1.0 Introduction

The U.S. Department of Energy's Hanford Site lies within the semiarid shrub-steppe (see Appendix B) Pasco Basin of the Columbia Plateau in southeastern Washington State. The Hanford Site occupies an area of ~586 square miles north of the confluence of the Snake and Yakima Rivers with the Columbia River (DOE 1999). The Columbia River flows through the northern part of the Hanford Site and, turning south, forms part of the site's eastern boundary. The Yakima River runs along part of the southern boundary and joins the Columbia River below the city of Richland, which bounds the Hanford Site on the southeast. Rattlesnake Mountain, Yakima Ridge, and Umtanum Ridge form the southwestern and western boundaries. The Saddle Mountains form the northern boundary of the Hanford Site.

The regional temperatures, precipitation, and winds are greatly affected by the presence of mountain barriers. The Cascade Range, beyond Yakima to the west, greatly influences the climate of the Hanford Site area by its rain shadow effect. The Rocky Mountains and ranges in southern British Columbia protect the inland basin from the more severe cold polar air masses moving south across Canada and from the winter storms associated with them.

This document presents the calendar year 2002 climatological data summary for the Hanford Meteorology Station and additional information for temperature, wind, precipitation, and other meteorological parameters for the Hanford Meteorology Station and the automated stations of the Hanford Meteorological Monitoring Network. Climatological normal and extreme values for temperature and precipitation are also presented. Currently, 30 monitoring stations are located within and near the U.S. Department of Energy's Hanford Site (Table 1.1, Figure 1.1). A detailed description of each monitoring station, including photographs of the topography surrounding each site, is provided in Glantz and Islam (1988), and excerpts from this document are included in Appendix C. A description of instrumentation and calibration is provided in DOE (2000).

Operation of the Hanford Meteorology Station is a function of the Meteorological and Climatological Services Project funded by the U.S. Department of Energy. This project, managed by the Pacific Northwest National Laboratory, is responsible for providing the U.S. Department of Energy and Hanford Site contractors ongoing meteorological and climatological services, primarily for emergency response activities, Hanford Site work scheduling, and general site safety. Detailed, real-time meteorological data are needed in the event of a release of hazardous material to the atmosphere from any of the Hanford Site facilities. These data can be used to model atmospheric dispersion and to estimate the environmental impact of the release. Meteorological data and weather forecasts also are necessary to ensure that operations and activities on the Hanford Site are conducted safely, particularly where specific weather conditions might affect those operations or activities. The climatological database also is used in environmental studies, environmental impact reports, facility design, and planning operations.

During the period April 1912 through March 1943, cooperative observers for the U.S. Weather Bureau (now the National Weather Service) recorded daily maximum and minimum temperatures and precipitation, including measurements of unmelted snow at the Hanford town site ~10 miles east-northeast of the present Hanford Meteorology Station. From late 1943 until mid-1944, the U.S. Weather

Table 1.1. Station Numbers, Names, and Codes for the Hanford Meteorological Monitoring Network

Station Number	Station Name	Station Code	Station Elevation (ft)	Longitude Degrees	Latitude Degrees	Period of Operation
1	Prosser Barricade	PROS	480	119.412	46.392	01/82 - Present
2	Emergency Operations Center	EOC	1,240	119.537	46.392	01/82 - Present
3	Army Loop Road	ARMY	565	119.551	46.489	01/82 - Present
4	Rattlesnake Springs	RSPG	680	119.700	46.506	01/82 - Present
5	Edna	EDNA	410	119.397	46.587	01/82 - Present
6	200 East	200E	680	119.521	46.556	01/82 - Present
7	200 West	200W	650	119.663	46.543	01/82 - Present
8	Beverly	BVLY	555	119.944	46.752	08/91 - Present
9	Fast Flux Test Facility	FFTF	570	119.360	46.430	01/82 - Present
10	Yakima Barricade	YAKB	795	119.726	46.578	01/82 - Present
11	300 Area	300A	390	119.286	46.364	01/82 - Present
12	Wye Barricade	WYEB	550	119.391	46.482	01/82 - Present
13	100-N	100N	460	119.551	46.689	01/82 - Present
14	WNP-2	WPPS	450	119.345	46.470	01/82 - Present
15	Franklin County	FRNK	875	119.238	46.417	01/82 - Present
16	Gable Mountain	GABL	1,085	119.460	46.598	01/82 - Present
17	Ringold	RING	620	119.238	46.545	01/82 - Present
18	Richland Airport	RICH	390	119.301	46.301	01/82 - Present
19	Plutonium Finishing Plant-200W	PFP	675	119.633	46.545	02/94 - Present
20	Rattlesnake Mountain	RMTN	3,560	119.593	46.394	01/82 - Present
21	Hanford Meteorology Station	HMS	733	119.599	46.563	01/82 - Present
22	Pasco Airport	PASC	410	119.114	46.257	10/87 - Present
23	Gable West	GABW	490	119.558	46.612	03/86 - Present
24	100-F	100F	410	119.452	46.635	03/86 - Present
25	Vernita Bridge	VERN	430	119.728	46.641	02/88 - Present
26	Benton City	BENT	1,055	119.608	46.290	02/95 - Present
27	Tri-City Vocational Skills Center	VSTA	505	119.201	46.218	02/91 - Present
28	Roosevelt, WA	SURF	350	120.218	45.744	09/94 - Present
29	100-K	100K	450	119.578	46.657	03/96 - Present
30	HAMMER	HAMR	450	119.326	46.356	01/98 - Present

Bureau recorded some meteorological operations in Richland. Then, in 1944 as part of the Manhattan Project, the Hanford Meteorology Station was established. Hourly observations began on December 7, 1944.

The Hanford Meteorology Station and its 408-foot instrument tower are located near the center of the Hanford Site between the 200 West and 200 East Areas (Figure 1.1). Hourly observations of wind direction, wind speed, and air temperature are made at multiple levels on the 408-foot tower. Throughout this document, wind measurements from the Hanford Meteorology Station are reported from the 50-foot level and temperature measurements are reported from the 3-foot level. A variety of other meteorological variables also are measured or observed, including current weather, dew point temperature, relative humidity,

precipitation, atmospheric pressure, cloud cover, visibility, and solar radiation. Several climatological summaries of data collected at the Hanford Meteorology Station, at the Hanford town site, and Richland monitoring locations were published over the past 30 years (Jenne and Kerns 1959; Stone et al. 1972, 1983; Hoitink and Burk 1994, 1995, 1996, 1997, 1998; Hoitink et al. 1999, 2000, 2001, 2002).

This document is composed of the following information. The 2002 calendar year summary of climatological data for the Hanford Site is contained in Section 2.0. Temperature, precipitation, wind, and miscellaneous climatological statistics are contained in Sections 3.0 through 6.0, respectively. Section 7.0 contains information on extreme value analysis. Section 8.0 lists the references cited in the document, and Section 9.0 provides a bibliography of database, computer code, and other pertinent reports. Appendix A gives the station-specific wind roses and joint frequency distributions for 2002. Appendix B describes in detail the climate classification of the Mid-Columbia region. Appendix C provides a description of the Hanford Meteorological Monitoring Network.

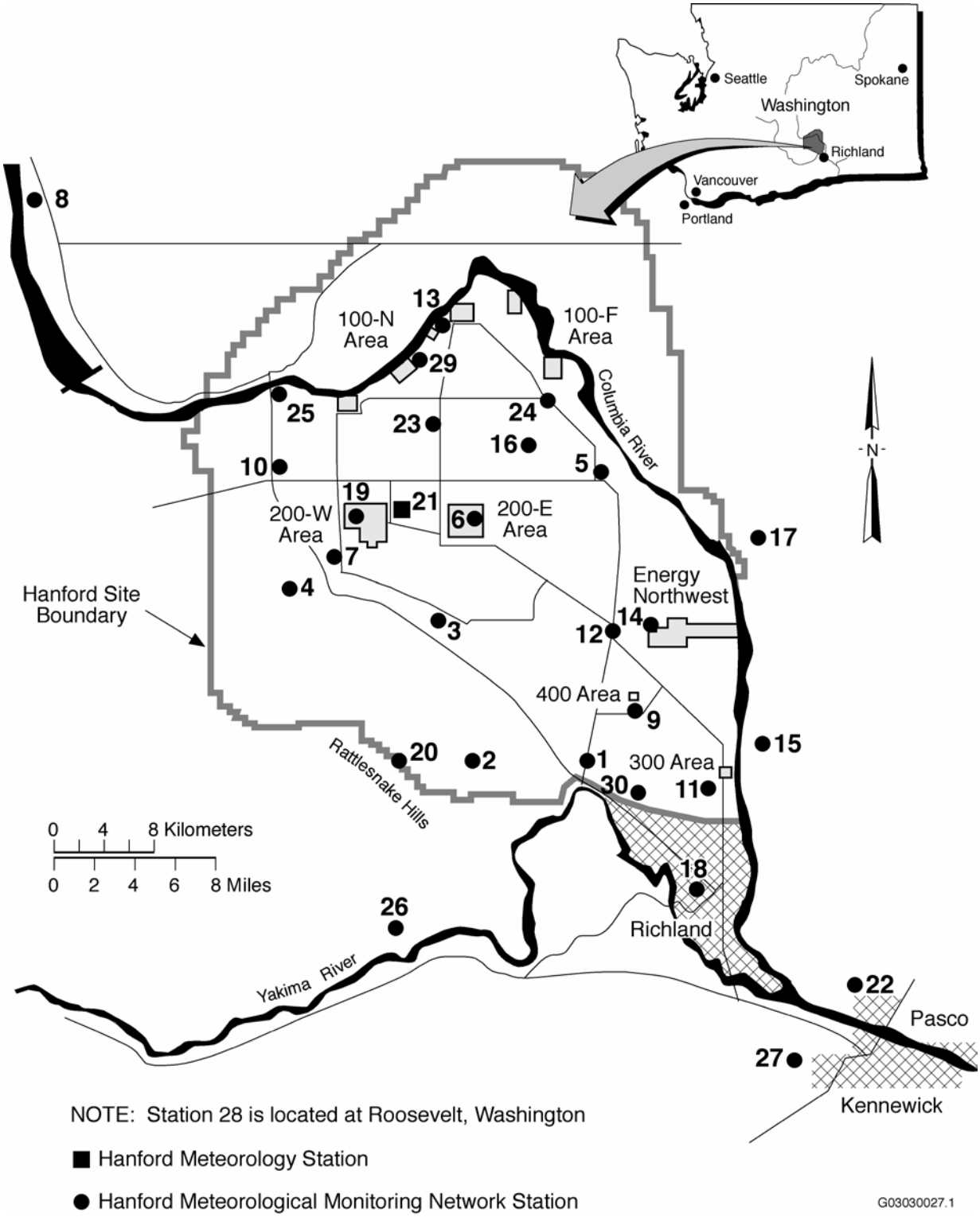

Figure 1.1. Map of the Hanford Site and Surrounding Areas (Refer to Table 1.1 for numbered locations on this map.)