bar Nuclear Plant Jan 1, 74 - Dec 31, 93

Wind	Wind Speed (MPH)									
Direction	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.051	0.288	0.245	0.027	0.006	0.001	0.000	0.000	0.000	0.617
NNE	0.043	0.229	0.219	0.027	0.001	0.001	0.000	0.000	0.000	0.519
NE	0.054	0.246	0.318	0.025	0.002	0.001	0.000	0.000	0.000	0.645
ENE	0.087	0.345	0.567	0.058	0.002	0.002	0.000	0.000	0.000	1.062
E	0.046	0.286	0.200	0.010	0.001	0.001	0.000	0.000	0.000	0.544
ESE	0.016	0.120	0.048	0.001	0.000	0.000	0.000	0.000	0.000	0.185
SE	0.023	0.159	0.082	0.005	0.001	0.000	0.000	0.000	0.000	0.270
SSE	0.042	0.254	0.189	0.018	0.002	0.002	0.000	0.000	0.000	0.508
S	0.061	0.338	0.304	0.040	0.005	0.004	0.000	0.000	0.000	0.751
SSW	0.078	0.387	0.435	0.175	0.063	0.013	0.000	0.000	0.000	1.151
SW	0.096	0.517	0.498	0.064	0.018	0.005	0.001	0.000	0.000	1.199
WSW	0.126	0.738	0.588	0.038	0.007	0.001	0.000	0.000	0.000	1.497
W	0.131	0.884	0.499	0.028	0.001	0.001	0.000	0.000	0.000	1.544
WNW	0.126	0.937	0.393	0.024	0.002	0.001	0.000	0.000	0.000	1.483
NW	0.184	1.225	0.707	0.041	0.004	0.002	0.001	0.000	0.000	2.163
NNW	0.099	0.644	0.398	0.030	0.004	0.000	0.000	0.000	0.000	1.175
SUBTOTAL	1.262	7.598	5.688	0.609	0.119	0.035	0.002	0.000	0.000	15.311

Total Hours Of Valid Stability Observations 166789

Total Hours Of Stability Class F 25805

Total Hours Of Valid Wind Direction-Wind Speed-Stability Class F 25173

Total Hours Of Valid Wind Direction-Wind Speed-Stability Observations 164406

Total Hours Calm 2075

Meteorological Facility: Watts Bar Nuclear Plant

Stability Based On Delta-T Between 9.51 and 45.63 Meters

Wind Speed And Direction Measured At 9.72 Meter Level

Mean Wind Speed = 1.53

Date Printed: 20-SEP-94

NOTE: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-51 Joint Percentage Frequencies Of Wind Speed By Wind Direction For Stability Class G (Delta T > 4.0 C/100 M), Watts Bar Nuclear Plant Jan 1, 74 - Dec 31, 93

Wind	Wind Speed (MPH)									
Direction	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.034	0.195	0.066	0.001	0.000	0.000	0.000	0.000	0.000	0.296
NNE	0.038	0.196	0.095	0.002	0.000	0.000	0.000	0.000	0.000	0.331
NE	0.054	0.257	0.161	0.001	0.000	0.000	0.000	0.000	0.000	0.473
ENE	0.091	0.376	0.327	0.008	0.000	0.001	0.000	0.000	0.000	0.803
E	0.047	0.257	0.105	0.002	0.000	0.000	0.000	0.000	0.000	0.410
ESE	0.015	0.095	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.135
SE	0.027	0.159	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.235
SSE	0.031	0.176	0.065	0.002	0.000	0.000	0.000	0.000	0.000	0.274
S	0.035	0.192	0.075	0.005	0.002	0.000	0.000	0.000	0.000	0.308
SSW	0.042	0.217	0.107	0.012	0.002	0.000	0.000	0.000	0.000	0.379
SW	0.053	0.278	0.130	0.005	0.000	0.000	0.000	0.000	0.000	0.466
WSW	0.089	0.436	0.251	0.007	0.000	0.000	0.000	0.000	0.000	0.782
W	0.094	0.464	0.260	0.005	0.000	0.000	0.000	0.000	0.000	0.823
WNW	0.075	0.406	0.172	0.004	0.000	0.000	0.000	0.000	0.000	0.656
NW	0.101	0.517	0.264	0.010	0.001	0.000	0.000	0.000	0.000	0.893
NNW	0.056	0.306	0.128	0.003	0.000	0.000	0.000	0.000	0.000	0.494
SUBTOTAL	0.881	4.525	2.280	0.068	0.004	0.001	0.000	0.000	0.000	7.758

Total Hours Of Valid Stability Observations 167789

Total Hours Of Stability Class G 13078

Total Hours Of Valid Wind Direction-Wind Speed-Stability Class G 12755

Total Hours Of Valid Wind Direction-Wind Speed-Stability Observations 164406

Total Hours Calm 1448

Meteorological facility: Watts Bar Nuclear Plant

Stability Based On Delta-T Between 9.51 And 45.63 Meters

Wind Speed And Direction Measured at 9.72 Meter Level

Mean Wind Speed = 1.23

Date Printed: 20-SEP-94

NOTE: Totals And Subtotals AreObtained From Unrounded Numbers

Table 2.3-52 Joint Percentage Frequencies Of Wind Speed By Stability Class, Watts Bar Nuclear Plant Jan 1, 74 - Dec 31, 93

WIND SPEED	STABILITY CLASS						
(MPH)	A	B	C	D	E	F	G
CALM	0.001	0.000	0.000	0.108	0.748	1.262	0.881
0.6-1.4	0.008	0.006	0.015	1.450	6.208	7.598	4.525
1.5-3.4	0.350	0.519	1.027	9.428	10.478	5.688	2.280
3.5-5.4	0.925	1.072	2.097	9.828	4.925	0.609	0.068
5.5-7.4	1.102	0.944	1.494	7.014	2.415	0.119	0.004
7.5-12.4	1.563	0.982	1.460	7.463	1.658	0.035	0.001
12.5-18.4	0.210	0.123	0.184	0.751	0.280	0.001	0.000
18.5-24.4	0.008	0.007	0.009	0.042	0.028	0.000	0.000
>=24.5	0.000	0.000	0.000	0.001	0.000	0.000	0.000
TOTAL	4.166	3.654	6.286	36.085	26.739	15.311	7.758

Total Hours Of Valid Stability Observations	167789
Total Hours Of Valid Wind Direction-Wind Speed-Stability Observations	164406
Total Hours Of Observations	175320
Joint Recoverability Percentage	93.8

Meteorological Facility: Watts Bar Nuclear Plant

Stability Based On Delta-T Between 9.51 And 45.63 Meters

Wind Speed And Direction Measured At 9.72 Meter Level

Date Printed: 20-SEP-94

Table 2.3-53 Joint Percentage Frequencies Of Wind Speed By Wind Direction For Stability Class A (Delta T<=-1.9 C/100 M), Watts Bar Nuclear Plant Jan 1, 77 - Dec 31, 93

Wind	Wind Speed (Mph)									
Direction	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.000	0.000	0.006	0.019	0.029	0.072	0.016	0.001	0.000	0.144
NNE	0.000	0.001	0.011	0.036	0.071	0.136	0.019	0.000	0.000	0.275
NE	0.000	0.002	0.032	0.066	0.091	0.128	0.009	0.000	0.000	0.327
ENE	0.000	0.001	0.035	0.073	0.076	0.072	0.003	0.000	0.000	0.261
E	0.000	0.001	0.022	0.036	0.016	0.007	0.000	0.000	0.000	0.082
ESE	0.000	0.001	0.014	0.021	0.003	0.003	0.000	0.000	0.000	0.042
SE	0.000	0.001	0.016	0.025	0.003	0.001	0.001	0.000	0.000	0.047
SSE	0.000	0.001	0.027	0.049	0.016	0.016	0.004	0.001	0.000	0.114
S	0.000	0.000	0.037	0.087	0.058	0.091	0.028	0.005	0.000	0.307
SSW	0.000	0.001	0.032	0.161	0.261	0.699	0.347	0.056	0.006	1.564
SW	0.000	0.000	0.014	0.080	0.150	0.334	0.141	0.019	0.000	0.736
WSW	0.000	0.001	0.004	0.009	0.016	0.046	0.056	0.024	0.008	0.165
W	0.000	0.000	0.001	0.003	0.005	0.032	0.039	0.002	0.003	0.085
WNW	0.000	0.000	0.001	0.003	0.001	0.023	0.036	0.001	0.000	0.066
NW	0.000	0.001	0.001	0.002	0.002	0.019	0.014	0.002	0.000	0.041
NNW	0.000	0.001	0.004	0.009	0.014	0.043	0.016	0.001	0.000	0.088
SUBTOTAL	0.001	0.011	0.258	0.680	0.813	1.721	0.728	0.114	0.017	4.343

Total Hours Of Valid Stability Observations 144312

Total Hours Of Stability Class A 6198

Total Hours Of Valid Wind Direction-Wind Speed-Stability Class A 6089

Total Hours Of Valid Wind Direction-Wind Speed-Stability Observations 140205

Total Hours Calm 2

Meteorological Facility: Watts Bar Nuclear Plant

Stability Based On Delta-T Between 9.51 and 45.63 Meters

Wind Speed And Direction Measured At 46.36 Meter Level

Mean Wind Speed = 9.02

Date Printed: 29-NOV-94

NOTE: Total And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-54 Joint Percentage Frequencies Of Wind Speed By Wind Direction For Stability Class B (-1.9< Delta T<=-1.7 C/100 M), Watts Bar Nuclear Plant Jan 1, 77 - Dec 31, 93

Wind	Wind Speed(MPH)									
Direction	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.000	0.001	0.024	0.037	0.051	0.103	0.019	0.001	0.000	0.237
NNE	0.000	0.001	0.039	0.083	0.091	0.198	0.041	0.000	0.000	0.453
NE	0.000	0.000	0.055	0.125	0.106	0.138	0.012	0.000	0.000	0.437
ENE	0.000	0.002	0.075	0.093	0.088	0.064	0.001	0.000	0.000	0.324
E	0.000	0.001	0.036	0.044	0.020	0.006	0.001	0.000	0.000	0.108
ESE	0.000	0.001	0.016	0.028	0.003	0.001	0.000	0.000	0.000	0.049
SE	0.000	0.000	0.020	0.029	0.006	0.003	0.001	0.001	0.000	0.059
SSE	0.000	0.001	0.031	0.049	0.009	0.008	0.001	0.000	0.000	0.098
S	0.000	0.000	0.034	0.078	0.049	0.044	0.010	0.004	0.001	0.220
SSW	0.000	0.001	0.050	0.160	0.178	0.293	0.111	0.029	0.004	0.826
SW	0.000	0.000	0.021	0.103	0.148	0.161	0.044	0.007	0.002	0.486
WSW	0.000	0.000	0.005	0.014	0.016	0.045	0.015	0.008	0.001	0.105
W	0.000	0.000	0.004	0.005	0.005	0.040	0.031	0.009	0.001	0.093
WNW	0.000	0.000	0.004	0.004	0.006	0.063	0.039	0.001	0.001	0.117
NW	0.000	0.000	0.002	0.009	0.006	0.056	0.024	0.001	0.001	0.098
NNW	0.000	0.000	0.005	0.016	0.024	0.068	0.039	0.004	0.001	0.155
SUBTOTAL	0.001	0.007	0.422	0.876	0.806	1.292	0.387	0.063	0.011	3.866

Total Hours Of Valid Stability Observations	144312
Total Hours Of Stability Class B	5522
Total Hours Of Valid Wind Direction-Wind Speed-Stability Class B	5420
Total Hours Of Valid Wind Direction-Wind Speed-Stability Observations	140205
Total Hours Calm	1

Meteorological Facility: Watts Bar Nuclear Plant

Stability Based On Delta-T Between 9.51 And 45.63 Meters

Wind Speed And Direction Measured At 46.36 Meter Level

Mean Wind Speed = 7.71

Date Printed: 29-NOV-94

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-55 Joint Percentage Frequencies Of Wind Speed By Wind Direction For Stability Class C (-1.7< Delta T<=-1.5 C/100 M), Watts Bar Nuclear Plant Jan 1, 77 - Dec 31, 93

Wind	Wind Speed (MPH)									
Direction	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.000	0.001	0.030	0.087	0.091	0.178	0.039	0.001	0.000	0.427
NNE	0.000	0.002	0.068	0.138	0.178	0.314	0.070	0.000	0.000	0.770
NE	0.000	0.004	0.122	0.215	0.172	0.201	0.016	0.000	0.000	0.730
ENE	0.000	0.004	0.133	0.168	0.123	0.049	0.006	0.000	0.000	0.482
E	0.000	0.001	0.048	0.087	0.018	0.009	0.000	0.000	0.000	0.163
ESE	0.000	0.001	0.031	0.051	0.007	0.002	0.000	0.000	0.000	0.092
SE	0.000	0.001	0.044	0.044	0.006	0.001	0.003	0.001	0.000	0.101
SSE	0.000	0.001	0.049	0.078	0.027	0.014	0.006	0.001	0.000	0.176
S	0.000	0.001	0.070	0.127	0.068	0.057	0.020	0.009	0.001	0.352
SSW	0.000	0.003	0.076	0.270	0.270	0.331	0.115	0.028	0.004	1.096
SW	0.000	0.001	0.039	0.165	0.193	0.192	0.037	0.011	0.001	0.638
WSW	0.000	0.001	0.015	0.036	0.033	0.048	0.020	0.009	0.001	0.163
W	0.000	0.000	0.011	0.016	0.019	0.059	0.023	0.005	0.001	0.135
WNW	0.000	0.000	0.006	0.011	0.026	0.106	0.067	0.011	0.000	0.226
NW	0.000	0.001	0.011	0.020	0.024	0.132	0.051	0.001	0.000	0.239
NNW	0.000	0.001	0.020	0.031	0.041	0.121	0.045	0.002	0.000	0.262
SUBTOTAL	0.001	0.022	0.772	1.544	1.296	1.814	0.516	0.078	0.009	6.051

Total Hours Of Valid Stability Observations 144312

Total Hours Of Stability Class C 8714

Total Hours Of Valid Wind Direction-wind Speed-stability Class C 8484

Total Hours Of Valid Wind Direction-wind Speed-stability Observations 140205

Total Hours Calm 1

Meteorological Facility: Watts Bar Nuclear Plant

Stability Based On Delta-t Between 9.51 And 45.63 Meters

Wind Speed And Direction Measured At 46.36 Meter Level

Mean Wind Speed = 7.24

Date Printed: 29-NOV-94

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-56 Joint Percentage Frequencies Of Wind Speed By Wind Direction For Stability Class D (-1.5< Delta T<=-0.5 C/100 M), Watts Bar Nuclear Plant Jan 1, 77 - Dec 31, 93

Wind	Wind Speed(MPH)									
Direction	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.006	0.047	0.324	0.516	0.633	1.831	0.384	0.009	0.000	3.749
NNE	0.008	0.068	0.435	0.852	1.134	1.933	0.294	0.007	0.000	4.731
NE	0.012	0.101	0.718	1.040	0.901	0.962	0.088	0.001	0.000	3.822
ENE	0.012	0.116	0.660	0.569	0.310	0.164	0.012	0.000	0.000	1.843
E	0.008	0.102	0.402	0.215	0.104	0.043	0.004	0.000	0.000	0.878
ESE	0.004	0.058	0.213	0.107	0.021	0.013	0.002	0.000	0.000	0.419
SE	0.004	0.059	0.240	0.150	0.038	0.037	0.008	0.004	0.000	0.539
SSE	0.007	0.086	0.393	0.247	0.068	0.066	0.039	0.009	0.000	0.914
S	0.010	0.085	0.588	0.553	0.271	0.285	0.133	0.044	0.006	1.976
SSW	0.014	0.083	0.824	1.378	1.026	1.387	0.718	0.145	0.016	5.590
SW	0.009	0.063	0.558	0.880	0.622	0.745	0.238	0.038	0.009	3.162
WSW	0.006	0.061	0.361	0.331	0.210	0.302	0.118	0.020	0.006	1.416
W	0.005	0.068	0.233	0.194	0.188	0.484	0.198	0.030	0.002	1.402
WNW	0.004	0.052	0.185	0.188	0.257	0.867	0.277	0.017	0.000	1.847
NW	0.004	0.054	0.230	0.215	0.356	0.964	0.279	0.020	0.001	2.123
NNW	0.004	0.039	0.226	0.306	0.383	1.080	0.335	0.012	0.000	2.385
SUBTOTAL	0.116	1.144	6.589	7.742	6.522	11.162	3.128	0.356	0.039	36.798

Total Hours Of Valid Stability Observations 144312

Total Hours Of Stability Class D 52796

Total Hours Of Valid Wind Direction-Wind Speed-Stability Class D 51592

Total Hours Of Valid Wind Direction-Wind Speed-Stability Observations 140205

Total Hours Calm 162

Meteorological Facility: Watts Bar Nuclear Plant

Stability Based On Delta-T Between 9.51 And 45.63 Meters

Wind Speed And Direction Measured At 46.36 Meter Level

Mean Wind Speed = 6.93

Date Printed: 29-NOV-94

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-57 Joint Percentage Frequencies Of Wind Speed By Wind Direction For Stability Class E (-0.5< Delta T<= 1.5 C/100 M), Watts Bar Nuclear Plant Jan 1, 77 - Dec 31, 93

Wind	Wind Speed(Mph)									
Direction	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.030	0.168	0.363	0.275	0.415	0.595	0.019	0.000	0.000	1.865
NNE	0.051	0.242	0.655	0.561	0.436	0.337	0.007	0.000	0.000	2.288
NE	0.070	0.336	0.893	0.540	0.273	0.123	0.004	0.000	0.000	2.239
ENE	0.054	0.336	0.622	0.216	0.070	0.039	0.003	0.000	0.000	1.339
E	0.031	0.270	0.281	0.082	0.034	0.021	0.003	0.000	0.000	0.722
ESE	0.017	0.157	0.137	0.056	0.019	0.006	0.000	0.001	0.000	0.393
SE	0.017	0.133	0.166	0.062	0.037	0.046	0.012	0.003	0.000	0.476
SSE	0.032	0.205	0.359	0.155	0.073	0.120	0.049	0.008	0.000	1.002
S	0.058	0.275	0.749	0.509	0.311	0.340	0.126	0.032	0.006	2.406
SSW	0.080	0.303	1.108	1.282	1.081	1.430	0.575	0.099	0.003	5.961
SW	0.044	0.205	0.575	0.538	0.439	0.729	0.223	0.026	0.003	2.782
WSW	0.025	0.168	0.277	0.225	0.159	0.255	0.083	0.010	0.001	1.202
W	0.020	0.124	0.220	0.127	0.133	0.211	0.037	0.004	0.000	0.875
WNW	0.016	0.121	0.170	0.135	0.123	0.160	0.016	0.001	0.000	0.741
NW	0.018	0.121	0.203	0.138	0.205	0.205	0.019	0.001	0.000	0.910
NNW	0.018	0.118	0.196	0.149	0.183	0.223	0.023	0.000	0.000	0.910
SUBTOTAL	0.581	3.281	6.976	5.049	3.992	4.840	1.198	0.184	0.012	26.112

Total Hours Of Valid Stability Observations 144312

Total Hours Of Stability Class E 37823

Total Hours Of Valid Wind Direction-Wind Speed-Stability Class E 36611

Total Hours Of Valid Wind Direction-Wind Speed-Stability Observations 140205

Total Hours Calm 814

Meteorological Facility: Watts Bar Nuclear Plant

Stability Based On Delta-T Between 9.51 And 45.63 Meters

Wind Speed And Direction Measured At 46.36 Meter Level

Mean Wind Speed = 5.17

Date Printed: 29-NOV-94

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-58 Joint Percentage Frequencies Of Wind Speed By Wind Direction For Stability Class F (1.5< Delta T<= 4.0 C/100 M), Watts Bar Nuclear Plant Jan 1, 77 - Dec 31, 93

Wind	Wind Speed (MPH)									
Direction	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.057	0.223	0.333	0.142	0.086	0.032	0.001	0.000	0.000	0.875
NNE	0.110	0.314	0.757	0.388	0.147	0.031	0.000	0.000	0.000	1.747
NE	0.147	0.469	0.964	0.293	0.059	0.010	0.000	0.000	0.000	1.943
ENE	0.105	0.377	0.645	0.071	0.006	0.001	0.000	0.000	0.000	1.207
E	0.049	0.291	0.190	0.010	0.003	0.002	0.000	0.000	0.000	0.546
ESE	0.023	0.151	0.072	0.008	0.002	0.000	0.000	0.000	0.000	0.256
SE	0.026	0.150	0.106	0.018	0.009	0.004	0.000	0.000	0.000	0.314
SSE	0.050	0.206	0.278	0.061	0.016	0.016	0.000	0.000	0.000	0.626
S	0.094	0.297	0.617	0.254	0.086	0.046	0.001	0.001	0.000	1.397
SSW	0.111	0.270	0.814	0.689	0.450	0.334	0.029	0.000	0.000	2.698
SW	0.066	0.240	0.405	0.208	0.130	0.173	0.027	0.001	0.000	1.251
WSW	0.037	0.153	0.205	0.079	0.056	0.056	0.004	0.001	0.000	0.591
W	0.033	0.168	0.155	0.049	0.032	0.019	0.001	0.000	0.000	0.458
WNW	0.026	0.150	0.106	0.046	0.025	0.015	0.000	0.000	0.000	0.369
NW	0.028	0.132	0.136	0.060	0.038	0.018	0.001	0.000	0.000	0.412
NNW	0.033	0.155	0.165	0.066	0.053	0.020	0.001	0.000	0.000	0.493
SUBTOTAL	0.997	3.749	5.950	2.442	1.198	0.777	0.066	0.003	0.000	15.182

Total Hours Of Valid Stability Observations 144312

Total Hours Of Stability Class F 22122

Total Hours Of Valid Wind Direction-Wind Speed-Stability Class F 21286

Total Hours Of Valid Wind Direction-Wind Speed-Stability Observations 140205
Total Hours Calm 1398

Meteorological Facility: Watts Bar Nuclear Plant

Stability Based On Delta-T Between 9.51 And 45.63 Meters

Wind Speed And Direction Measured At 46.36 Meter Level

Mean Wind Speed = 2.91

Date Printed: 29-NOV-94

Note: Totals and Subtotals are Obtained from Unrounded Numbers

Table 2.3-59 Joint Percentage Frequencies Of Wind Speed By Wind Direction For Stability Class G (Delta T > 4.0 C/100 M) Watts, Bar Nuclear Plant Jan 1, 77 - Dec 31, 93

Wind	Wind Speed (MPH)									
Direction	Calm	0.6-1.4	1.5-3.4	3.5-5.4	5.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>=24.5	Total
N	0.023	0.123	0.205	0.087	0.017	0.009	0.000	0.000	0.000	0.465
NNE	0.041	0.185	0.415	0.195	0.066	0.009	0.000	0.000	0.000	0.912
NE	0.063	0.238	0.674	0.208	0.034	0.004	0.000	0.000	0.000	1.220
ENE	0.043	0.179	0.439	0.053	0.001	0.001	0.000	0.000	0.000	0.715
E	0.014	0.109	0.087	0.004	0.000	0.001	0.000	0.000	0.000	0.215
ESE	0.006	0.051	0.038	0.006	0.000	0.000	0.000	0.000	0.000	0.101
SE	0.007	0.046	0.049	0.005	0.003	0.001	0.000	0.000	0.000	0.111
SSE	0.018	0.081	0.175	0.035	0.009	0.003	0.000	0.000	0.000	0.319
S	0.033	0.113	0.367	0.178	0.043	0.011	0.000	0.000	0.000	0.745
SSW	0.032	0.092	0.376	0.424	0.218	0.091	0.002	0.000	0.000	1.235
SW	0.018	0.081	0.175	0.108	0.046	0.034	0.001	0.000	0.000	0.463
WSW	0.012	0.065	0.113	0.044	0.023	0.009	0.000	0.000	0.000	0.265
W	0.011	0.068	0.091	0.027	0.016	0.008	0.000	0.000	0.000	0.220
WNW	0.010	0.070	0.069	0.027	0.010	0.004	0.000	0.000	0.000	0.189
NW	0.011	0.082	0.080	0.041	0.015	0.004	0.000	0.000	0.000	0.233
NNW	0.012	0.073	0.096	0.041	0.018	0.001	0.000	0.000	0.000	0.240
SUBTOTAL	0.353	1.655	3.449	1.484	0.517	0.188	0.003	0.000	0.000	7.648

Total Hours Of Valid Stability Observations 144312

Total Hours Of Stability Class G 11137

Total Hours Of Valid Wind Direction-Wind Speed-Stability Class G 10723

Total Hours Of Valid Wind Direction-Wind Speed-Stability Observations 140205
Total Hours Calm 495

Meteorological Facility: Watts Bar Nuclear Plant

Stability Based On Delta-T Between 9.51 And 45.63 Meters

Wind Speed And Direction Measured At 46.36 Meter Level

Mean Wind Speed = 2.78

Date Printed: 29-NOV-94

Note: Totals And Subtotals Are Obtained From Unrounded Numbers

Table 2.3-60 Joint Percentage Frequencies Of Wind Speed By Stability Class.
Watts Bar Nuclear Plant
Jan 1, 77 - Dec 31, 93

Wind Speed	Stability Class						
(MPH)	A	B	C	D	E	F	G
CALM	0.001	0.001	0.001	0.116	0.581	0.997	0.353
0.6-1.4	0.011	0.007	0.022	1.144	3.281	3.749	1.655
1.5-3.4	0.258	0.422	0.772	6.589	6.976	5.950	3.449
3.5-5.4	0.680	0.876	1.544	7.742	5.049	2.442	1.484
5.5-7.4	0.813	0.806	1.296	6.522	3.992	1.198	0.517
7.5-12.4	1.721	1.292	1.814	11.162	4.840	0.777	0.188
12.5-18.4	0.728	0.387	0.516	3.128	1.198	0.066	0.003
18.5-24.4	0.114	0.063	0.078	0.356	0.184	0.003	0.000
>=24.5	0.017	0.011	0.009	0.039	0.012	0.000	0.000
TOTAL	4.343	3.866	6.051	36.798	26.112	15.182	7.648

Total Hours Of Valid Stability Observations	144312
Total Hours Of Valid Wind Direction-Wind Speed-Stability Observations	140205
Total Hours Of Observations	149016
Joint Recoverability Percentage	94.1

Meteorological Facility: Watts Bar Nuclear Plant

Stability Based On Δt Between 9.51 And 45.63 Meters

Wind Speed And Direction Measured At 46.36 Meter Level

Date Printed: 29-NOV-94

Table 2.3-61 Calculated 1-hour Average Atmospheric Dispersion Factors (X/q) At Minimum Distance (1100 Meters) Between Release Zone (100 M Radius) And Exclusion Area Boundary (1200 M Radius) For Watts Bar Nuclear Plant
(Sheet 1 of 1)

Based on RG 1.145 and Meteorological Data for 1974 Through 1988*

Plume Sector Direction	0.5th Percentile X/Q Value (sec/m^3)	5th Percentile X/Q Value (sec/m^3)
N	3.312E-4	3.396E-5
NNE	3.341E-4	4.596E-5
NE	3.954E-4	3.314E-5
ENE	5.060E-4	2.883E-5
E	5.293E-4	3.177E-5
ESE	5.321E-4	2.721E-5
SE	6.040E-4	5.996E-5
SSE	4.705E-4	2.622E-5
S	3.068E-4	2.662E-5
SSW	2.901E-4	2.806E-5
SW	3.441E-4	1.791E-5
WSW	4.394E-4	3.217E-5
W	3.704E-4	-**
WNW	1.322E-4	-**
NW	2.242E-4	-**
NNW	3.154E-4	-**
All Directions Combined	1.217E-3	5.323E-4

* Meteorological facility located 0.8 km SSW of reactor site. Temperature instruments 9.51 and 45.63 meters above ground. Wind speed and direction measured at 9.72-meter level. Joint percent valid data in data base = 93.4.

** Less than 5% of the hours had nonzero X/Q values.

Table 2.3-61a Calculated 1-hour Average Atmospheric Dispersion Factors (X/q) At Minimum Distance (1100 Meters) Between Release Zone (100 M Radius) And Exclusion Area Boundary (1200 M Radius) For Watts Bar Nuclear Plant
(Sheet 1 of 1)

Based On Rg 1.145 And Meteorological Data For 1974 Through 1993*

Plume Sector Direction	0.5th Percentile X/Q Value (sec/m^3)	5th Percentile X/Q Value (sec/m^3)
N	3.674E-4	3.550E-5
NNE	3.808E-4	5.036E-5
NE	4.597E-4	3.990E-5
ENE	5.305E-4	3.181E-5
E	5.297E-4	2.989E-5
ESE	5.089E-4	2.572E-5
SE	6.069E-4	4.769E-5
SSE	4.645E-4	2.375E-5
S	3.452E-4	2.598E-5
SSW	3.171E-4	2.721E-5
SW	3.703E-4	2.376E-5
WSW	4.728E-4	3.286E-5
W	3.701E-4	-**
WNW	1.452E-4	-**
NW	2.357E-4	-**
NNW	3.239E-4	-**
All Directions Combined	9.297E-3	5.263E-5

* Meteorological facility located 0.8 km SSW of reactor site. Temperature instruments 9.51 and 45.63 meters above ground. Wind speed and direction measured at 9.72-meter level. Joint percent valid data in data base = 93.7.

** Less than 5% of the hours had nonzero X/Q values.

Table 2.3-62 Calculated 1-hour Average And Annual Average Atmospheric Dispersion Factors (X/q) At Low Population Zone Distance (4828 Meters) For Watts Bar Nuclear Plant

Based on R.G. 1.145 and Meteorological Data for 1974 Through 1988*

Plume Sector Direction	0.5th Percentile x/Q Value (sec/m^3)	5th Percentile x/Q Value (sec/m^3)	Annual Average x/Q Value (sec/m^3)
N	7.665E-5	4.828E-6	7.054E-7
NNE	7.799E-5	8.040E-6	1.150E-6
NE	9.809E-5	4.720E-6	1.225E-6
ENE	1.298E-4	3.714E-6	1.282E-6
E	1.348E-4	4.333E-6	1.391E-6
ESE	1.331E-4	3.357E-6	1.533E-6
SE	1.445E-4	1.060E-5	1.467E-6
SSE	1.183E-4	3.148E-6	9.964E-7
S	7.146E-5	3.246E-6	7.454E-7
SSW	6.759E-5	3.542E-6	7.091E-7
SW	8.790E-5	1.467E-6	8.111E-7
WSW	1.206E-4	4.466E-6	9.701E-7
W	9.350E-5	-**	4.400E-7
WNW	2.284E-5	-**	2.335E-7
NW	4.944E-5	-**	2.507E-7
NNW	7.223E-5	-**	3.935E-7
All Directions Combined	2.717E-4	1.352E-4	-

* Meteorological facility located 0.8 km SSW of reactor site. Temperature instruments 9.51 and 45.63 meters above ground. Wind speed and direction measured at 9.72-meter level. Joint percent valid data in data base = 93.4.

** Less than 5% of the hours had nonzero x/Q values.

Table 2.3-62a Calculated 1-hour Average And Annual Average Atmospheric Dispersion Factors (X/q) At Low Population Zone Distance (4828 Meters) For Watts Bar Nuclear Plant

Based on R.G. 1.145 and Meteorological Data for 1974 Through 1993*

Plume Sector Direction	0.5th Percentile X/Q Value (sec/m^3)	5th Percentile X/Q Value (sec/m^3)	Annual Average X/Q Value (sec/m^3)
N	0.798E-4	5.094E-6	0.842E-6
NNE	0.845E-4	8.854E-6	1.386E-6
NE	1.135E-4	5.827E-6	1.639E-6
ENE	1.338E-4	4.514E-6	1.561E-6
E	1.365E-4	4.128E-6	1.600E-6
ESE	1.305E-4	3.181E-6	1.655E-6
SE	1.411E-4	7.997E-6	1.526E-6
SSE	1.161E-4	2.853E-6	1.035E-6
S	0.772E-4	3.211E-6	0.881E-6
SSW	0.731E-4	3.444E-6	0.814E-6
SW	0.930E-4	2.451E-6	1.001E-6
WSW	1.239E-4	4.608E-6	1.212E-6
W	0.897E-4	-**	0.469E-6
WNW	0.265E-4	-**	0.263E-6
NW	0.502E-4	-**	0.272E-6
NNW	0.691E-4	-**	0.416E-6
All Directions Combined	2.797E-4	1.349E-4	-

* Meteorological facility located 0.8 km SSW of reactor site. Temperature instruments 9.51 and 45.63 meters above ground. Wind speed and direction measured at 9.72-meter level. Joint percent valid data in data base = 93.7.

** Less than 5% of the hours had nonzero X/Q values.

Table 2.3-63 Values Of 5th Percentile Overall Site 8-hour, 16-hour, 3-day, And 26-day Atmospheric Dispersion Factors (X/q) At Low Population Zone Distance (4828 Meters) For Watts Bar Nuclear Plant

Based on R.G. 1.145 Method of Logarithmic Interpolation Between Overall 5th Percentile 1-hour X/Q Assumed to Apply for 2-hour Period and Maximum Sector Annual Average X/Q (underscored in Table 2.3-62)*

Averaging Period	5th Percentile X/Q Value (sec/m^3)
8-hour	6.447E-5
16-hour	4.452E-5
3-day	1.993E-5
26-day	6.288E-6

* 1-hour and annual average X/Qs calculated from meteorological data for 1974 through 1988. Meteorological facility located 0.8 km SSW of reactor site. Temperature instruments 9.51 and 45.63 meters above ground. Wind speed and direction measured at 9.72-meter level. Joint percent valid data in data base = 93.4.

Table 2.3-63a VALUES OF 5TH PERCENTILE OVERALL SITE 8-HOUR, 16-HOUR, 3-DAY, AND 26-DAY ATMOSPHERIC DISPERSION FACTORS (X/Q) AT LOW POPULATION ZONE DISTANCE (4828 METERS) FOR WATTS BAR NUCLEAR PLANT

Based on RG 1.145 Method of Logarithmic Interpolation Between Overall 5th Percentile 1-hour X/Q Assumed to Apply for 2-hour Period and Maximum Sector Annual Average X/Q (from Table 2.3-62a)*

Averaging Period	5th Percentile X/Q Value (sec/m^3)
8-hour	6.516E-5
16-hour	4.529E-5
3-day	2.057E-5
26-day	6.621E-6

* 1-hour and annual average X/Qs calculated from meteorological data for 1974 through 1993. Meteorological facility located 0.8 km SSW of reactor site. Temperature instruments 9.51 and 45.63 meters above ground. Wind speed and direction measured at 9.72-meter level. Joint percent valid data in data base = 93.7.

Table 2.3-64 0.5th Percentile Sector Values Of 8-hour, 16-hour, 3-day, And 26-day Atmospheric Dispersion Factors (X/q) At Low Population Zone Outer Boundary Distance (4828 Meters) For Watts Bar Nuclear Plant

Based on R.G. 1.145 Method of Logarithmic Interpolation Between 0.5th Percentile 1-hour X/Q for Each Sector and Annual Average X/Q for Same Sector.*

	Sector-Specific X/Q Values (sec/m^3)			
Plume Sector	8-hour	16-hour	3-day	26-day
N	3.531E-5	2.396E-5	1.034E-5	3.090E-6
NNE	3.884E-5	2.741E-5	1.286E-5	4.342E-6
NE	4.752E-5	3.308E-5	1.507E-5	4.874E-6
ENE	6.049E-5	4.130E-5	1.804E-5	5.492E-6
E	6.328E-5	4.336E-5	1.909E-5	5.877E-6
ESE	6.363E-5	4.399E-5	1.975E-5	6.257E-6
SE	6.765E-5	4.629E-5	2.032E-5	6.230E-6
SSE	5.370E-5	3.618E-5	1.536E-5	4.488E-6
S	3.361E-5	2.305E-5	1.017E-5	3.139E-6
SSW	3.182E-5	2.183E-5	9.639E-6	2.980E-6
SW	4.051E-5	2.750E-5	1.187E-5	3.550E-6
WSW	5.433E-5	3.647E-5	1.535E-5	4.433E-6
W	3.855E-5	2.475E-5	9.465E-6	2.381E-6
WNW	1.071E-5	7.329E-6	3.221E-6	9.895E-7
NW	2.064E-5	1.333E-5	5.167E-6	1.325E-6
NNW	3.051E-5	1.983E-S	7.784E-6	2.033E-6

* 1-hour and annual average X/Qs calculated from meteorological data for 1974 through 1988. Meteorological facility located 0.8 km SSW of reactor site. Temperature instruments 9.51 and 45.63 meters above ground. Wind speed and direction measured at 9.72-meter level. Joint percent valid data in data base = 93.4.

Table 2.3-65 0.5th Percentile Sector Values Of 8-hour, 16-hour, 3-day, And 26-day Atmospheric Dispersion Factors (X/q) At Low Population Zone Outer Boundary Distance (4828 Meters) For Watts Bar Nuclear Plant

Based on RG 1.145 Method of Logarithmic Interpolation Between 0.5th Percentile 1-hour X/Q for Each Sector and Annual Average X/Q for Same Sector.*

	Sector-Specific X/Q Values (sec/m^3)			
Plume Sector	8-hour	16-hour	3-day	26-day
N	3.760E-5	2.581E-5	1.141E-5	3.534E-6
NNE	4.281E-5	3.048E-5	1.458E-5	5.060E-6
NE	5.631E-5	3.967E-5	1.855E-5	6.228E-6
ENE	6.412E-5	4.438E-5	1.997E-5	6.347E-6
E	6.545E-5	4.532E-5	2.041E-5	6.494E-6
ESE	6.340E-5	4.418E-5	2.018E-5	6.553E-6
SE	6.677E-5	4.592E-5	2.039E-5	6.353E-6
SSE	5.319E-5	3.601E-5	1.544E-5	4.579E-6
S	3.683E-5	2.545E-5	1.141E-5	3.606E-6
SSW	3.475E-5	2.396E-5	1.070E-5	3.359E-6
SW	4.397E-5	3.023E-5	1.341E-5	4.174E-6
WSW	5.765E-5	3.933E-5	1.715E-5	5.208E-6
W	3.763E-5	2.438E-5	0.950E-5	2.458E-6
WNW	1.234E-5	0.843E-5	0.369E-5	1.124E-6
NW	2.116E-5	1.375E-5	0.539E-5	1.406E-6
NNW	2.969E-5	1.946E-5	0.777E-5	2.084E-6

* 1-hour and annual average X/Qs calculated from meteorological data for 1974 through 1993. Meteorological facility located 0.8 km SSW of reactor site. Temperature instruments 9.51 and 45.63 meters above ground. Wind speed and direction measured at 9.72-meter level. Joint percent valid data in data base = 93.7.

Table 2.3-66 Atmospheric Dispersion Factors (X/q), Sec/m^3, For Design Basis Accident Analyses Based On Onsite Meteorological Data For Watts Bar Nuclear Plant[a]
(Sheet 1 of 1)

A. Regulatory Guide 1.4 Results in original FSAR (5th percentile values) for July 1973 Through June 1975 Data.[b]

Period (hours)	Minimum Distance to Exclusion Boundary (1100 m)[c]	Low Population Zone (4828 m)
0-2	0.692E-3[d]	0.160E-3d
2-8	-	0.844E-4d
8-24	-	0.854E-5
24-96	-	0.455E-5
96-720	-	0.198E-5

B. Regulatory Guide 1.145 Results (maximum sector 0.5th percentile 1-hour value for 0-2 hours at exclusion area boundary and at low population zone; and 8-hour, 16-hour, 3-day and 26-day values for 2-8, 8-24, 24-96, and 96-720 hours from logarithmic interpolation between 0.5th percentile maximum sector 1-hour value at 2 hours and corresponding sector annual average value at 8760 hours at low population zone) for 1974 through 1988 Data[e].

Period	(1100 m)[c]	(4828 m)
0-2	0.604E-3	0.145E-3
2-8	-	0.677E-4
8-24	-	0.463E-4
24-96	-	0.203E-4
96-720	-	0.623E-5

[a] Hourly 10-m wind and 10- and 46-m temperature data. Meteorological facility located 0.8 km SSW of reactor site.

[b] Calms assigned a wind speed of 0.3 mph.

[c] Travel distance from 100-m radius release zone to 1200-m exclusion area boundary distance.

[d] Actual 2-hour and 6-hour X/Q averaging periods were used.

[e] Calms assigned a wind speed of 0.6 mph.

Table 2.3-66a Atmospheric Dispersion Factors (X/q), Sec/m[3], For Design Basis Accident Analyses Based On Onsite Meteorological Data For Watts Bar Nuclear Plant[1]

A. Regulatory Guide 1.4 Results in original FSAR (5th percentile values) for July 1973 Through June 1975 Data.[2]

Period (hours)	Minimum Distance to Exclusion Boundary (1100 m)[3]	Low Population Zone (4828 m)
0-2	0.692E-3[4]	0.160E-3[4]
2-8	-	0.844E-4[4]
8-24	-	0.854E-5
24-96	-	0.455E-5
96-720	-	0.198E-5

B. Regulatory Guide 1.145 Results (maximum sector 0.5th percentile 1-hour value for 0-2 hours at exclusion area boundary and at low population zone; and 8-hour, 16-hour, 3-day and 26-day values for 2-8, 8-24, 24-96, and 96-720 hours from logarithmic interpolation between 0.5th percentile maximum sector 1-hour value at 2 hours and corresponding sector annual average value at 8760 hours at low population zone) for 1974 through 1993 Data[5].

Period (hours)	Minimum Distance to Exclusion Boundary (1100 m)[3]	Low Population Zone (4828 m)
0-2	0.607E-3	0.141E-3
2-8	-	0.668E-4
8-24	-	0.459E-4
24-96	-	0.204E-4
96-720	-	0.635E-5

1. Hourly 10-m wind and 10 and 46-meter temperature data. Meteorological facility located 0.8 km SSW of reactor site.
2. Calms assigned a wind speed of 0.3 mph.
3. Travel distance from 100-m radius release zone to 1200-m exclusion area boundary distance.
4. Actual 2-hour and 6-hour X/Q averaging periods were used.
5. Calms assigned a wind speed of 0.6 mph.

Table 2.3-67 Dispersion Meteorology - Onsite 10-meter Wind Data - 5th Percentile Values Of Inverse Wind Speed (1/u) Distributions For Post-loca Control Bay Dose Calculations For Watts Bar Nuclear Plant

A. July 1973 through June 1975 Wind Speed and Direction Data

Plume Sectors	Averaging Periods				
(degrees)	1-hour	8-hour	16-hour	3-day	26-day
89.75-157.25	1.59	0.834	0.670	0.447	0.348
132.25-199.75	1.61	0.864	0.688	0.496	0.361
154.75-222.25	1.44	0.743	0.598	0.441	0.300
192.25-259.75	1.33	0.719	0.601	0.437	0.302

B. January 1974 through December 1988 Wind Speed and Direction Data

Plume Sectors	Averaging Periods				
(degrees)	1-hour	8-hour	16-hour	3-day	26-day
89.75-157.25	1.82	1.04	0.852	0.593	0.463
132.25-199.75	1.27	0.760	0.626	0.440	0.316
154.75-222.25	0.866	0.574	0.497	0.360	0.264
192.25-259.75	1.04	0.653	0.576	0.416	0.266

NOTE: The calculations for the 2-year data base were slightly conservative in comparison to those for the 15-year data base. The 2-year values were computed in 1976 with the speed assigned to calm hours assumed to be 0.3 mph. The 15-year values were computed in 1989 with the speed assigned to calms assumed to be 0.6 mph, which is the starting threshold for the anemometer.

*Meteorological facility located 0.8 km SSW of reactor site.

Table 2.3-67a Dispersion Meteorology - Onsite 10-meter Wind Data - 5th Percentile Values Of Inverse Wind Speed (1/u) Distributions For Post-loca Control Bay Dose Calculations For Watts Bar Nuclear Plant

A. July 1973 through June 1975 Wind Speed and Direction Data

Plume Sectors	Averaging Periods				
(degrees)	1-hour	8-hour	16-hour	3-day	26-day
89.75-157.25	1.59	0.834	0.670	0.447	0.348
132.25-199.75	1.61	0.864	0.688	0.496	0.361
154.75-222.25	1.44	0.743	0.598	0.441	0.300
192.25-259.75	1.33	0.719	0.601	0.437	0.302

B. January 1974 through December 1993 Wind Speed and Direction Data

Plume Sectors	Averaging Periods				
(degrees)	1-hour	8-hour	16-hour	3-day	26-day
89.75-157.25	1.97	1.04	0.862	0.607	0.456
132.25-199.75	1.29	0.784	0.626	0.434	0.312
154.75-222.25	0.891	0.606	0.516	0.368	0.255
192.25-259.75	1.10	0.713	0.610	0.435	0.300

NOTE: The 2-year values were computed in 1976 with the speed assigned to calm hours assumed to be 0.3 mph. The 20-year values were computed in 1994 with the speed assigned to calms assumed to be 0.6 mph, which is the starting threshold for the anemometer.

*Meteorological facility located 0.8 km SSW of reactor site.

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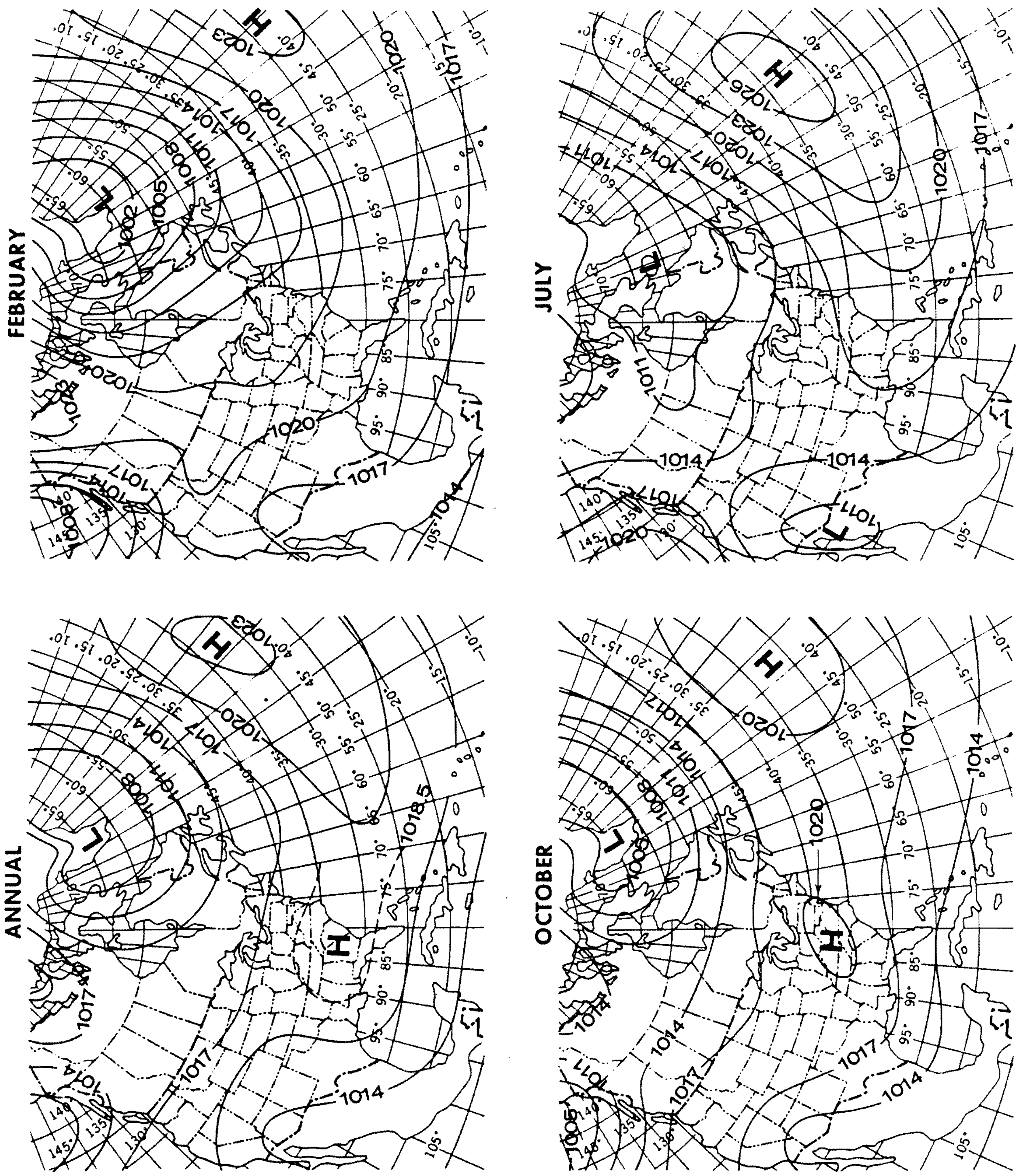

From A Meteorological Survey of the Oak Ridge Area, U. S. Atomic Energy Commission Publication ORO-99, Weather Bureau, Oak Ridge, Tennessee, November 1953. Page 377.

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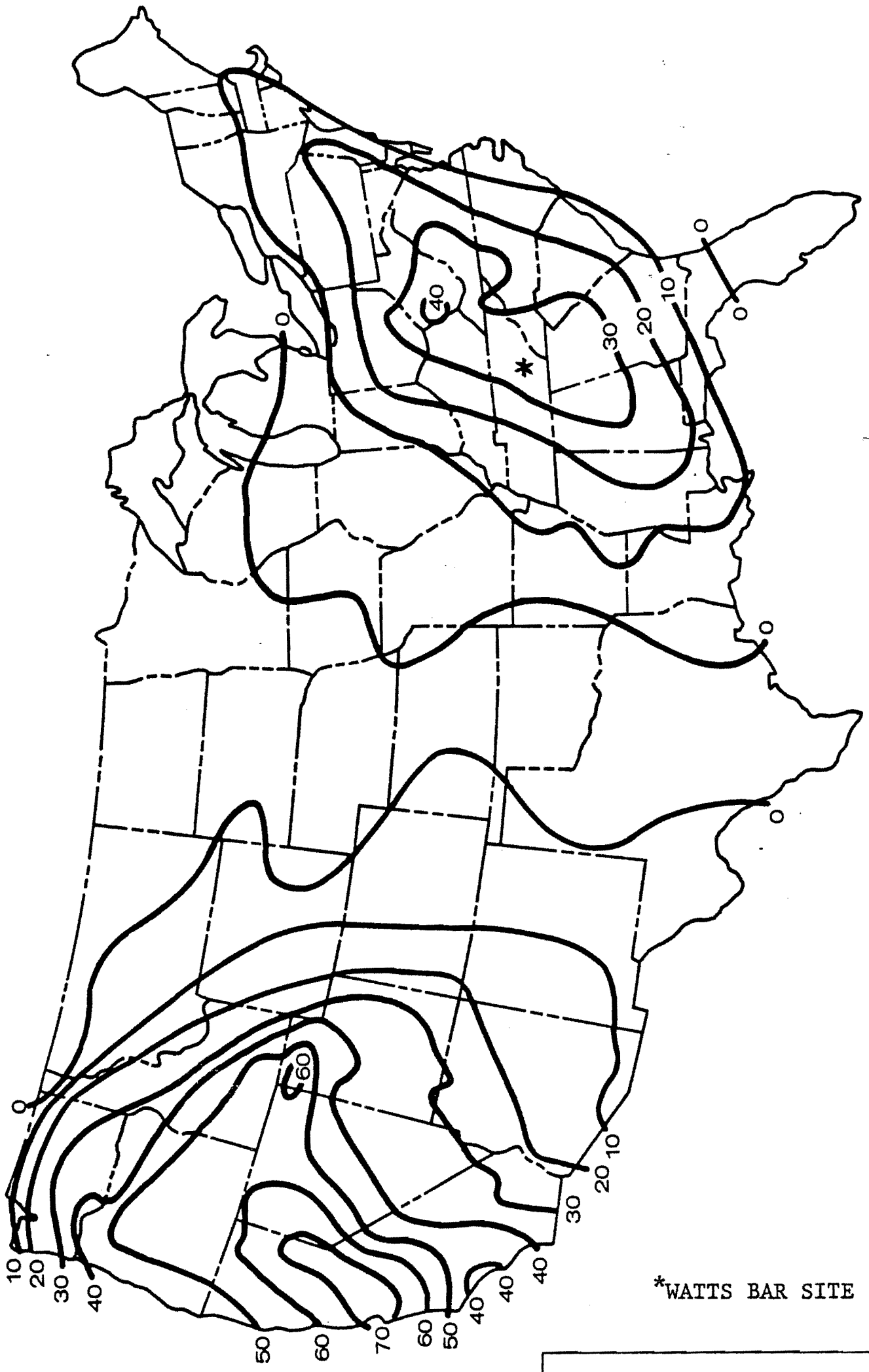
Figure 2.3-1

Normal Sea Level Pressure Distribution Over North America and the North Atlantic Ocean

Figure 2.3-1 Normal Sea Level Pressure Distribution Over North America and The North Atlantic Ocean



From Holzworth, Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States, EPA, Research Triangle Park, N.C., January 1972. Page 96.

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Figure 2.3-2

Total Number of Forecast-Days of High Meteorological Potential for Air Pollution in a 5 Year Period

Figure 2.3-2 Total Number of Forecast-Days of High Meteorological Potential For Air Pollution in a 5 Year Period

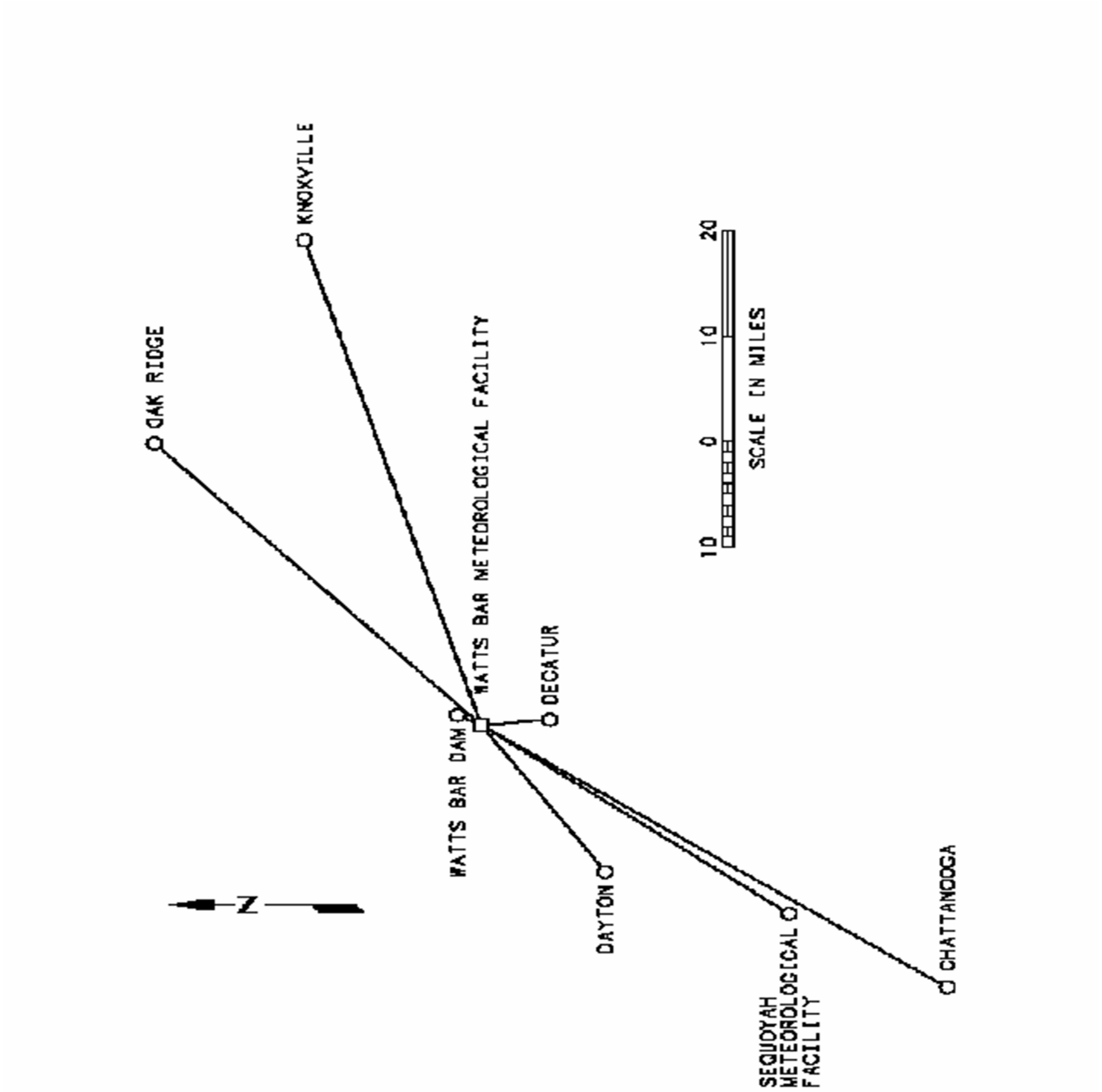
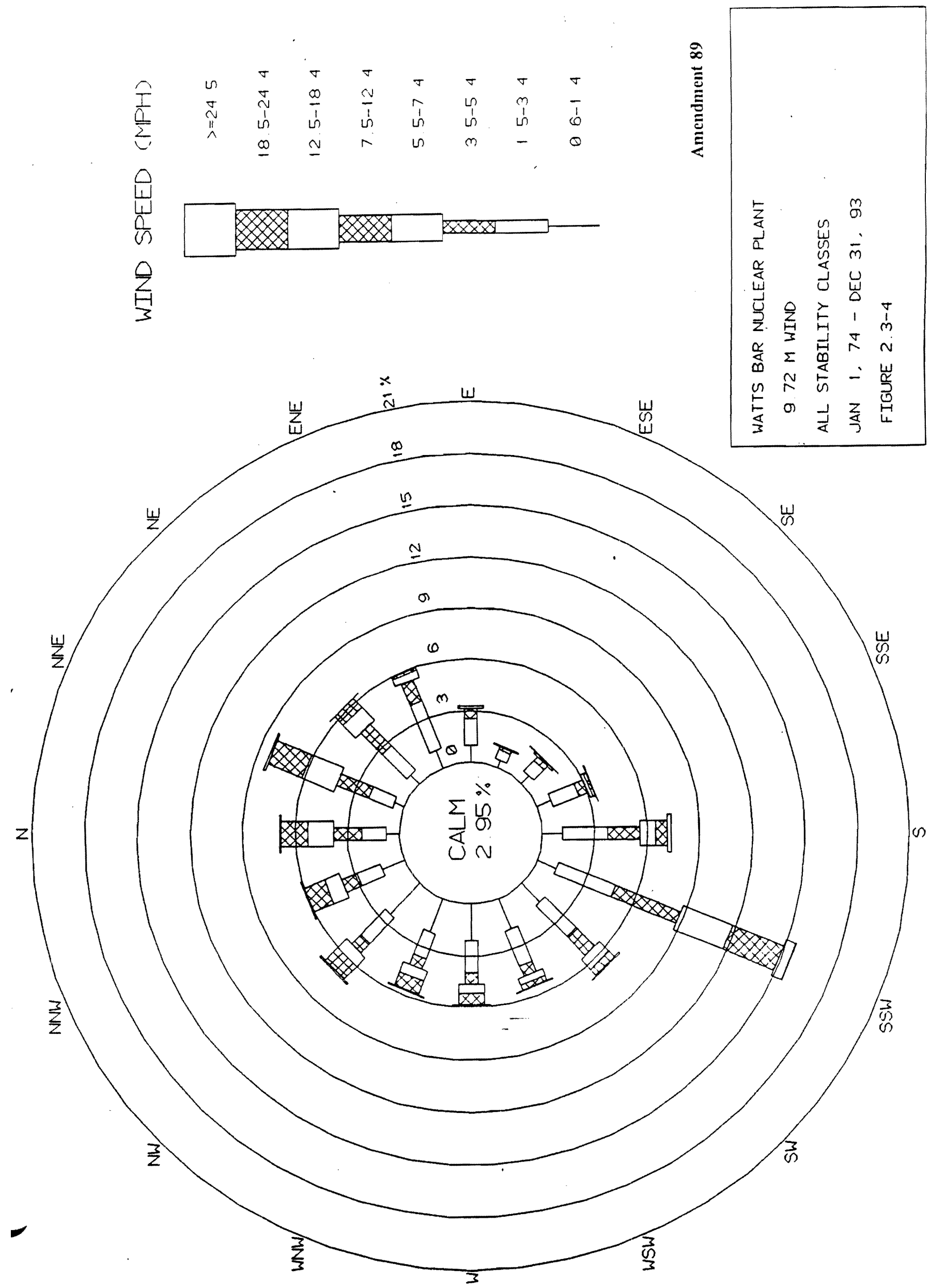


Figure 2.3-3 Climatological Data Sources in Area Around Watts Bar Site



Amendment 89

Figure 2.3-4 Wind Speed at 9.72 Meters All Stability classes, Watts Bar Nuclear Plant, January 1, 1974 -December 31, 1993

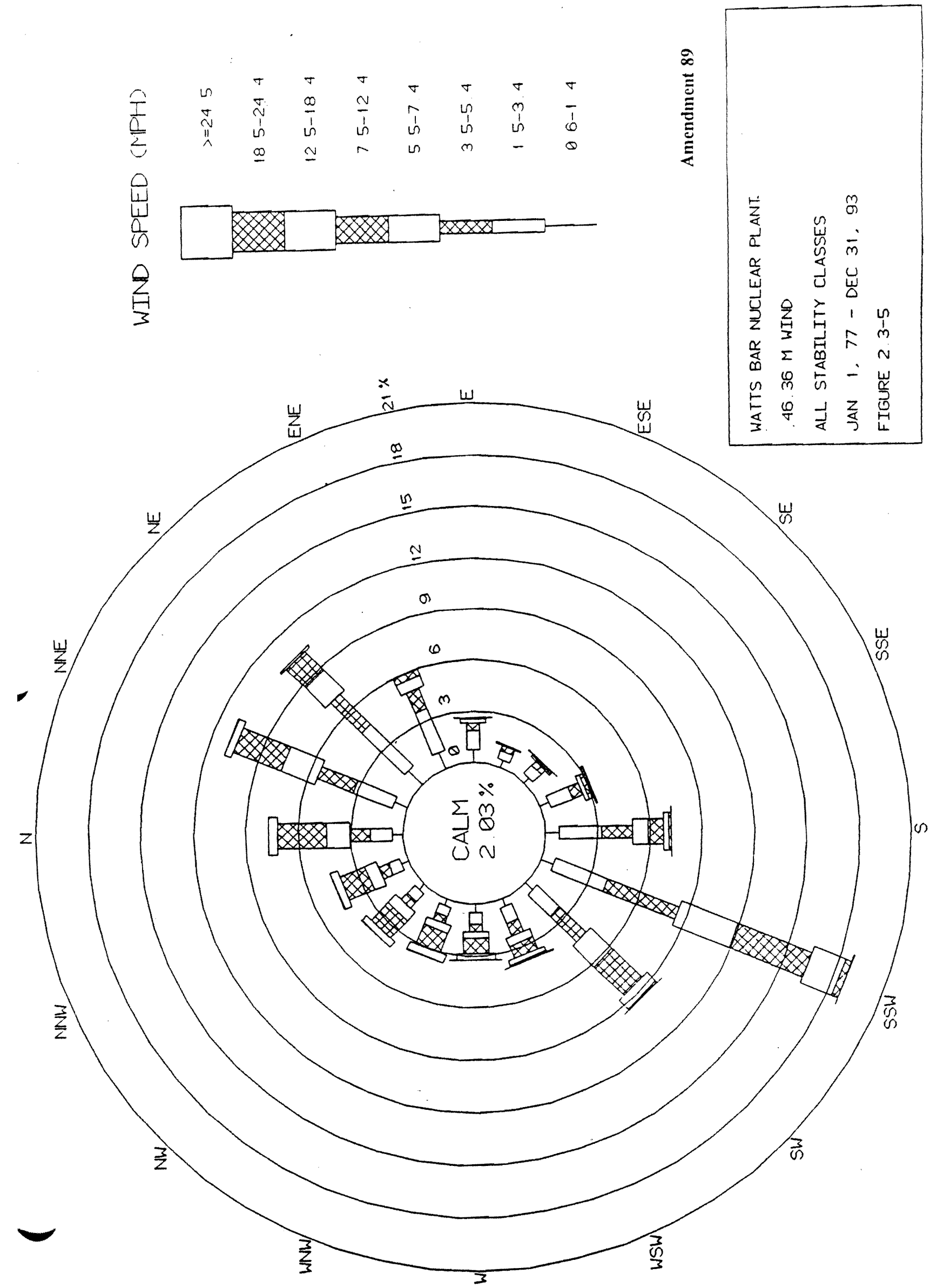
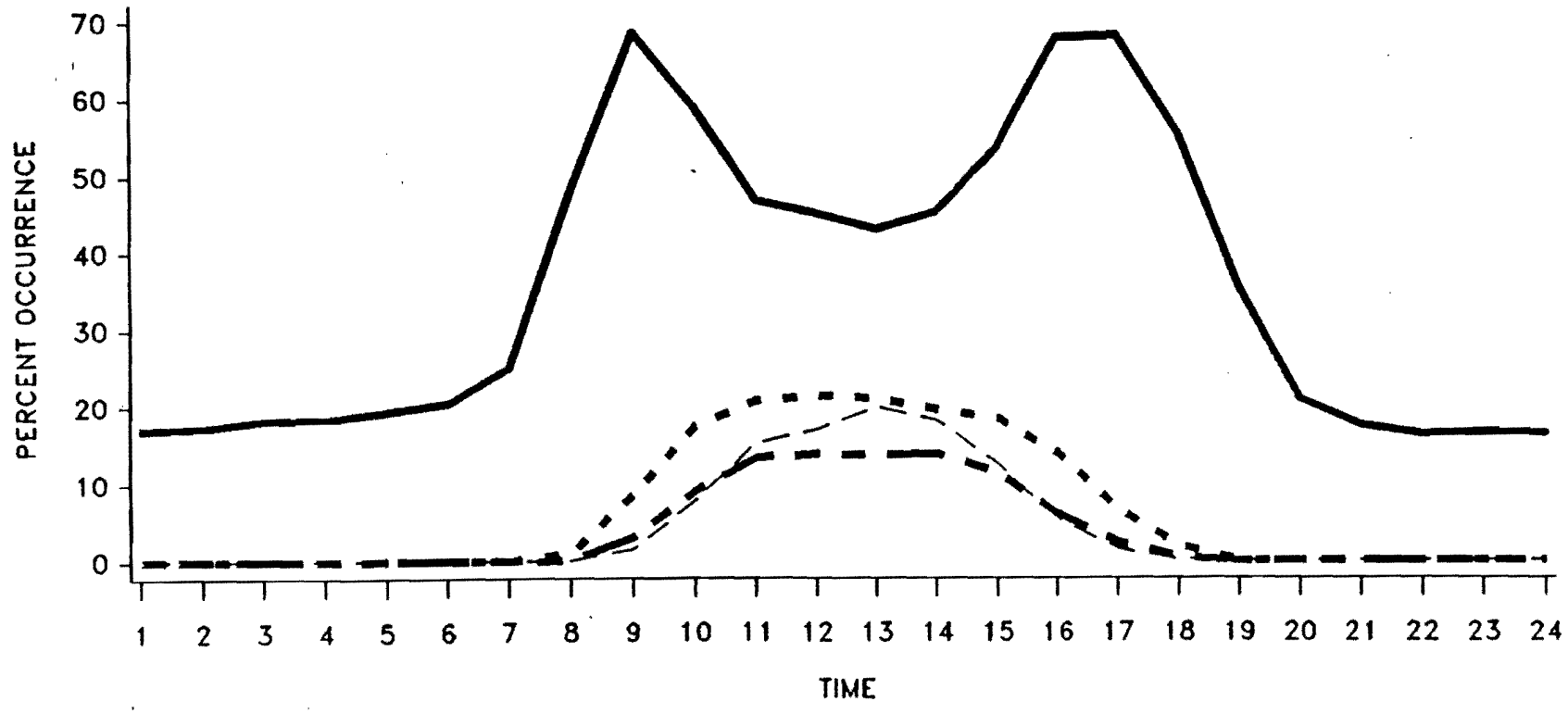


Figure 2.3-5 Wind Speed at 46.36 Meters All Stability Classes, Watts Bar Nuclear Plant, January 1, 1977 -December 31, 1993

PERCENT OCCURRENCE OF PASQUILL STABILITY CLASSES *

A, B, C, AND D BY TIME OF DAY
WATTS BAR NUCLEAR PLANT
1974 – 1993



Watts Bar Nuclear Plant
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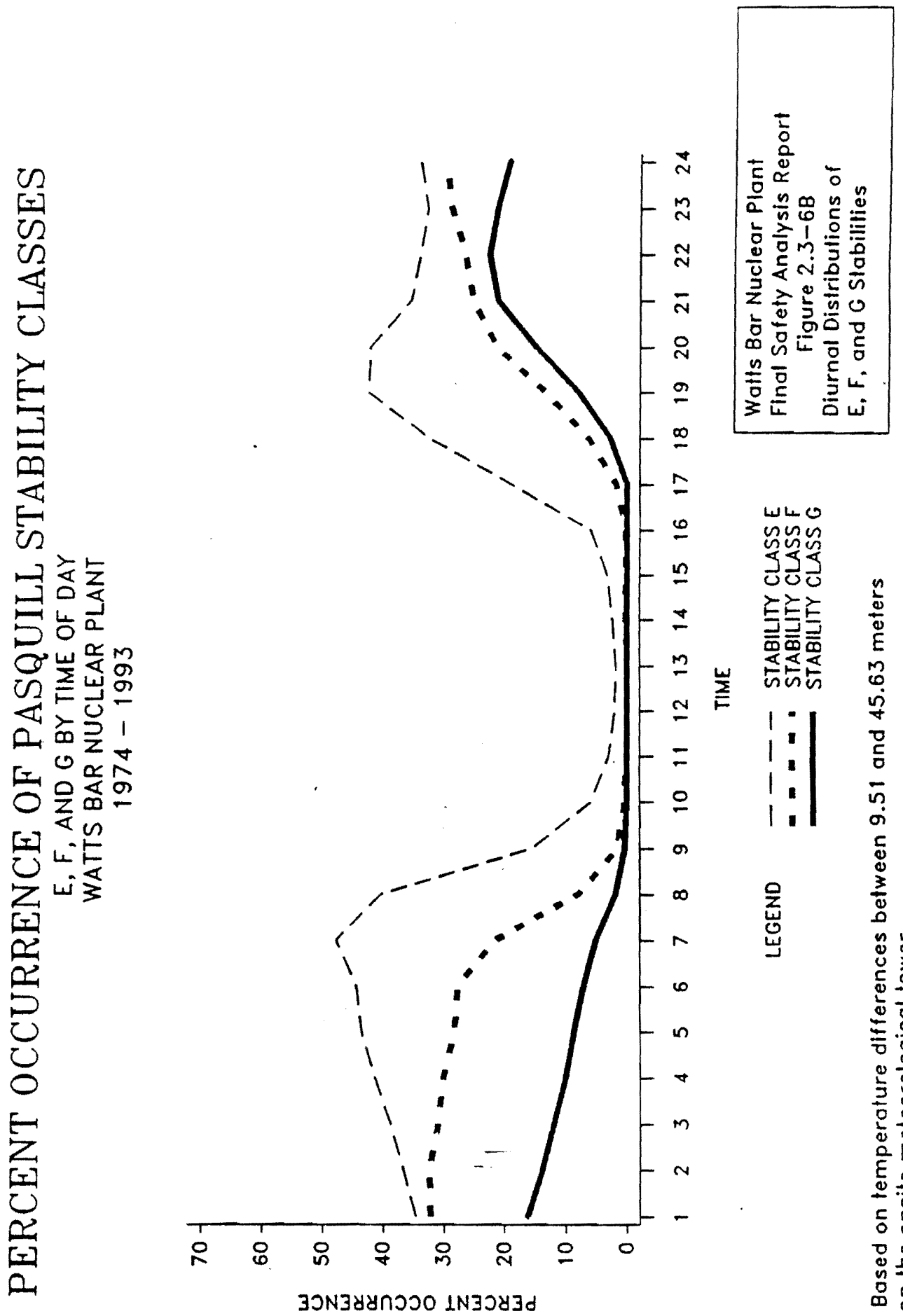
Figure 2.3–6A
Diurnal Distributions of
A, B, C, and D Stabilities

* Based on temperature differences between 9.51 and 45.63 meters on the onsite meteorological tower.

Amendment 89

Figure 2.3-6a Percent Occurrences Of Pasquill Stability Classes A, B, C, And D By Time Of Day, Watts Bar Nuclear Plant, 1974-1993



* Based on temperature differences between 9.51 and 45.63 meters on the onsite meteorological tower.

Figure 2.3-6b Percent Occurrences Of Pasquill Stability Classes E, F, and G By Time of Day, Watts Bar Nuclear Plant, 1974-1993

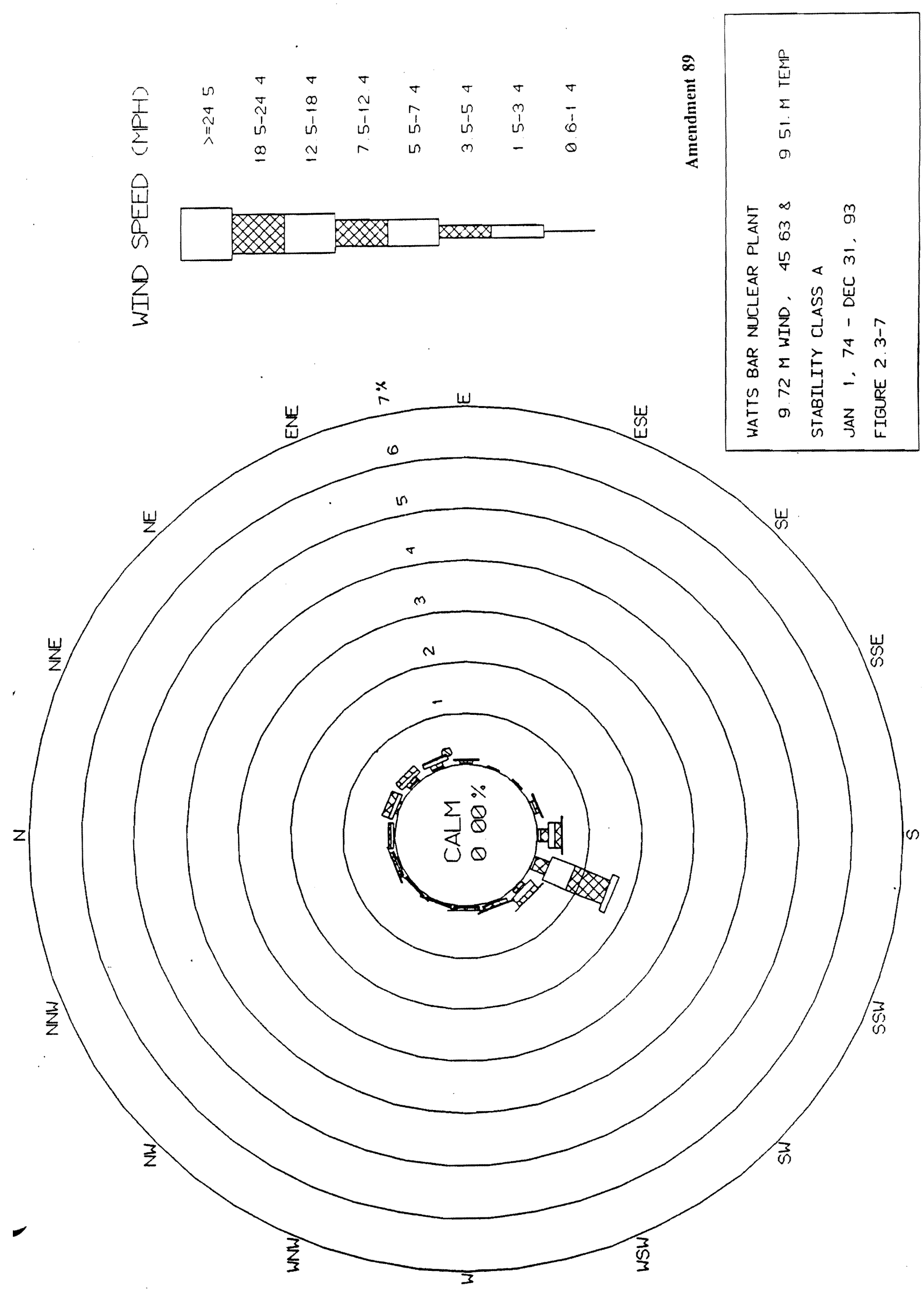


Figure 2.3-7 Wind Speed at 9.72 Meters for Stability Class A, Watts Bar Nuclear Plant, January 1, 1974 - December 31, 1993

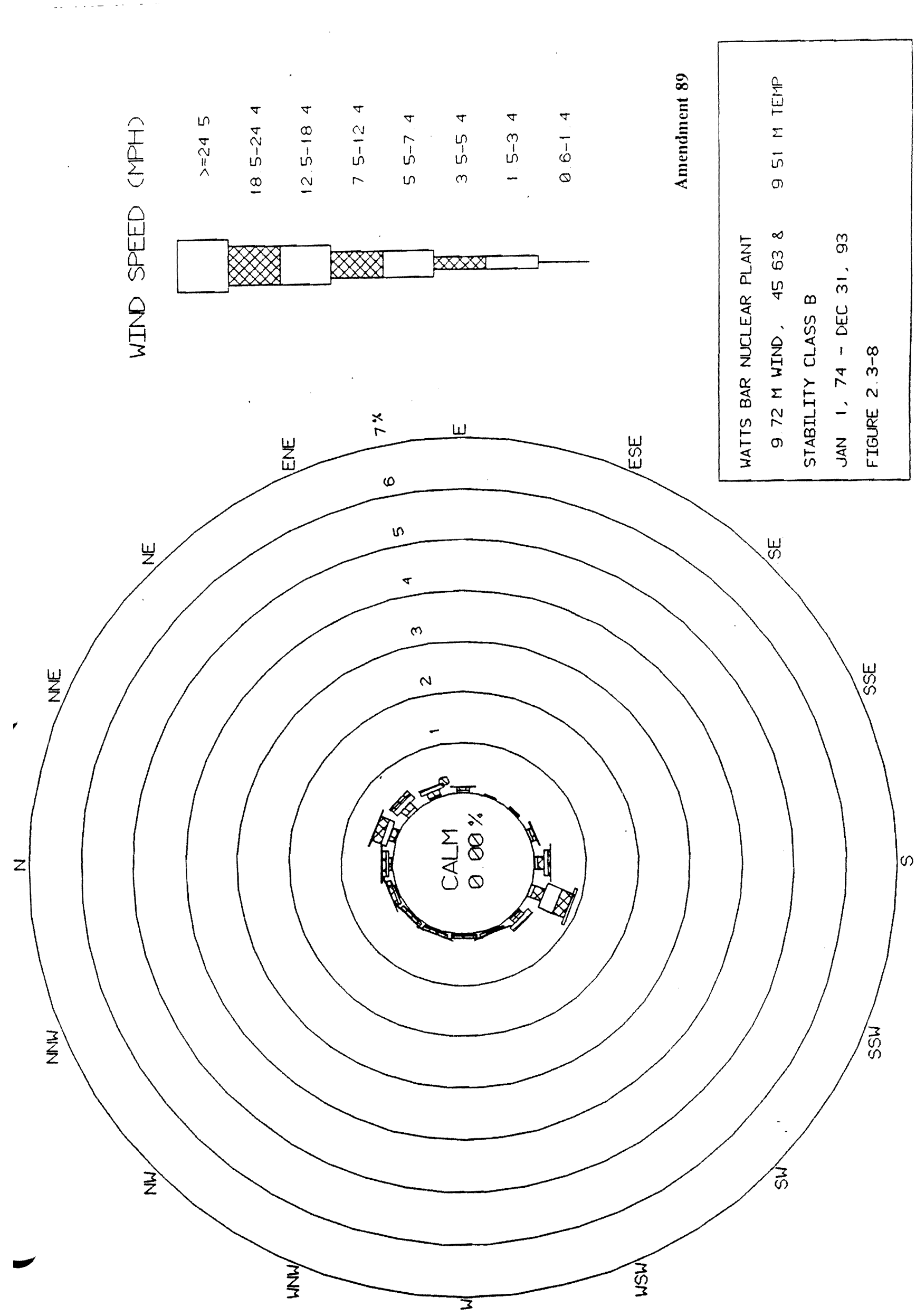


Figure 2.3-8 Wind Speed at 9.72 Meters for Stability Class B, Watts Bar Nuclear Plant, January 1, 1974 - December 31, 1993

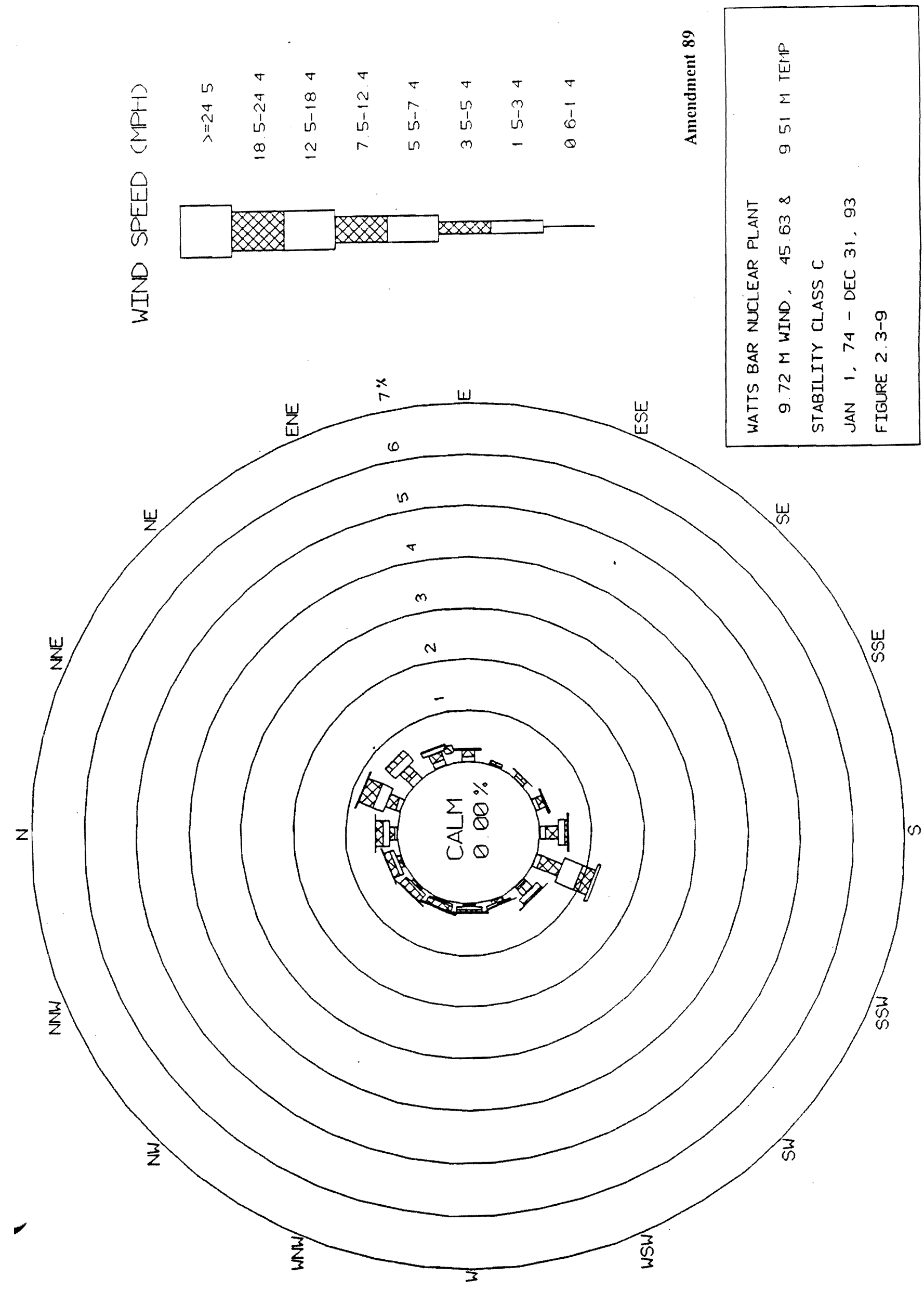


Figure 2.3-9 Wind Speed at 9.72 Meters for Stability Class C, Watts Bar Nuclear Plant, January 1, 1974 - December 31, 1993

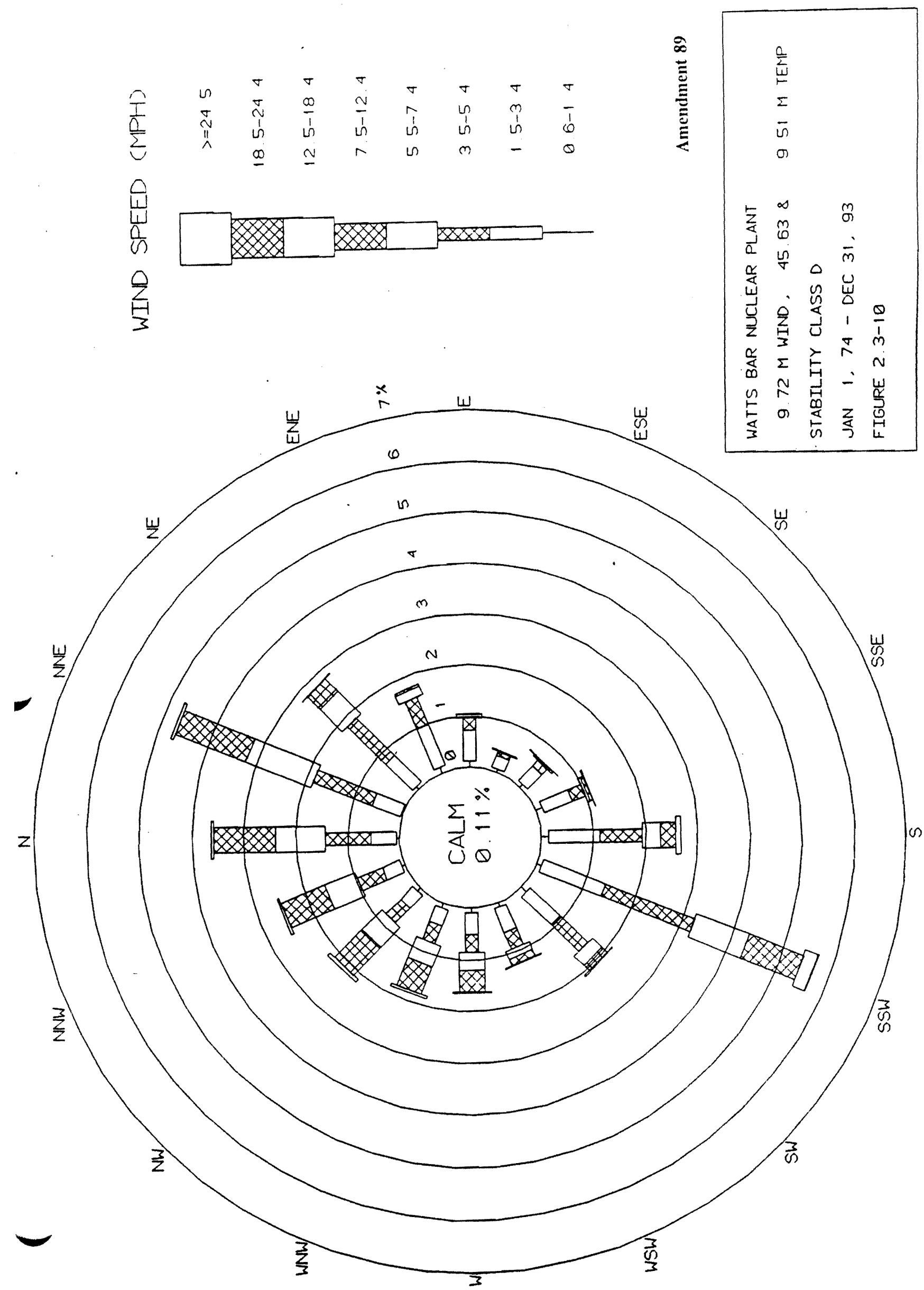


Figure 2.3-10 Wind Speed at 9.72 Meters for Stability Class D, Watts Bar Nuclear Plant, January 1, 1974 - December 31, 1993

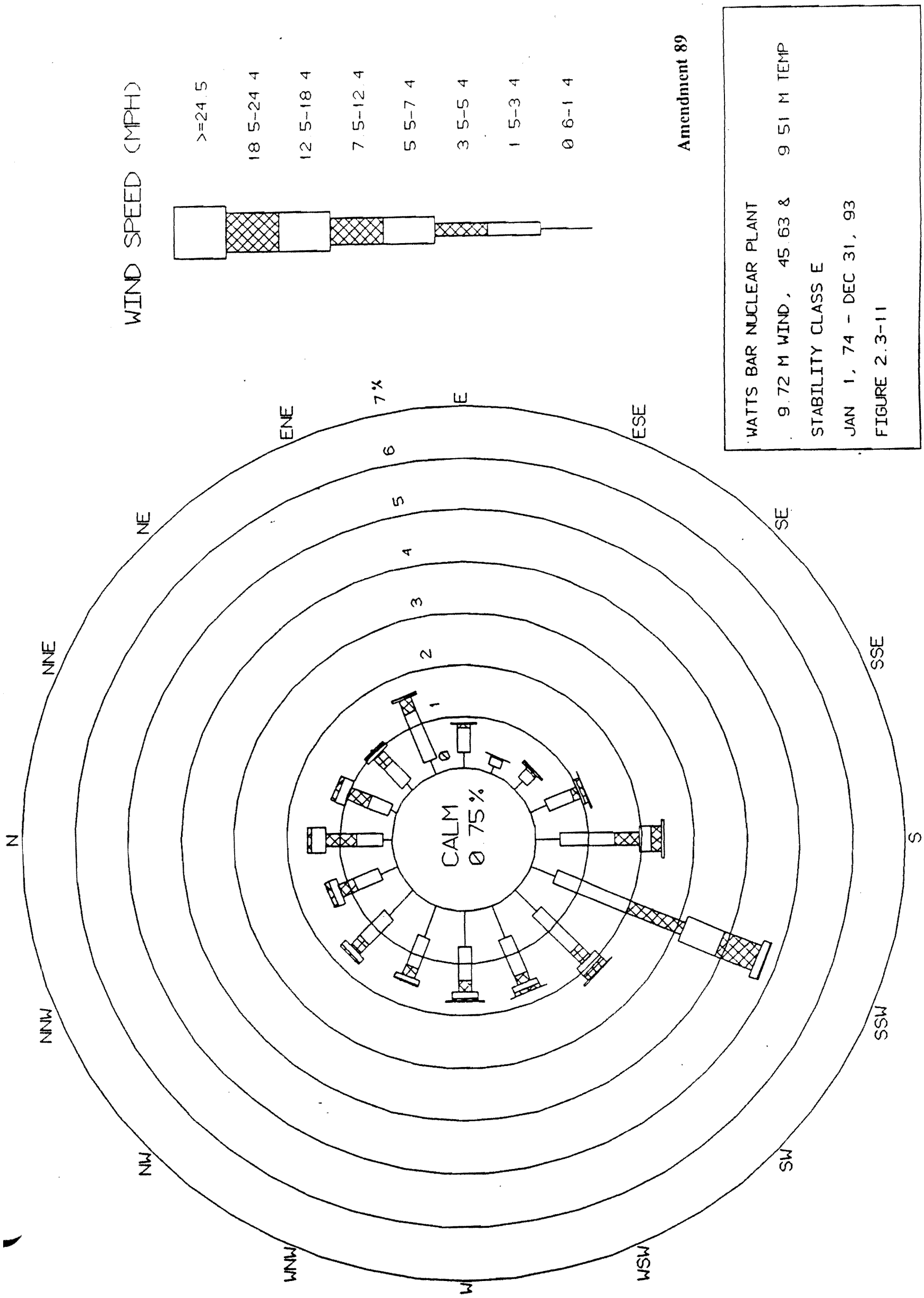


Figure 2.3-11 Wind Speed at 9.72 Meters for Stability Class E, Watts Bar Nuclear Plant, January 1, 1974 -December 31, 1993

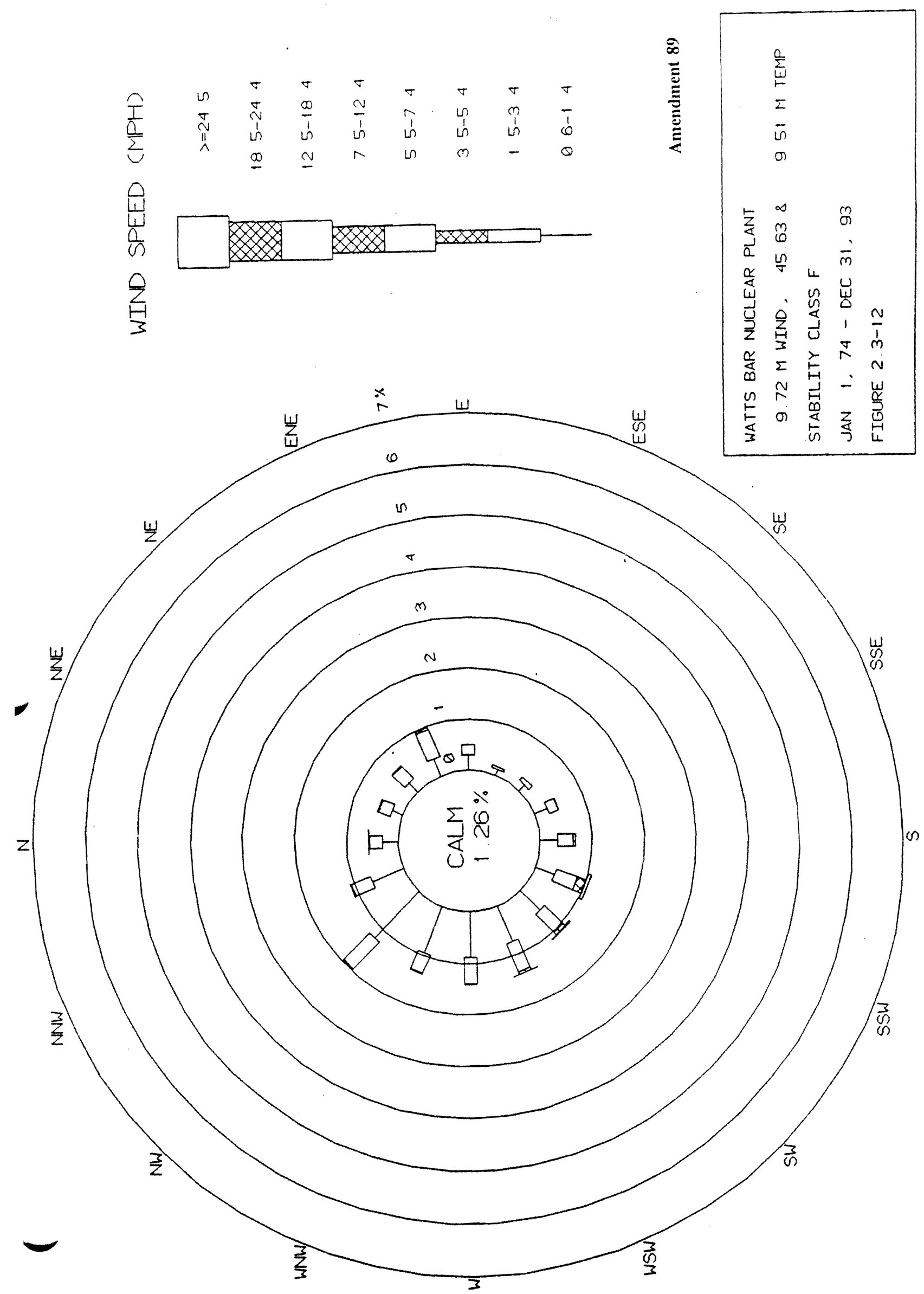


Figure 2.3-12 Wind Speed at 9.72 Meters for Stability Class F, Watts Bar Nuclear Plant, January 1, 1974 -December 31, 1993

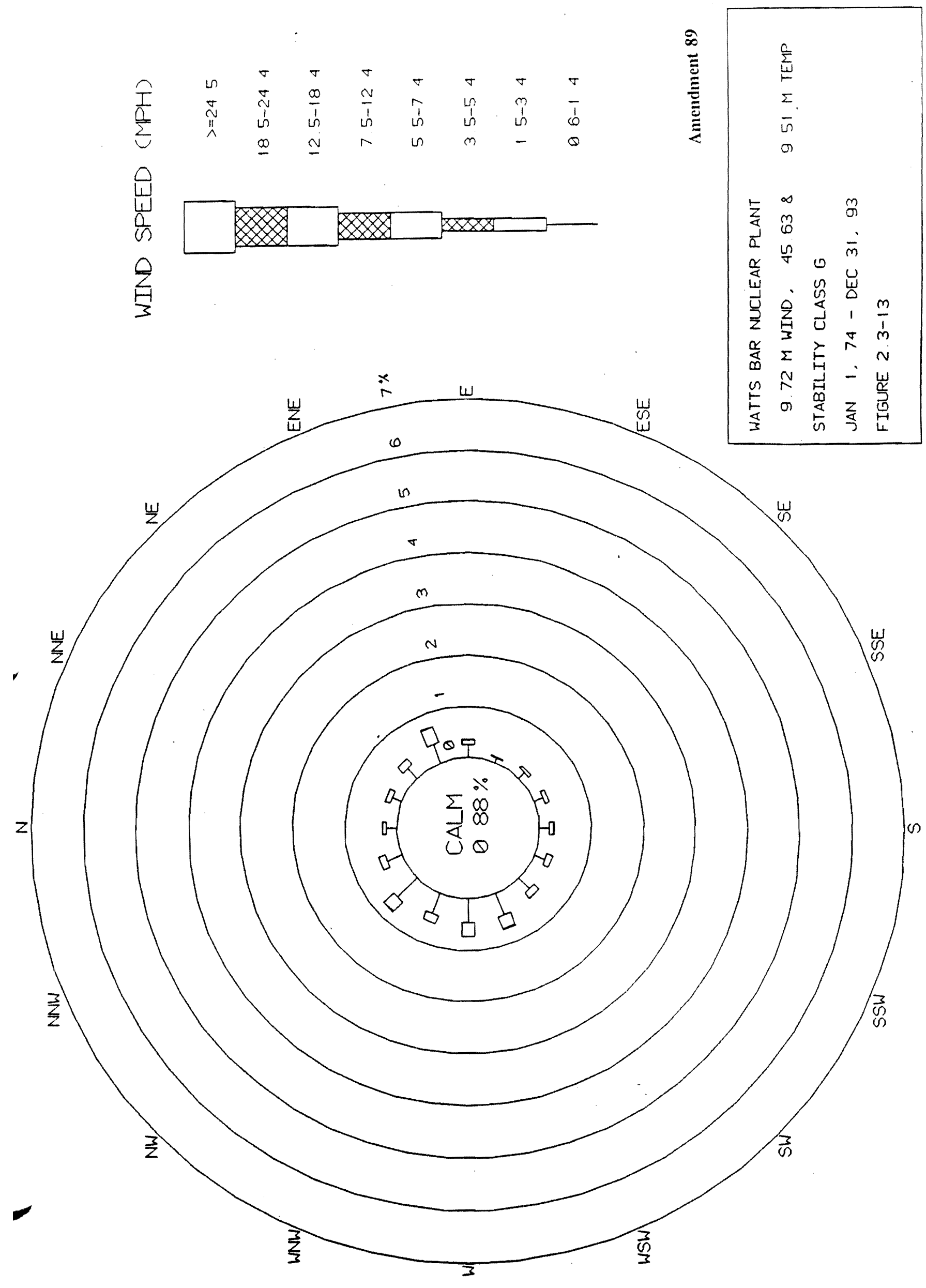


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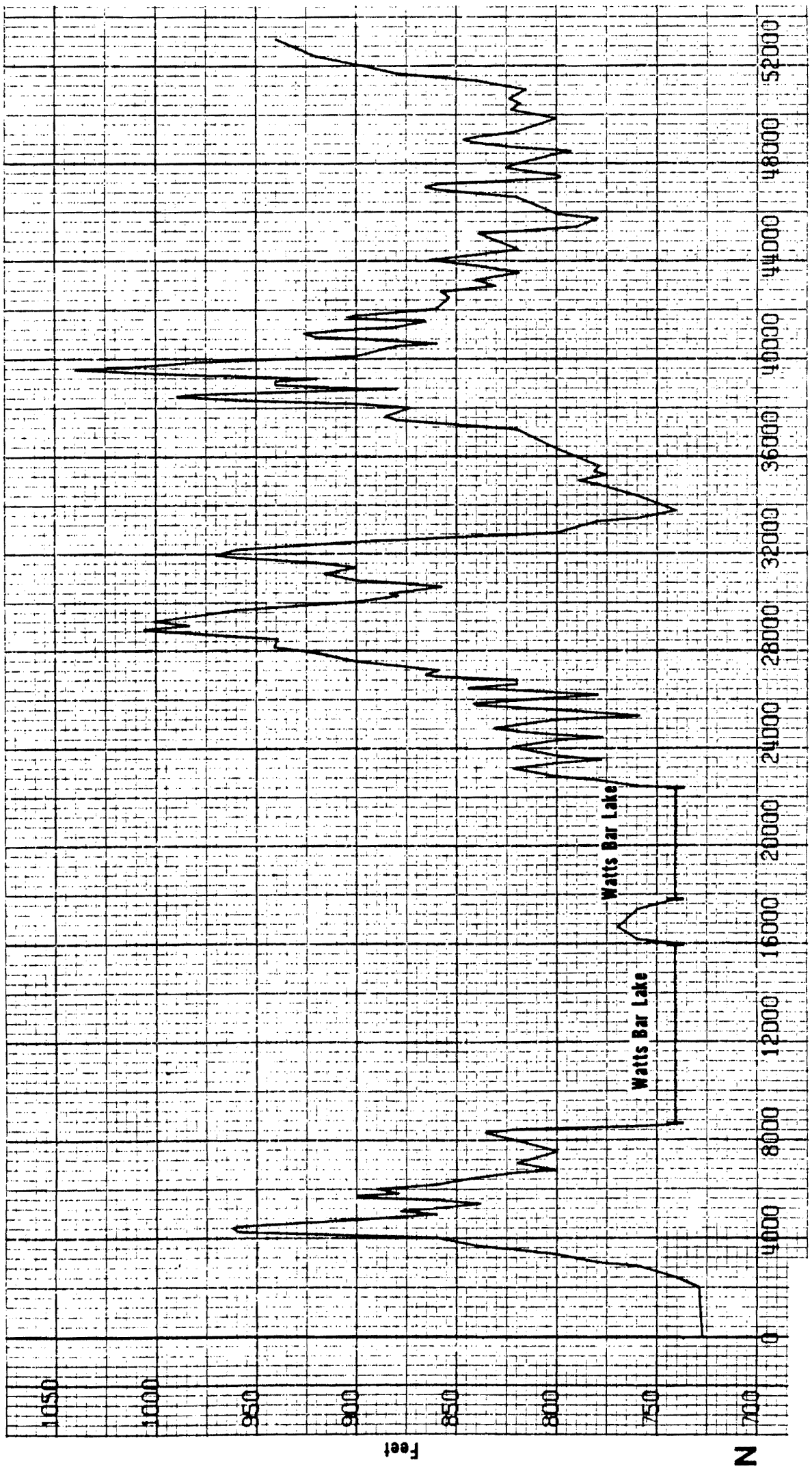
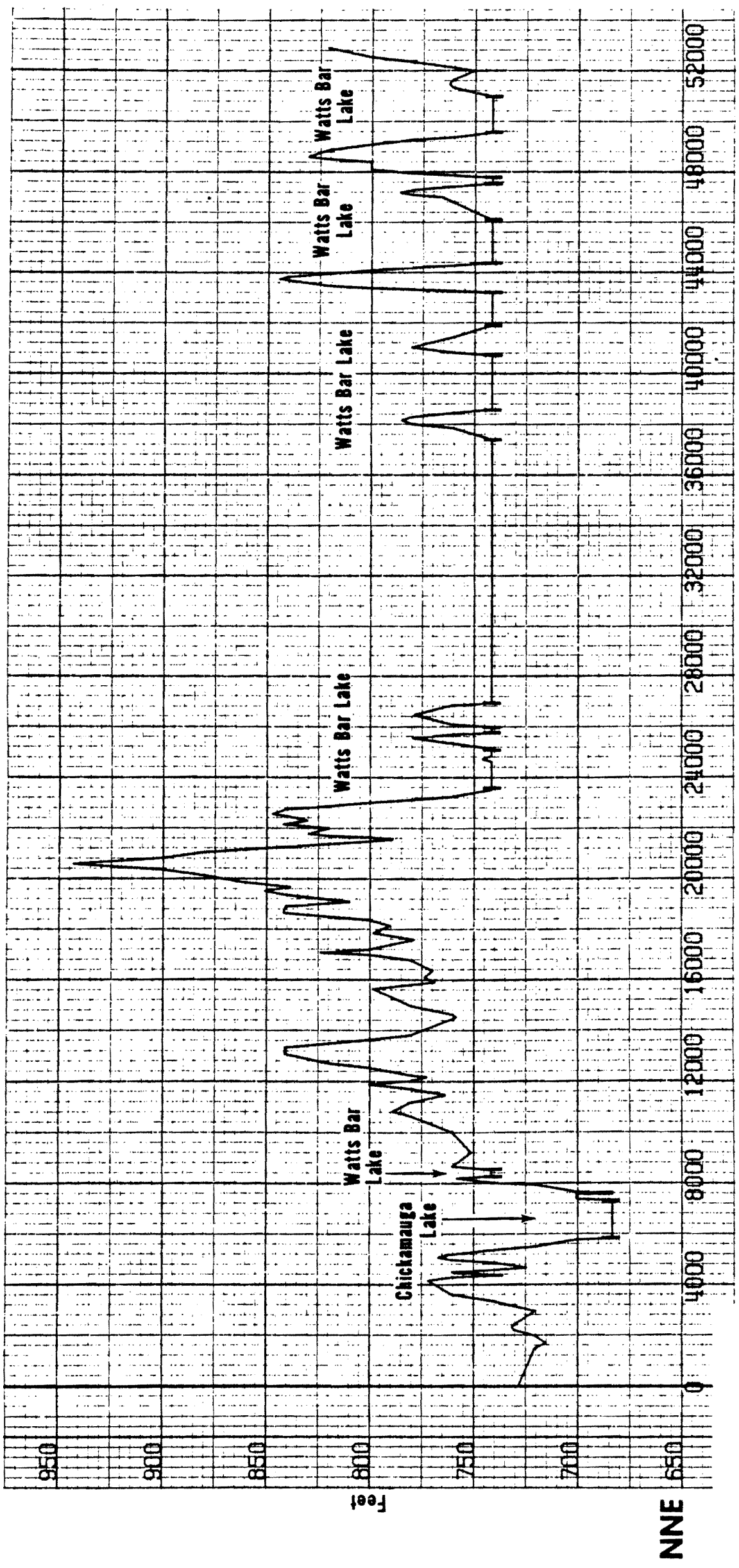
Figure 2.3-13 Wind Speed at 9.72 Meters for Stability Class G, Watts Bar Nuclear Plant, January 1, 1974 - December 31, 1993



WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT	TOPOGRAPHY WITHIN 10 MILE RADIUS Figure 2.3-14

Figure 2.3-14 Topography Within 10 Mile Radius - N



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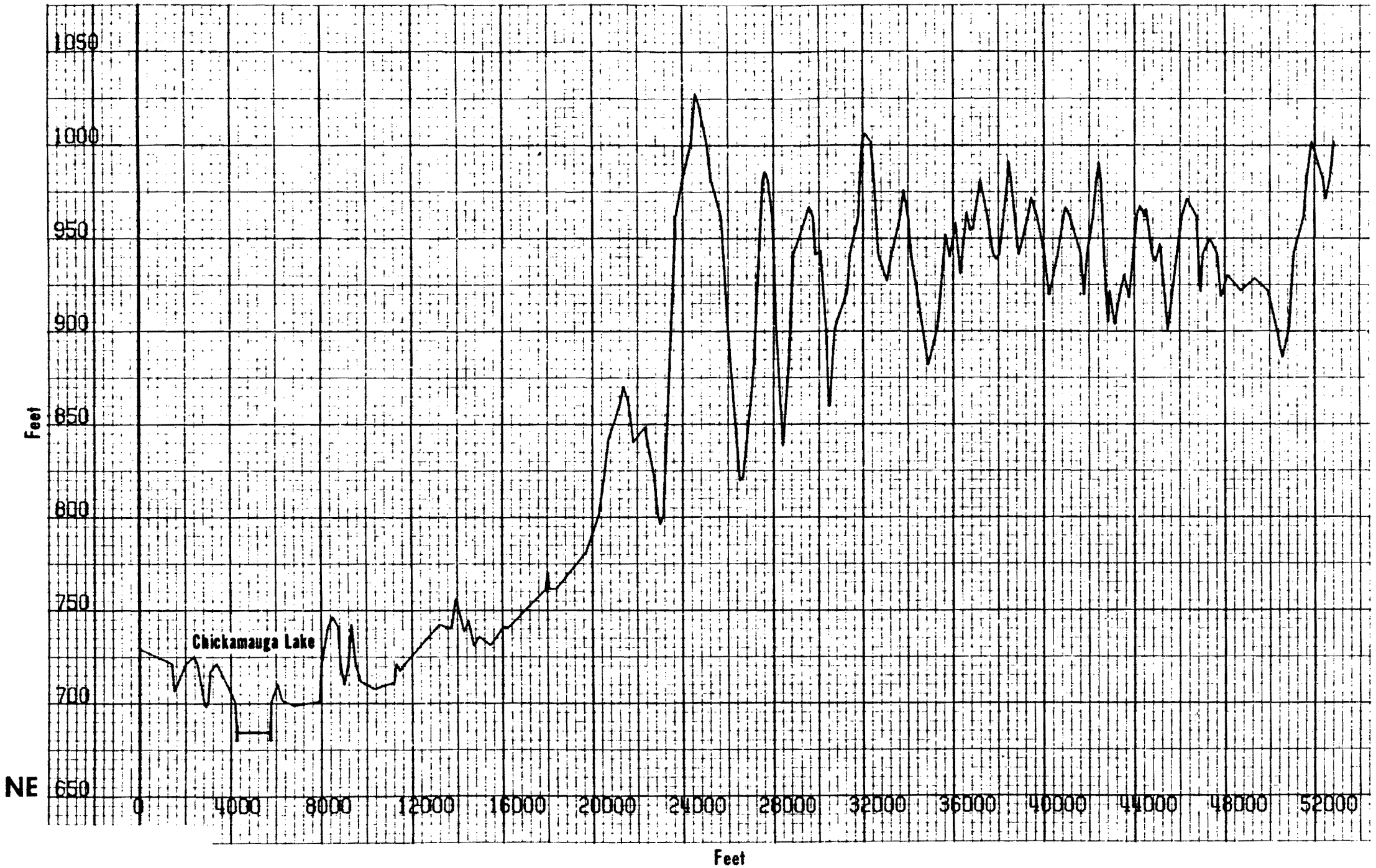
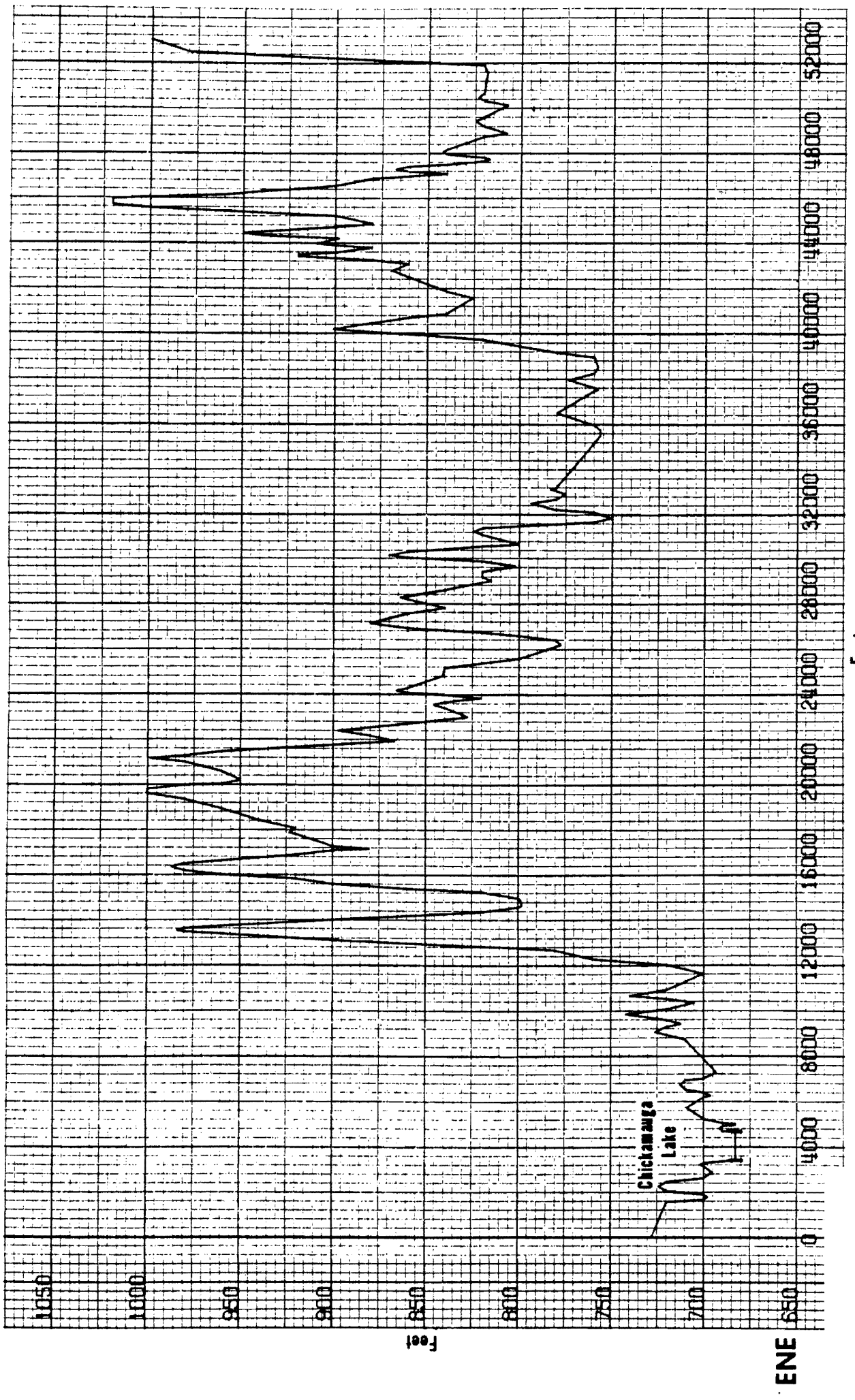
TOPOGRAPHY WITHIN 10
MILE RADIUS
Figure 2.3-15

Figure 2.3-15 Topography Within 10 Mile Radius - NNE



WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
TOPOGRAPHY WITHIN 10 MILE RADIUS Figure 2.3-16

Figure 2.3-16 Topography Within 10 Mile Radius - NE



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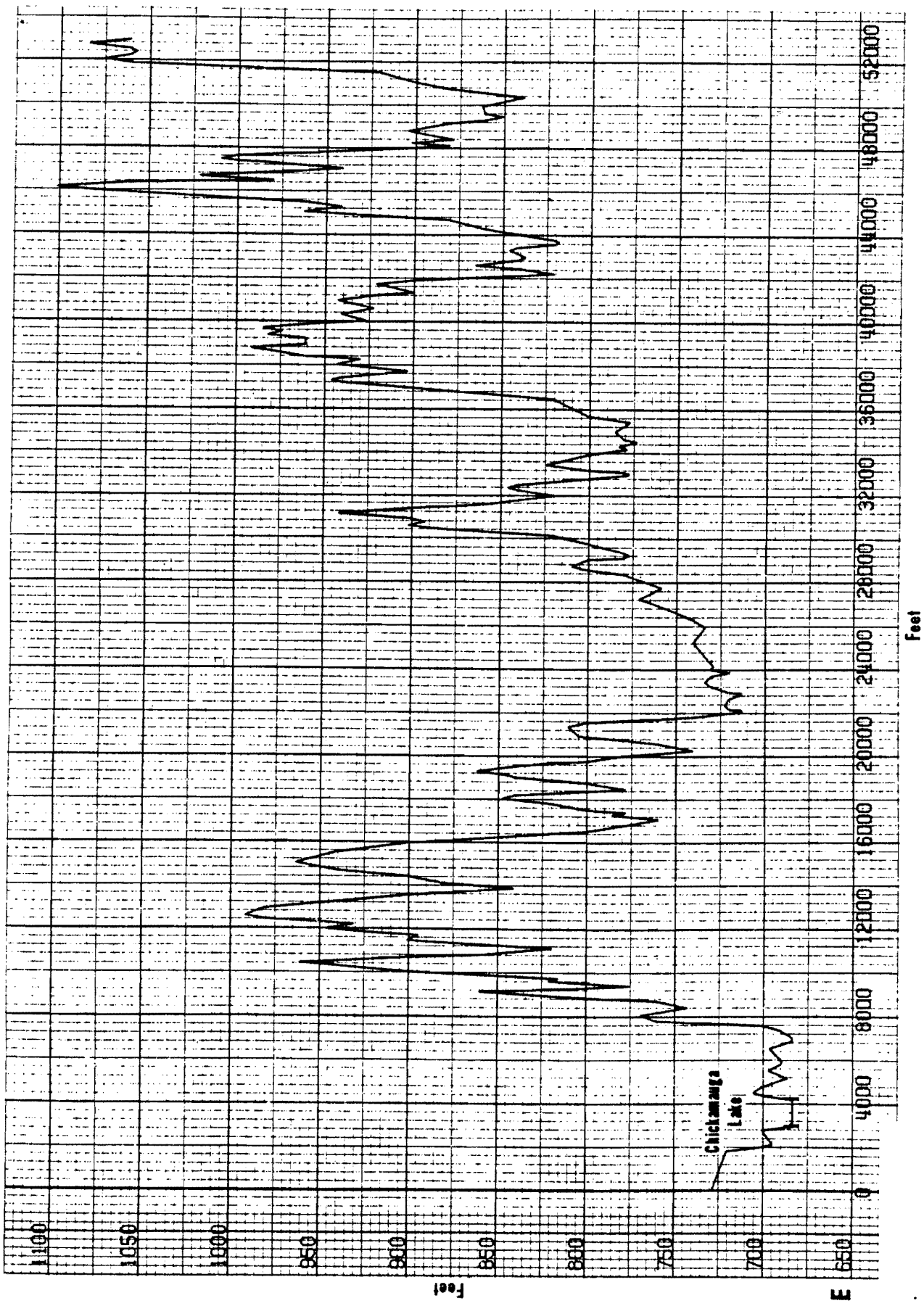
TOPOGRAPHY WITHIN 10
MILE RADIUS
Figure 2.3-17

Figure 2.3-17 Topography Within 10 Mile Radius - ENE



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TOPOGRAPHY WITHIN 10
MILE RADIUS
Figure 2.3-18

Figure 2.3-18 Topography Within 10 Mile Radius - E

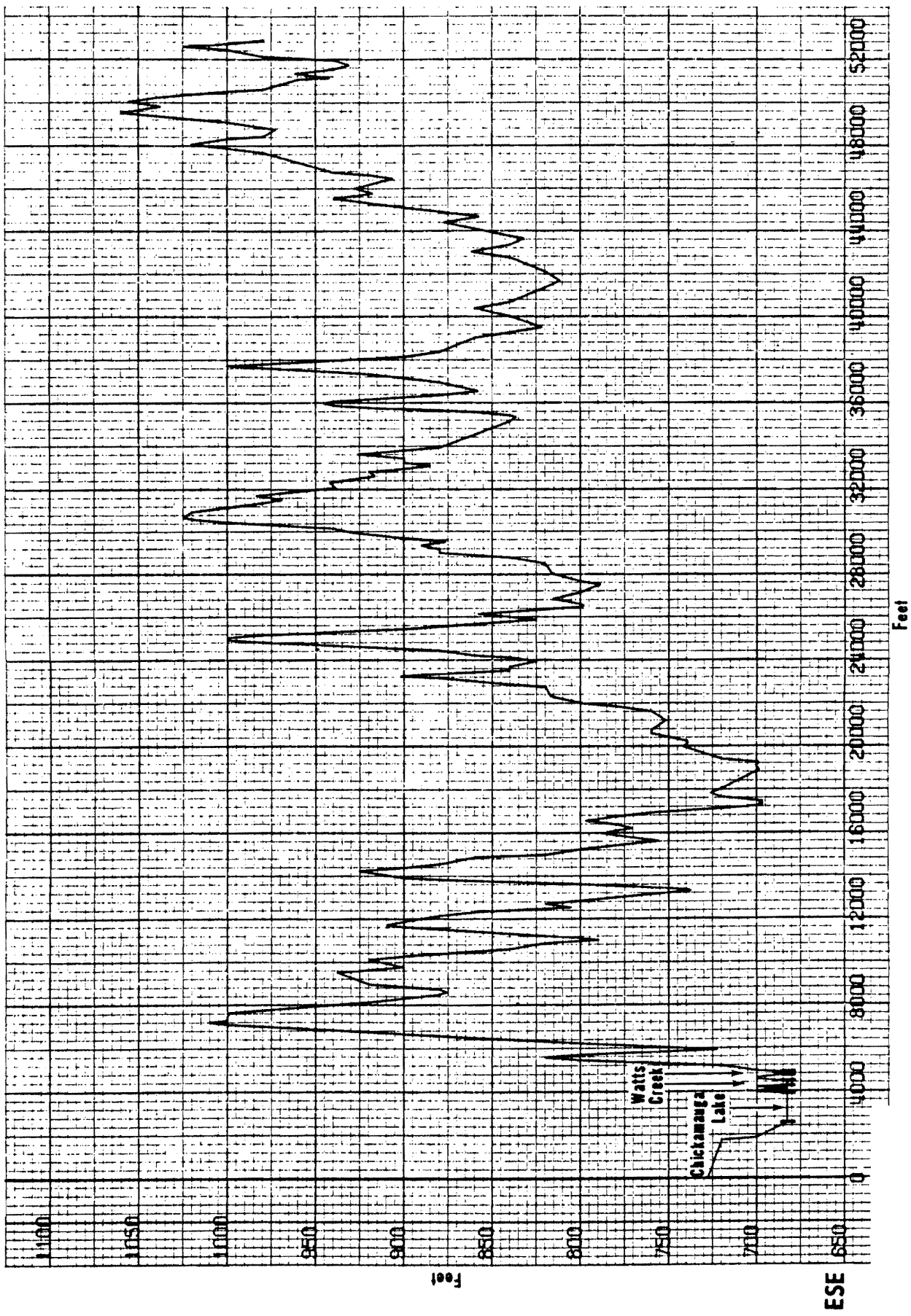
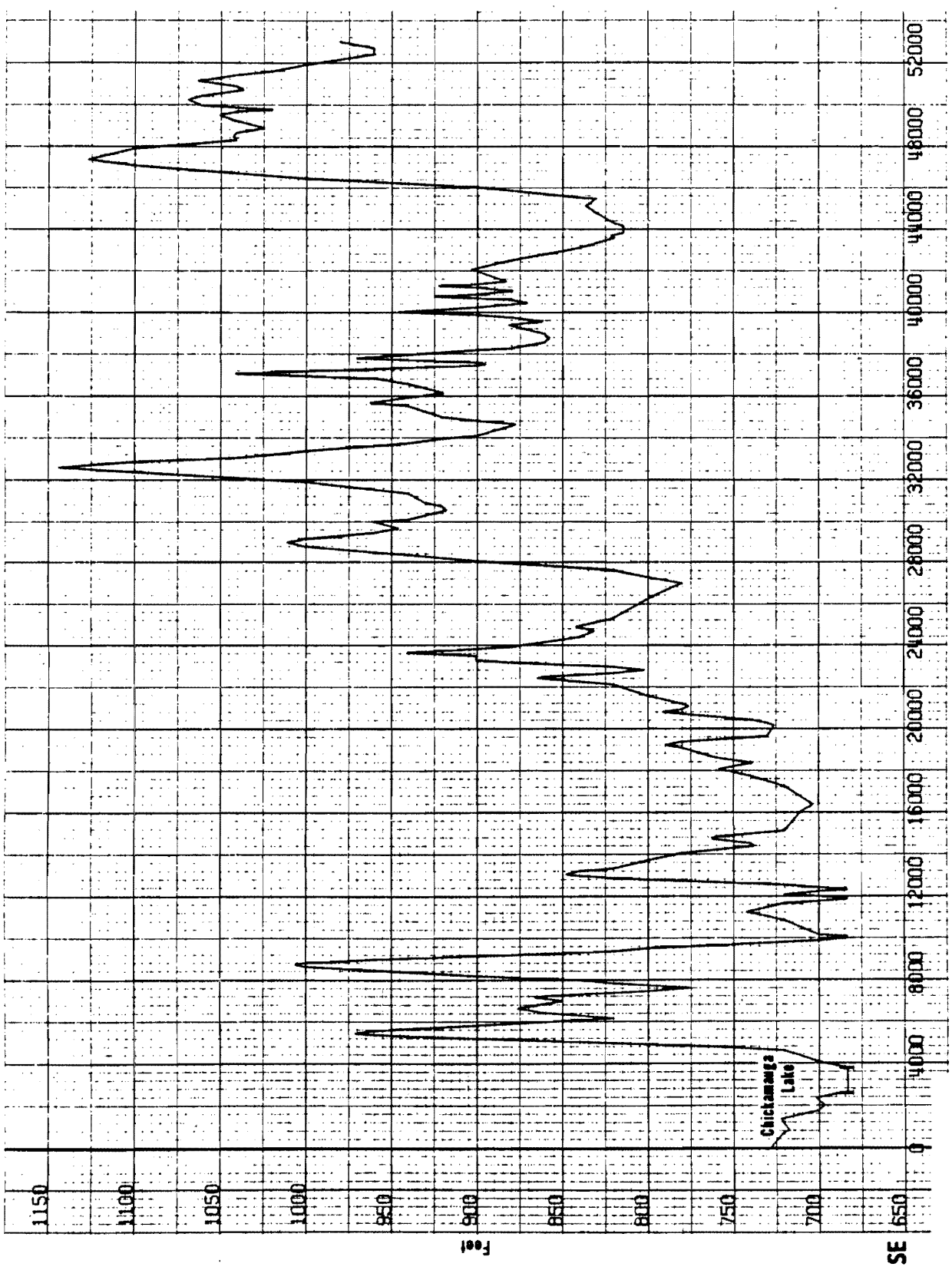


Figure 2.3-19 Topography Within 10 Mile Radius - ESE



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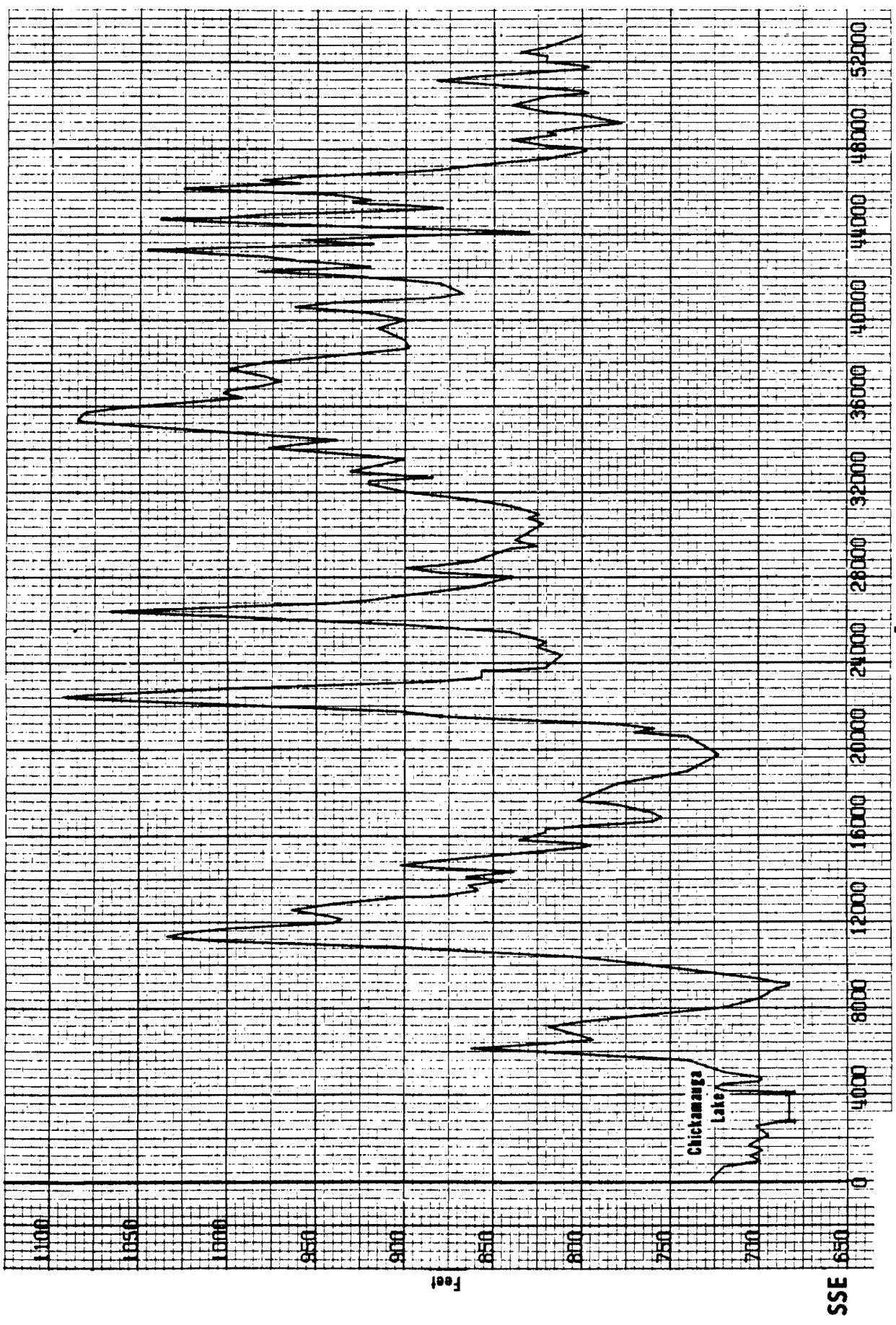
TOPOGRAPHY WITHIN 10
MILE RADIUS
Figure 2.3-20

Figure 2.3-20 Topography Within 10 Mile Radius - SE



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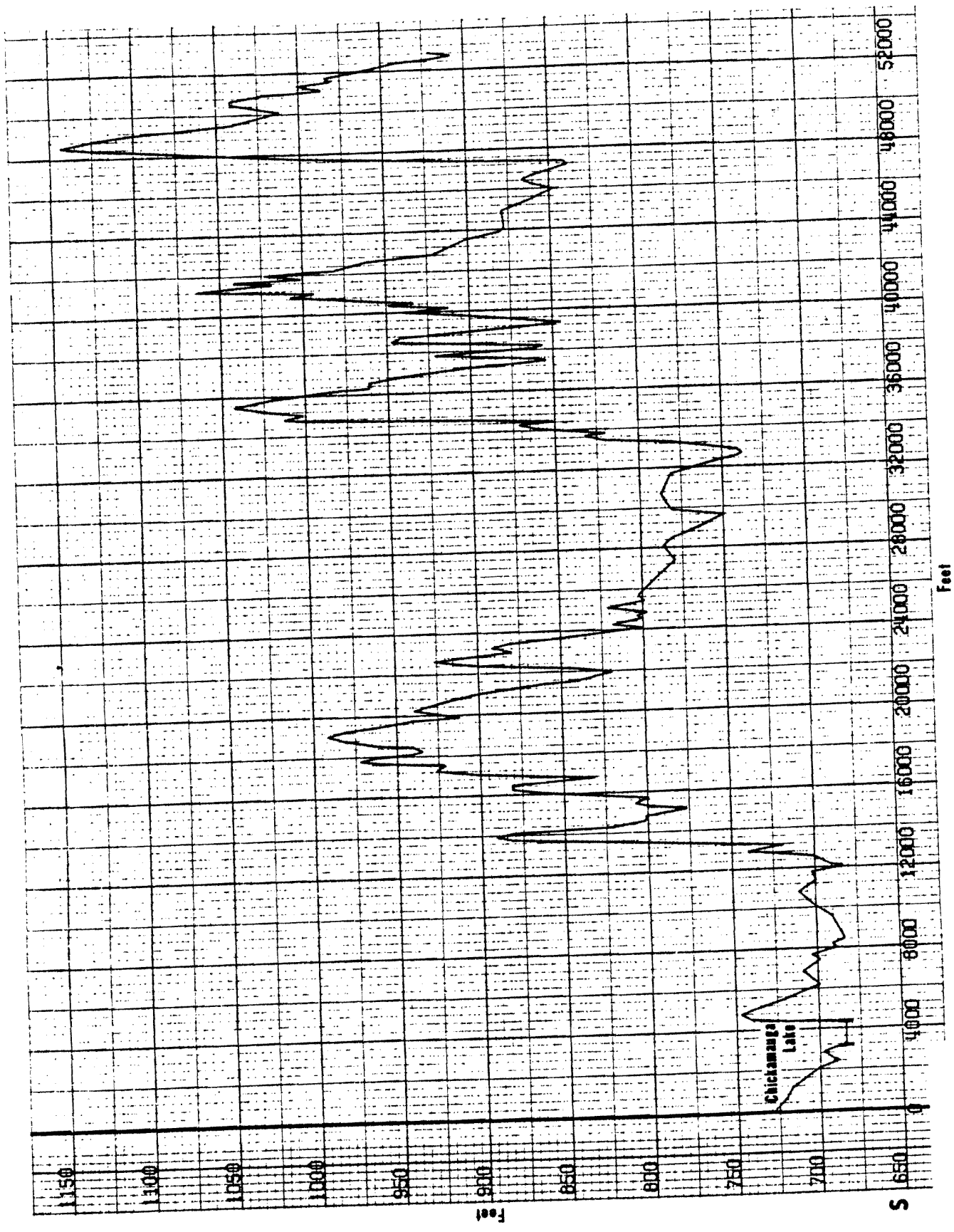
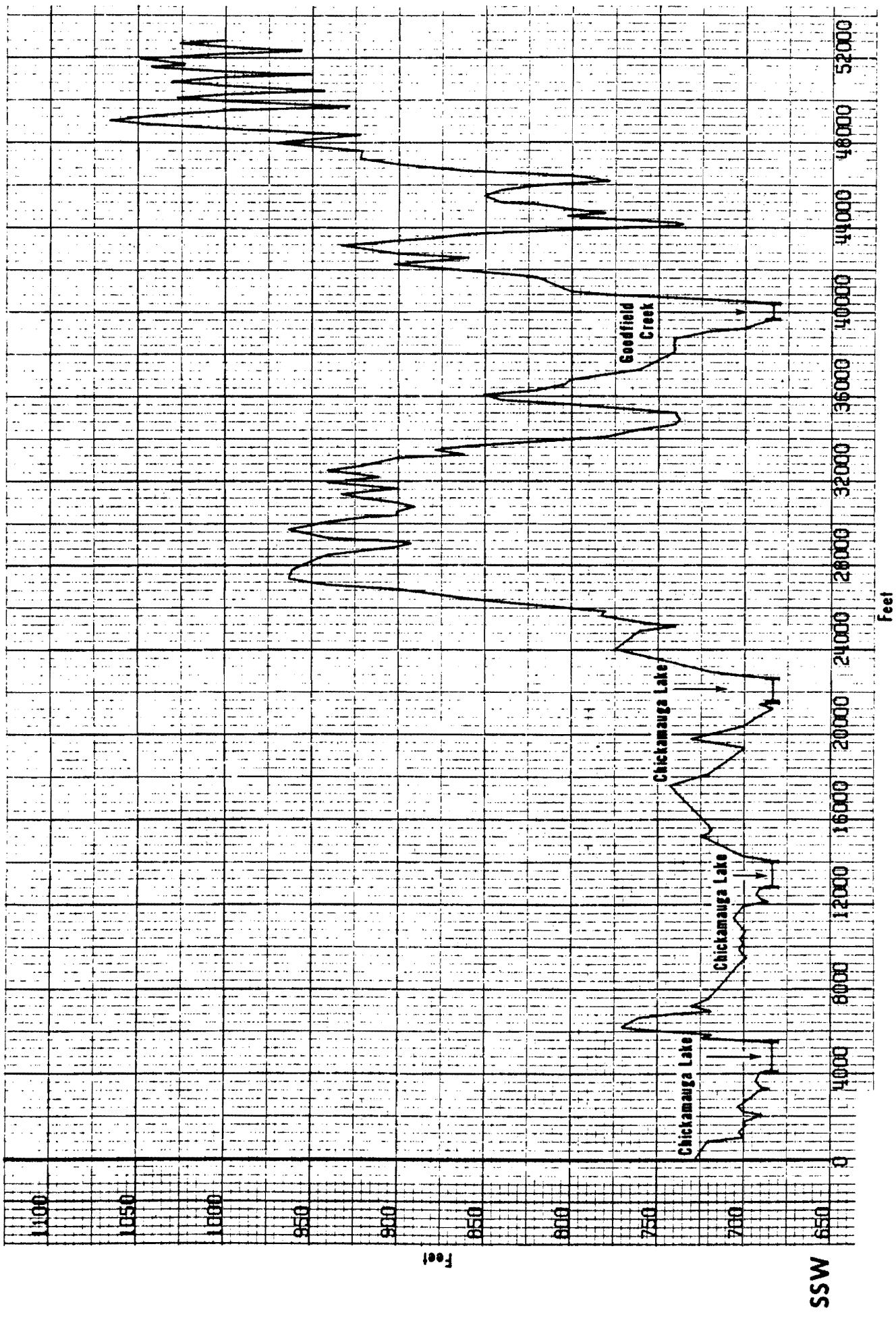
TOPOGRAPHY WITHIN 10
MILE RADIUS
Figure 2.3-21

Figure 2.3-21 Topography Within 10 Mile Radius - SSE



WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT	TOPOGRAPHY WITHIN 10 MILE RADIUS Figure 2.3-22

Figure 2.3-22 Topography Within 10 Mile Radius - S



WATTS BAR NUCLEAR PLANT
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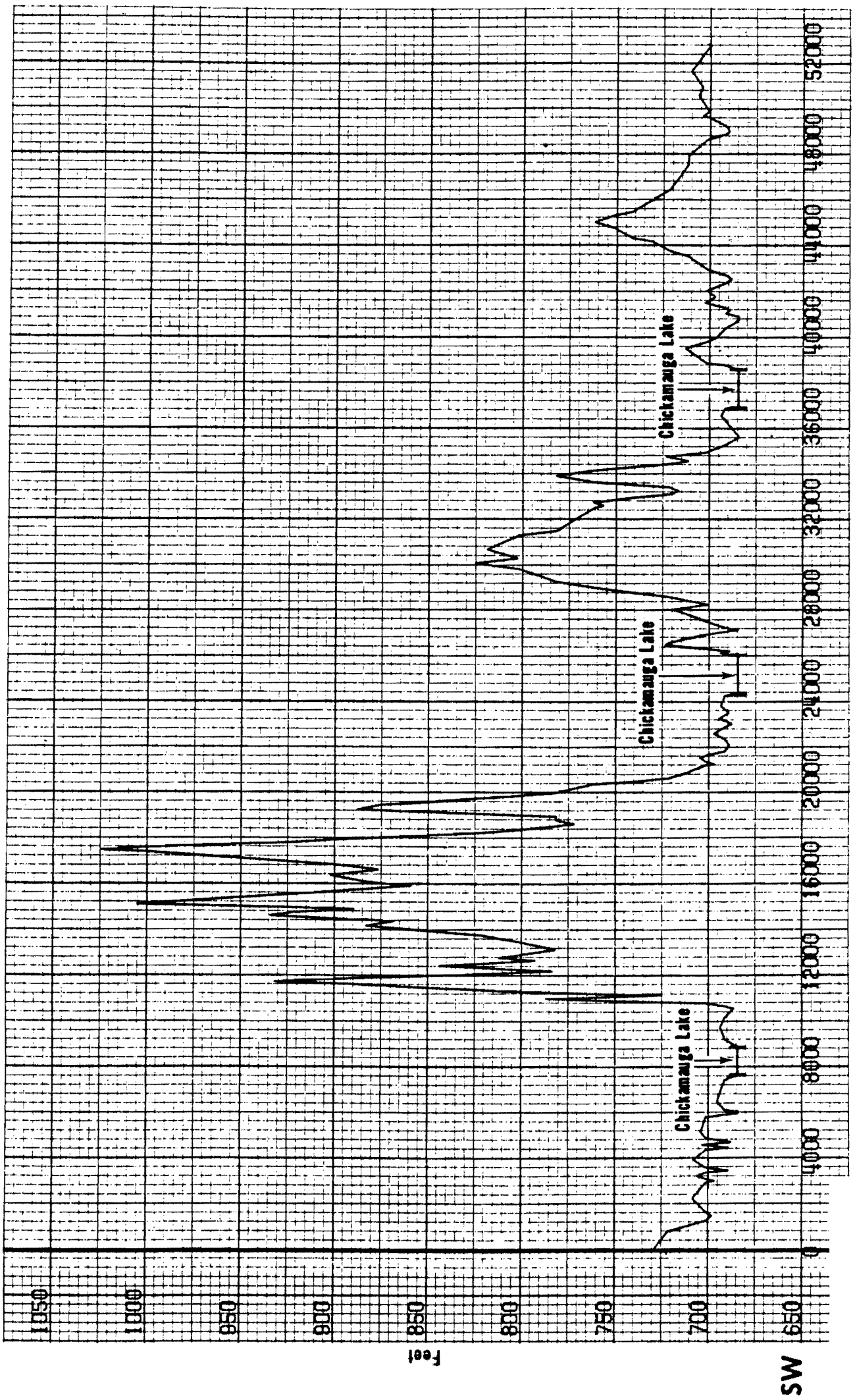
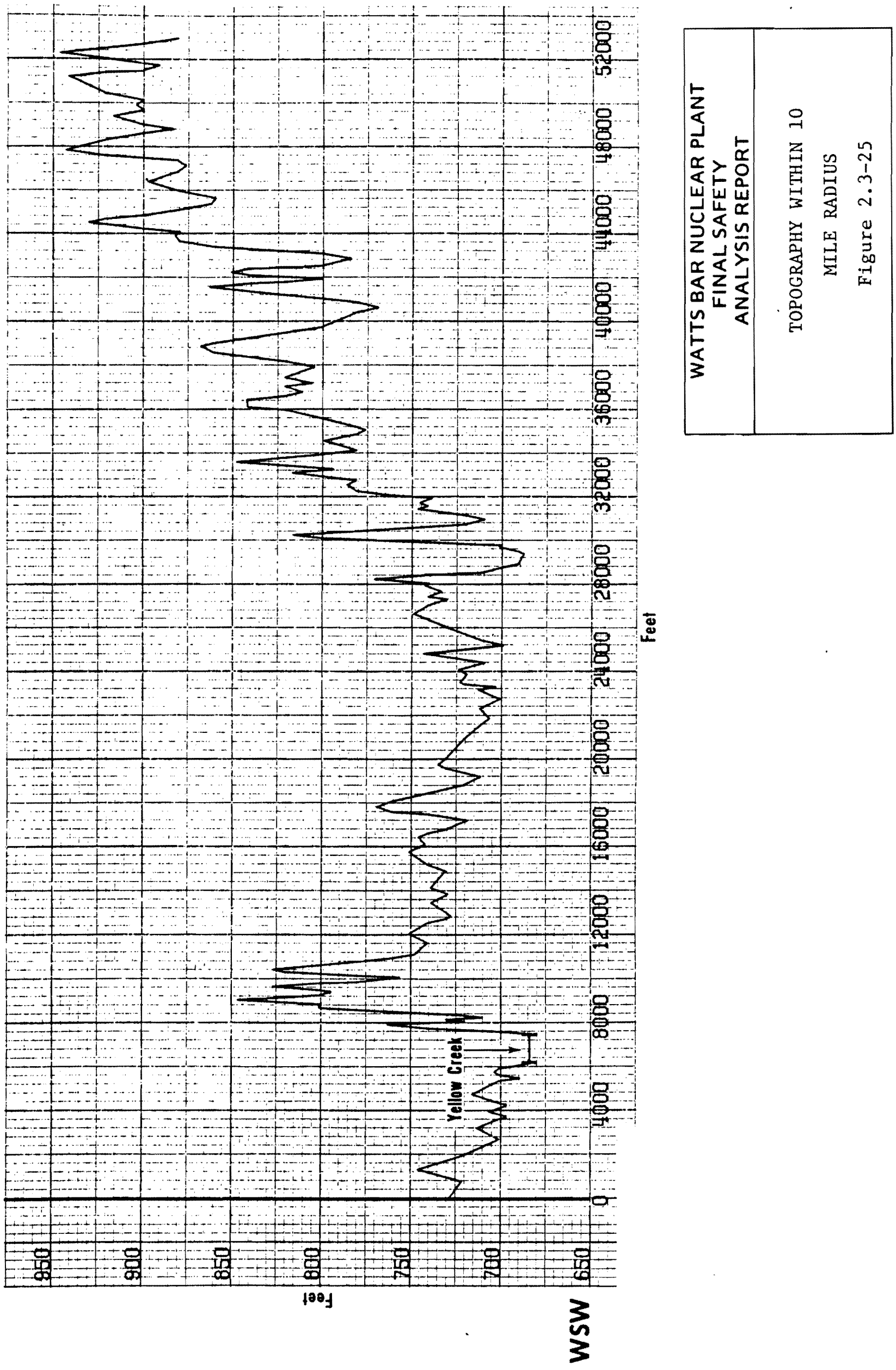
TOPOGRAPHY WITHIN 10
MILE RADIUS
Figure 2.3-23

Figure 2.3-23 Topography Within 10 Mile Radius - SSW



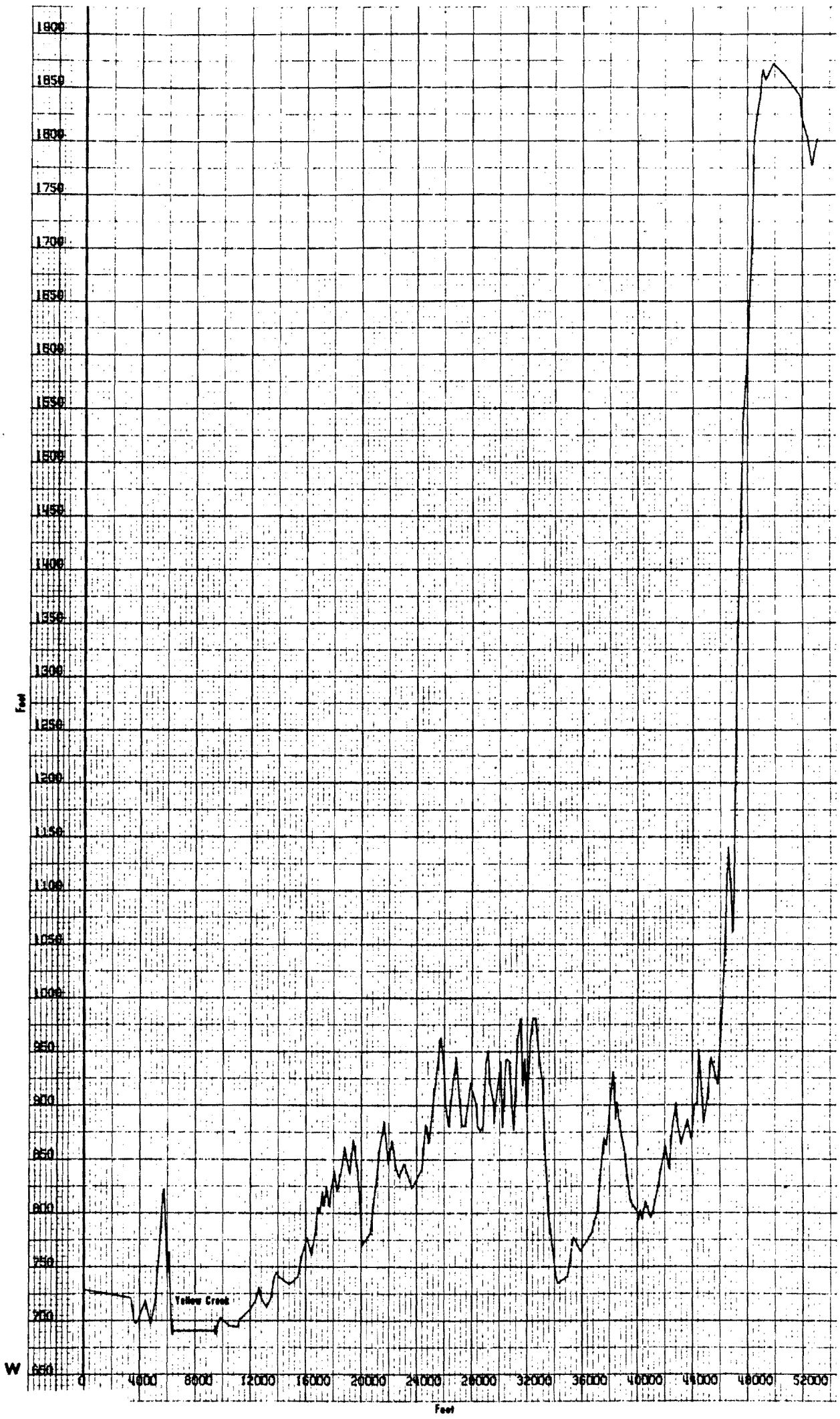
WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT	TOPOGRAPHY WITHIN 10 MILE RADIUS Figure 2.3-24

Figure 2.3-24 Topography Within 10 Mile Radius - SW



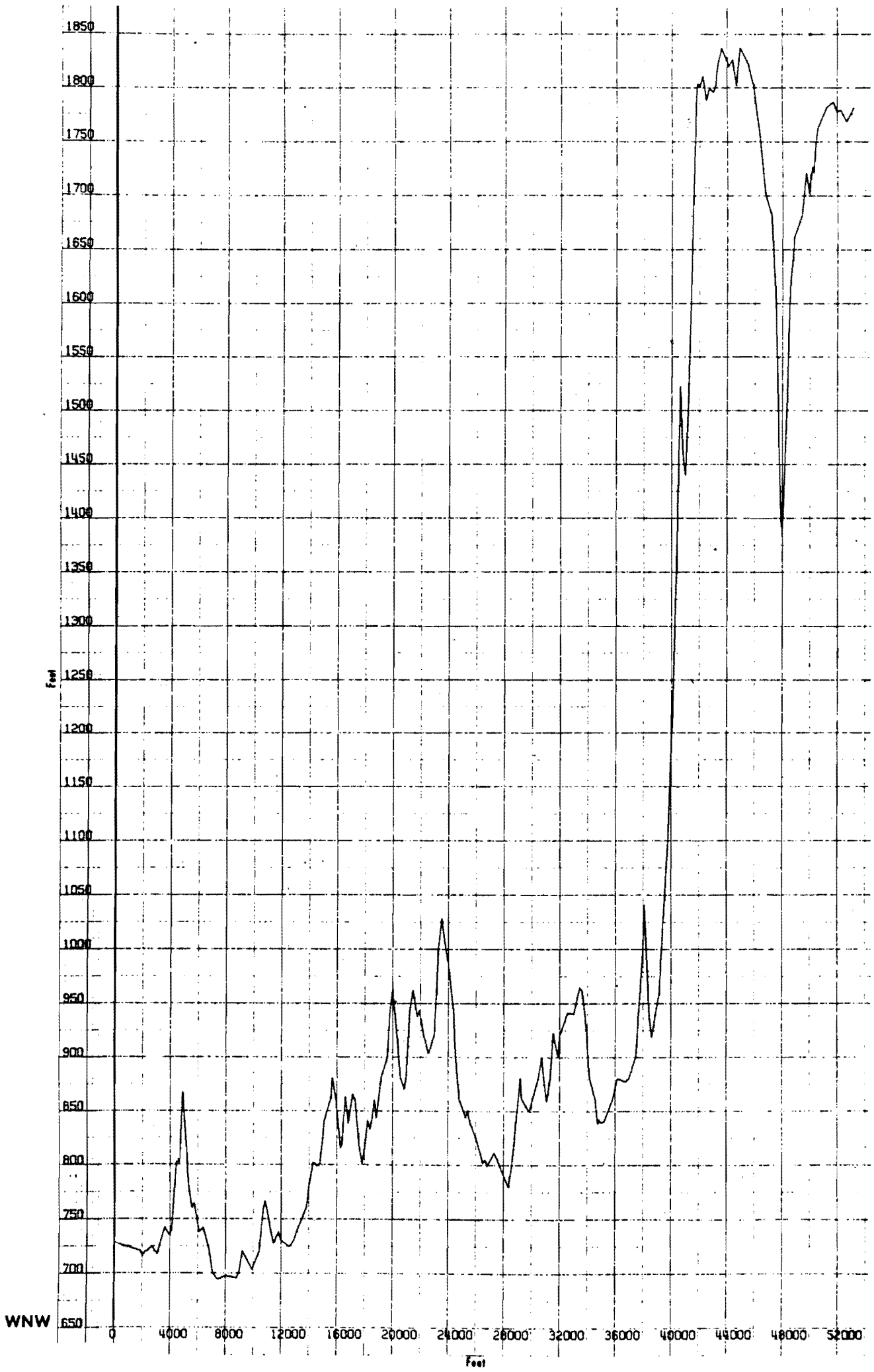
WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT	TOPOGRAPHY WITHIN 10 MILE RADIUS Figure 2.3-25

Figure 2.3-25 Topography Within 10 Mile Radius - WSW



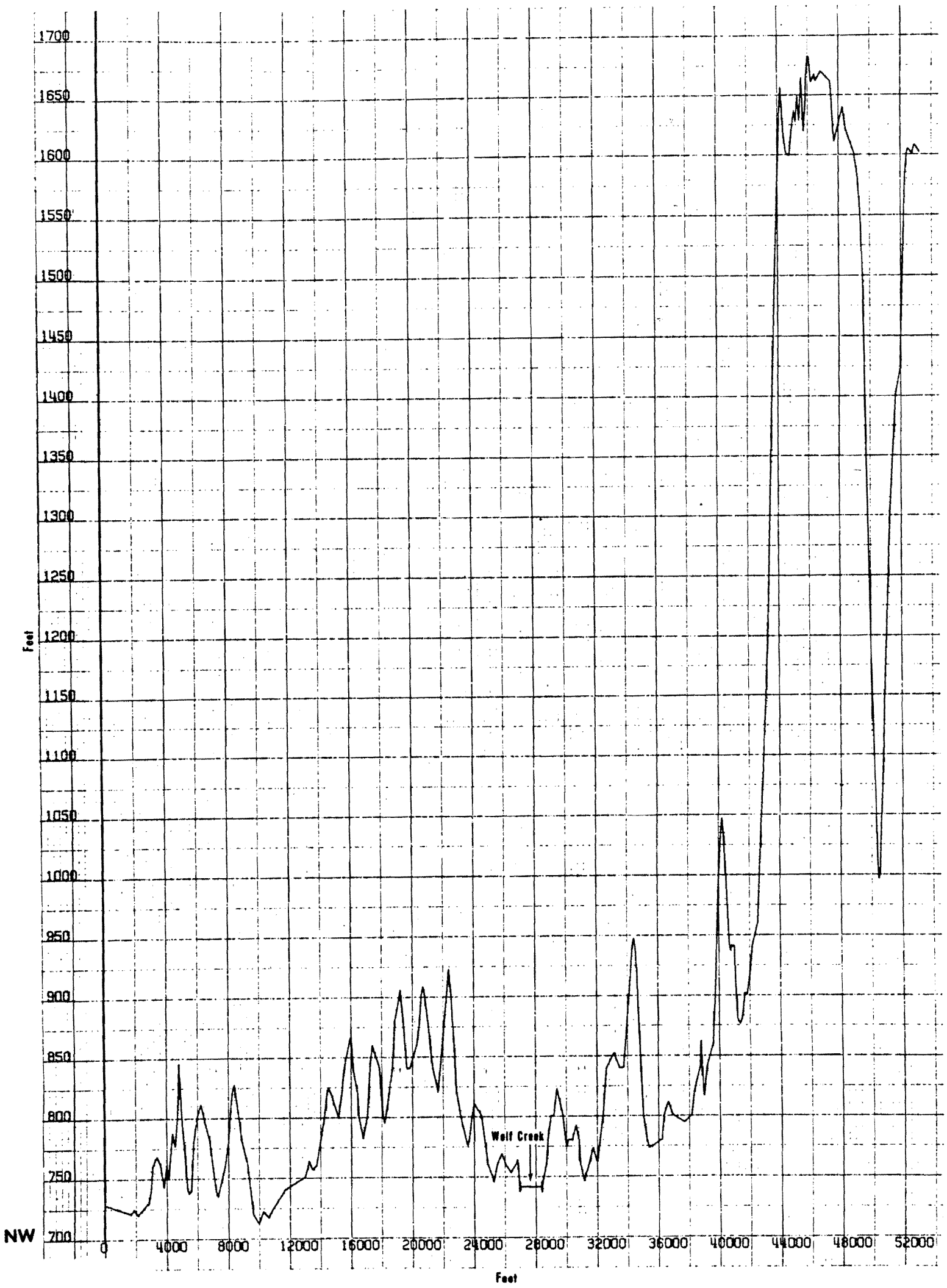
WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
TOPOGRAPHY WITHIN 10 MILE RADIUS Figure 2.3-26

Figure 2.3-26 Topography Within 10 Mile Radius - W



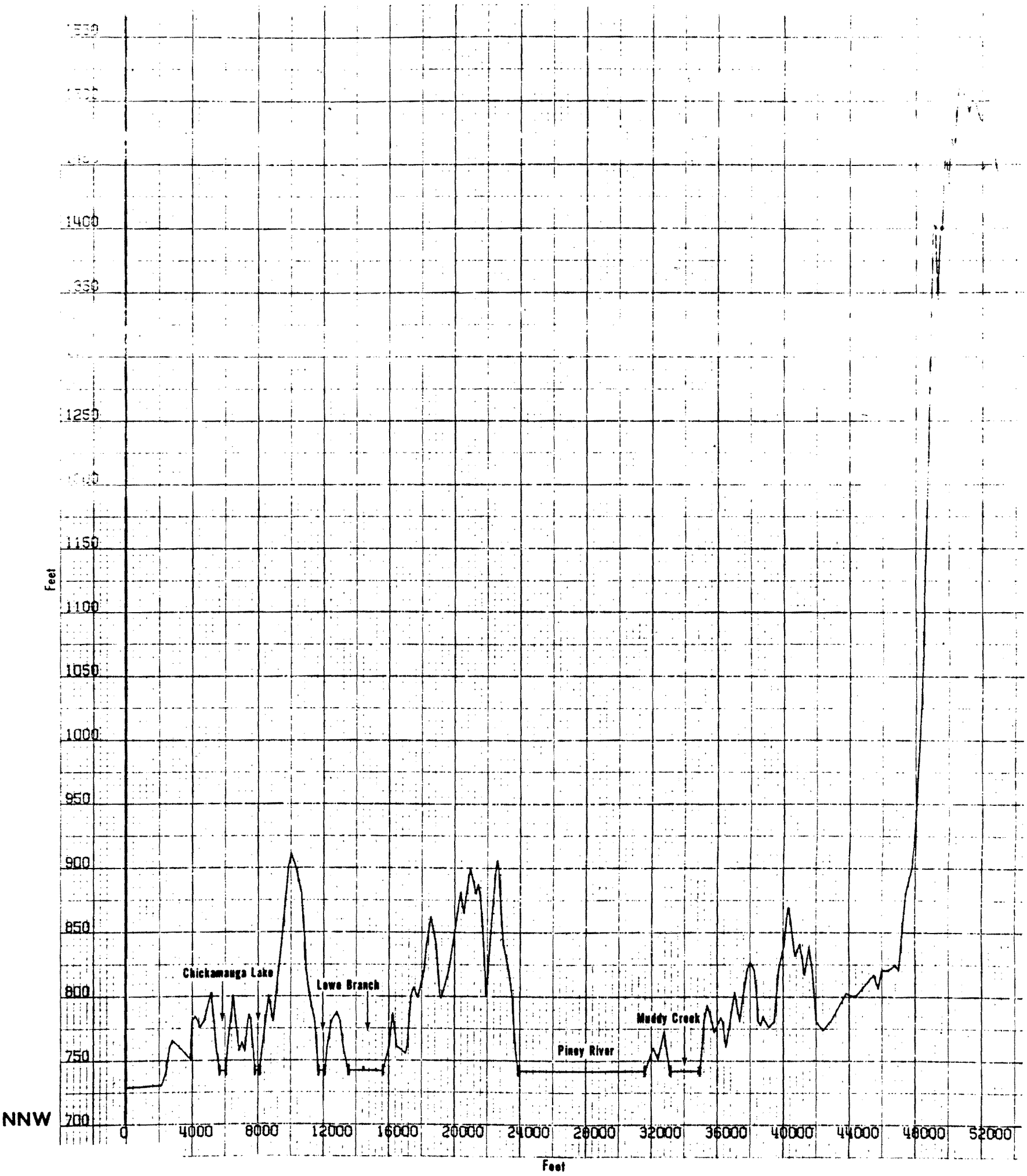
WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
TOPOGRAPHY WITHIN 10 MILE RADIUS Figure 2.3-27

Figure 2.3-27 Topography Within 10 Mile Radius - WNW



WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
TOPOGRAPHY WITHIN 10 MILE RADIUS Figure 2.3-28

Figure 2.3-28 Topography Within 10 Mile Radius - NW



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WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
TOPOGRAPHY WITHIN 10 MILE RADIUS Figure 2.3-29

Figure 2.3-29 Topography Within 10 Mile Radius