

4.8.10 Aesthetic and Scenic Resources

Broad basins and plateaus interspersed with ridges characterize the Hanford Site landscape. The wide vistas composing much of the area are interrupted by numerous large industrial facilities (for example, reactors and processing facilities). However, DOE and its predecessors have disturbed only about 6 percent of the site. The remainder lies undeveloped and includes natural areas and abandoned agricultural lands that remain undisturbed because of restricted public access. The Hanford Reach National Monument was established in part because of these aesthetic and scenic resources.

The Columbia River flows through the northern portion of the Hanford Site before turning south and forming the eastern site boundary. The White Bluffs, steep whitish-brown cliffs adjacent to the Columbia River, comprise a striking natural feature of the landscape. Rattlesnake Mountain, rising to 1092 m (3581 ft) above mean sea level forms the southeastern boundary of the Hanford Site. Gable Mountain and Gable Butte are the highest landforms within the Hanford Site. Large rolling hills are located to the west and north.

SR 240 provides public access through the southwestern portion of the Hanford Site. Views along this highway include the open lands of the Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE) in the foreground to the west, with the prominent peak of Rattlesnake Mountain and the extended ridgelines of the Rattlesnake Hills in the background. To the east, the views include relatively flat terrain with the structures of the 200 East and 200 West Areas visible in the central area with Gable Butte and Gable Mountain in the background. From the highway, the Saddle Mountains can be seen in the distance to the north and steam plumes from the Energy Northwest reactor cooling towers are often visible in the distance to the east. The views along SR 240 are expansive due to the flat terrain and the predominantly short, treeless, vegetation cover.

Hanford Site facilities can also be seen from elevated locations, such as Gable Mountain, Gable Butte, Rattlesnake Mountain, and other parts of the Rattlesnake Hills along the western perimeter. Facilities are visible from the Columbia River as well. Because of the vast expanse, terrain, and distances involved, only portions of the site are visible from any one point.

The acquisition of spiritual guidance and assistance through personal vision quests is deeply rooted in the religious practices of the indigenous people of the Columbia Basin. High spots were selected because they afforded extensive views of the natural landscape and seclusion for quiet meditation. These practices, and the areas where they took place, are critical in maintaining the continuing cultural identity of the Native American community, and, as such, are eligible for inclusion in the National Register. The high points of the Hanford Site, including Gable Mountain, Rattlesnake Mountain, and Wahluke Slope, are representative of locations where vision quests were conducted. The physical landscape visible from each location is a means to determine areas and resources of concern.

4.9 Noise

Noise is technically defined as sound waves that are unwanted and perceived as a nuisance by humans. Sound waves are characterized by frequency, measured in Hertz (Hz), and sound pressure

expressed as decibels (dB). Most humans have a perceptible hearing range of 31 to 20,000 Hz. A decibel is a standard unit of sound pressure. The threshold of audibility for most humans ranges from about 60 dB at a frequency of 31 Hz to less than about 1 dB between 900 and 8000 Hz. (For regulatory purposes, noise levels for perceptible frequencies are weighted to provide an A-weighted sound level [dBA] that correlates highly with individual community response to noise.) Sound pressure levels outside the range of human hearing are not considered noise in a regulatory sense, even though wildlife may be able to hear at these frequencies.

Noise levels are often reported as the equivalent sound level (L_{eq}). The L_{eq} is expressed in dBA over a specified period of time, usually 1 or 24 hour(s). The L_{eq} is the equivalent steady sound level that, if continuous during a specified time period, would contain the same total energy as the actual time-varying sound over the monitored or modeled time period.

Environmental noise measurements were made on the Hanford Site in 1981 during site characterization for the Skagit/Hanford Nuclear Power Plant Site (NRC 1982). Measurements were also made at five locations during 1987 when the Hanford Site was considered for a geologic waste repository (BWIP) for spent commercial nuclear fuel and other high-level nuclear waste. Additionally, noise levels as a result of field activities, such as well drilling and sampling, were measured. Baseline offsite noise measurements attributable to automobile traffic were also determined.

During site characterization for the Skagit/Hanford Nuclear Power Plant (NRC 1982), 15 sites were monitored and noise levels were found to range from 30 to 60.5 dBA (L_{eq}). The values for isolated areas ranged from 30 to 38.8 dBA. Measurements taken around the sites where Energy Northwest was constructing nuclear power plants (WNP-1, WNP-2, and WNP-4) ranged from 50.6 to 64 dBA. Measurements taken along the Columbia River near the intake structures for WNP-2 were 47.7 and 52.1 dBA, compared with more remote river noise levels of 45.9 dBA (measured about 4.8-km [3 mi] upstream of the intake structures). Community noise levels in north Richland (Horn Rapids Road and SR 240) were 60.5 dBA.

Background noise levels were determined at five locations within the Hanford Site for studies supporting the BWIP. Noise levels are expressed as L_{eqs} for 24 hr (L_{eq-24}). On the dates tested, the average noise level for the five sites was 38.9 dBA. Wind was identified as the primary contributor to background noise levels, with winds exceeding 19 km/hr (12 mi/hr) significantly affecting noise levels. Background noise levels in undeveloped areas at Hanford can best be described as a mean L_{eq-24} of 24 to 36 dBA. Periods of high wind that normally occur in the spring would elevate background noise levels.

Baseline noise levels as a result of automobile traffic were determined for two locations: SR 24, leading from the Hanford Site west to Yakima, and SR 240, south of the site and west of Richland where the route handles maximum traffic volume (DOE 1991). Traffic volumes were predicted based on an operational workforce and a construction workforce. Peak (rush hour) and off-peak hours were modeled. Noise levels were expressed in L_{eq} for 1-hr periods in dBA at a receptor located 15 m (49 ft) from the road edge. Baseline noise levels during the construction phase were 62 dBA for SR 24 and 70.2 dBA

for SR 240. Levels based on the operational phase ranged from 62 to 65.7 dBA for SR 24 and 70.2 to 74.1 dBA for SR 240. Adverse community responses would not be expected at increases of 5 dBA over background noise levels.

In the interest of protecting Hanford workers and complying with Occupational Safety and Health Administration (OSHA) standards for noise in the workplace, that Hanford Environmental Health Foundation (HEHF) has monitored noise levels resulting from several routine operations performed at Hanford. Occupational sources of noise propagated in the field include well sampling, well drilling, water wagon operation, trucks, compressors, and generators. Noise levels from these activities ranged from 74.8 to 125 dBA (Neitzel 2002a) and have the potential for disturbing sensitive wildlife.

4.10 Occupational Safety

Total occupational work hours at the Hanford Site for the 5-year period, 1997-2001, were 106,836,082 hours, or about 56,230 worker-years (DOE 2002). The DOE records occupational injuries and illnesses in four categories pertinent to NEPA analysis. Total recordable cases (TRCs) are work-related deaths, illnesses, or injuries resulting in loss of consciousness, restriction of work or motion, transfer to another job, or required medical treatment beyond first aid. Lost workday cases (LWCs) represent the number of cases recorded resulting in days away from work or days of restricted work activity, or both, for affected employees. Lost workdays (LWDs) are the total number of workdays (consecutive or not), after the day of injury or onset of illness, during which employees were away from work or limited to restricted work activity because of an occupational injury or illness. Fatalities are the number of occupationally related deaths. Information on occupational safety used in this section is updated quarterly and is available at URL: <http://tis.eh.doe.gov/cairs>.

Occupational injury and illness incidence rates for the Hanford Site Office of River Protection showed a steady decrease from 1997 through 2000 (Figure 4.29). Rates ranged from 3.0 cases per 200,000 worker hours (100 worker years) in 1997 to 1.7 cases in 2001. Occupational injury and illness incidence rates for Richland Operations declined from 1997 to 2000, increasing slightly during 2001. In 1997 there were 3.1 cases per 200,000 worker hours. Rates decreased to 2.0 cases in 2000 and increased slightly in 2001 to 2.1 cases per 200,000 worker hours. Occupational injury and illness incidence rates for the DOE complex also demonstrate annual decreases, ranging from 3.5 cases per 200,000 worker hours during 1997 to 2.3 cases in 2001 (DOE 2002).

Over the 5-year period from 1997 to 2001, rates on the Hanford Site averaged 2.4 cases per 200,000 worker hours, whereas the incidence rate for the entire DOE complex averaged slightly higher, at 2.8 cases per 200,000 worker hours (DOE 2002). The Hanford Site and DOE-wide average TRC rates were well below the Bureau of Labor Statistics (BLS) rates for U.S. private industry of 6.7 cases per 200,000 worker hours during the same period (BLS 2002).