

## Appendix C

### Hanford Meteorological Monitoring Network Description

This appendix provides a brief description of the Hanford Meteorological Monitoring Network using information extracted primarily from two previous documents: Glantz and Islam (1988) and Neitzel et al. (2001).

The network currently consists of 30 stations as shown in Figure C.1. Most stations are on the Hanford Site; however, eight are offsite, with Station 28 (at Roosevelt) being the most distant. All stations provide meteorological data every 15 minutes to a central computer located at the Hanford Meteorological Station. With the exception of Station 28 that relays information by telephone, all other stations report via radio telemetry.

Table C.1 lists the network stations and the meteorological information collected at each. As can be seen from this table, not all stations collect the same information, e.g., solar powered stations do not collect precipitation data.

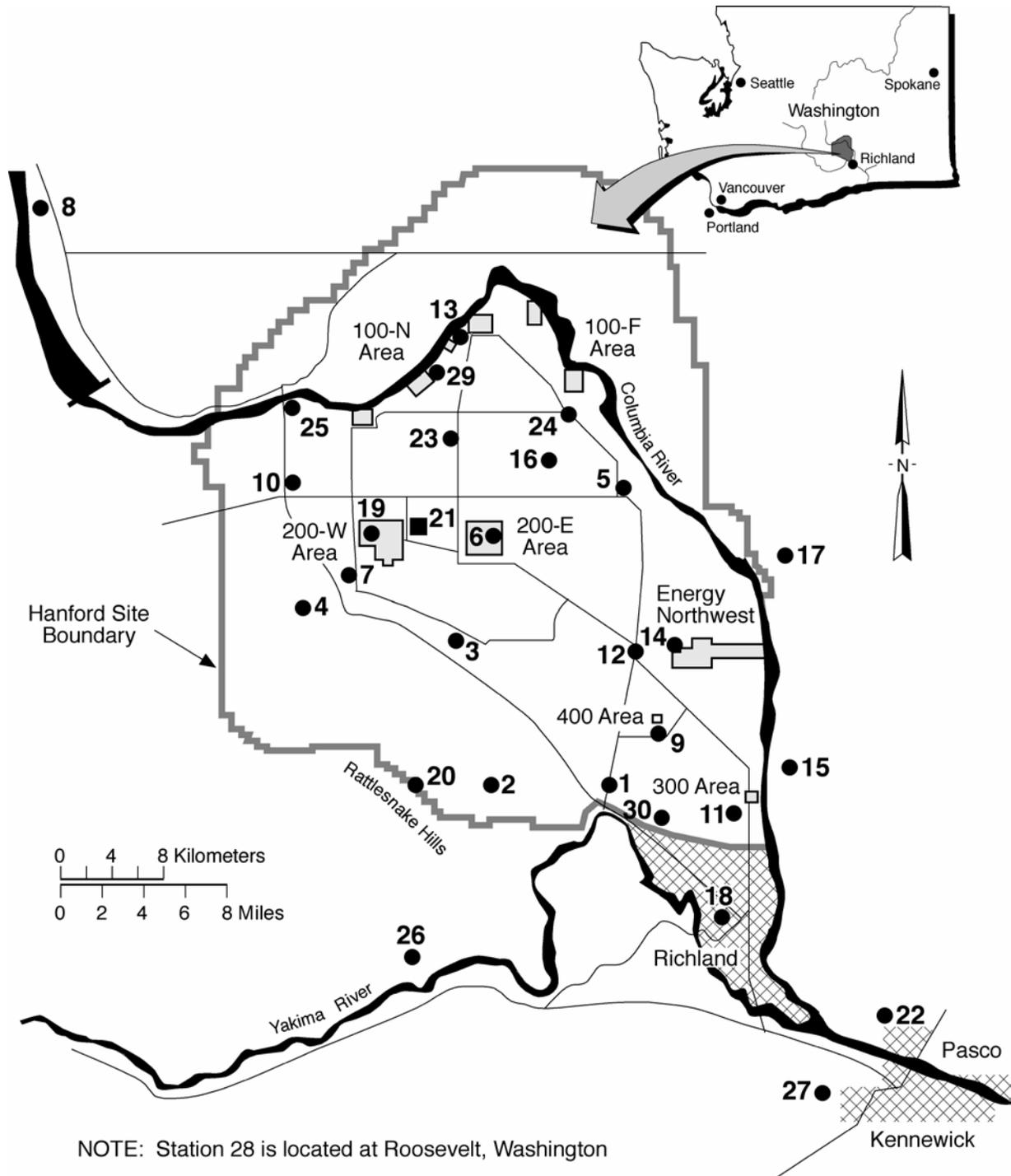
The brief station descriptions that follow pertain to 23 of the 30 network stations. Descriptions of the seven remaining stations will be included in the climatological summary for calendar year 2003.

#### C.1 Meteorological Monitoring Sites

Meteorological monitoring by the Hanford Meteorology Monitoring Program is conducted at the Hanford Meteorology Station and at twenty-nine other monitoring sites. The locations of the meteorological monitoring sites are depicted in Figure C.1. The following paragraphs briefly describe each monitoring site.

##### C.1.1 Site 1 – Prosser Barricade Monitoring Site (Pros)

The Prosser Barricade monitoring site is located near the old Prosser Barricade on Hanford Route 10 (near the southern boundary of the Hanford Site). The Prosser Barricade guardhouse is no longer present on Route 10, but its former location is roughly indicated by a parking area on the west side of road. The site is located to the west of the southern edge of the parking area about 0.9 mile up the road from Highway 240. The 30-foot instrumented tower is situated on a slight rise (a stabilized sand dune) about 160 feet west of the parking area. The topography near the Prosser Barricade is composed of low, rolling mounds and stabilized sand dunes. Slightly higher terrain is found to the west, north, and east of the site. The monitoring site is located at 46° 23' 31" N latitude and 119° 24' 40" W longitude. The elevation of the site is 480 feet above sea level.



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**Figure C.1.** Map of the Hanford Site and Surrounding Areas Including Location of Hanford Meteorological Monitoring Network Stations (Refer to Table C.1 for the names of the numbered locations on this map.)

**Table C.1.** Station Numbers, Names, and Instrumentation for Each Hanford Meteorological Monitoring Network Site (all stations are 30 feet tall unless otherwise indicated)

Site Number	Site Name	Instrumentation
1	Prosser Barricade	WS, WD, T, P
2	EOC	WS, WD, T, P
3	Army Loop Road	WS, WD, T, P
4	Rattlesnake Springs	WS, WD, T, P
5	Edna	WS, WD, T
6	200 East Area	WS, WD, T, P, AP
7	200 West Area	WS, WD, T, P
8	Beverly	WS, WD, T, P
9	FFTF (200 feet)	WD, T, TD, DP, P, AP
10	Yakima Barricade	WS, WD, T, P, AP
11	300 Area (200 feet)	WS, WD, T, TD, DP, P, AP
12	Wye Barricade	WS, WD, T, P
13	100-N Area (200 feet)	WS, WD, T, TD, DP, P, AP
14	Energy Northwest (Supply System)	WS, WD, T, P
15	Franklin County	WS, WD, T
16	Gable Mountain	WS, WD, T
17	Ringold	WS, WD, T, P
18	Richland Airport	WS, WD, T, AP
19	Plutonium Finishing Plant	WS, WD, T, AP
20	Rattlesnake Mountain	WS, WD, T, P
21	Hanford Meteorology Station (410 feet)	WS, WD, T, P, AP
22	Tri-Cities Airport	WS, WD, T, P
23	Gable West	WS, WD, T
24	100-F Area	WS, WD, T, P
25	Vernita Bridge	WS, WD, T
26	Benton City	WS, WD, T, P
27	Vista	WS, WD, T, P
28 <sup>(a)</sup>	Roosevelt, Washington	WS, WD, T, P, AP
29	100-K Area	WS, WD, T, P, AP
30	HAMMER	WS, WD, T

(a) Roosevelt is located on the Columbia River west/southwest of the Hanford Site.

AP = Atmospheric pressure.

DP = Dewpoint temperature.

P = Precipitation.

T = Temperature.

TD = Temperature difference.

WD = Wind direction.

WS = Wind speed.

### **C.1.2 Site 2 – Emergency Operations Center Monitoring Site (EOC)**

The Emergency Operations Center (EOC) monitoring site is located in the old Ecology Reserve compound within the boundaries of the Arid Lands Ecology Reserve. The compound is on the east slope of Rattlesnake Mountain, downhill and to the east of the Rattlesnake Mountain Observatory. The monitoring site is situated in the northwest corner of the Ecology Reserve compound approximately 300 feet from a series of one-story buildings located in this portion of the compound. The elevation of the local topography decreases smoothly to the east-northeast, as the terrain slopes downward from Rattlesnake Mountain with a 5% grade. The monitoring site is at 46° 23' 33" N latitude and 119° 32' 10" W longitude. The elevation of the site is 1,240 feet above sea level.

### **C.1.3 Site 3 – Army Loop Road Monitoring Site (Army)**

The Army Loop Road monitoring site is located about 4 miles south of the 200 East Area and about 1 mile northeast of Highway 240. The 30-foot tower is positioned 100 feet south of Army Loop Road on flat terrain that slopes gradually toward the floor of the Cold Creek Valley to the southwest. The site is at 46° 29' 19" N latitude and 119° 32' 53" W longitude. The elevation of the site is 565 feet above sea level.

### **C.1.4 Site 4 – Rattlesnake Springs Monitoring Site (RSPG)**

The Rattlesnake Springs monitoring site is located east of Highway 240 on the Hanford Site's Arid Land Ecology Reserve. The site is 0.4 mile east of the eastern edge of the Yakima Ridge and 1.6 miles southwest of gate 218 on Highway 240. Topography should have a strong influence on the meteorological parameters measured at this site. The site is located about 300 feet south of Dry Creek, in a valley that descends from west to east between the Yakima Ridge (to the north) and the Rattlesnake Hills (to the south). The valley is not symmetrical; most of the valley is composed of a 2-degree slope that descends from the south to meet valley's steep northern slope. Dry Creek runs along the floor of the valley just south of the steep northern slope. Winds and temperatures at the site are affected by local drainage flows along the valley floor. The site is at 46° 30' 22" N latitude and 119° 41' 56" W longitude. The elevation of the site is 680 feet above sea level.

### **C.1.5 Site 5 – Edna Monitoring Site (EDNA)**

The Edna monitoring site is located just east of Highway 2N about 0.7 mile north of the intersection of Hanford Route 11-A. The site is about 0.5 mile west of the remains of the Hanford Townsite's old school. The name of the monitoring site is taken from the "Edna" railroad crossing, which is located about 0.6 mile west of the site. The topography of the area is flat. The site is at 46° 35' 15" N latitude and 119° 23' 50" W longitude. The elevation of the site is 410 feet above sea level.

### **C.1.6 Site 6 – 200 East Monitoring Site (200E)**

The 200 East monitoring site is located within the confines of the 200 East Area. The monitoring site is about 0.4 mile north of the Plutonium Uranium Extraction Plant (PUREX) and about 0.25 mile east of the Critical Mass Laboratory. The topography within the 200 East Area is flat. The impact of 200 East

buildings on the winds measured at the monitoring site should be negligible. The site is at 46° 33' 23" N latitude and 119° 31' 14" W longitude. The elevation of the site is 680 feet above sea level.

### **C.1.7 Site 7 – 200 West Monitoring Site (200W)**

The 200 West monitoring site is currently located about 400 feet west of Hanford Route 6 and 2.4 miles south of Hanford Route 11-A. The site is several hundred meters outside the 200 West Area fence line. The monitoring site has been at its present location since 1988. From 1985 to 1988, the site was located several hundred meters north-northwest of its current location. The topography near the current and previous location of the monitoring site is level; there is only a 10-foot variation in elevation within a mile of the site. Before 1985, the site was located approximately 500 feet west of the 242-S Building within the 200 West Area. One reason for the site's removal from this location was the potential for local meteorological interference from nearby buildings and trees. The current location of the site is at 46° 32' 35" N latitude and 119° 39' 41" W longitude. The elevation of the site is 635 feet above sea level.

### **C.1.8 Site 9 – Fast Flux Test Facility Monitoring Site (FFTF)**

The Fast Flux Test Facility (FFTF) monitoring site is located about 1,000 feet south of the FFTF fence line almost due south of the reactor dome. Measurements at this site are made using a 200-foot instrumented tower. The tower is situated on a large gravel pad on a stabilized sand dune at a slightly higher elevation than the surrounding terrain. The local topography is dominated by a series of low, stabilized sand dunes that are oriented along a southwest-northeast axis. The elevation of the local terrain changes dramatically along a lengthy north-south slope that approaches within 2,000 feet to the east of the monitoring site. At the bottom of this slope, the terrain elevation is more than 100 feet lower than at the base of the 200-foot tower. The site is at 46° 25' 49" N latitude and 119° 21' 31" W longitude. The elevation of the base of the tower is 570 feet above sea level.

Winds are measured at three levels on the towers: 30 feet, 82 feet, and 200 feet. Air temperatures are also measured at three levels on the tower: 5 feet, 30 feet, and 200 feet. The dew point temperature is also measured at the 5-foot level. Before 1983, a 30-foot tower was operated at a location about 0.8 mile to the north-northeast of the 200-foot tower.

### **C.1.9 Site 10 – Yakima Barricade Monitoring Site (YAKB)**

The Yakima Barricade monitoring site is located by the Yakima Barricade guardhouse near the intersection of Hanford Route 11-A and State Highway 240 at the western edge of the Hanford Site. The 30-foot tower is located about 230 feet north-northeast of the guardhouse within the boundaries of the Hanford Site. This site is located on the 200 Area Plateau. The southern edge of the plateau is just over 0.6 mile south-southeast of the site. Higher terrain is located just over 0.6 mile to the west of the site. There are no major topographical features in the immediate vicinity of the site. The monitoring site is at 46° 34' 41" N latitude and 119° 43' 30" W longitude. The elevation of the site is 795 feet above sea level.

### **C.1.10 Site 11 – 300 Area Monitoring Site (300A)**

The 300 Area monitoring site is located about 1,300 feet southwest of the southwestern corner of the 300 Area. The site is about 800 feet west of Hanford Route 4S (Stevens Drive) and about 500 feet west of the railroad tracks that parallel Route 4S. Measurements at this site are made using a 200-foot instrumented tower. The tower is situated on a gravel pad at the top of partially stabilized sand dune. The dune appears to be one of several dunes in the area that are oriented along a southwest-northeast axis. The site is at 46° 21' 50" N latitude and 119° 17' 08" W longitude. The elevation of the base of the tower is 390 feet sea level.

Winds are measured at three levels on the towers: 30 feet, 82 feet, and 200 feet. Air temperatures are also measured at three levels on the tower: 5 feet, 30 feet, and 200 feet. The dew point temperature is also measured at the 5-foot level. Before 1983, meteorological measurements at this site were made on a 30-foot instrumented tower. The old 30-foot tower was located within 100 feet of the present tower.

### **C.1.11 Site 12 – Wye Barricade Monitoring Site (WYEB)**

The Wye Barricade monitoring site is located just west of the Wye Barricade guardhouse on Hanford Route 4S. The 30-foot tower is located about 260 feet west of the guardhouse on the top of a stabilized sand dune. Because of its position on top of a sand dune, the base of the 30-foot tower is about 10 to 13 feet above the base of the guardhouse. There are no significant terrain features in the vicinity of this monitoring site; however, low, stabilized sand dunes characterize the terrain to the southwest of the site. The monitoring site is at 46° 28' 56" N latitude and 119° 23' 34" W longitude. The elevation of the site is 550 feet above sea level.

### **C.1.12 Site 13 – 100-N Monitoring Site (100A)**

The 100-N monitoring site is located between the 100-N and 100-D Areas, just over 1,300 ft to the southwest of the Columbia River. The 100-N monitoring site is closer to the 100-D Area (0.5 mile from the reactor buildings) than to the 100-N Area (1.5 miles away). Measurements at this site are made using a 200-foot instrumented tower. The topography around the 200-foot tower is flat. The site is located at 46° 41' 16" N latitude and 119° 32' 58" W longitude. The elevation of the station is 460 feet above sea level.

Winds are measured at three levels on the towers: 30 feet, 82 feet, and 200 feet. Air temperatures are also measured at three levels on the tower: 5 feet, 30 feet, and 200 feet. The dew point temperature is also measured at the 5-foot level. Before 1983, a 30-foot tower was operated at a location much closer to the 100-N Area. This tower was on a rise about 0.3 mile east of the reactor building, at a point about 500 feet northeast of the 100-N Area's main access road.

### **C.1.13 Site 14 – WNP-2 Monitoring Site (WPPS)**

The Washington Nuclear Power Plant 2 (WNP-2) monitoring site is located about 0.4 mile west of the WNP-2 reactor building. The 30-foot tower at this site is located about 120 feet west of WNP's 200-foot instrumented tower, which is not part of the Hanford Meteorology Monitoring Network. The topography

in the immediate vicinity of the monitoring site is flat, but stabilized sand dunes are located within several hundred feet of the site. The monitoring site is at 46° 28' 12" N latitude and 119° 20' 34" W longitude. The elevation of the site is 450 feet above sea level.

#### **C.1.14 Site 15 – Franklin County Monitoring Site (FRNK)**

The Franklin County monitoring site is located outside of the Hanford Site on the east side of the Columbia River. The site is located just over 4 miles north-northeast of the 300 Area and about 1.2 miles east of the Columbia River. The topography near the site is flat, although the elevation of the terrain increases slightly to the west. Rankin Canyon is located about 0.3 mile to the west of the site, but the steep slope of the canyon's walls cannot be seen from the base of the 30-foot tower. This monitoring site is on a gravel road that runs through an apple orchard. The trees are currently about 9 to 13 feet tall. The trees might have some impact on the meteorological parameters measured on the tower in recent years. This impact should be greatest during the warm season when leaves are on the trees. The monitoring site is at 46° 25' 3" N latitude and 119° 14' 12" W longitude. The elevation of the terrain on the east side of the Columbia River is significantly higher than on the west side of the river; the elevation of the monitoring site is 875 feet above sea level.

#### **C.1.15 Site 16 – Gable Mountain Monitoring Site (GABL)**

The Gable Mountain monitoring site is located at the eastern summit of Gable Mountain. The summit contains various types of towers and power poles. The 30-foot instrumented meteorological tower is located about 30 feet to the west of the small (approximately 13 feet by 20 feet), low (10 feet), cinder-block building at the summit. A tall utility-type pole with a diameter of about 2 feet is located near the southwestern corner of the building. Under some conditions these structures may influence meteorological measurements at this site. The monitoring site is located at 46° 35' 53" N latitude and 119° 27' 36" W longitude. The elevation of the site is 1,085 feet above sea level.

#### **C.1.16 Site 17 – Ringold Monitoring Site (RING)**

The Ringold monitoring site is outside of the Hanford Site on the east side of the Columbia River. The site is located at the intersection of Rickert Road and Ranger Drive about 2.2 miles east of the Columbia River and 2.5 miles north-northeast of the Ringold fish hatchery. The local topography increases in elevation to the northeast (up-valley) and northwest (toward the valley rim). To the southwest, a hill in the middle of the valley splits the valley in half before it reaches the Columbia River. There are a few small-scale undulations in terrain height within the valley; however, changes in elevation are so gradual and uniform that the valley floor appears flat. The monitoring site is at 46° 32' 42" N latitude and 119° 14' 13" W longitude. The site is located in a northeast-southwest oriented valley at an elevation of 620 feet above sea level. The elevation of the terrain on the northwestern rim of the valley, 0.7 mile from the site, exceeds 900 feet above sea level. The elevation of the terrain on the southeastern rim of the valley, 1.5 miles from the site, exceeds 850 feet above sea level.

### **C.1.17 Site 18 – Richland Airport Monitoring Site (RICH)**

The monitoring site at the Richland Airport is on the roof of the old control tower on the south side of the airport. The wind sensors are mounted about 10 feet above the roof of the control tower at about 40 feet above the ground. Air temperature is measured at a height of 5.5 feet above the roof of the control tower on a short instrument tower at the northern edge of the roof. The topography of the surrounding area is relatively flat. The site is located at 46° 18' 04" N latitude and 119° 18' 01" W longitude. The elevation of the base of the control tower is 390 feet above sea level.

### **C.1.18 Site 20 – Rattlesnake Mountain Monitoring Site (RTMN)**

The Rattlesnake Mountain monitoring site is located near the Astronomical Observatory on the crest of Rattlesnake Mountain. The monitoring site is about 230 feet southeast of the southernmost observatory dome. Instruments at the site are mounted on a 15-foot pole that is sunk into a concrete support platform on the crest of Rattlesnake Mountain. This site is subjected to extreme winds and a much cooler temperature regime than the monitoring sites in the basin to the east. The site is located at 46° 23' 40" N latitude and 119° 24' 40" W longitude. The elevation of the site is 3,560 feet above sea level.

### **C.1.19 Site 21 – The Hanford Meteorology Station (HMS)**

Meteorological monitoring at the Hanford Meteorology Station is conducted on the station's 410-foot instrumented tower and at surface locations. The station is located between the 200 West and 200 East operating areas, about 0.6 mile north of the east gate to the 200 West Area and about 300 feet east of Hanford Route 3. At this site, wind measurements are made at seven heights, ranging from 7 feet to 400 feet above ground level, using near-surface monitoring equipment and instruments on the 410-foot tower. Similarly, air temperatures are measured at eight heights, ranging from 5 feet to 400 feet above ground level.

In addition to winds and air temperatures, a variety of other meteorological variables are measured or observed at the Hanford Meteorology Station. These parameters, including dew point, relative humidity, precipitation, atmospheric pressure, cloud cover, and visibility are also measured at the Hanford Meteorology Station (Glantz and Islam 1988). Winds aloft are also measured using a Doppler acoustic sounder.

### **C.1.20 Site 22 – Pasco Airport Monitoring Site (PASC)**

The monitoring site at the Pasco Airport is on the roof of the old control tower on the east side of the airport. The control tower is approximately five stories tall. The wind sensors are mounted at a height of about 5 feet above the roof of the control tower, roughly 70 feet above the ground. Air temperature is measured at a height of 5.5 feet above the ground on the north side of the control tower building. The topography near the monitoring site is relatively flat; however, large aircraft hangers are located to the south of the control tower. The size and location of these buildings could affect the winds measured on the control tower under some circumstances. The site is located at 46° 15' 48" N latitude and 119° 06' 18" W longitude. The elevation of the base of the control tower is 410 feet above sea level.

### **C.1.21 Site 23 – 100-F Monitoring Site (100F)**

The 100-F monitoring site is located about 1.5 miles south of the 100-F Area, slightly southwest of the Junction of Hanford Route 1 and Hanford Route 2N, and east of the local railroad tracks. The monitoring site is about 1.5 miles west of the Columbia River. The station tower is situated in an area of relatively flat topography. The site is at 46° 38' 6" N latitude and 119° 27' 4" W longitude. The elevation of the site is 410 feet above sea level.

### **C.1.22 Site 24 – Gable West Monitoring Site (GABW)**

The Gable West monitoring site is located about 0.4 mile west of the western edge of Sable Mountain at a point less than 230 feet west of Hanford Route 4N. The site is 2.2 miles north of the intersection of Hanford Route 4N and Route 11-A and about 1.6 miles south of the intersection of Hanford Route 4N and Route 1. The tower is situated in an area of relatively flat topography, approximately 0.6 mile north of the 200 Area Plateau. The site is at 46° 36' 35" N latitude and 119° 33' 23" W longitude. The elevation of the station is 490 feet above sea level.

### **C.1.23 Site 25 – Vernita Bridge Monitoring Site (VERN)**

The Vernita Bridge monitoring site is located about 0.2 mile downriver (northeast) from the Vernita Bridge. The site is located about 400 feet south of the Columbia River and 50 feet west of the abandoned highway that runs north toward the Columbia River from Hanford Route 6. About 80 feet north of the tower, the local topography begins a 30-foot descent to the waters of the Columbia River. The terrain south of the monitoring site rises gradually in elevation but appears quite flat. The meteorology at this site should be strongly influenced by the Columbia River and surrounding terrain. The site is at 46° 38' 29" N latitude and 119° 43' 34" W longitude. The elevation of the site is 430 feet above sea level.

## **C.2 References**

Glantz, C. S. and M. M. Islam. 1988. *The Data Collection Component of the Hanford Meteorology Monitoring Program*. PNL-6684, Pacific Northwest Laboratory, Richland, Washington.

Neitzel D.A. (ed.). 2001. *Hanford Site National Environmental Policy Act (NEPA) Characterization*. PNNL-6415, Rev. 13, Pacific Northwest National Laboratory, Richland, Washington.