

### 3.0 EXISTING CONDITIONS

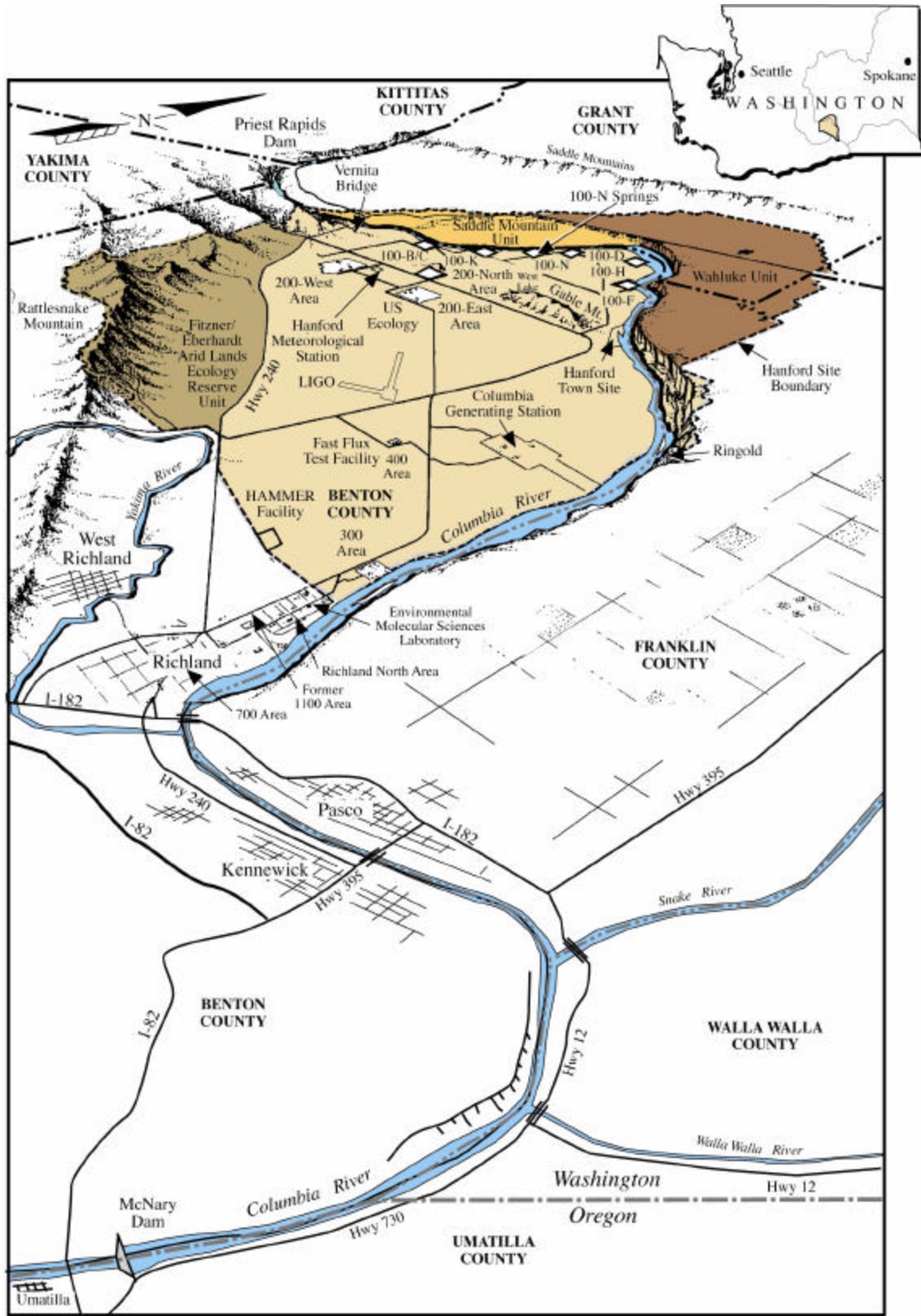
Section 3 provides an overview of the existing conditions at Hanford. The section begins with a facility description, including the current operational context and past and potential impacts that operations have on cultural resources. This is followed by the cultural and historical setting, a summary of known cultural resources, and a summary of accomplishments made by the U.S. Department of Energy (DOE) Richland Operations Office (DOE-RL) Hanford Cultural and Historic Resources Program (the program). The section concludes with summaries of cultural resource compliance activities at Hanford.

#### 3.1 FACILITY DESCRIPTION

Complete descriptions of the Hanford Site, its components, condition, and related activities can be found in the *Hanford Site National Environmental Policy Act (NEPA) Characterization* report (Neitzel et al. 2002) and the *Hanford Site Environmental Report for Calendar Year 2001* (Poston et al. 2002). The following descriptions have been extracted from these documents.

The major areas on the Hanford Site (see Figure 1) include the following:

- The 100 Areas, on the south shore of the Columbia River, are the sites of nine retired plutonium production reactors, including the dual-purpose N Reactor (in the 100-N Area). The 100 Areas occupy ~11 square kilometers (4 square miles).
- The 200-West and 200-East Areas are centrally located on a plateau and are ~8 and 11 kilometers (5 and 7 miles), respectively, south and west of the Columbia River. The 200 Areas cover ~16 square kilometers (6 square miles).
- The 300 Area is located just north of the city of Richland. This area covers 1.5 square kilometers (0.6 square mile).
- The 400 Area is ~8 kilometers (5 miles) northwest of the 300 Area.
- The 600 Area includes all of the Hanford Site not occupied by the 100, 200, 300, 400, and 700 Areas.
- The former 311-hectare (768-acre) 1100 Area is located generally between the 300 Area and the city of Richland. It included site support services such as general stores and transportation maintenance. On October 1, 1998, this area was transferred to the Port of Benton as a part of the DOE-RL economic diversification efforts and is no longer part of the Hanford Site. However, DOE contractors continue to lease facilities in this area.
- The Richland North Area (off the Site) includes the Environmental Molecular Sciences Laboratory and other DOE and contractor facilities, mostly leased office buildings, generally located in the northern part of the city of Richland.



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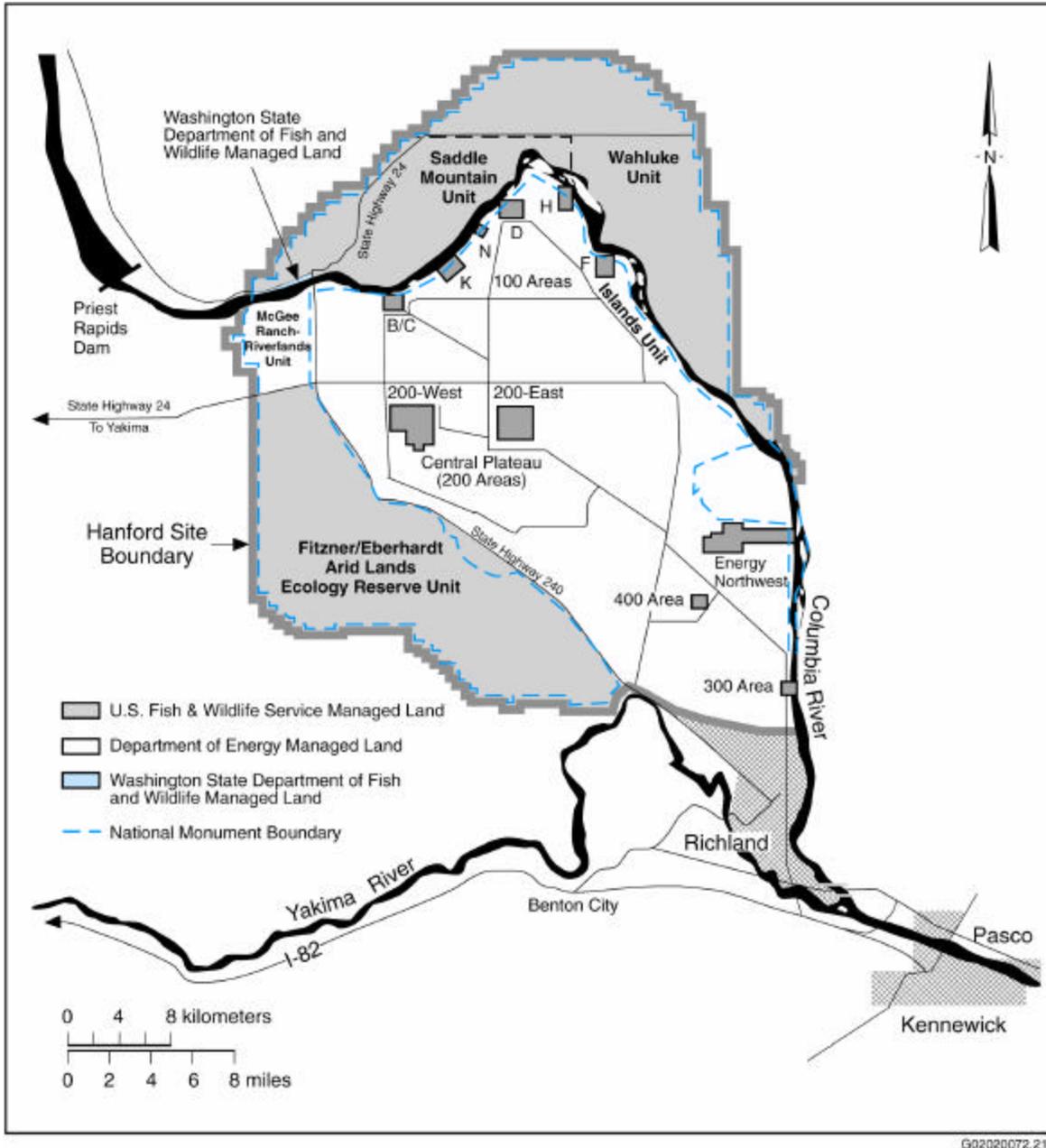
FIGURE 1 Hanford Site and Surrounding Areas

The 78,900-hectare (195,000-acre) Hanford Reach National Monument (Figure 2) was established by Presidential Proclamation in June 2000 (65 FR 37253) to protect the nation's only non-impounded stretch of the Columbia River above Bonneville Dam and the largest remnant of the shrub-steppe ecosystem once blanketing the Columbia River Basin. Under the existing MOU, DOE and the U.S. Fish and Wildlife Service (USFWS) are joint stewards of the monument. The USFWS administers three major management units of the Monument: 1) the Fitzner/Eberhardt Arid Lands Ecology Reserve Unit, a 312-square-kilometer (120-square-mile) tract of land in the southwestern portion of the Hanford Site; 2) Saddle Mountain Unit, a 130-square-kilometer (50-square-mile) tract of land located north-northwest of the Columbia River and generally south and east of State Highway 24; and 3) Wahluke Unit, a 225-square-kilometer (87-square-mile) tract of land located north and east of both the Columbia River and the Saddle Mountain Unit. The portion of the monument administered only by DOE includes the McGee/Riverlands area (north and west of State Highway 24), the Columbia River islands of Benton County, the Columbia River corridor (0.4 kilometer [0.25 mile] inland from the river shoreline) on the Hanford (Benton County) side of the river, and the sand dunes area located on the Hanford side of the Columbia River, north of Energy Northwest. Approximately 162 hectares (400 acres) along the north side of the Columbia River, west of Vernita Bridge and south of State Highway 243, are managed by the Washington State Department of Fish and Wildlife. All these lands have served as a safety and security buffer zone for Hanford Site operations since 1943, resulting in an ecosystem that has been relatively untouched for nearly 60 years.

Non-DOE operations and activities on Hanford Site leased land or in leased facilities include commercial power production by Energy Northwest (4.4 square kilometers [1.6 square miles]) and operation of a commercial low-level radioactive waste burial site by US Ecology, Inc. (0.4 square kilometer [0.2 square mile]). The National Science Foundation has built the Laser Interferometer Gravitational-Wave Observatory facility for gravitational wave studies. R. H. Smith Distributing operates vehicle-fueling stations in the former 1100 Area and in the 200 Areas. Washington State University at Tri-Cities operated several laboratories in the 300 Area until March 2002. Livingston Rebuild Center, Inc. has leased the 1171 Building in the former 1100 Area to rebuild train locomotives. Johnson Controls, Inc. operates 42 diesel and natural gas package boilers to produce steam in the 200 and 300 Areas (replacing the old coal-fired steam plants) and also has compressors supplying compressed air to the Site. Near the city of Richland, immediately adjacent to the southern boundary of the Hanford Site, Framatome-ANP, Inc. (formerly Siemens Power Corporation) operates a commercial nuclear fuel fabrication facility, and Allied Technology Group Corporation operates a low-level radioactive waste decontamination, supercompaction, and packaging facility.

### **3.1.1 Current Physical Setting**

The Hanford Site lies within the semiarid Pasco Basin of the Columbia Plateau in southeastern Washington State (see Figure 1). The Site occupies an area of about 1,517 square kilometers (586 square miles) north of the confluence of the Yakima River with the Columbia River. The Hanford Site is about 50 kilometers (30 miles) north to south and 40 kilometers (24 miles) east to west. This land, with restricted public access, provides a buffer for the smaller areas currently used for storage of nuclear materials, waste storage, and waste disposal; only about 6 percent of the land area is known to have been disturbed and is actively used. 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 near



**FIGURE 2** Hanford Reach National Monument

the southern boundary of the Hanford Site and joins the Columbia River at the city of Richland, which bounds the Hanford Site boundary 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. Two small east-west ridges, Gable Butte and Gable Mountain, rise above the plateau of the central part of the Hanford Site. Adjoining lands to the west, north, and east are principally range and agricultural land.

The cities of Kennewick, Pasco, and Richland (the Tri-Cities), West Richland, and Benton City constitute the nearest population centers and are located southeast of the Hanford Site.

### 3.1.2 Current Operational Context

The Hanford Site is managed by DOE-RL and DOE-Office of River Protection (DOE-ORP), each with its own responsibility. For example, the DOE-RL manages legacy cleanup, research, and other programs at the Hanford Site. Hanford supplied plutonium for the U.S. nuclear weapons defense for more than four decades and is now engaged in the world's largest environmental cleanup project. Three cleanup outcomes are being pursued: restoring the Columbia River corridor, transitioning the Central Plateau for waste treatment and long-term storage, and putting DOE's assets to work solving regional and global environmental challenges.

The DOE-ORP was established by Congress in 1998 as a DOE field office to manage DOE's largest, most complex environmental cleanup project—Hanford tank waste retrieval, treatment, and disposal. Sixty percent of the nation's high-level radioactive waste is stored at Hanford in aging, deteriorating tanks. In late spring of 2000, the DOE-ORP conducted an expedited bidding process to complete the design and construction of a waste vitrification facility. The contract was awarded in December 2000.

Contractors working at Hanford change as contracts elapse and new ones are awarded. For an up-to-date list of current contractors, see the Hanford contractor web site (<http://www.hanford.gov/top/whowho.html>). To provide the reader with a general understanding of the work performed by contractors at Hanford, the following descriptions of contracts in place in fiscal year (FY) 2002 are provided:

- **Fluor Hanford, Inc.** was the prime contractor for the nuclear legacy cleanup. Fluor Hanford, Inc.'s three principal subcontractors were Duke Engineering & Services Hanford, Inc.; Duratek Federal Services of Hanford, Inc.; and Numatec Hanford Corporation. Other subcontractors to Fluor Hanford included Day & Zimmerman Protection Technology Hanford.
- **Bechtel Hanford, Inc.** was the environmental restoration contractor. Bechtel Hanford, Inc. planned, managed, executed, and integrated a full range of activities for the cleanup of groundwater, contaminated soil, and inactive nuclear facilities. Bechtel Hanford, Inc.'s preselected subcontractors were CH2M HILL Hanford, Inc. and Eberline Services Hanford, Inc.
- The Health Risk Management Program at the **Hanford Environmental Health Foundation** worked with the Site to identify and analyze the hazards that Hanford personnel faced in the work environment. The foundation's occupational health services provided occupational medicine and nursing, medical surveillance, ergonomics assessment, exercise physiology, case management, psychology and counseling, fitness for duty evaluations, health education, infection control, immediate health care, industrial hygiene, and health, safety, and risk assessment.
- Battelle Memorial Institute operated the **Pacific Northwest National Laboratory (PNNL)** for DOE's national security and energy missions. The core mission was to deliver environmental science and technology in the service of the nation and humanity. Additionally, PNNL's capabilities were used to meet selected human health needs, to strengthen the U.S. economy, and to support the education of future scientists and engineers. The Laboratory's services included molecular science research, advanced processing technology, biotechnology, global environmental change research, and energy technology development. The Laboratory also operated the Hanford Cultural Resources Laboratory (HCRL) for DOE-RL, which provided Site-wide cultural resources services at Hanford.

- **Bechtel-Washington** was the team the DOE-ORP chose to design, build, and start up waste treatment facilities that will transform liquid radioactive waste into a stable glass form. The waste is currently stored in 177 huge underground tanks at the Hanford Site. It will be treated and converted to a glass waste form, a process known as vitrification, in facilities that will be built on a 26-hectare (65-acre) site on the Central Plateau of Hanford. Once immobilized, the high-level radioactive waste will be shipped to a federal geologic repository for permanent disposal. The low-level radioactive waste will be disposed at Hanford. The Bechtel-Washington team comprised Bechtel National, Inc. as the prime contractor with Washington Group International, Inc. as a subcontractor. The 10-year, \$4-billion contract was awarded in December 2000.
- **CH2M HILL Hanford Group, Inc.** was the DOE-ORP prime contractor with the responsibility for storing and retrieving for treatment ~204 million liters (~54 million gallons) of highly radioactive and hazardous waste stored in 177 huge underground tanks. The company's role included characterizing the waste and delivering it to the future waste vitrification facility. In January 2001, the contract for CH2M HILL Hanford Group, Inc. was extended through 2006.
- **MACTEC-ERS** was a prime contractor to the DOE Grand Junction Office. The Grand Junction Office has contracted with DOE-RL and DOE-ORP to conduct vadose zone, geophysical characterization, and monitoring work at former waste disposal facilities on the Site.

On June 9, 2000, President William J. Clinton, by Presidential Proclamation 7319, created the Hanford Reach National Monument under the 1906 Antiquities Act (65 FR 37253). As established, the monument totals 32,076 hectares (195,843 acres) and includes the Fitzner/Eberhardt Arid Lands Ecology Reserve, Saddle Mountain National Wildlife Refuge, McGee Ranch/Riverlands Area, Wahluke Slope, federally owned islands in the Hanford Reach, a portion of White Bluffs, the sand dune area northwest of the Energy Northwest site, and the 82-kilometer (51-mile) long Hanford Reach, the last free-flowing, non-tidal stretch of the Columbia River (see Figure 2). This designation establishes the protection and management of the lands within the region of the monument. By memorandum, the President also directed the Secretary of Energy to consult with the Secretary of the Interior on including additional Hanford Site lands into the monument as the land is remediated.

The national monument is jointly administered by DOE and USFWS. The USFWS administers the portions for which it is responsible (Arid Lands Ecology Reserve and Wahluke Slope) under the National Wildlife Refuge System in accordance with the Presidential Proclamation (65 FR 37253) establishing the Hanford Reach National Monument.

### 3.1.3 Potential Impacts to Cultural Resources

Potential impacts to cultural resources on the Hanford Site come from past and present operations at Hanford. These are discussed below. It should also be noted that before the federal government's arrival, nineteenth- and twentieth-century development, primarily farming, caused substantial damage to the Native American-related resources as well.

### 3.1.3.1 Past Practices

The Hanford Site was established in 1943 to use technology developed at the University of Chicago and the Clinton Laboratory in Oak Ridge, Tennessee, to produce plutonium for two of the nuclear weapons tested and used in World War II. Hanford was the first plutonium production facility in the world. The Site was selected by the U.S. Army Corps of Engineers because it was remote from major populated areas and had 1) ample electrical power from Grand Coulee Dam, 2) a functional railroad, 3) clean water from the nearby Columbia River, and 4) sand and gravel that could be used to construct large concrete structures. When the government acquired the land, everyone living there had to move. For security, safety, and functional reasons, the Site was then divided into the numbered areas (see Figure 1).

The government quickly constructed large production facilities and many support buildings to create its plutonium production facility; several expansions occurred into the 1960s (DOE-RL 2002). Where former and present-day living sites, cemeteries, and traditional-use areas were co-located, construction activities would have destroyed the integrity of the resources. In addition to buildings, construction of numerous structures related to the wastes generated by the plutonium production processes also took place over several decades.

Much of the current Hanford mission is to remove the buildings constructed over the years and clean up the wastes that were deposited in the ground and, in some cases, have since spread. A brief description of the wastes and the way they were handled are presented below.

Hanford Site operations produced liquid, solid, and gaseous waste. Most waste resulting from Site operations had at least the potential to contain radioactive materials. From an operational standpoint, radioactive waste was originally categorized as “high level,” “intermediate level,” or “low level,” which referred to the level of radioactivity present. Some high-level solid waste, such as large pieces of machinery and equipment, was placed onto railroad flatcars and stored in underground tunnels. Both intermediate- and low-level solid waste, consisting of tools, machinery, paper, or wood, were placed into covered trenches at storage and disposal sites known as “burial grounds.” Beginning in 1970, solid waste was segregated according to the makeup of the waste material. Solids contaminated with plutonium and other transuranic materials were packaged in special containers and stored in trenches covered with soil for possible later retrieval.

High-level liquid waste was stored in large underground tanks. Intermediate-level liquid waste streams were usually routed to underground structures of various types called “cribs.” Occasionally, trenches (specific retention trenches) were filled with the liquid waste and then covered with soil after the waste had soaked into the ground. Low-level liquid waste streams were usually routed to surface impoundments (ditches and ponds). Non-radioactive solid waste was usually burned in places called “burning grounds.” This practice was discontinued in the late 1960s in response to the Clean Air Act, and the materials were buried at sanitary landfill sites. These storage and disposal sites, with the exception of high-level waste tanks, are now designated as “active ” or “inactive ” waste sites, depending on whether the Site currently receives waste.

### 3.1.3.2 Planned Activities

The DOE, the U.S. Environmental Protection Agency (EPA), and the Washington State Department of Ecology (Ecology) signed a comprehensive cleanup and compliance agreement on May 15, 1989. The Hanford Federal Facility Agreement and Consent Order, or Tri-Party Agreement (Ecology et al. 1998), is an agreement for achieving compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remedial action provisions and with the Resource Conservation and Recovery Act (RCRA) treatment, storage, and disposal unit regulations and corrective action provisions. More specifically, the Tri-Party Agreement 1) defines and ranks CERCLA and RCRA cleanup commitments, 2) establishes responsibilities, 3) provides a basis for budgeting, and 4) reflects a concerted goal of achieving full regulatory compliance and remediation with enforceable milestones in an aggressive manner.

The Tri-Party Agreement is a legally binding agreement consisting of two main documents:

1. The “Legal Agreement” itself describes the roles, responsibilities, and authority of the three agencies, or “Parties,” in the cleanup, compliance, and permitting processes. It also sets up dispute resolution processes and describes how the agreement will be enforced.
2. The “Action Plan” to implement the cleanup and permitting efforts includes milestones for initiating and completing specific work and procedures the three agencies will follow (see Appendix D).

All the Hanford production reactors and most associated facilities have been shut down, and each 100 Area is in some stage of cleanup, decommissioning, or restoration. For example, C Reactor has been cocooned and placed into interim safe storage as a large-scale demonstration, an economical state that it can safely remain in for many years pending final disposal of the reactor core. Of the 24 facilities associated with the reactor, 23 have been removed.

The Hanford Site encompasses more than 1,500 waste management units and groundwater contamination plumes that have been grouped into 62 operable units. Each unit has complementary characteristics of parameters such as geography, waste content, type of facility, and relationship of contaminant plumes. This grouping into operable units allows for economies of scale to reduce the cost and number of characterization investigations and remedial actions that will be required for the Hanford Site to complete environmental cleanup efforts. The 62 operable units have been aggregated into four areas: 22 in the 100 Area (17 source, 5 groundwater), 33 in the 200 Areas (29 source, 4 groundwater), 3 in the 300 Area (2 source, 1 groundwater), and 4 in the former 1100 Area.<sup>1</sup>

In 2000, the DOE-RL Manager introduced a draft plan for Hanford cleanup that focused on three outcomes: restore the river corridor, transition the Central Plateau, and prepare for the future. The final version is called *Hanford 2012* (<http://www.hanford.gov/rl/index.asp>). This plan establishes several goals to be accomplished by 2012.

For example, Hanford’s river corridor consists of about 54,390 hectares (210 square miles) beginning at the shores of the Columbia River and extending inland towards the Central Plateau in the middle of the

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<sup>1</sup> Source: Personal communication with L. Dietz, Bechtel Hanford, Inc., August 1999.

Hanford Site. While 0.4 kilometer (0.25 mile) along the river is included in the Hanford Reach National Monument, the monument is primarily composed of the Fitzner/Eberhardt Arid Lands Ecology Reserve and the Wahluke Slope. Cleanup of the river corridor will allow DOE, in consultation with area tribal nations, regulators, and stakeholders, to make land available for other uses, conservation of ecological resources, and protection of historic cultural resources. The footprint for active Hanford cleanup operations will reduce to ~19,420 hectares (75 square miles).

One goal is to remediate most sources of radiological and chemical contamination that threaten the air, groundwater, or Columbia River. Much of that work has already begun (digging up contaminated soil, taking down the old reactor complexes, moving spent fuel away from the river, etc.), and nearly all can be completed by 2012, with two notable exceptions. First, decisions have yet to be made on which groundwater contamination plumes need to be remediated and which technologies to use. Second, DOE will meet the Tri-Party Agreement requirements to establish a schedule for remediation of 618-10 and 618-11 burial grounds by 2002 but, because of technical complexity and safety concerns, will not complete remediation until after 2012. If ongoing studies and monitoring determine earlier action is required, DOE will work with regulators to establish a path forward.

Another goal involves transitioning the Central Plateau to long-term waste management. The Central Plateau is ~19,420 hectares (75 square miles) near the middle of the Hanford Site and includes the 200-East and 200-West Areas. The 200 Areas are home to a large number of facilities formerly used for spent nuclear fuel processing and plutonium metal production, and to Hanford's 177 underground high-level radioactive waste storage tanks, which are managed by DOE-ORP. The DOE is transitioning the Central Plateau from primarily inactive storage to active waste characterization, treatment, storage, and disposal operations. New, state-of-the-art, environmentally compliant facilities will be used to support completion of the Hanford Site cleanup. Some of these facilities, including the Canister Storage Building, Waste Receiving and Processing Facility, and Environmental Restoration Disposal Facility, have already begun operation.

Cleanup activities in the Central Plateau are expected to continue for more than 40 years. During this period, DOE will transition areas to long-term stewardship to monitor and verify the effectiveness of cleanup actions in ensuring protection of the public and the environment over the long term.

Hanford's cleanup mission is finite. As the environmental remediation work is completed, DOE is committed to fulfilling its responsibility to derive the maximum taxpayer benefits from the nation's multi-billion dollar investment in the Hanford Site. The DOE anticipates multiple future uses for the Hanford Site, including long-term stewardship, other DOE missions, non-DOE federal missions, and other public and private sector uses. The largest part of the Hanford Site will emphasize conservation of ecological and cultural resources and will be managed as the Hanford Reach National Monument jointly by DOE and the USFWS.

### **3.1.4 Summary of Current Planning Procedure**

The DOE adopted a Comprehensive Land-Use Plan (CLUP) for its Hanford Site in 1999. The purpose of the Hanford CLUP (DOE 1999) and its implementing policies and procedures is to facilitate decision-making about the site's uses and facilities over at least the next 50 years. The Department's decision

seeks to balance the Department's continuing land-use needs at Hanford with its desire to preserve important ecological and cultural values of the site and allow for economic development in the area. This land-use plan consists of several key elements which are included in the Department's Preferred Alternative in the Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement (HCP EIS). These elements are a land-use map that addresses the Hanford Site as five geographic areas – the Wahluke Slope, the Columbia River Corridor, the Central Plateau, All Other Areas of the Site, and the Fitzner-Eberhardt Arid Lands Ecology (ALE) Reserve – and depicts the planned future uses for each area; a set of nine land-use designations that define the permissible uses for each area of the site; and the planning and implementing policies and procedures that will govern the review and approval of future land uses. Together these four elements create the Hanford CLUP.

The DOE-RL manages its cultural resources through its Hanford Cultural and Historic Resources Program, under the direction of a program manager. Most technical activities are performed by cultural resource contractors and, in some cases, by cleanup contractors who perform their own cultural resource work. The DOE-RL Hanford Cultural and Historic Resources Program Manager provides oversight of all cultural resource work done on DOE-managed portions of the Hanford Site.

The DOE-RL Hanford Cultural and Historic Resources Program Manager provides overall direction to contractors on work that is needed. Contractors then perform the work according to agreed-to costs and schedules. Plans and reviews of major products are prepared in consultation with the Washington State Historic Preservation Officer, tribes, and interested parties.

The DOE-RL Hanford Cultural and Historic Resources Program Manager also participates in USFWS planning related to those portions of the Hanford Reach National Monument it manages (i.e., the Fitzner/Eberhardt Arid Lands Ecology Reserve Unit and Wahluke Unit of the Hanford Site). This participation is performed according to the terms of the Memorandum of Understanding [DOI/DOE 2001] between the two organizations signed in 2001. Additionally, the USFWS has begun the process of creating a management plan for the entire Hanford Reach National Monument. This plan, known as a "Comprehensive Conservation Plan," will guide the management of the monument for the next 10 to 15 years. The DOE-RL Hanford Cultural and Historic Resources Program will be reviewing planning documents and providing comments to the USFWS.

### **3.1.5 Funding**

The DOE-RL Hanford Cultural and Historic Resources Program Manager oversees and integrates all cultural resource activities performed on the Hanford Site. Funding for program activities conducted by the parties in FY 2002 was provided through separate funding mechanisms at the program and project level.

## **3.2 CULTURAL AND HISTORICAL SETTING**

Hanford's cultural resources are diverse, ranging from early times to the atomic age. The Site contains a fragile and extensive record of human occupation documenting a series of overlapping cultural landscapes stretching thousands of years into the past. Each layer of history tells the story of how people have used

the area. Archaeological remains combine with oral histories and traditional cultural places (TCPs) to document through time the changes in peoples' life ways on the Hanford Site.

In describing the historical development of Hanford, it is important to recognize that members of the Native American tribes with historical ties to Hanford have their own descriptions of how the landforms were created and the animals and people appeared. These explanations are generally considered sacred and have not been shared with Hanford cultural resource staff. As a result, they are not available to provide here.

The following sections, therefore, are dominated by the more common scientific explanations provided by the fields of geography, geology, geomorphology, history, archaeology, and anthropology.

### **3.2.1 Historic and Prehistoric Natural Environments**

The DOE's Hanford Site occupies an area of ~1,517 square kilometers (586 square miles) in southeastern Washington State. Generally speaking, the physiographic setting here results from three major categories of physical processes: 1) Miocene-age flood basalt volcanism and subsequent regional deformation resulting in uplifted basalt folds; 2) Pleistocene-age large-scale cataclysmic and sequentially occurring floods; and 3) the more recent physical appearance resulting from river and wind dynamics during the Holocene. For a scientific but succinct discussion of history and affects of these processes on the landscape, the reader is referred to information contained in the most recent *Hanford Site National Environmental Policy Act (NEPA) Characterization* report (Neitzel et al. 2002), from which most of the information presented herein is extracted.

The integrated result of this geologic timeframe and its landscape-forming processes is the Hanford Site panorama of today. The Site covers about one-third of the semiarid Pasco Basin and is primarily located within the Columbia Basin subprovince of the Columbia Intermontane Province, immediately northwest of the confluence of the Columbia River with the Yakima, Snake, and Walla Walla Rivers. The local setting is dominated by the Columbia River, which flows through the northern part of the Hanford Site and, after turning southward, forms part of the Site's eastern boundary. The stretch of the Columbia River extending through the Hanford Site is some 82 kilometers (51 miles) long, and is commonly referred to as the "Hanford Reach." Uplifted basaltic folds comprise the major topographic features on the landscape, including the Saddle Mountains on the north edge of the Site, the east-west trending Umtanum Ridge-Gable Butte-Gable Mountain continuum in the central portion, and the prominent Rattlesnake Hills along the southwestern Site boundary, dominated by Rattlesnake Mountain. Elevation within the Hanford Site ranges from about 110 meters (360 feet) at the Columbia River near the southern Site boundary, to about 1,097 meters (3,600 feet) at Rattlesnake Mountain in the southwest corner, and to over 610 meters (2,000 feet) at the Saddle Mountains in the north-central portion of the Site.

In addition to the Columbia River and the prominent elevated ridges and mountains, several other physiographic features stand out on the landscape as a result of the cataclysmic flooding and more recent physical processes. Features left behind by a series of Pleistocene and earlier floods flowing southward through the Pasco Basin periodically formed deep temporary lakes in the basin, resulting in the nearly complete inundation of the area that is the Hanford Site. Surface features left from the floods include flood channel boundaries such as the White Bluffs; giant current ripples; giant flood bars such as the Cold Creek

Bar that forms the Central Plateau area of the Hanford Site; and bergmounds, representing places where icebergs melted and dropped the sediment and boulder loads they had carried into the basin in a frozen state.

More recent active and stabilized sand dunes are widespread over the Pasco Basin, and are prominent in the southern and eastern sectors of the Hanford Site as northeast-trending longitudinal shaped dunes (Gaylord et al. 1991). Active dunes on the Hanford Site are found above the White Bluffs and in an area north of the city of Richland, known as the Hanford Dune Field. The Hanford Dune Field is a more-than 2,550-hectare (6,300-acre) area of migrating barchan dunes and partially stabilized transverse dunes with bare rock-rubbed areas between the dunes. This field is distinctive enough that in the late 1970s it was evaluated to be of national significance and was recommended for inclusion into the National Natural Landmark system (DOI 1994).

Like the physical features of the Hanford Site landscape, the ecological picture is similarly diverse. The Site is characterized as a shrub-steppe ecosystem in which 75 species of vascular plants have been identified, along with 240 species of terrestrial vertebrates and 44 species of fish in the Hanford Reach of the Columbia River. Several terrestrial vegetation and wildlife zones have been delineated at Hanford, including shrublands, grasslands, tree zones, riparian areas, and unique habitats such as bluffs, dunes, river islands, and basalt outcrops.

### **3.2.2 Prehistory and History**

The historical setting for Hanford spans the last 10,000 years. This section summarizes the chronology from the period when archaeological evidence indicates people first started living in the Hanford area to the period when Native Americans and non-Native Americans were removed from the area by the U.S. government in 1943.

#### **3.2.2.1 Pre-Contact History**

The pre-contact era refers to the time before the arrival of non-Indians to the regions. The following descriptions of periods within this era are based primarily on archaeological studies in keeping with the typical approach used in cultural resource management. It is recognized that Native American chronologies typically differ from archaeological reconstructions as they are based primarily from oral traditions handed down from generation to generation. Referring to these oral traditions from the Mid-Columbia, Boxberger (2000) explains

The oral traditions speak of a way of life not unlike that described in the ethnographies of the Plateau. From this perspective we might see the oral traditions as a form of historical documentation that can be used to supplement the descriptive ethnographic accounts. Plateau oral traditions recognize three main historical periods (Jacobs 1929, p. 244; Ramsey 1977, p. xxiv). The first period was when all animals were people, not only previous forms of animals that still exist but also monsters and other creatures that have since disappeared. The second period was the time of transformation, when some transformer, usually Coyote, made changes in preparation for the people. The final period is the period of the people which links the previous periods with the present time.

The Plateau people distinguish between oral histories that speak of the earlier periods, the myth time, and stories that speak of events that occurred in the time more customarily referred to as the “historical period.”

The cultural chronology based on archaeological investigations conducted within the Columbia Plateau dates back to the end of the Pleistocene, approximately 12,000 years ago. Upriver cultural chronologies most often referenced for the Hanford Reach originated from archaeological work initially conducted by Earl Swanson and later expanded by Charles Nelson at the Sunset Creek Site in the late 1960s. From collected data, Nelson established five cultural phases for the Vantage area. Downriver chronologies are based on the work conducted in the lower Snake River (Leonhardy and Rice 1970). Over the years, other researchers have continued to develop and refine a regional cultural chronology. A generalized chronology, based primarily on work conducted by Ames (2000) is summarized below.

### **Period Ia/b (Paleo-Indian/Windust 13,500 to 7000/6400 B.P.)**

The Period Ia/b Paleo-Indian/Windust Phase represents the oldest known cultural complex in the Columbia Plateau region. Period Ia refers to Clovis culture, which is very weakly represented on the Columbia Plateau, and is not discussed here because of that limitation. Period Ib has been called post-Clovis, and, although rare, is fairly well represented on the plateau. Although archaeological evidence is somewhat limited, it is believed the people of this period were highly mobile, most likely employing a subsistence strategy referred to by Binford (1980) as “foraging.” This strategy entails continuous movement of small groups of people between resource patches throughout the year. The food source was primarily large mammals supplemented with small mammals and fish, with plant processing implements beginning to appear following 9000 B.P. Population density was very low, with total population possibly numbering in the hundreds in the early part of the period. Living areas are believed to have been primarily in rock shelters and caves, with some evidence demonstrating the use of temporary shelters, huts, and windbreaks.

Projectile point styles include Windust, Clovis, and Cascade, all of which are assumed to be dart points used in conjunction with the atlatl. Lithic raw materials are dominated by cherts, with significant quantities of fine-grained basalt exploited during the later portions of the period. Other items within the assemblage include cobble tools, scrapers, graters and burins, hammerstones, grooved stones, utilized flakes, bone awls, ocher beads, and antler wedges.

All sites from both Period Ia and Ib are considered relatively rare, although several have been located in the Columbia Plateau region. Most of these sites are associated with Period Ib, and include the following: Marmes Rockshelter, Bernard Creek, Lind Coulee, Kirkwood Bar, Deep Gully, Granite Point, Fivemile Rapids, and Bobs Point. Supporting evidence of a Period Ib culture on the Hanford Reach was discovered in both 2000 and 2001, when Windust style projectile points were discovered near Vernita Bridge (Hazelbrook 2000) and the 100-K Area (Sharpe and Marceau 2001), respectively.

## **Period II (7000/6400 B.P. to 3900 B.P.)**

Ames (2000) notes that in select areas of the plateau this period differs little from the preceding Period I (particularly in the southwest), while other areas see significant cultural change. The most telling sign of a change in adaptive strategy is the appearance of pithouses in the southeastern and south-central plateau around 5000 B.P., and possibly earlier. The appearance of pithouses has been taken by archaeologists as proxy evidence for a more sedentary lifestyle, the exact nature of which is still under debate.

Much debate has also been focused on the degree to which fish and/or plant resources were utilized during this period, with little agreement among researchers outside the idea that subsistence was drastically changed during this period. In general, a wide range of animal resources were utilized; however, medium-sized mammals (e.g., rabbits) are conspicuously absent. Plant resources were apparently exploited to a higher degree than in previous times, with plant processing tools being sometimes present in large numbers.

Characteristic artifacts for this phase include leaf-shaped Cascade projectile points, stemmed projectile points, ovate knives, edge ground cobble tools, microblades, hammerstones, core tools, and scrapers. The chipped stone artifacts themselves seem to be more expedient, with less investment of time and skill than the preceding period. A variety of well-made bone tools are found during this period, including large needles and leister parts.

Chatters (1989) outlines a possible abandonment of the sedentary/semi-sedentary adaptive strategy associated with the appearance of the housepits at around 4500 B.P., which lasted approximately 500 to 600 years. The reasons behind this inferred reversion to a previous mobile foraging strategy are defined by Chatters as being bounded within demography and shifting productivity/reliability of the resource base.

## **Period III (3900 to 1720 AD)**

A number of cultural changes from the previous period mark Period III. The most significant of these changes is the widespread use of pithouses, which had virtually disappeared at the end of Period II. Evidence for the storage of gathered foods in conjunction with the use of pithouses have led researchers to surmise that the roots of the sedentary “Winter Village Pattern” observed at the time of Euro-American contact has its roots within the phase.

Plant, animal, and riverine resources were all intensively exploited at specific times throughout the year. The winter months were spent in large pithouse villages, located along the major rivers and trunk streams, where people subsisted on large quantities of stored fish, meat, and plant foods collected during the previous seasons of the year. As observed by initial Euro-American settlers, salmon appears to have a central role as a food source on the plateau during this time. Archaeological sites from this period are found throughout the Columbia Plateau, showing widespread use of the entire region.

Projectile point styles become quite variable, with a general trend towards smaller size. The reduction of projectile point sizes indicates the adoption of the bow and arrow, although larger dart points are still found until about 1000 A.D., demonstrating continued use of the atlatl. Raw material used in the creation

of chipped stone tools is dominated by cherts, with occasional use of obsidian, obtained through trade from sources in Oregon. This period also marks the appearance of basketry, fiber, and wood artifacts in the archaeological record, although the survival of these perishable items is possibly the result of favorable storage practices (i.e., within caves), and a lesser span of time they have been exposed to the elements of decay.

### **Suggested Pre-Contact Archaeological Site Types**

Based on the association of features and artifacts found at individual archaeological sites, the following is a generalized classification of site types found at the Hanford Site.

**Base Camps:** These are sites of permanent or semi-permanent habitation, typically associated with pithouse depressions. Associated artifact/tool and feature assemblages are diverse, due to a wide variety of activities being conducted at the Site. Sites of this type are predominately found along the shores and mid-channel islands of the Columbia River. Approximately 70 of these base camps have been located on the Hanford Site.

**Field Camps:** In contrast to base camps, field camps are sites of no, or very temporary, habitation. These sites are associated with resource procurement and/or processing. Artifact/tool and feature assemblages are quite narrow in diversity, as very limited, task specific, activities are conducted. Field camps are by far the most common site type located on the Hanford Site, with several hundred being located. Many are found within the interior of the Hanford Site, at some distance from the Columbia River. As activities at field camps are limited and resource specific, they can be further subdivided into specific types based on the artifacts/tools and features present.

This field camp subdivision includes the following:

***Plant Processing/Collecting Sites*** – Defined by artifacts such as pestles, bifaces, mortars, milling stones, fire-cracked rock, cobble tools, and hopper mortar bases.

***Animal Processing/Collecting Sites*** – Defined by artifacts such as projectile points, scrapers, fire-cracked rock, knives, lithic debris, animal bone, cobble tools, bifaes, blades, and modified flakes.

***Primary Lithic Procurement/Processing Sites*** – Defined by artifacts such as cores, lithic debris, and hammerstones. Natural outcrops of raw material are present.

***Secondary Lithic Processing Sites*** – Defined by artifacts such as cores, lithic debris, and hammerstones. Natural outcrops of raw material are not present.

***Fishing Sites*** – Defined by artifacts such as net weights, lithic debris, shell, fire-cracked rock, bifaces, and cobble tools. Often these sites are found on rivers near rapids, riffles, or river channel constrictions.

**Trails:** Several trails at Hanford were used ethnohistorically and have significance to Native Americans. The White Bluffs Road is the best known road, but others existed as well from camps and villages to the various use areas.

**Cairn Sites:** Defined specifically by the presence of rock cairns, these sites have been associated with ceremonial or religious practices. Most are found on prominent peaks and crests, such as Gable Mountain, Gable Butte, and Rattlesnake Mountain, all of which are considered as sacred places and held in reverence by local Native American tribes.

### **Overview of Pre-Contact Settlement of the Hanford Area**

For the most part, pre-contact archaeological sites on the Hanford Reach tend to be on the alluvial flats and lower terraces near the shorelines and islands of the Columbia River. Shoreline sites are generally long, narrow, and parallel to the river (Rice 1980c). Inland sites have been discovered on Gable Butte, Rattlesnake Mountain, and near the few isolated springs existing on the Site. Because of the unique geomorphology of the area, there are no rock shelters or mesa top sites, which are typically found both upriver and downriver from the Hanford Site.

Pre-contact settlement patterns and seasonal rounds in this section of the Columbia Basin were associated with non-agricultural practices that included fishing, upland root gathering, and hunting. Archaeological evidence suggests that pre-contact settlement patterns consisted of consolidated winter villages and dispersed summer camps. Winter villages consisted of long tule mat lodges placed in shallow, bermed pits. Open summer camps were associated with seasonal procurement strategies.

Long-term prehistoric winter sites tend to have pithouses and a tool assemblage that could support stone tool manufacture as well as plant and animal preparation. In contrast, short-term seasonal use sites do not have pithouses, but contain artifacts similar to long-term use sites (Green 1976). The distinction between the two rests primarily with the presence or absence of pithouses and the density of artifacts, with winter sites tending to accumulate more debris. Rice reported in 1980 that 53 percent of the recorded archaeological sites along the Hanford Reach were open camps, 26 percent were fishing stations, and 14 percent were open camps with housepits. His findings revealed that seasonal use of the area centered around the fall fish migrations and winter villages (Rice 1980c).

Seasonal rounds began in the spring with the maturing of plants in the lowland areas and gradually moved to the higher elevations as plant maturation continued into the early fall. Fishing continued from April until September. Hunting was undertaken in the winter months. Collected food reserves were stored for later winter consumption when plant and fish supplies were the lowest of the year.

Archaeological evidence indicates the west bank of the Columbia River contains greater concentrations of sites than the east bank, probably as a result of several factors. Overall, the west bank contains greater numbers of ephemeral drainage channels with more desirable areas for food sources, storage, shelter, water, and travel. The west bank is logistically closer to a more diverse supply of upland resources. Water may also have been a consideration of upland sites. Upland sites on the west side of the Columbia River contain more inland springs and ephemeral streams than do the upland areas east of the river.

### 3.2.2.2 Ethnohistory

Historical information indicates that the Sahaptin-speaking Wanapum people occupied the region of the Columbia River between the Wenatchee and Snake Rivers. Pre-contact population numbers were estimated to be as high as 10,000 before the beginning of the 1800s. By the early to middle 1800s, several epidemics reduced the population to a fraction of their original size.

The Hanford area was used by Native Americans before the arrival of the Euro-Americans. These groups include the Columbia, Nespelem, Sanpoil, Southern Okanogan, Umatilla, Walula, Wanapum, Wayukma, and Yakama. Nearby groups, such as the Cayuse; Chelan; Columbia; Colville; Kittitas; Lower, Middle, and Upper Spokane; Methow; Nez Perce; Palus; Wayampum; Wenatchi; and Wishram; also occasionally used the area (Andrefsky et al. 1996). Vern Ray referred to the Kittitas, Yakamas, Wayampama, and Wanapum as Northwestern Sahaptins, and the Cayuse, Palus, Walula, and Umatillas as the Northeastern Sahaptins (Ray 1936). These groups continued to use the area until the non-Native Americans created treaties that relocated most of the indigenous people to reservations.

In the mid-1800s, a large group of indigenous people lived at Priest Rapids, referred to by early traders as Priest Rapids People. This group was later referred to as Wanapum, believed to mean “distant” or “people at the end or extremity” (Teit 1928). Below Priest Rapids, the Wanapum resided at 15 different village locations. One of the villages, *Tacht*, was located near what would later be referred to as White Bluffs. Author Ron Anglin reported that a village named *Teplash* was located at this location (Anglin 1995). Scattered between these village sites along this portion of the Columbia River were areas where small family groups also resided and places where food was cached (Relander 1986).

The Wanapum year was divided into six seasons. It began in the winter months and was based on the maturation of plants, the arrival of animals used in the seasonal rounds, and the end of winter (Relander 1986).

Generally, the Wanapums wintered along the shoreline of the Columbia River relying on stored foods collected during the yearly seasonal rounds. Seasonal rounds consisted of collecting roots as they matured to desirable stages of growth, and advancing to higher elevations throughout the growing season. Plant collecting began in the low elevations in the spring and culminated each year in the upland areas near the end of the summer and early fall months. Midsummer was a time of hunting large and small game with seasonal camps near the foothills. By fall, they would return to the river to pursue the fall fish migrations and prepare for the upcoming winter (Rice 1980c).

An ethnohistoric context for Hanford provides additional details concerning the people and their life in the Hanford area during this period (DOE 1997c).

### 3.2.2.3 Early Settler/Farming History

The Lewis and Clark expedition of 1805 ushered in the initial group of explorers/traders to the southern Columbia Plateau. Their travels began the exploration and subsequent settlement of the region, and ultimately, the Hanford Reach. The explorers sought trade items from the Native Americans and trade routes for traded goods. They were later followed by gold miners, livestock producers, and homesteaders.

An historic context for the pre-government era has been prepared as part of a National Register Multiple Property Documentation form to assist with the evaluation of the National Register eligibility of historic archaeological resources, TCPs, and historic structures (DOE 1997c). A brief summary follows (Table 2).

**Gold Mining Era.** By the 1860s, the discovery of gold to the north and east of the Mid-Columbia Region, and to a lesser extent along the Hanford Reach, resulted in a large influx of miners traveling through the region on their way to the gold fields. Several locations along the Hanford Reach, such as Ringold, White Bluffs, and Wahluke, were part of the transportation routes used by miners and the support industry. Numerous locations believed to be gold mining features created by Euro-American and Chinese remain along the shoreline of the Hanford Reach (Sharpe 1999, 2000). The mining industry created a demand for beef, and the Columbia Basin was quickly discovered to be an ideal location for livestock production.

**Livestock Era.** A noticeable increase in Euro-American settlement began in eastern Washington in the late 1800s. The initial, permanent settlement by non-Native Americans within the area began slowly with

**TABLE 2** Historic Timeline

1805	Lewis and Clark travel up the Columbia River from the mouth of the Snake River to the mouth of the Yakima River, approximately 11.3 kilometers (7 miles) from Hanford.
1811	The explorer David Thompson passes through the Hanford Site.
1855	Ben Snipes of Yakima finances cattle drive through Hanford.
1858	Steamboats arrive at White Bluffs.
1859	Ferry starts at White Bluffs by Thomas Howe.
1860s	Chinese mine along the Hanford Reach.
1861	Jordan Williams ranges cattle at east White Bluffs.
1863	Trading post starts at White Bluffs by AR Booth.
1876	20 soldiers stationed at White Bluffs to control Indians.
1888	Completion of the Northern Pacific Railroad bridge across the Columbia stimulates settlement in the White Bluffs area.
1905	Priest Rapids Irrigation and Power Company announces plans to develop an irrigation system to water 12,950 hectares (32,000 acres) using water pumped from the Columbia. Company purchases land in White Bluffs and Hanford areas.
1907	Hanford townsite platted.
1908	White Bluffs II townsite platted.
1913	Chicago, Milwaukee, and St. Paul Railroad branch completed to White Bluffs and Hanford providing a transcontinental rail link for the White Bluffs-Hanford area.
1920s	State sponsors soldier settlements in Hanford and White Bluffs.
1930s	488 Midwest farm families and others buy irrigated farms through the railway's land agent.
1939	Mormon farmers move to White Bluffs area.
1943	Government condemns properties for Manhattan Project.

livestock producers who discovered the area was extremely suitable for the production of cattle to support gold miners in Alaska and Idaho. Pasture was free for the taking and very abundant. Ranchers relied on the bountiful supply of bunchgrass and open rangeland to graze thousands of cattle and later sheep and horses. It was also an ideal winter pasture. The open range lasted from the 1880s to about 1910 when homesteaders settled into the area and began to plow up the rangeland to plant crops. Even though open rangeland was no longer available, livestock remained an important economic commodity to agricultural producers. As farmland replaced large portions of open rangeland, cattle were confined by fences, but sheep continued to pasture the Rattlesnake Hills and Horse Heaven Hills on remaining open range (Fridlund 1985). Agricultural producers gradually replaced the open-range livestock operations that had dominated the area in the later part of the 1800s and early 1900s.

**Agricultural Era.** Homesteaders developed the agricultural landscape in the Columbia Basin by removing unwanted sagebrush and bunchgrass and plowing the land. Their opportunity to do so was brought about by the passage of the Homestead Act by Congress in 1862 (DOE 1997b). Under the Act, anyone, 21 years of age or older, who was willing to live on and develop 160 acres of public land for 5 years, was declared the legal owner. Near the turn of the twentieth century, many would-be homesteaders moved west to begin a new life. Many of the homesteaders traveled by one of the three transcontinental railroads (Northern Pacific, Great Northern, or Chicago Milwaukee) to the Columbia Basin area. Local transportation systems in the Columbia Valley were very limited at that time, so many of the new settlers arrived by river transportation.

Steamboat and ferry service were the primary transportation systems on the Columbia River in the early non-Native American settlement of the area. The new agricultural towns of Hanford and White Bluffs, the small communities of Allard-Vernita, Wahluke, and Fruitvale, and local rural residents alike relied almost exclusively on river transportation during the early development of the area.

River transportation played a significant role in the development of the Hanford Reach. Initially, when population numbers were low, canoes and ferry operations met the demand; however, as the population increased, an opportunity to earn large profits was realized by steamboat owners. Many steamboats operated on the Hanford Reach carrying the larger cargoes, while canoes and ferries carried small cargoes of people, animals, and equipment, primarily from one shore to the other. At least 10 ferry services operated on the Hanford Reach. The earliest known ferry service began at White Bluffs in 1859 (Sharpe 2001).

As increasing numbers of farmers moved into the region, it became apparent that more water, other than the small amounts supplied by rain, was needed to produce higher yields. Irrigation projects were under construction throughout eastern Washington shortly after the turn of the twentieth century. Many irrigation projects began as small-scale, privately funded projects, usually with insufficient funding, and the Hanford area was no exception. The Hanford area was sought after by developers and producers for its unique geographical ability to produce agricultural crops, especially fruit, from 2 to 3 weeks ahead of surrounding areas, which generally resulted in better profits. In the early 1900s, dryland wheat and livestock were the primary agricultural commodities produced in Benton County.

By the early 1900s, land speculators began constructing large-scale, privately funded irrigation canals to supply water to thousands of acres in the White Bluffs, Hanford, Fruitvale, Vernita, and Richland areas. A variety of irrigation techniques were initiated to produce the most affordable irrigation system. These

included pumping from wells, pumping directly from the Columbia River, and canals (Sharpe 1999). Irrigation systems generally consisted of a mainline, rill ditches, and occasionally, return lines. Irrigation systems were constructed of wire-wrapped wood pipe, wood flumes, metal, or cement pipe. Early irrigation pipe of wood and wire-wrapped wood pipe were later replaced with cement. Poor economic conditions, brought about by depressed commodity prices and the depression of the 1930s, created economic hardships on most local residents. These conditions continued until the area was taken over by the government for the Manhattan Project in 1943.

### 3.2.3 Traditional Lands and Resource Uses

Native Americans made widespread use of the Hanford landscape. When non-Native Americans arrived in the Hanford area, Native Americans were living in numerous villages from the mouth of the Yakima River to Priest Rapids. When the U.S. government entered into treaties with local tribes at Walla Walla in 1855, lands comprising the present-day Hanford Site were ceded either by the Confederated Tribes of the Umatilla Indian Reservation or the Yakama Nation.

During the Walla Walla Treaty negotiations, one Native American leader, Smohalla, led a small group of followers to Priest Rapids, choosing not to participate in the treaty process. Here they existed for decades, maintaining their traditional way of life to the extent possible. As non-Indians moved into the regions, this group, commonly referred to as the Wanapum, formed relationships with the new settlers, relationships that have continued into the present. In the early decades of the twentieth century, many Wanapum villages and camps were still occupied in the Hanford area, for example, near Vernita, at Wahluke, Coyote Rapids, near White Bluffs, and at Horn Rapids. In addition to Wanapum, people associated with other groups who had traditionally used the area came to these villages and camps to visit, trade, and carry on traditional activities.

By 1943, when the U.S. government condemned the land and forced the residents, including the Wanapum to relocate, the Vernita, White Bluffs, and Horn Rapids camps were the last ones routinely occupied.

Various resources located at Hanford were used by the Wanapums and others as part of their traditional way of life. Resources known or suspected to have been used include fish, birds, and mammals for food and other purposes; plants for medicinal uses, ceremonies, and tools; driftwood for fuel; and minerals for ceremonies. In addition, there are many places at Hanford that hold special meaning to Native Americans for spiritual and other cultural reasons. In many cases, the Native Americans prefer not to document use of traditional lands and resources, and therefore, the DOE-RL Hanford Cultural and Historic Resources Program does not have a complete understanding of this use.

The following types of traditional uses for lands and resources at Hanford by Native Americans are presented, based on information found in the multiple properties document (DOE 1997b):

**Cemeteries.** Numerous places exist at Hanford that were used to inter those who died. Some places were identified in the 1950s by tribal elders and are recognized as ethnohistoric cemeteries. Many other places are associated with human remains that have been discovered largely through erosion. Many of these places may be cemeteries or they may be single interments.

**Camp Sites and Villages.** Although Native American habitation of the Hanford area had declined precipitously in the early twentieth century, several areas were still used into the 1940s as villages or for various purposes (e.g., fishing).

**Former Living Sites.** Many living areas at Hanford predate the memories of recent generations of Native Americans. These former living areas hold special significance to the descendants of those earlier generations. What are viewed by many non-Native Americans as archaeological sites, are seen by Native Americans as links to their ancestors and places that are important to protect for current and future generations.

**Trails.** Several trails at Hanford were used ethnohistorically and have significance to Native Americans. The White Bluffs Road is the best known road, but others existed as well, from camps and villages to the various use areas.

**Fisheries.** Several areas along the Hanford Reach and the Yakima River were used into the early twentieth century as fisheries. Some areas, such as *Wanawish* at Horn Rapids Dam on the Yakima River, still are used. There is also discussion among native groups about reestablishing fisheries along parts of the Columbia River that flow through the Hanford Site.

**Hunting Grounds.** Hunting areas were common throughout the area. No hunting currently occurs on Hanford because of safety concerns.

**Plant Gathering Areas.** Many plants play an important role in the Native American culture, both in the past and the future. These include plants for foods, medicines, and fibers. Many desired plants existed at Hanford in the past and some still do, although their use since the government took possession has been curtailed for potential safety concerns. Hunn (1990) identifies many plants important to Native Americans in the region.

**Traditional Sacred Places.** The Hanford Site is an important region to members of the present-day Yakama, Umatilla, Nez Perce, and Wanapum tribal groups because their ancestors resided there for thousands of years before non-Indian occupation. During these thousands of years, the Native Americans used the land and its resources and built these into a cultural definition of themselves as people. Most of the Native Americans who traditionally lived at Hanford perceive that they were created there and, that in so doing, the Creator gave them a special supernatural responsibility to protect and manage the land and its resources. In western terminology, the Hanford Site and surrounding areas is their Holy Land (Stoffle and Evans 1988). Associated property types might include dwelling places of the spirits, vision quest sites, Washat dance sites, and ceremonial sites where first salmon or first food rites took place, among others.

Many of these places are sensitive and knowledge of them are retained by the Native Americans. Two places at Hanford highly revered by Native Americans are Gable Mountain and Rattlesnake Mountain.

**Cultural Landscapes.** As identified above, there are many specific areas within the Hanford Site boundaries that are important to tribes with historical ties to Hanford. It is important to note, however, that the entire landscape is important to Native Americans in its totality. Protecting the integrity of the landscape as a whole is as important as protecting the integrity of the landscapes individual components.

### 3.2.4 Treaties

The Hanford Cultural and Historic Resources Program interacts and consults directly with four federally recognized tribes: the Confederated Tribes of the Colville Reservation, the Confederated Tribes of the Umatilla Indian Reservation, the Nez Perce Tribe, and the Yakama Nation. In addition, the Wanapum people, who still live adjacent to the Hanford Site, are a non-federally recognized tribe who have strong cultural ties to the Site. The Wanapum are also consulted on cultural resource issues in accordance with DOE-RL policy and relevant legislation.

Three of the federally recognized tribes have treaties with the U.S. government. In June 1855, at Camp Stevens in the Walla Walla Valley, representatives of the United States negotiated treaties with leaders of various Columbia Plateau American Tribes and Bands. The negotiations resulted in three treaties, one with the 14 tribes and bands of what would become the Yakama Nation, one with the three tribes that would become the Confederated Tribes of the Umatilla Indian Reservation, and one with the Nez Perce Tribe. The U.S. Senate ratified the treaties in 1859.<sup>2</sup> The negotiated treaties are as follows:

1. Treaty with the Walla Walla, Cayuse, etc. (June 9, 1855; 12 Stats. 945)
2. Treaty with the Yakama (June 9, 1855; 12 Stats. 951)
3. Treaty with the Nez Perce (June 11, 1855; 12 Stats. 957).

The terms of the three preceding treaties are similar. Each of the three tribes agreed to cede large blocks of land to the United States. The Hanford Site is within the ceded lands. The tribes retained certain lands for their exclusive use (i.e., reservations) and also retained certain rights and privileges to continue traditional activities outside the reservations. These included 1) the right to fish (and erect temporary fish-curing facilities) at usual and accustomed places in common with citizens of the United States, and 2) the privileges of hunting, gathering roots and berries, and pasturing horses and cattle on open and unclaimed lands.

The Confederated Tribes of the Colville Reservation was established by Presidential Executive Order in 1872. Today, over 8,700 descendants of 12 aboriginal tribes of Indians are enrolled in the Confederated Tribes of the Colville Reservation. Tribes on the Colville Reservation with historical ties to the Hanford area are the Palus, the Moses Columbia, and the Nez Perce of Chief Joseph's Band.

### 3.2.5 Recent Scientific Significance

The Manhattan Project/Cold War cultural landscape has recent scientific significance. The U.S. government came to Hanford in 1943 to construct a secret war-time plutonium production plant, the first of its kind. Existing communities, including Native American villages, were removed and the facility constructed.

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<sup>2</sup> The text of the three treaties can be viewed in Appendix A of the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement and Comprehensive Land-Use Plan (HRA-EIS)* (DOE 1999). The treaties can be accessed at the following URL: <http://www.rootsweb.com/~usgenweb/wa/indians/treaties.htm>.

From the early 1940s until the advent of the cleanup mission, most research and development at the Hanford Site were carried out in the 300 Area, located just north of Richland. The 300 Area was also the location of nuclear fuel fabrication. Nuclear fuel in the form of pipe-like cylinders (fuel elements) was fabricated from metallic uranium shipped in from offsite production facilities. Metallic uranium was extruded into the proper shape and encapsulated in aluminum or zirconium cladding.

The fabricated fuel elements were shipped by rail (and later by truck) from the 300 Area to the 100 Areas. The 100 Areas are located along the Columbia River shoreline, where up to nine nuclear reactors were in operation. The main component of the nuclear reactors consisted of a large pile of graphite blocks that had tubes and pipes running through it. The tubes were receptacles for the fuel elements while the pipes carried water to cool the graphite pile. Placing large numbers of slightly radioactive uranium fuel elements into the tubes created an intense radiation field, and a radioactive chain reaction resulted in the conversion of some uranium atoms into plutonium atoms.

The first eight reactors, constructed between 1943 and 1955, used water from the Columbia River for direct cooling. Large quantities of water were pumped through the pipes in the graphite piles and discharged back into the river. The ninth reactor, N Reactor, was completed in 1963 and was a modified design. Purified water was recirculated through the reactor core in a closed-loop cooling system. Beginning in 1966, the heat from the closed-loop system was used to produce steam that was sold to Energy Northwest to generate 860 megawatts of electricity at the adjacent Hanford Generating Plant.

When fresh fuel elements were pushed into the front face of a reactor's graphite pile, irradiated fuel elements were forced out the rear into a deep pool of water called a "fuel storage basin." After a brief period of storage in the basin, the irradiated fuel was shipped to the 200 Areas for processing. The fuel was shipped in casks by rail in specially constructed railcars.

The 200-East and 200-West Areas are located on a plateau approximately in the center of the Hanford Site. These areas house facilities that received and dissolved irradiated fuel and then separated out the valuable plutonium. These facilities were called "separations plants."

Three types of separations plants were used over the years to process irradiated fuel. Each of the separation processes began with the dissolution of the aluminum or zirconium cladding material in solutions containing ammonium hydroxide/ammonium nitrate/ammonium fluoride followed by the dissolution of the irradiated fuel elements in nitric acid. All three separations plants, therefore, produced large quantities of nitric acid waste solutions that contained high levels of radioactive materials. This waste was neutralized and stored in large underground tanks. Fumes from the dissolution of cladding and fuel and from other plant processes were discharged to the atmosphere from tall smokestacks. Filters were added to the stacks in the early 1950s.

Both B and T Plants used a bismuth phosphate process to precipitate and separate plutonium from acid solutions during the early days of site operations. Leftover uranium and high-level waste products were not separated and were stored together in large, underground, single-shell tanks (i.e., tanks constructed with a single wall of steel). The leftover uranium was later salvaged, purified into uranium oxide powder at the Uranium Trioxide Plant, and transported to uranium production facilities in other parts of the country for reuse. The salvage process used a solvent extraction technique that resulted in radioactive liquid waste that was discharged to specific retention trenches and covered with soil at the BC cribs area

south of the 200-East Area. After T Plant stopped functioning as a separations facility, it was converted to a decontamination operation, where pieces of equipment and machinery could be radiologically decontaminated for reuse.

B Plant was later converted into a facility to separate radioactive strontium and cesium from high-level waste. The strontium and cesium were then concentrated into a solid salt material, melted, and encapsulated at the adjacent encapsulation facility. The Plutonium Finishing Plant was used to convert the plutonium nitrate into plutonium metal blanks (buttons) that were shipped off the Site for manufacture into nuclear components.

In addition to research and development activities in the 300 Area, the Hanford Site has supported several test facilities. The largest is the Fast Flux Test Facility, located ~8 kilometers (5 miles) northwest of the 300 Area. This special nuclear reactor was designed to test various types of nuclear fuel. The facility operated for ~13 years and was shut down in 1993. The reactor was a unique design that used liquid sodium metal as the primary coolant. The heated liquid sodium was cooled with atmospheric air in heat exchangers.

### **3.3 KNOWN CULTURAL RESOURCES**

The following section presents a summary of cultural, archaeological, and historical resources that are known to be located on the Hanford Site. The inventory is based on a summary of archaeological, historical, and ethnographic data collected from archival records, archaeological survey, and ethnographic interviews. It does not reflect a complete inventory as only 22% of the Hanford Site has been surveyed for archaeological resources.

Approximately 1,171 cultural resources sites and isolated finds and 531 buildings and structures have been documented since 1926 on the Hanford Site. Early archaeological reconnaissance projects dating from 1926 to 1968 (Drucker 1948; Krieger 1928; Rice 1968a, 1968b) and the more recent National Historic Preservation Act, Section 110 and 106, archaeological surveys conducted between 1987 and 2001 have resulted in formal recordation of these resources on archaeological site and isolate forms and Washington State Historic Property Inventory Forms.

Of the 124 sites that have been evaluated for listing in the National Register, 49 have been listed. Except for B Reactor, which is associated with the Manhattan Project, the other listed sites are associated with the Native American landscape. Most of these are part of six Archaeological Districts and with the exception of the Rattlesnake Springs Sites and the Snively Canyon Archaeological District, are situated on the shores and islands of the Columbia River (Table 3).

Eleven individual archaeological sites and 3 historic districts comprising 58 archaeological sites and 530 buildings/structures have also been determined to be eligible for listing in the National Register (Table 4). These sites are dispersed throughout the Hanford Site and represent the three cultural landscapes found on the Hanford Site. In addition to the National Register sites and districts described above, 47 of Hanford's cultural resource sites (46 in 3 districts and 1 site) are listed in the Washington Heritage Register (Table 5). These are associated with the Native American cultural landscape and are located predominantly along the Columbia River.

**TABLE 3** Historic Buildings, Archaeological Sites, and Districts Listed in the National Register

Property Name	General Location	Landscape Association
<b>Districts</b>		
Hanford North Archaeological District	Vicinity of 100 F	Native American
Locke Island Archaeological District	Vicinity of 100 H	Native American
Ryegrass Archaeological District	Vicinity of 100 K	Native American
Savage Island Archaeological District	North of Energy Northwest	Native American
Snively Canyon Archaeological District	Rattlesnake Hills	Native American
Wooded Island Archaeological District	North of 300 Area	Native American
<b>Sites</b>		
Hanford Island Archaeological Site (45BN121)	Vicinity of Hanford townsite	Native American
Paris Archaeological Site (45GR317)	Vicinity of Vernita Bridge	Native American
Rattlesnake Springs Sites (2) (45BN170, 45BN171)	Base of Rattlesnake Mountain	Native American
<b>Building</b>		
105-B Reactor	100B/C Area	Manhattan Project

**TABLE 4** Archaeological Sites and Historic Districts Determined Eligible for Listing in the National Register

Property Name	General Location
<b>Native American</b>	
Gable Mountain Cultural District (TCP)	600 Area, North of 200 East
45BN423	100-K Area
45BN434	100-K Area
45BN446	100-B/C Area
45BN606 (HT-95-186)	100-F Area
45-BN-888 (HT-2001-007)	100-D Area
<b>Early Settlers</b>	
McGee Ranch/Cold Creek Valley District	600 Area (Along HW24)
HT-95-050 (Fry and Conforth Farm)	600 Area, East of 100-B/C Area
H3-121 (White Bluffs Road)	600 Area, 200 West Area
HT-95-231 (White Bluffs Bank)	Town of White Bluffs
HT-98-039 (Bruggemann's Warehouse)	600 Area, West of 100-B/C
Hanford Electrical Substation-Switching Station	600 Area
Hanford High School	600 Area
Coyote Rapids Hydroelectric Pumping Plant	600 Area
<b>Manhattan Project/Cold War</b>	
Hanford Site Manhattan Project and Cold War Era Historic District	100, 200 E and W, 300, 400, 600, and 700 Areas
HT-94-028 (Anti-Aircraft Artillery Site)	600 Area, Vicinity of 200 E/W
HT-94-029 (Anti-Aircraft Artillery Site)	600 Area, Vicinity of 200 E/W
HT-94-030 (Anti-Aircraft Artillery Site)	600 Area, Vicinity of 200 E/W
HT-94-031 (Anti-Aircraft Artillery Site)	600 Area, Vicinity of 200 E/W
HT-94-032 (Anti-Aircraft Artillery Site)	600 Area, Vicinity of 200 E/W
HT-99-007 (Hanford Atmospheric Dispersion Test Facility)	600 Area, Vicinity of 200 W

**TABLE 5** Archaeological Sites and Districts Listed in the Washington Heritage Register

Property Name	General Location
<b>Districts</b>	
Coyote Rapids Archaeological District	Vicinity of 100-K Area
Hanford South Archaeological District	Vicinity of Energy Northwest, 300 Area, and North Richland.
Wahluke Archaeological District	Vicinity of 100-D Area
<b>Site</b>	
Gable Mountain Archaeological Site	600 Area, North of 200 East

The DOE identified a National Register-eligible Hanford Site Manhattan Project and Cold War Era Historic District that serves to organize and delineate the evaluation and mitigation of Hanford's plutonium production built environment (see Table 4). Standards for evaluating and mitigating the built environment were established in accordance with National Register criteria as well as historic contexts and themes associated with nuclear technology for national defense and non-military purposes, energy production, and human health and environmental protection. A programmatic agreement that addresses management of the built environment (buildings and structures) constructed during the Manhattan Project and Cold War periods was completed by DOE. The Advisory Council on Historic Preservation and Washington State Historic Preservation Officer accepted this programmatic agreement in 1996 (DOE 1996a).

Establishment of the Hanford Site Manhattan Project and Cold War Era Historic District resulted in the selection of 190 buildings, structures, and complexes as contributing properties within the historic district recommended for individual documentation and mitigation. Certain property types, such as mobile trailers, modular buildings, storage tanks, towers, wells, and structures with minimal or no visible surface manifestations, were exempt from the identification and evaluation requirements.

Approximately 900 buildings and structures were identified as either contributing properties with no individual documentation requirement (not selected for mitigation) or as non-contributing exempt properties and are documented in a DOE-maintained database (Marceau 1998). The role the Hanford Site played in Manhattan Project and Cold War history has been chronicled in *The History of the Plutonium Production Failures at the Hanford Site Historic District 1943-1990* (DOE 2002).

### 3.3.1 Native American Cultural Landscape

Native Americans have lived in and around the present-day Hanford Site for thousands of years (Relander 1956; Spier 1936). When Euro-Americans arrived in the 1800s, peoples presently referred to as the Wanapum inhabited villages and fishing camps. Neighboring groups known today as the Yakama, Umatilla, Cayuse, Walla Walla, Palus, Nez Perce, and Middle Columbia Salish frequented the area to trade, gather resources, and conduct other activities. Many descendants of these tribes and bands are affiliated with the Wanapum, Yakama Nation, Confederated Tribes of the Umatilla Reservation, Nez Perce Tribe, or the Confederated Tribes of the Colville Reservation, and they retain traditional, cultural,

and religious ties to Hanford's places and resources. This record of Native American use and history is reflected in the archaeological sites and TCPs that are located across the Hanford Site.

### **3.3.1.1 Archaeological Resources**

More than 8,000 years of prehistoric human activity in this largely arid environment of the Middle Columbia River region have left extensive archaeological deposits along the river shores (Chatters 1989; Greengo 1982; Leonhardy and Rice 1970). Well-watered areas inland from the river also show evidence of concentrated human activity (Chatters 1982, 1989; Daugherty 1952; Green 1976; Leonhardy and Rice 1970; Rice 1980a), and recent surveys have indicated extensive, although dispersed, use of arid lowlands for hunting. Throughout most of the region, hydroelectric development, agricultural activities, and domestic and industrial construction have destroyed or covered the majority of these deposits. Amateur artifact collectors have had an immeasurable impact on what remains at numerous sites. However, by virtue of their inclusion in the Hanford Site from which the public is restricted, archaeological deposits found in the Hanford Reach of the Columbia River and on adjacent plateaus and mountains have witnessed less destruction than many other areas.

Four hundred and fifty-nine archaeological sites and isolated finds associated with the prehistoric period have been recorded on Hanford; of these, approximately 70 contain historic components as well. Prehistoric period sites common to the Hanford Site include remains of numerous pithouse villages, various types of open campsites, spirit quest monuments (rock cairns), hunting camps, game drive complexes, and quarries in nearby mountains and rocky bluffs (Rice 1968a, 1968b, 1980a); hunting/kill sites in lowland stabilized dunes; and small temporary camps near perennial sources of water located away from the river (Rice 1968b).

A historic context for the Prehistoric Period of the Hanford Site has been prepared as part of a National Register Multiple Property Documentation form to assist with the evaluation of the National Register eligibility of prehistoric archaeological resources.

### **3.3.1.2 Traditional Cultural Places**

In 1990, the National Park Service developed the concept of traditional cultural property or traditional cultural place (TCP) as a means to identify and protect cultural landscapes, places, and objects that have special cultural significance to Native Americans and other ethnic groups (Parker and King 1990). A significant TCP is associated with "cultural practices or beliefs of a living community that are rooted in that community's history, and are important in maintaining the continuing cultural identity of the community" (Parker and King 1990).

The Hanford Reach and the greater Hanford Site, a geographic center for regional Native American religious belief, is central to the practice of Native American religion of the region, and many believe the Creator made the first people here. Native American religious leaders such as *Smoholla*, a prophet of Priest Rapids who brought the Washani religion to the Wanapum and others during the late nineteenth century, began their teachings here. Native plant and animal foods, some of which can be found on the Hanford Site, are used in the ceremonies performed by tribal members. Certain landforms, especially

Rattlesnake Mountain, Gable Mountain, Gable Butte, and various sites along and including the Columbia River, remain sacred to them.

Native American TCPs within the Hanford Site include, but are not limited to, a wide variety of places and landscapes: archaeological sites, cemeteries, trails and pathways, campsites and villages, fisheries, hunting grounds, plant gathering areas, holy lands, landmarks, important places in Native American history and culture, places of persistence and resistance, and landscapes of the heart (DOE 1997c). Because of their sacred nature, many TCPs remain unidentified. The DOE and HCRL continue to consult with Hanford tribes for input on these important locations, as their importance is determined through methods that are mutually agreed upon by DOE and the Native American community.

### **3.3.1.3 Identified Resources Within the Native American Cultural Landscape**

Various parts of the Hanford Site have been surveyed over the years, resulting in the identification of hundreds of sites. Intensive field surveys were completed in the 100 and 300 Areas from 1991 to 1995 (Andrefsky et al. 1996; Chatters et al. 1992; Wright 1993). In the 200 Areas, surveys were largely completed in 1987 and 1988 (Chatters and Cadoret 1990). Much of the surface area within the developed areas of Hanford have been disturbed by the industrial activities that have taken place during the past 50 years. Despite this development, many of these areas, particularly those located near the Columbia River, remain rich in significant cultural resources. Disturbance maps and reports have been prepared for the 100-B/C, 100-D/DR, and 100-F Areas. Contact the DOE-RL Hanford Cultural and Historic Resources Program Manager for further information.

#### **100-B/C Area**

**Archaeological Resources.** There is a high density of archaeological resources associated with the Native American and Early Settlers cultural landscape in the 100 B/C Area; three of which are located partially within the 100-B/C Area (Rice 1968a, 1980a, 1980b). Thirty-five have been recorded within the immediate vicinity of the B/C Area during archaeological surveys completed in 1995.

Historic archaeological resources include the remains of Haven Station, a small stop on the former Chicago, Milwaukee, St. Paul, and Pacific Railroad, located to the west of the reactor compound. One archaeological site and the remains of the small community of Haven lie on the opposite bank of the Columbia River. The Hanford Irrigation Ditch, which carried water from the pumping plant to the Hanford and White Bluffs townsites, is located adjacent and south of the plant.

Two archaeological sites located near the 100-B/C Area have been investigated. Test excavations conducted in 1991 at one hunting site revealed large quantities of deer and mountain sheep bone and projectile points dating from 500 to 1,500 years. The second archaeological site is considered to be eligible for listing in the National Register, in part, because it may contain new information about the Frenchman Springs and Cayuse Phases of prehistory.

**Traditional Cultural Places.** Many sites related to hunting and religious activities are located at the west-end of Gable Butte, due south of the 100-B/C Area. These sites are part of the proposed Gable Mountain/Gable Butte Cultural District nomination.

### **100-D/DR Area**

**Archaeological Resources.** One hundred and seven known archaeological sites lie within 2 kilometers (1.2 miles) of the 100-D/DR Reactor compound, three on the northern bank and the remainder on the southern bank of the Columbia River. The Wahluke Archaeological District is located north of the reactor compound area. Most remaining sites represent early Euro-American settlement activities. The former community of Wahluke, which was at the landing of a ferry of the same name, is situated on the river's north bank. In 2001, an unanticipated discovery was made when a significant archaeological site associated with the Native American cultural landscape was uncovered during the monitoring of the 100-D Area environmental restoration activities (Sharpe and Marceau 2002a).

**Traditional Cultural Places.** Twenty-seven sites located south of the reactor compound may potentially be eligible for the National Register because of their association with a TCP.

### **100-F Area**

**Archaeological Resources.** The 100-F Area is situated on a segment of the Columbia River that contains many cultural sites associated with the Native American cultural landscape. According to Relander (1956), camps and villages of the Wanapum extended from the Hanford Townsite upstream to the White Bluffs Townsite. Eighty-one archaeological sites have been recorded near the 100-F Area. Sites of particular importance include a site recently determined eligible to the National Register, a cemetery, a National Register site, and a site that appears to contain artifact deposits dating to at least 4,000 years ago (Sharpe and Marceau 2002a).

**Traditional Cultural Places.** Cemeteries associated with the Native American landscape are known to be in the vicinity of the 100-F Area.

### **100-H Area**

**Archaeological Resources.** As of 2001, there have been 40 archaeological sites recorded within 2 kilometers (1.2 miles) of the 100-H Area. Included in this group are two historic Wanapum cemeteries, six camps (one with an associated cemetery), and three housepit villages. The largest village contains approximately 100 housepits and numerous storage caches. It appears to have been occupied from 2,500 years ago to historic times (Rice 1968a). The cemeteries, camps, and villages are included in the Locke Island Archaeological District.

**Traditional Cultural Places.** As noted above, Wanapum cemeteries are known to be in the vicinity of the 100-H Area.

### **100-K Area**

**Archaeological Resources.** An archaeological survey of the 100-K Area in 1991 revealed five previously unrecorded archaeological sites. Archaeological surveys conducted during 1995 of areas not

surveyed in 1991 resulted in documentation of 31 additional prehistoric and historic sites. Two of these sites are believed to date to the Cascade Phase (9,000 to 4,500 years ago). Two National Register Districts are located near the 100-K Area: the Coyote Rapids Archaeological District and the Ryegrass Archaeological District. Two individual archaeological sites near the 100-K Area have been determined to be eligible for listing in the National Register.

**Traditional Cultural Places.** Events took place at this locality in the mid-nineteenth century that were of great significance to Native American people in the interior Northwest (Relander 1956). The origin of the Washani religion (also known as Seven Drums or Dreamer religion) began in this area, spreading to many neighboring tribes. A group of pithouses with an associated long house and sweat lodge have been identified that may have been the site of Smohalla's first *Washat* dance. Coyote Rapids, which is a short distance upstream, was called *Moon*, or Water Swirl Place. Water Swirl Place is also recognized as a TCP because its significance lies in its association with Wanapum history and traditional cultural beliefs.

### 100-N Area

**Archaeological Resources.** Thirty-one archaeological sites associated with the Native American cultural landscape have been recorded within 2 kilometers (1.2 miles) of the 100-N Area perimeter. Four of these sites are either listed, or considered eligible for listing, in the National Register. Three sites (two housepit villages and one cemetery) comprise the Ryegrass Archaeological District. Site 45BN179, once considered for a National Register nomination as the Hanford Generating Plant Site, has been found to be part of 45BN149, which is already listed in the National Register. Extant knowledge about the archaeology of the 100-N Area is based largely on reconnaissance-level archaeological surveys conducted during the late 1960s to late 1970s (Rice 1968b; see also Rice 1980a, 1980b), which do not purport to produce complete inventories of the areas covered.

**Traditional Cultural Places.** Three areas near the 100-N Area are known to have been of importance to the Wanapum. The knobs and kettles surrounding the area are called *Mooli Mooli*, which means Little Stacked Hills. Gable Mountain (called *Nookshai* or Otter) and Gable Butte, which lie to the south of the river, are sacred mountains where youths would go on overnight vigils seeking guardian spirits (Relander 1956). Sites of religious importance may also exist near the 100-N compound.

### 200 Areas

Much of the 200 Areas are disturbed. The program conducted a comprehensive archaeological resources survey for the fenced portions of the 200 Areas in 1987 and 1988 (Chatters and Cadoret 1990). The results from that report indicate that evidence of cultural resources associated with the Native American cultural landscape and the Early Settlers cultural landscape is minimal.

**Archaeological Resources.** The most significant archaeological resource located in the 200 Areas is an extensive linear feature known as the White Bluffs Road, a portion of which passes diagonally southwest to northeast through the 200-West Area. This road, in its entirety, was determined eligible for listing in the National Register. However, segments of the White Bluffs Road that are located in the 200-West Area have been determined to be non-contributing. Such non-contributing segments of the White Bluffs

Road are those that do not add to the historic significance of the road, but retain evidence of its contiguous bearing. Originally used as a Native American trail, it played a role in Euro-American immigration, development, agriculture, and Hanford Site operations. The 2000 White Bluffs Road survey recorded an additional 54 historic isolated finds and 2 prehistoric isolated finds, as well as 6 can dump features.

**Traditional Cultural Places.** Many sites related to hunting and religious activities are located on Gable Butte and Gable Mountain north of the 200-West and 200-East Areas. These sites are part of the proposed Gable Mountain/Gable Butte Cultural District nomination.

### **300 Area**

Much of the 300 Area has been highly disturbed by industrial activities associated with the Manhattan Project and Cold War cultural landscape. Before the Manhattan Project in 1943, the 300 Area was used by Native Americans as a camp location and by early settlers who developed a farming community known as Fruitvale. Because of its proximity to the Columbia River, many archaeological resources associated with these landscapes are located along the rivershore outside of the 300 Area fence. Subsurface archaeological deposits are likely to be located underneath existing 300 Area facilities in pockets of undisturbed ground. Disturbance maps and reports have been prepared for the 300 Area.

**Archaeological Resources.** Five recorded archaeological sites, including campsites, housepits, and a historic trash scatter are located at least partially within the 300 Area; many more may be located in subsurface deposits. Twenty-seven archaeological sites and 13 isolated artifacts have been recorded within 2 kilometers (1.2 miles) of the 300 Area fence. One archaeological site has been tested and is recognized as eligible for listing in the National Register. Several archaeological sites in this area are in the Hanford South Archaeological District, which is listed in the Washington Heritage Register. Other areas near the 300 Area have been found to be of great importance to the Native Americans and are fenced.

**Traditional Cultural Places.** One documented locality with great importance to the historic Wanapum is located near the 300 Area.

### **600 Area**

Project-driven surveys have been conducted throughout the area, but much of the 600 Area remains unsurveyed. All 33 archaeological sites and TCPs recorded in 2001 were located in the 600 Area and are associated with the Native American and Early Settlers landscapes. Based on what is known, the 600 Area contains a diverse wealth of cultural resources associated with all three cultural landscapes. Representing a full range of human activity across the Hanford Site, the activities are best characterized for the Native American cultural landscape by their seasonal round, gathering inland (quarry sites, hunting sites, religious use sites, plant gathering sites) and riverine (fishing sites, open camp sites, root gathering) resources. The Early Settlers cultural landscape is present in the 600 Area as farmsteads, ranches, and transportation routes.

**Archaeological Resources.** Numerous National Register Districts associated with the Native American landscape are located within the 600 Area, including the Hanford Archaeological Site, the Hanford North Archaeological District, the Paris Archaeological Site, Rattlesnake Springs Sites, Savage Island Archaeological District, Snively Basin Archaeological District, and the Wooded Island Archaeological District.

**Traditional Cultural Places.** Areas of traditional cultural importance include Rattlesnake Mountain and foothills, the Columbia River, and Gable Mountain and Butte. In 2001, additional resources related to religious and hunting activities were added to the Gable Mountain Cultural District. Cemeteries associated with the Native American cultural landscape are also dispersed throughout the 600 Area.

### **3.3.2 Early Settler/Farming Cultural Landscape**

The Early Settler/Farming cultural landscape comprises those areas on the Hanford Site where people, mainly of European descent, settled in the Columbia River Plateau before the start of the Manhattan Project in 1943. Non-Native American presence in the Mid-Columbia began in 1805 with the arrival of the Lewis and Clark Expedition. It was not until the late nineteenth and early twentieth centuries, however, that non-Native American peoples began intensive settlement on the Hanford Site. A record of their activities and use is present in the archaeological sites, TCPs, and buildings and structures that are located throughout the Hanford Site.

#### **3.3.2.1 Buildings and Structures**

Although most of the structures were razed by the U.S. government to build infrastructure for the Hanford Engineer Works in 1943, a small number of buildings associated with the Early Settlers cultural landscape remain standing today. They include the Hanford Irrigation and Power Company's pumping plant at Coyote Rapids, the Hanford townsite high school, the electrical substation at the Hanford townsite, White Bluffs Bank, Bruggemann's fruit warehouse, and the blacksmith cabin at the East White Bluffs ferry landing. These structures are located near the Columbia River and throughout the 600 Area of the Hanford Site.

The Hanford Irrigation Ditch and the former Chicago, Milwaukee, and St. Paul Railroad are two important linear features associated with the Early Settlers cultural landscape.

#### **3.3.2.2 Traditional Cultural Places**

Traditional cultural places associated with the Early Settler/Farming cultural landscape that are located on the Hanford Site include structures and places that are important to descendants of pre-1943 settlers in the former White Bluffs, Hanford, Allard, Fruitvale, Vernita, and Cold Springs areas. These places are deeply rooted in the memories of local residents and include, but are not limited to, a former cemetery, numerous former homesites and townsites, orchards, fields, former swimming holes, and places of former community activities (e.g., Hanford Grange Hall, town parks, churches, and schools). Former residents visit these areas annually with friends and family.

### **3.3.2.3 Archaeological Resources**

The first Euro-Americans to pass near the Hanford Site were part of the Lewis and Clark expedition, which traveled along the Columbia and Snake rivers during the 1803 to 1806 exploration of the Louisiana Territory. The first European explorer to cross the Hanford Site was David Thompson, who traveled along the Columbia River from Canada during his 1811 exploration of the Columbia River. Other visitors included fur trappers, military units, traders, and miners who traveled through the Hanford Site on their way to lands up and down the Columbia River and across the Columbia Basin. It was not until the 1860s that merchants set up stores, a freight depot, and the White Bluffs Ferry on the Hanford Reach. Chinese miners soon began to work the gravel bars for gold. Cattle ranches were established in the 1880s, and farmers soon followed. Agricultural development, irrigation districts, and roads soon dotted the landscape, particularly in the eastern portion of the central Hanford Site. Several small thriving towns, including Hanford, White Bluffs, Richland, and Ringold, grew up along the riverbanks in the early twentieth century. The communities' accessibility to outside markets expanded with the arrival in 1913 of the Chicago, Milwaukee, and St. Paul Railroad branch line (Priest Rapids-Hanford Line) from Beverly, Washington. Ferries were established at Richland, Hanford, Wahluke, and Vernita. The towns and nearly all other structures were razed in the years after the U.S. government acquired the land for the Hanford Engineer Works in 1943 (Chatters 1989; ERTEC 1981; Rice 1980a).

Approximately 650 historic archaeological sites associated with the Early Settler/Farming cultural landscape including an assortment of towns, farmsteads, irrigation features corrals, and dumps have been recorded by the HCRL since 1987. Approximately 60 of these sites contain prehistoric components as well. Properties from this period include the Hanford Irrigation Ditch; former Hanford Townsite; Wahluke Ferry; White Bluffs Townsite; Richmond Ferry; Arrowsmith Townsite; White Bluffs Road; and Chicago, Milwaukee, and St. Paul Railroad (Priest Rapids-Hanford Line) and associated stops.

### **3.3.3 Resources of Ethnic Importance**

Sites have been recorded that may be associated with Asians and Asian Americans (Sharpe 2000). African Americans also worked at Hanford in the twentieth century, but no sites have been identified that may be associated with them.

### **3.3.4 Properties of Recent Scientific Significance**

Historic-built resources documented from the Manhattan Project and Cold War eras include buildings and structures found in the 100, 200, 300, 400, 600, and 700 Areas. The most important of these are the plutonium production and test reactors, chemical separation and plutonium finishing buildings, and fuel fabrication/manufacturing facilities. The first reactors, 105-B, 105-D, and 105-F, were constructed during the Manhattan Project. Plutonium for the first atomic explosion and the bomb that destroyed Nagasaki to end World War II were produced at the Hanford Site. Additional reactors and processing facilities were constructed after World War II during the Cold War period. All reactor containment buildings still stand, although many ancillary structures have been removed, and the 100-C, 100-DR, and 100-F reactors have been considerably modified.

Historic contexts were completed for the Manhattan Project and Cold War eras as part of a National Register Multiple Property Documentation Form prepared for the Hanford Site to assist with the evaluation of National Register eligibility of buildings and structures Site-wide (DOE 1997b).

Five hundred and twenty-eight Manhattan Project and Cold War era buildings/structures and complexes have been determined eligible for the National Register as contributing properties within the Historic District. Of that number, 190 were recommended for individual documentation. Historical narratives and individual building documentations have been completed for the *History of the Plutonium Production Facilities at the Hanford Site Historic District, 1943-1990* (DOE-RL 2002). DOE-RL will consider the retention of National Register-eligible buildings and structures that may qualify for adaptive reuse as interpretive centers, museums, industrial, or manufacturing facilities, as identified in Chapter 4 of this document (DOE-RL 2002). Also, DOE-RL is in the process of undertaking an assessment of the contents of the contributing buildings and structures to locate and identify any Manhattan and Cold War era artifacts that may have interpretive or educational value for museum exhibit purposes.

### **3.3.4.1 Districts, Sites, Buildings, Structures, and Other Facilities**

#### **100 Areas**

Nine plutonium production reactors and their ancillary and support facilities were located in the 100 Areas. The production reactors functioned to irradiate uranium fuel elements, the essential second step in the plutonium production process. A complete inventory of 100 Area buildings and structures was completed during FY 1995, and a National Register evaluation for each was finalized during 1996. To date, 146 buildings/structures have been inventoried in the 100 Areas. Of that number, 55 have been determined eligible for the National Register as contributing properties within the historic district recommended for individual documentation and mitigation (Marceau 1998).

**100-B/C Area.** The 105-B Reactor was the world's first full-scale plutonium production reactor and is designated as a National Historic Mechanical Engineering Landmark. It is also listed in the National Register, was named a National Civil Engineering Landmark, and was given the Nuclear Historic Landmark Award. Historic American Engineering Record documentation of B Reactor was completed in 1999. A total of 14 buildings and structures within the 100-B/C Area have been recorded on historic property inventory forms. Of that number, 10 properties have been determined eligible for the National Register as contributing properties within the historic district recommended for individual documentation. These include 105-B Reactor, 181-B River Pumphouse, 104-B-1 Tritium Vault, 104-B-2 Tritium Laboratory, 105-B-Rod Tip Cave, 116-B Reactor Exhaust Stack, 117-B Exhaust Air Filter Building, 118-B-1 Solid Waste Burial Trench, and 182-B Reservoir and Pumphouse (Marceau 1998).

An assessment of the contents of 105-B Reactor was conducted to locate and identify Manhattan Project and Cold War era artifacts that may have interpretive or educational value in potential exhibits. Thirty-nine industrial artifacts were identified and tagged, located mainly in the fuel basin, exhaust fan room, and supply room. For the time being, these artifacts will be retained in place.

**100-D/DR Area.** All the buildings and structures in the 100-D/DR Area were built during the Manhattan Project and Cold War eras. Twenty buildings/structures have been inventoried, including the 105-D and

105-DR Reactor buildings. Both reactors were determined eligible for the National Register as contributing properties within the historic district, but were not recommended for individual documentation. An assessment of the contents of the 105-D Reactor building was conducted to locate and identify Manhattan Project and Cold War era artifacts that may have interpretive or educational value in potential exhibits. Twenty-four industrial artifacts were identified and tagged, from control panels and a reactor curtain to lunch tables, benches, tools, and signs. An assessment of the contents of the 105-DR Reactor building was conducted to locate and identify any Cold War era artifacts that may have interpretive or educational value in potential museum exhibits. Ten industrial artifacts were identified and tagged, which included a radiological worker procedures poster, instrument ladder, three metal signs, a lead sampling chamber “pig,” control panel, vintage ceiling lights and graphite blocks. The 185/189-D buildings and adjoining facilities, all part of the 190-D complex, have been determined eligible for the National Register and were documented to Historic American Engineering Record standards (Marceau 1998). However, the 190-D Complex has been demolished.

**100-F Area** Three Manhattan Project/Cold War era buildings/structures have been inventoried in this area, including the 105-F Reactor building. An assessment of the contents of the 105-F Reactor building was conducted to identify any artifacts that may have value as potential museum exhibits. Eleven industrial artifacts were identified and tagged, which included a fuel scale, elevator control panel, two shop signs, four safety signs, hardhat, graphite blocks, and vintage ceiling lights.

**100-H Area** Four Cold War era buildings/structures were inventoried in the 100-H Area. Of that number, only the 105-H Reactor was determined eligible for the National Register as a contributing property within the historic district. The reactor, however, was not recommended for individual documentation (Marceau 1998). An assessment of the contents of the 105-H Reactor was conducted to locate and identify Cold War era artifacts that may have interpretive or educational value in potential exhibits. No artifacts of interpretive or educational value were identified.

**100-K Area** Thirty-eight buildings/structures have been inventoried in the 100-K Reactor Area, including the 105-KE and 105-KW Reactor buildings. Of that number, 13 have been determined eligible for the National Register as contributing properties within the historic district recommended for individual documentation. These include the 105-KW Reactor, 190-KW Main Pumphouse, 107-KW Retention Basin, 183-KW Filter Plant, and 181-KW River Pumphouse (Marceau 1998).

An assessment of the contents of the 105-KE and 105-KW Reactor buildings was conducted to identify any artifacts that may have educational or interpretive value as potential museum exhibits. Fourteen industrial artifacts were identified and tagged in 105-KE Reactor, including tools, signage, radiation monitor equipment, furniture, and a gas mask. Seven artifacts were identified and tagged from 105-KW Reactor, including furniture, a measurement scale, tools, and a floodlight. An assessment of the 190-KW Pumphouse was also conducted, and two artifacts were tagged: a phone booth with phone set and a wooden safety bulletin board.

**100-N Area** Sixty-six Cold War era buildings and structures have been inventoried in the 100-N Area (Marceau 1998). The 100-N Reactor, completed in 1963, was the last of the plutonium production, graphite-moderated reactors. The design of N Reactor differed from the previous eight reactors in several ways to afford greater safety and to enable co-generation of electricity. Thirty 100-N Area buildings/structures have been determined eligible for the National Register as contributing properties within the

historic district recommended for individual documentation. These include the 105-N Reactor, 109-N Heat Exchanger Building, 181-N River Water Pumphouse, 183-N Water Filter Plant, 184-N Plant Service Powerhouse, 185-N Export Powerhouse, and the 1112-N Guard Station (DOE 1997d).

An assessment of the contents of the 185-N Export Powerhouse was conducted to locate and identify Cold War era artifacts that may have interpretive or educational value in potential exhibits. Six artifacts were identified and tagged, including control room panels, phone booths, a “hear-here” phone, metal cart, and a safety sign.

## **200 Areas**

The 200 Areas contain many significant buildings and structures associated with the Manhattan Project and Cold War cultural landscape. They were the locations of the chemical separations (processing) plants and their ancillary and support facilities. The plants functioned to dissolve the irradiated fuel elements to separate out the plutonium, the essential third step in plutonium production. Historic property inventory forms have been completed for 72 buildings/structures in the 200 Area. Of that number, 58 have been determined eligible for the National Register as contributing properties within the historic district recommended for individual documentation. These include the 202-A Purex Plant, 212-N Lag Storage Facility, 221-T Plant, 222-S Redox Plant, 225-B Encapsulation Building, 231-Z Plutonium Metallurgical Laboratory, 234-5Z Plutonium Finishing Plant, 236-Z Plutonium Reclamation Facility, 242-Z Water Treatment Facility, 282-E Pumphouse and Reservoir Building, 283-E Water Filtration Plant, and the 284-W Powerhouse and Steam Plant (Marceau 1998). The 221-T Plant, 232-Z Waste Incinerator Facility and the 233-S Plutonium Concentration Building, determined eligible for the National Register, have been documented to Historic American Engineering Record standards.

An assessment of the contents of six facilities in the Plutonium Finishing Plant complex was conducted during FY 1998. These buildings/structures included the 234-5Z/234-5ZA Plutonium Finishing Plant, 291-Z Exhaust Stack, 2704-Z Safeguards and Security Building, and the 2736-Z, ZA, and ZB Plutonium Storage Facilities. Because of security/radiological exposure concerns and/or inaccessibility, a number of identified artifacts were not tagged. These included a radiation detection device, plutonium storage vaults, and a dry air glove box. In the 234-5Z Plutonium Finishing Plant, the entire Remote Mechanical C line (gloveboxes) and control room, and the Remote Mechanical A line (gloveboxes) and control room, were identified and tagged. Ten additional Cold War era artifacts were identified and tagged as a result of a walk-through of the Analytical Laboratories in the 234-5Z Plutonium Finishing Plant. An assessment was also conducted of the 2704-Z Building and three artifacts were identified but not tagged: the classified documents vault, typology of “cans” poster, and vintage fluorescent light fixtures.

Thirty-two industrial artifacts were identified and tagged in chemical separations buildings located in 200-East and 200-West Areas. The following buildings were inspected for artifacts during the walkthroughs: 202-A, 202-S, 221-T, 221-U, 224-U, 224-B, and 271-U. Types of artifacts selected included electrical equipment, control panels, tools, vintage lights, health and safety items, signage, and communications equipment.

### **300 Area**

The 300 Area, the location of the uranium fuel fabrication plants that manufactured fuel rods to be irradiated in the Hanford Site reactors, provided the first essential step in the plutonium production process. The 300 Area was also the location of most of the research and development laboratories. One hundred and fifty-nine buildings/structures in the 300 Area have been documented on historic property inventory forms. Of that number, 47 buildings/structures have been determined eligible for the National Register as contributing properties within the historic district recommended for individual documentation. This total includes the 305 Test Pile, 313 Fuels Fabrication Facility, 314 Metal Press/Extrusion Building, 318 High Temperature Lattice Test Reactor, 321 Separation Building, 325 Radiochemistry Laboratory, 333 Fuel Cladding Facility, 3706 Radiochemistry Laboratory, and the 3760 (former) Hanford Technical Library (Marceau 1998).

Assessments of the contents of former fuel manufacturing and reactor operations facilities in the 300 Area have been conducted including the 303-A Magazine Product Storage Building, 305 Test Pile, 305-B Engineers Development Lab Annex, 306-W Materials Development Laboratory, 306-E Fabrication Test Lab, 308 Plutonium Fabrication Pilot Plant, 309 Plutonium Recycle Test Reactor, 313 Fuels Fabrication Facility/Metal Fabrication Building, 314 Press Building, and 333 Fuel Cladding Facility. The 27 Manhattan Project/Cold War era artifacts that were identified and tagged are mainly industrial in nature associated with the fuel manufacturing processes and reactor operations. A second walkthrough of Building 333 resulted in an additional 12 artifacts being identified that included a selection of safety signs/posters, a control panel, a safety shower, protective worker clothes, and a sample uranium fuel element.

Other 300 Area buildings assessed include the 303-K Fresh Metal Storage Building, 304 Uranium Scrap Concentration Storage Facility, 324 Chemical Engineering Laboratory, 327 Post Irradiation Test Laboratory, 329 Biophysics Laboratory, 334 Chemical Handling Facility, 334-A Acid Pumphouse, 3701-D (former) Hanford Patrol Building, 3707-G Change House, 3716 Fuels Manufacturing Storage/Automotive Repair Shop, 3727 Classified Storage Facility, 3746 Radiological Physics Building, 3762 Technical Safety Building, 340 Waste Neutralization Complex, 3745-B Positive Ion Accelerator Building, 3708 Radiochemical Lab, 3706 Radiochemistry Lab, 326 Physics Lab, 3707-D Patrol Headquarters, 384 Power House, 328 Engineering Services Building, 3745-A Electron Accelerator Building, 3722 Area Shop, and the 3713 Storeroom. Twenty-one Manhattan Project/Cold War era artifacts were identified and tagged in these buildings.

### **400 Area**

The 400 Area consists of the Fast Flux Test Facility complex. The 405 Reactor Containment Building includes a 400 megawatt, sodium-cooled test reactor designed primarily to test fuels and materials for advanced nuclear power plants. All the buildings and structures in the 400 Area were constructed during the Cold War era. Twenty-one building/structures have been recorded on historic property inventory forms. Of that number, six have been determined eligible for the National Register as contributing properties within the historic district recommended for individual documentation. These include the 405 Reactor Containment Building, 436 Training Facility, 4621-W Auxiliary Equipment Facility, 4703 Fast Flux Test Facility Control Building, 4710 Operation Support Building, and the 4790 Patrol Headquarters (Marceau 1998). An assessment of the contents of Building 427 was conducted to locate

and identify Cold War era artifacts that may have interpretive or educational value in potential exhibits. Four artifacts were identified and tagged, including fuel assembly components.

## **600 Area**

Fifteen Cold War era buildings/structures, including the underground missile storage facility, have been inventoried at the former 6652 Nike launch and control center in the Fitzner/Eberhardt Arid Lands Ecology Reserve. The 622 Meteorological Complex, located near 200 West, includes seven inventoried properties. Both complexes have been determined eligible for the National Register as contributing properties within the historic district recommended for mitigation. An assessment of the contents of 622-F and the 6652 Nike site were conducted. No artifacts of interpretive or educational value were identified.

Historic archaeological military sites associated with the Manhattan Project and Cold War landscape are scattered throughout the Hanford Site's 600 Area. These archaeological resources are mainly located within the former Camp Hanford forward positions, the 16 anti-aircraft artillery sites that encircled the 100 and 200 Areas, and the three Nike missile installations on the Wahluke Slope. (A fourth Nike position, in relatively intact condition, is located at the base of Rattlesnake Mountain on the Arid Lands Ecology Reserve.) The Nike position on the Arid Lands Ecology Reserve has been determined eligible for inclusion in the National Register as a contributing property within the Hanford Site Manhattan Project and Cold War Era Historic District. Five of the 16 anti-aircraft artillery sites have also been determined eligible for the National Register.

The anti-aircraft artillery and Nike sites were strategic components in Camp Hanford's military defense of the Site's plutonium production facilities during the 1950s and early 1960s. Potential archeological resources at these sites include former gun emplacements, launch and radar sites, concrete foundations and pads, pathways/sidewalks, and associated dumpsites, small arms firing ranges, and ammunition caches.

The Atmospheric Dispersion Test Facility Grid located in the 600 Area of the Hanford Site in the vicinity of the 200-West Area was used for monitoring airborne waste dispersion experiments during the 1960s and 1970s.

Five other 600 Area properties, 604 Yakima Patrol Checking Station, 604-A Sentry House, 607 Batch Plant, 618-10 Solid Waste Burial Trench, and the Hanford Site Railroad, have been determined eligible for the National Register as contributing properties within the historic district recommended for individual documentation. A number of the 25 railcars located at the 212-N rail spur were designated Register-eligible as contributing features of the Hanford Site Railroad and the Manhattan Project/Cold War Historic District and recommended for mitigation. Documentation of the 25 railcars and mitigation of the Register-eligible cars were completed as an addendum to the Hanford Site Plant Railroad Expanded Historic Property Inventory Form (ExHPIF).

Buildings 623 (Gable Mountain Relay Station) and 213 (Magazine/Waste Storage Vault) were originally designated as contributing properties within the historic district with no individual documentation required. They were reevaluated and designated as contributing properties recommended for individual documentation.

Cold War era archaeological resources that are located in the 600 Area include five anti-aircraft artillery sites that are associated with Camp Hanford's defense of the Hanford Site during the 1950s have been determined eligible for the National Register. The Hanford Atmospheric Dispersion Test Facility was evaluated and determined a contributing property within the historic district, recommended for individual documentation. Mitigation required the completion of an ExHPIF for the Test Facility. Numerous artifacts were identified as having interpretive or educational value in potential exhibits. A selected, representative number of artifacts were removed and curated into the Hanford collection.

### **700 Area**

The 700 Area was the location of the administrative functions of the early Hanford Site period. Most of the 700 Area has been highly disturbed by industrial activities. Of the seven Manhattan Project and Cold War era buildings/structures identified in this area, the 703 Administrative Building, 712 Records/Printing/Mail Office Facility, and 748 Radiosurgery/Emergency Decontamination Facility have been determined eligible for listing in the National Register as contributing properties within the historic district recommended for individual documentation (Marceau 1998).

### **1100 Area**

Land ownership of the former 1100 Area was transferred from the DOE to the Port of Benton in 1998. As a result of this land transfer, archaeologists and historians investigated lands and buildings/structures within the former 1100 Area to ensure that all historic cultural resources were identified and are evaluated for listing in the National Register. Archival research and field surveys revealed the presence of eighteen historic archaeological sites and one isolated find. The archaeological sites fall into two categories: concentrations of historic debris and farmstead complexes. Most of these historic archaeological sites pre-date federal acquisition of the Hanford Site in 1943 and represent an important era in Euro-American settlement with regard to early irrigation and agricultural techniques. All of the historic archaeological sites were evaluated in 1998. Sites found to be eligible for listing in the National Register will be managed by the Port of Benton according to NHPA requirements following the land ownership transfer.

In addition to historic archaeological sites, the 1100 Area contains transportation maintenance buildings/structures from the Cold War period. Of the nineteen Cold War era buildings/structures identified in this area, the 1170 Bus Terminal/Dispatcher Facility, 1171 Transportation Maintenance Shops, 1167 Warehouse, 1167-A Excess Salvage Office, X-1 Railroad Scale House, and the X-4 Railroad Maintenance Shed have been determined eligible for listing in the National Register as contributing properties within the Historic District recommended for individual documentation. Mitigation has been completed for these facilities.

### **North Richland Area**

During World War II, the North Richland Area was the locale for a camp that housed Hanford Site construction personnel. No historic archaeological sites have been recorded for this area, but homesteads and remnants of the former North Richland Townsite, Manhattan Project/Cold War construction camp, and industrial facilities associated with the 1950s Camp Hanford are found there. Seventeen former Camp Hanford industrial buildings/structures located in the former 3000 Area adjacent to the North Richland Area have been inventoried and determined not eligible for the National Register.

### 3.3.4.2 Objects

Please see Section 3.3.4.1.

### 3.3.4.3 Other Properties

This section is not applicable.

## 3.4 CRM ACCOMPLISHMENTS

In this section, accomplishments made by the Hanford Cultural and Historic Resources Program in the areas of records management, cultural resource site inventory, archaeological excavations, buildings documentation, laboratory analysis, curation, preservation, research, and outreach are discussed.

### 3.4.1 Cultural Resource Records and Reports

The Hanford Cultural and Historic Resources Program generates large volumes of data in performing its cultural resource management activities at Hanford. These data are contained in an assortment of records stored by the program. Table 6 lists the databases available to facilitate searches and retrieval of data contained in some of these records.

Beginning in 1999, DOE initiated development of an electronic database system called STEWARD,<sup>3</sup> adapted from an earlier system known as the Cultural and Environmental Compliance Database. STEWARD (Version 1.0) currently has two components: a set of electronic files, referred to as the database, and an analytical tool, referred to as the geographic information system (Figure 3).

The STEWARD database component can be described as three Microsoft® Access forms: the Hanford Cultural Resource Compliance Tracking form, the Hanford Cultural Resource Survey form, and the Hanford Cultural Site and Isolate form. The initial design decisions made in FY 1999 were to use Microsoft® Access for the database portion. Microsoft® Access was chosen because it was the market standard, was easy to use, could export data, and could be linked to a geographic information system. Research was then conducted to select the appropriate geographic information system software for the project. ArcView/ArcInfo was chosen as the geographic information system software for its capabilities in mapping and modeling and because it was personal computer-based software. Each component, its design, and its use, is described in detail in the following sections.

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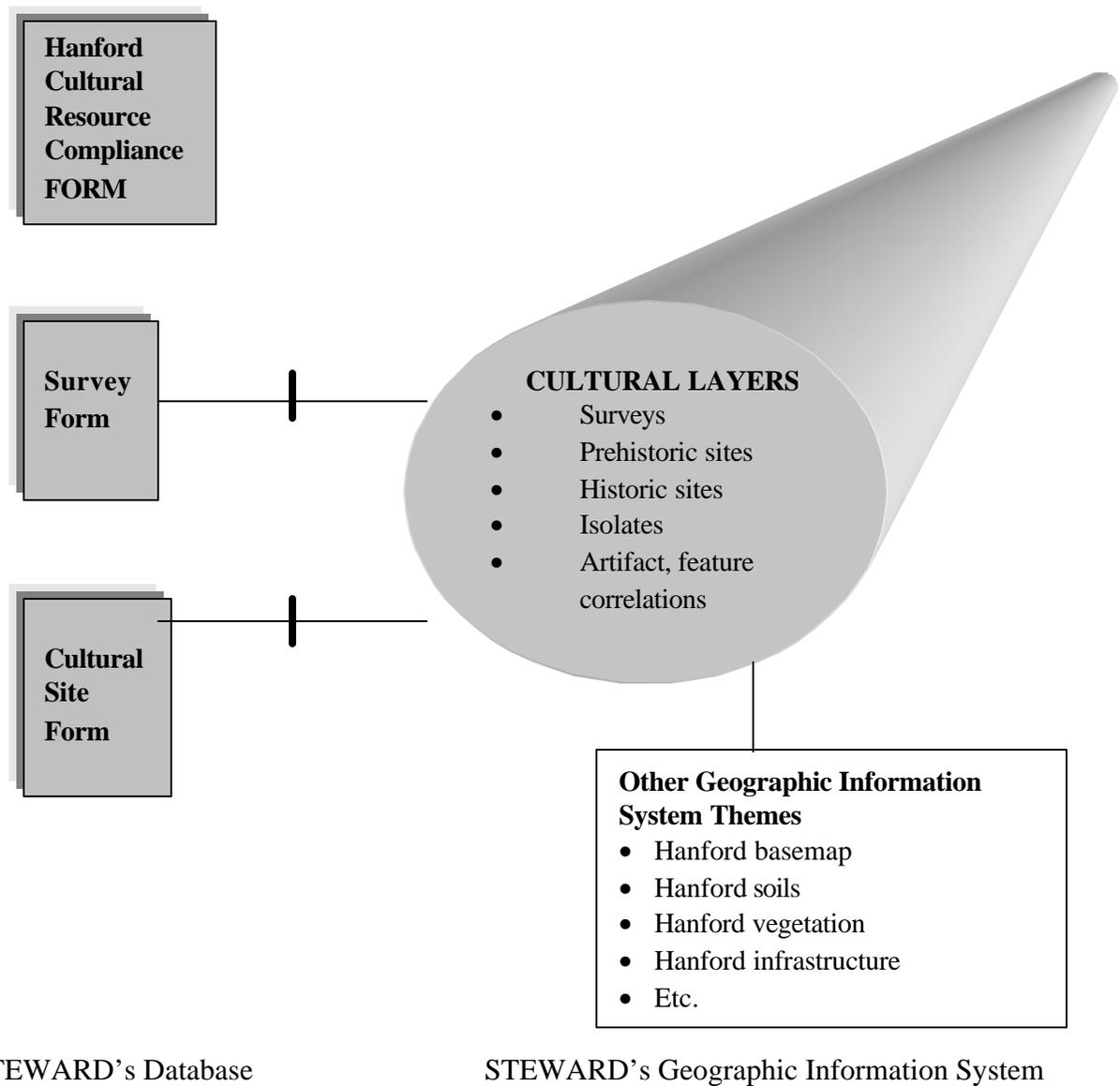
<sup>3</sup> STEWARD is described in the *Stewardship Information System Long-Term Database Project Plan* prepared by the Hanford Cultural Resources Laboratory in FY 2001.

**TABLE 6** Hanford Cultural and Historic Resource Program Records and Databases

Hanford Cultural Resource and Historic Program Records	STEWARD Database				Other Electronic System	Hard Copy Files
	HCRC	Site/Isolate	Survey	GIS		
<b>Archaeological/TCP-Related Records</b>						
Site Forms		X		X	CECOM	
Isolate Forms		X		X	CECOM	
Historic Property Inventory Forms						X
Site Maps						X
Collection Inventories					Excel	
Site Photographs/Slides/Videos						X
<b>Administrative Records</b>						
HCRC Files						
106 Reviews	X				CECOM	
Surveys	X		X	1999+		
Monitoring						X
Special Projects	X					
HCRC Distribution Maps				2000+		
Site Distribution Maps				X		
Photos/Slides/Videos						X
Field Notebooks						X
<b>Research Records</b>						
Human Subjects						X
Aerial Photographs						X
Historic Maps						X
Library					Excel	
<b>Project Records (RIDS)</b>					CRIS	
CECOM = Cultural and Environmental Compliance Management database. ERC = Environmental Restoration Contractor. GIS = Geographic Information System. HCRC = Hanford Cultural Resource Compliance. RIDS = Record Inventory Disposition Schedule. TCP = Traditional Cultural Place.						

### 3.4.1.1 Cultural Resource Site Records

The program holds records for approximately 1,009 cultural resource sites and isolated finds as well as 531 buildings and structures that have been recorded on Washington State Historic Property Inventory forms. Of the 1,009 recorded cultural resource sites, 118 have been evaluated for listing in the National Register. The remaining sites have not been evaluated.



**FIGURE 3** Hanford Cultural and Historic Resource Laboratory Stewardship Information System (STEWARD)

*Hanford Cultural Site and Isolate Forms.* These forms (see Appendix B) are used to input data collected when an archaeological site, TCP, or isolated find is recorded at Hanford. The site form includes administrative data, cultural data, and environmental data. If the record to be input is an isolated find, once that box is checked, the form immediately converts to an abbreviated “Isolate” form (see Appendix B).

The numbering system for the form follows the archaeological site numbering system in Washington State, which follows the traditional Smithsonian numbering system for prehistoric archaeological sites. Site numbers take the form of “45BN10,” where 45 refers to Washington (the 45th state in alphabetical

order when the system was developed), BN refers to Benton County (Hanford sites also exist in Grant County [GR] and Franklin County [FR]), and 10 refers to the 10<sup>th</sup> site recorded in the County. Historic sites use a different numbering system, where “H-38” refers to the 38th historic site assigned in Washington State. Isolated finds are assigned “HI” numbers such as “HI-95-73,” where HI refers to Hanford Isolate, 95 is the year, and 73 as the 73rd isolate to be recorded at Hanford. When new sites are located at Hanford, they are typically given a temporary number until the site form is filed with the Washington State Office of Archaeology and Historic Preservation. These numbers take the form of “HT-95-288,” where HT refers to Temporary, 95 refers to the year, and 288 refers to the 288th temporary site at Hanford to be recorded.

In FY 2001, STEWARD developers added a Site/Isolate Index to provide the user with a quick glance at forms in the system. With site or isolate number in hand, a user can quickly retrieve a form by going to this numerically ordered index and double clicking on the desired form.

### **3.4.1.2 Hanford Cultural and Historic Resources Program Records**

The first module designed and made functional for STEWARD (Version 1.0) was the Hanford Cultural Resource Compliance (HCRC) tracking form. The foundation for this form is the HCRC numbering system. The number is based on the year that the review is done, the area for which the review is done, and the order in which the review was assigned. Thus, HCRC# 2000-100-034 refers to the 34th review number assigned to a project in the 100 Area in the year 2000. Projects are conducted in the 100, 200, 300, 400, and 600 Areas. Other compliance projects conducted outside of Section 106, for example, Section 110 surveys, Archaeological Resources Protection Act (ARPA) investigations, or site protection feasibility studies also use this numbering system, using the 800 designation in place of a Hanford Site area designation.

The survey component was added next in FY 2000 when it was learned that no locational information was available for surveys in the existing electronic database. This made it impossible to graphically display areas that were surveyed, a key piece of information for conducting cultural resource reviews using a computer (such information was available on U.S. Geological Survey maps on which surveys had been plotted). Programmers created a survey form to facilitate data input. Also in FY 2000, the Hanford Cultural Resource Site and Isolate forms were redesigned and a Microsoft® Access form created to facilitate data entry. The form was designed so that a typed form meeting Washington State Historic Preservation Officer (SHPO) standards could be printed and data would be in a format accessible to the geographic information system. Efforts were made to extract data from the cultural and economic compliance into the new stewardship database; however, this proved to be a costly endeavor. To get the cultural site component operational, the decision was made to input all new sites using the new system and to input a subset of the data fields for all sites recorded before FY 2000.

***HCRC Tracking Form.*** This form (see Appendix B) is used to keep track of National Historic Preservation Act Section 106 compliance reviews conducted for all types of Hanford construction and cleanup projects (referred to as undertakings). The tracking system is also used to track activities such as Section 110 surveys, inadvertent discoveries, and other special efforts.

***Hanford Survey Form.*** This form (see Appendix B) is used to input data related to cultural resource surveys conducted at Hanford. It includes basic administrative information about the survey (e.g.,

surveyors, dates, location) and the results (i.e., site found). There is an occasional need to pull up this form for information, but primarily the survey data are used in the geographic information system component.

### **Geographic Information System Component**

The geographic information system component of STEWARD makes it possible to conduct a variety of analyses in ways that were never possible before and to display the results graphically on maps. Initial uses include conducting preliminary cultural resource reviews and conducting simple spatial analysis to look for correlations among various data.

### **Security**

Security for STEWARD is of utmost importance because of the confidential/sensitive nature of cultural site locations. Issues surrounding security are routinely considered. The system currently exists on a protected project share where only selected staff have access to the database. Different levels of users can be established such as read-only and read-and-write (full) access. All data stored on the project share is backed up daily.

#### **3.4.1.3 Other Cultural Resource Records**

Other records include administrative project records. These records are evaluated according to RIDS retention schedules and sent to Records Storage as specified in DOE requirements. Thus, this process provides systemized storage of records and easy location and retrievability of all documents.

#### **3.4.1.4 Cultural Resource Reports**

##### **Standardized Report Outlines**

The only standardized report outline pertains to survey reports and follows those guidelines established by the Washington State Office of Archaeology and Historic Preservation. Other formats follow basic cultural resource professional formats.

##### **Report Library**

The Hanford Cultural and Historic Resources Program library houses documents for the Hanford Cultural and Historic Resources Program. All the documents are assigned a specific number, making them unique. The number and document information is maintained in the library database. This Access database is housed in the Records Management Share (RIM 1) and maintained by Records Management. Access control allows the manager to control who is able to view the database.

As stated, the database provides a unique number to all library documents as well as maintaining the following information: document location, media type (e.g., newspaper article, book), document number, volume number, revision number, document title, document author/s, published in (e.g., magazine title), document date, and comments. These fields allow the user to search for documents by keywords, document numbers, and all other listed fields. Thus, this process provides systemized storage of records and easy location and retrievability of all documents.

A list of published and unpublished reports generated by the DOE-RL Hanford Cultural and Historic Resources Program is provided in Appendix E.

## **3.4.2 Inventory**

Efforts to systematically inventory and understand the distribution of cultural resources began in 1987 when the DOE-RL Hanford Cultural and Historic Resources Program began. A review of efforts to date are provided below.

### **3.4.2.1 Archival Searches**

Record and literature reviews are often carried out on a project-by-project basis, with few large-scale archival research projects taking place. An archival search of both local and national archives for general information about the Hanford area located some primary documentation and early photographs of the area. Materials from early archaeological reconnaissance work at the Hanford Site curated by the Smithsonian Institution were also investigated. The archives and repositories visited for this project included:

- Yakima Valley Regional Library, Yakima, WA
- East Benton County Historical Museum, Kennewick, WA
- Franklin County Historical Museum, Pasco, WA
- U.S. Department of Energy, Richland Operations Files, Richland, WA
- Bureau of Indian Affairs, Portland, OR
- McWhorter Collection, Manuscripts, Archives, and Special Collections, Holland Library, Washington State University, Pullman, WA
- National Archives, Pacific Northwest Region, Seattle, WA
- H. Dean Guie Collection, Manuscripts and Archives Department, Oregon Historical Society, Portland, OR
- North Central Washington Museum, Wenatchee, WA
- Rocky Reach Dam Visitor Center and Museum, Chelan County Public Utility District, Wenatchee, WA
- Wanapum Dam Visitor Center, Grant County Public Utility District, Beverly, WA
- Columbia Gorge Discovery Center/Wasco County Museum, The Dalles, OR
- Mid-Columbia Archaeological Society Collection, Benton City, WA
- Francis Riddell Collection, Phoebe Apperson Hearst Museum of Anthropology, University of California-Berkeley, CA

- Herbert Krieger Collection, Department of Anthropology, National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Additional local/regional museums and archives that may curate materials relevant to the history and prehistory of the Hanford Site include:

- Benton County Historical Museum, Prosser, WA
- Washington State Railroads Historical Society and Museum, Pasco, WA
- Grant County Historical Museum and Village, Othello, WA
- Central Washington Agricultural Museum, Ellensburg, WA
- Columbia River Exhibition of History, Science and Technology, Richland, WA
- Washington State Genealogical Resource Guide - Benton County, Richland, WA
- National Archives and Records Administration - Pacific Alaska Region, Seattle, WA
- Washington State Archives - Central Regional Branch, Ellensburg, WA.

### **3.4.2.2 Ethnographic Fieldwork**

Along with archaeological surveys and historic building walkthroughs, ethnographic and oral history interviewing is one of the many ways that DOE complies with federal historic preservation requirements. The oral history and ethnography effort began in FY 2000 when an ethnographer was hired to formalize the program and ensure DOE's compliance with recent human subjects regulations and existing historic preservation requirements. To document and record the rich cultural landscapes that comprise the Hanford Site, oral history research projects have focused on the collection of interview data from people who have contributed to each of the Hanford Site's three cultural landscapes (Native American, Early Settlers, and Manhattan Project/Cold War). The information provided by oral history and ethnographic interviews has contributed greatly to the understanding of cultural resources located on the Hanford Site. As a method, oral history can guarantee that everyone's past is included and preserved as part of the Hanford story. The DOE uses the information to protect cultural resources and educate the public about the history of the Hanford Site.

The program has three types of interview data situations:

1. Past interviews conducted by the program between 1987-1999 without consent and/or release forms.
2. Interviews conducted by the program since FY 2000 with informed consent forms that were conducted for the purposes of historical documentation. These most likely do not contain sensitive information, and interviewees would probably like to release them to the program archives for researcher access.
3. Interviews conducted since FY 2000 containing sensitive information. These have informed consent forms that authorize specific uses of the information. The interviewees do not want these tapes to be released.

Most oral history interviews conducted before 2000 were completed without signed informed consent forms. The program currently maintains an inventory of 13 of those interviews.

Since FY 2000, the program has initiated four research projects for oral history collection, all of which have been reviewed by PNNL's Institutional Review Board. Eighteen interviews have been completed, and informed consent forms have been obtained and signed for each interview.

Concentrated efforts have been made to interview former residents of the Priest Rapids Valley to document their memories and experiences of living on farmsteads and the towns of White Bluffs and Hanford between 1920 and 1943. Since most of these individuals are over the age of 70, they represent a finite resource, their contributions make up 75 percent of the oral history inventory. Some of this information, in a limited form, has been made available to the public, as it was used in an exhibit at the East Benton County Historical Museum for Washington State's Archaeology Month in October 2001. The program is currently obtaining release forms from these individuals so that more information collected by these interviews can be made available to researchers and the interested public. Appropriate storage and access procedures have been developed to make this information available. The program will continue to conduct interviews with descendants of the Priest Rapids Valley to document cultural resources that contribute to the Early Settlers cultural landscape.

Preliminary efforts were made in FY 2001 to begin documenting the untold story of African Americans' contributions to making and operating Hanford's reactors and associated facilities. To date, one interview has been completed. This information was used in a DOE-sponsored exhibit for Black History Month. The program is currently obtaining release forms from these individuals so more of the information collected by these interviews can be made available to researchers and the interested public. For those who worked at the Hanford Site before 1950, because of their age, their knowledge remains a diminishing resource. The program will continue to conduct interviews with individuals associated with the making of the Hanford Site to document cultural resources that contribute to the Manhattan Project/Cold War landscape.

Three ethnographic interviews have been conducted to document TCPs' importance to the Wanapum people. As these resources and the knowledge associated with them are very sensitive, interviewees have requested that the information collected by these interviews be kept confidential. With the interviewees' permission, however, some information is being used to nominate an ethnographic fishing site to the National Register. As a public document, the information contained in the nomination report will not be kept confidential. The program will continue to conduct ethnographic interviews with the tribes associated with the history of the Hanford Site to document cultural resources that contribute to the Native American cultural landscape. Procedures are in place so the interviews of a sensitive nature can be kept confidential.

### **3.4.2.3 Structure and Facility Surveys**

DOE identified a National Register-eligible Hanford Site Manhattan Project and Cold War Era Historic District in 1996 that serves to organize and delineate the evaluation and mitigation of Hanford's plutonium production built environment. Standards for evaluating and mitigating the built environment were established in accordance with National Register criteria, as well as historic contexts and themes associated with nuclear technology for national defense and non-military purposes, energy production, and human health and environmental protection. A programmatic agreement that addresses management of the built environment (buildings and structures) constructed during the Manhattan Project and Cold

War periods was completed by DOE, the Advisory Council on Historic Preservation, and the Washington State Historic Preservation Officer in 1996 (DOE 1996a).

Establishment of the Hanford Site Manhattan Project and Cold War Era Historic District resulted in the selection of 190 buildings, structures, and complexes eligible for listing in the National Register as contributing properties within the historic district recommended for individual documentation. Certain property types, such as mobile trailers, modular buildings, storage tanks, towers, wells and structures with minimal or no visible surface manifestations, were exempt from the identification and evaluation requirements. Approximately 900 buildings and structures were identified as either contributing properties with no individual documentation requirement (not selected for mitigation) or as non-contributing and exempt properties, and will be documented in a DOE-maintained database (Marceau 1998; Neitzel et al. 2002). The role the Hanford Site played in Manhattan Project and Cold War history has been chronicled in *The History of the Plutonium Production Failures at the Hanford Site Historic District 1943-1990* (DOE 2002).

All these historic properties recommended for individual documentation have been documented according to standards identified in the Site-wide treatment plan. Six historic properties, including B Reactor, have been documented at the Historic American Engineering Record level, 46 have been documented with ExHPIFs, while standard Historic Property Inventory Forms have been prepared for the remaining 138 buildings and structures (Neitzel et al. 2002).

Walkthroughs to identify Manhattan Project/Cold War era artifacts that may have interpretive or educational value have already taken place in a large number of the contributing properties. Those artifacts that had to be removed from the historic properties were transferred into the custody of the Columbia River Exhibition of History, Science and Technology museum for curation (Poston et al. 2002).

Other ongoing recording and preservation projects include the stabilization of the East White Bluffs log cabin, planned rehabilitation of the White Bluffs Bank building, and preservation of B Reactor and associated artifacts. Stabilization of the high school at the Hanford townsite, Bruggemann's Warehouse, and the Coyote Rapids Pumping Plant is also being considered. The structural condition of these buildings was assessed in 2000-2001, and existing conditions, interim actions, conservation needs, and immediate stabilization requirements are detailed in the *Hanford Site Environmental Report for Calendar Year 2001* (Poston et al. 2002).

#### **3.4.2.4 Structure and Facility Survey Status**

While these surveys were effective in identifying which structures and buildings were eligible or contributing to the Manhattan Project/Cold War Era Historic District, additional work is needed to complete the walkthroughs and assessments of the contents of the Sites historic properties. In addition to preservation of the industrial artifacts, further collection of documents, photos, drawings, maps, and objects related to the Manhattan Project/Cold War era landscape needs to take place (Marceau 1998). This type of information is important for research and other public interpretation efforts. Collection of oral histories from Hanford workers will also enrich the information that has already been collected about Hanford's history (DOE-RL 2002).

Recommendations for further work include retention in place of selected buildings and adaptive use of others. Specific buildings and structures representative of fuel manufacturing, reactor operations, chemical separation, and plutonium finishing activities at Hanford during the Manhattan Project/Cold War are identified for preservation in place and for use as heritage facilities.

### 3.4.2.5 Archaeological Surveys

The first archaeological surveys in the Hanford areas occurred in the 1920s (Krieger 1928) and 1940s (Drucker 1948). The first large-scale reconnaissance on Hanford was conducted in 1968 in response to proposed construction of the Ben Franklin Dam. During reconnaissance, 105 prehistoric sites were documented within the proposed pool reservoir (to the 122-meter [400-foot] contour line) along the Columbia River from Wooded Island to Priest Rapids Dam (Rice 1968a). The first reconnaissance survey to document historical and ethnohistorical archaeological sites in addition to prehistoric sites was also undertaken in 1968 (Rice 1968b). During this reconnaissance, Rice inspected portions of Gable Mountain, Gable Butte, Snively Canyon, Rattlesnake Mountain, and Rattlesnake Springs (Rice 1968b). Although only selected portions of the Hanford Site (outside of fenced security areas) were investigated during these projects, the latter effectively confirmed the presence of archaeological sites well away from the Columbia River. Much of this early archaeological survey and reconnaissance activity concentrated on islands and on a strip of land ~400 meters (1,312 feet) wide on either side of the river (Rice 1980a).

From 1970 through 1979, various agencies commissioned archaeological assessments on the Hanford Site; most involved field survey and a few included minor test excavations. Small-scale surveys (Jackson and Hartmann 1977; Smith et al. 1977), reconnaissances (Rice 1972; Rice et al. 1978), and test excavations (Rice 1973, 1976) were conducted during this period (Rice 1980c; Rice and Chavez 1980; Rice 1987a). These efforts resulted in the documentation of new archaeological sites (Rice 1972; Jackson and Hartmann 1977; Smith et al. 1977) and provided evidence of continuous prehistoric use along the banks of the Columbia River (Rice 1973). Two overviews produced in the 1980s, a document produced for the Washington Public Power Supply System (Rice 1983), and a compendium map of cultural resource surveys conducted through 1987 (Rice 1987b) provided comprehensive synopses of known archaeological sites, excavations, and surveyed areas completed during the 1980s (Rice 1980c; Rice and Chavez 1980; Rice 1983).

Numerous archaeological surveys were conducted during the early 1980s as DOE's major contractors and other companies and agencies commissioned their own archaeological investigations in response to an expanding pace of construction. Rice inspected additional portions of Gable Mountain and part of Gable Butte in the late 1980s (Rice 1987a). Other examples are reconnaissance of the Basalt Waste Isolation Project Reference Repository Location (Rice 1984), a proposed land exchange in T. 22 N., R. 27 E., Section 33 (Rice 1981), three narrow transportation and utility corridors (ERTEC 1981, 1982; Smith et al. 1977), and miscellaneous others (Rice 1983, 1985, 1987a, 1987b; Thoms et al. 1983). In spite of these efforts, many construction activity areas were not surveyed for cultural resources, and most construction excavation went unmonitored during this time period (Rice 1987b).

DOE established a cultural resource compliance program in 1987 to consolidate and standardize cultural resource management for all Hanford activities (Rice 1987b). With the formation of the HCRL in 1987, cultural resource compliance reviews of Hanford undertakings became a standard procedure (Chatters

1989; Chatters et al. 1990; Chatters et al. 1991; Chatters and Gard 1992; Chatters et al. 1993; Last et al. 1994). These reviews, conducted to ensure compliance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, and other cultural resource-related legislation, resulted in many archaeological surveys. Hanford also initiated a random survey strategy that resulted in small plots being surveyed across the Site (Chatters 1989). The random survey concept was abandoned in 1992.

Large-scale survey areas have been completed in recent years, including in the 100 Areas from 1991 through 1993 (Chatters et al. 1992; Wright 1993), McGee Ranch (Gard and Poet 1992), the Laser Interferometer Gravitational Wave Observatory Project (O'Neil and Crist 1993), the Environmental Restoration Disposal Facility (Cadoret 1993), the 1995 Washington State University Archaeological Block Survey of the Hanford 600 Area (Andrefsky et al. 1996), the 100-KR-4 Pump-and-Treat Project Area Survey (Woodruff and Marceau 1996), the archaeological survey of 56 pre-selected parcels on the Arid Lands Ecology Reserve (Sharpe 1999), and the Section 110 Vernita Survey (Hale and McClintock 1998). More recent surveys include the Gable Mountain Block Survey in 2000, the Gable Butte Block Survey in 2001, the FY 2001 Fire Assessment Survey, and the FY 2001 Low-Water Survey (Eschbach et al. 2002). A comprehensive list of completed cultural resources surveys and survey acreage is available in Neitzel et al. (2002).

In recent years, surveys have involved the cultural resource staff from the Confederated Tribes of the Umatilla Indian Reservation, the Wanapum Band, the Yakama Nation, and the Nez Perce Tribe. In some cases, tribal members are participants, while in others, such as the Gable Mountain sacred site survey (Hale 2000), the survey has been designed and staffed primarily by tribal members. In recent years, the Confederated Tribes of the Umatilla Indian Reservation have been conducting archaeological surveys. Information will be provided to DOE-RL for incorporation into the Site databases.

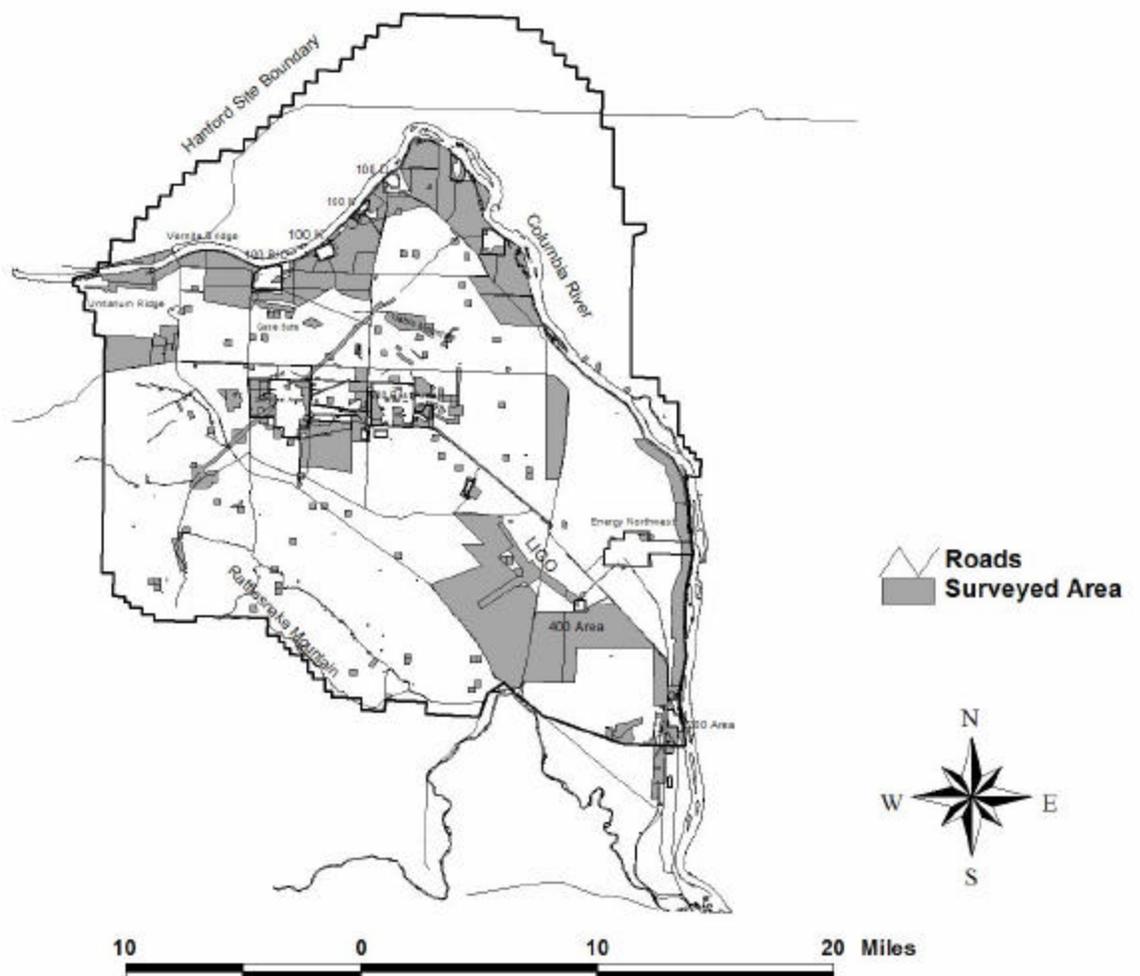
#### **3.4.2.6 Archaeological Survey Status**

To date, approximately 22% of the Hanford Site has been surveyed for archaeological resources (Figure 4). However, because much of the surveyed areas have been conducted in areas with high site densities, it is believed that a larger proportion of the existing sites have been located.

#### **Current State of Surveyed Areas on the Hanford Site**

Surveyed areas lie within a large tract of land that has been divided into three zones: the USFWS-managed areas of the Wahluke Slope and Arid Lands Ecology Reserve, the Central Plateau, and the Columbia River corridor.

Although these areas of the Hanford Site have been surveyed, standards of site recording have changed since 1987 when the program started. Early on, site forms consisted of one or two pages of brief site and artifact descriptions. Few photographs of the sites were taken. Global positioning system technology was not used to determine accurate site location coordinates before 1995. However, from 1996 to 2000, site recording standards improved with the addition of photo and video points, more detailed site and artifact descriptions, global positioning system technology, and global positioning system mapping technology.



**FIGURE 4** Areas Surveyed for Cultural Resources on the Hanford Site as of 2002

Few archaeological sites and no oral histories/ethnographic interviews have been recorded for the Early Prehistoric landscape on the Hanford Site. Bechtel Hanford, Inc. has recently initiated archaeological research into this time period by identifying ancient waterways.<sup>4</sup> The Late Prehistoric/Ethnographic landscape is better known in the number of archaeological sites recorded, but it still lacks adequate oral history/ethnographic documentation.

The pre-1943 Early Settler/Farming landscape has much available historic documentation, but systematic retrieval and organization of that information has not been attempted on a large scale. Many archaeological sites within the landscape have been recorded, but generally not to the standard necessary for doing any analysis of the landscape. Several portions of the farming landscape remain to be inventoried.

<sup>4</sup> Source: Personal communication with Tom Marceau.

The Manhattan Project/Cold War landscape is the best documented of all the landscapes. A Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan was written in 1998 to identify properties that contribute to the historic district and determine which of them require individual documentation or mitigation (Marceau 1998). Currently, all the contributing properties of the Hanford Site Manhattan Project and Cold War Era Historic District have been adequately documented. Oral histories will provide more documentation for the Manhattan Project/Cold War landscape, and many photographs remain to be cataloged.

### **Strategies for Completing Surveys**

Three types of surveys for completing an inventory of cultural resources on the Hanford Site are performed. These include archaeological surveys, surveys for TCPs, and oral history/ethnographic interviews. Surveys may be conducted using one of four suggested methods: project-driven surveys, block surveys of areas with the highest site probability, block surveys of areas with sites at high risk, and random sample surveys.

Because the cultural landscapes mentioned are represented in the archaeological record by differing patterns, the survey strategy employed must be tailored to each landscape. For example, the pre-1943 Early Settler/Farming landscape may be better inventoried by use of a block survey aimed at areas with sites that are at high risk for impacts such as fire damage. Another example may be using a block survey in areas with high potential for archaeological sites as a strategy for inventory of cultural resources in the Native American landscape. In the Central Plateau, continuation of the 1987 random plot survey strategy may be a good way of sampling an already well-surveyed portion of the Hanford Site.

Section 110 requires inventory of cultural resources on federal lands. Cultural resources not only include archaeological remains, but also TCPs and oral histories. TCP surveys are just beginning on the Hanford Site. The Gable Mountain Survey in 2000 began a step in that direction. With tribal and DOE cooperation, an inventory of Hanford Site TCPs remains to be completed.

### **Proposed 10-Year Survey Plan**

The following surveys are proposed over the next 10 years:

- Random plot surveys in the Central Plateau.
- Block surveys in areas with high potential for Late Prehistoric/Ethnographic sites where consideration is given to Special Protection Management Units that have not been fully surveyed (see *FY 2001 Hanford Cultural Resources Project Annual Report* [Eschbach et al. 2002]). Block surveys of known farmstead areas in the river corridor should be conducted.
- Geomorphological research on the ancient waterways and associated early archaeological sites.
- One TCP each year. The DOE-RL should continue to work with the tribal elders to identify other TCPs.

As the Hanford Site undergoes changes in the next 10 years, the cultural resources survey strategy will need to be flexible to be as productive as possible with available funding. The DOE-RL must coordinate cultural resources surveys with its proposed initiatives to 1) restore the Columbia River corridor, 2) complete the transition of the Central Plateau, and 3) prepare for the future. The cultural landscapes that lie on the Hanford Site require different survey strategies to fully inventory each area.

### **3.4.3 Excavation**

Few archaeological excavations have been conducted at Hanford over the years.

#### **3.4.3.1 Test Excavations**

The only documented archaeological collection before the 1970s was the Smithsonian Institution's excavations at a cemetery in the Wahluke area. In 1926 and 1927, Krieger had surveyed the middle Columbia River valley from the mouth of the Yakima River to the Canadian border. He tested eight sites, including one at Wahluke (45GR306). Krieger did not identify the location of his test pits at Wahluke, although selected cultural items from his excavation were described and photographed (Krieger 1927, 1928).

Site testing and/or site excavation was initiated during the 1970s to evaluate National Register eligibility and salvage archaeological sites that would be lost during construction. The significance of Rice's (1973) excavations at 45BN179 and 45BN180 is readily apparent. Work at these sites resulted in the first excavation report to connect site stratigraphy, diagnostic tools, and radiocarbon dating with cultural chronologies for the greater Mid-Columbia region. Information taken from oral history, artifacts, and stratigraphy were also combined to establish a pattern of continuous use from approximately 6500 years B.P. to the Wanapum who used the area as a dog-salmon fishing site during the spring and summer seasons of the post-contact period (Relander 1956; Rice 1973). Rice's recognition of ties between prehistoric use and historic use by the Wanapum continued to be a factor in his subsequent work on the Hanford Site (Rice 1973).

During the 1970s, Rice directed Mid-Columbia Archaeological Society excavations (Table 7) and conducted test excavations at a historic log structure (45FR266) on the east bank of the Columbia River at the White Bluffs ferry landing (Rice 1976). Although the bulk of his findings at the latter were historic in nature, his excavation confirmed an earlier prehistoric presence at this important river crossing.

Following creation of the Hanford Cultural and Historic Resources Program in 1987, staff conducted various test excavations at eight archaeological sites, generally to evaluate their eligibility for listing on the National Register. All of these excavations took place between 1987 and 1994. The majority of these excavations were focused on pre-contact Native American sites located adjacent to the Columbia River (45BN163, 45BN432/433, 45GR306, 45BN446, 45BN90, 45BN423); only two pre-contact sites from the interior of the Hanford Site have been subject to subsurface examination (45BN447/362, 45BN412). The following is a brief summary and status of each tested site.

**TABLE 7** Test Excavations Conducted on the Hanford Site

<b>Property Name</b>	<b>Excavation Conducted By</b>
45BN090	Western Washington University
45BN143	Hanford Cultural Resources Laboratory
45BN149	Mid-Columbia Archaeological Society
45BN150	Bechtel Hanford, Inc.
45BN157A	Mid Columbia Archaeological Society University of Idaho Columbia Basin College
45BN163	Hanford Cultural Resources Laboratory
45BN179	University of Idaho
45BN180	University of Idaho
45BN157A	Mid Columbia Archaeological Society
45BN307	ERTEC, Northwest Inc.
45BN423	Hanford Cultural Resources Laboratory
45BN412	Hanford Cultural Resources Laboratory Western Washington University
45BN431/432	Bechtel Hanford, Inc.
45BN432	Hanford Cultural Resources Laboratory
45BN433	Hanford Cultural Resources Laboratory
45BN446	Hanford Cultural Resources Laboratory
45BN447/362	Hanford Cultural Resources Laboratory
45BN606	Bechtel Hanford, Inc.
45BN888	Bechtel Hanford, Inc.
45FR266h	University of Idaho
45GR302A	Mid-Columbia Archaeological Society
45GR306	Smithsonian Institute Central Washington University Hanford Cultural Resources Laboratory
45GR306B	Mid-Columbia Archaeological Society
45GR317	Mid-Columbia Archaeological Society
45GR318	Mid-Columbia Archaeological Society

- 45BN90 – This is an open campsite, located on the south bank of the Columbia River near Vernita Bridge. Subsurface testing was conducted June through July 1990 in a collaborative effort between Western Washington University and the program. A total of 6,645 artifacts were recovered, of which 93 percent is lithic debris. To date, these excavations have not been formally reported, and National Register status of the site remains unevaluated.
- 45BN163 – This is a possible housepit site, located on the west bank of the Columbia River near the northern end of the 300 Area. Subsurface testing was conducted by the program in 1988, 1992, and 1993. A total of 619 artifacts were recovered, including both historic and pre-contact materials. A formal report on the subsurface testing has not been completed. The site is included in the Hanford South Archaeological District, and on the Washington State Register as of August 26, 1983.

- 45BN423 – This is an open campsite located on the south bank of the Columbia River immediately north of the K Reactor complex. Subsurface testing was conducted by the program in July-September 1992, in conjunction with the 100 Area Operable Unit CERCLA characterization study. A total of 6,273 artifacts were recovered, the majority of which were bone fragments and lithic debris. Based on diagnostic artifacts (projectile points), the site dates to at least 1500 B.P., and possibly as old as 4500 B.P. The site has been determined eligible for the National Register by SHPO on May 17, 1994.
- 45BN412 (Tsulim Bison Kill Site) – This site is located in an active sand dune on the east side of Route 2 South, approximately 2 kilometers (1.2 miles) west of the Columbia River. Subsurface testing was conducted in 1990 in a collaborative effort by the program and a Western Washington University archaeological field school. Approximately 7,516 artifacts were recovered, the majority of which were fragments of bison tooth enamel. Radiocarbon dating places the age of this site at  $2100 \pm 90$  B.P. A full report of the site, and a possible scenario of the events which took place there, was compiled by Chatters et al. (1995). The National Register status of the site remains unevaluated.
- 45BN432/433 – This is an open campsite located on a Columbia River terrace overlooking the Columbia River in the 100F Area. Subsurface testing was conducted by the program in July-September 1992, in conjunction with the 100 Area Operable Unit CERCLA characterization study. A total of 892 artifacts were recovered, the majority of which were bone fragments and lithic debris. A formal analysis of the tool and lithic debris was conducted by Gard; however, the test excavations were never documented. The National Register status of the site(s) remains unevaluated.
- 45BN446 – This is an open campsite located on a sloping Columbia River terrace near B Reactor. Subsurface testing was conducted by the program in 1993 and 1994 in conjunction with the 100 Area Operable Unit CERCLA characterization study. A total of 644 artifacts were recovered, the majority of which were bone fragments and lithic debris. Stratigraphic profiles and descriptions of sediment columns have been completed, although a formal analysis of the test excavation and artifact analysis has not been completed. The site has been determined eligible for the National Register by SHPO on May 17, 1994.
- 45BN447/362 – This site is located within an interior valley in the central portion of Gable Butte. Because of their close proximity, sites 45BN447 and 45BN362 were joined into a continuous unit in 2001. The site is recorded as an historic Wanapum and Yakama vision quest area, and the area considered a TCP. Subsurface testing was conducted by the program in 1993 at 45BN447. A total of 1,350 artifacts were recovered, the majority of which were bone fragments. Charcoal samples yielded radiocarbon dates of  $330 \pm 30$  B.P. and  $270 \pm 40$  B.P. Site 45BN362 has been determined eligible for the National Register by SHPO on February 12, 1990, is included in the Gable Mountain Cultural District, and is listed on the State Register as of November 15, 1974. There has been no formal analysis of 45BN447 excavations thus far, aside from the aforementioned radiocarbon analysis.
- 45GR306 – This is a large campsite located on the north bank of the Columbia River between Wahluke and the White Bluffs. Subsurface testing was conducted in 1989 as a collaborative

effort between the program and Central Washington University, the findings of which were reported by Chatters and Hackenberger (1989). Approximately 5,059 total artifacts were recovered. Chatters notes that although extensive looting has taken place at this site, intact cultural deposits are still present, extending ~1 meter (3 feet) below surface. Artifact analysis (projectile points) indicates the site dates to the Cayuse Phase (2500-250 B.P.) of Columbia Plateau pre-contact history. Subsurface testing was also conducted at this site by Krieger (1927, 1928), and as noted by Chatters (1989), possibly by Rice and the Mid-Columbia Archaeological Society. This site is included as a part of the National Register Wahluke Archaeological District, and is listed on the Washington State Register as of May 23, 1975.

Recently, ongoing environmental restoration actions necessitated measures (in the form of data recovery) at four archaeological sites located within the Area of Potential Effect for cleanup projects on the Hanford Site. The sites and associated projects were: 45-BN-150, Construction of the 100-KR-4 Pump and Treat Well Field (Sharpe and Marceau 2001); 45-BN-606, Remediation of liquid waste site 116-F-1, the Lewis Canal; 45-BN-888, Expansion of the 100-D In Situ REDOX Manipulation Well Field; and 45-BN-432/431, Remediation of Liquid Waste Site UPR-100-F-2. The purpose of each excavation was to preserve the information content of the effected site areas. These are explained in greater detail below:

45BN150 – This is an open camp located on a moderate terrace on the south bank of the Columbia River northeast of the 100-K Area. Test excavations were conducted by the ERC in July 1996. Materials noted during excavation included lithic debitage, mussel shell fragments, seeds, fragmented subsistence bone, rodent bone, fire-cracked rock. A single, small Columbia Side-Notched point was the only diagnostic tool observed, indicating at least one occupation during the Cayuse Phase from 2,500 to 250 B.P. No collections were made. All items were identified and described as excavation proceeded. While some charcoal was observed, none was of sufficient size or concentration to collect for radiocarbon dating (DOE 1997a). This site is a contributing property within the Ryegrass Archaeological District.

- 45BN606 – This is an open campsite located on the upper of two terraces that descend gradually to the Columbia River west of the 100-F Area. Data recovery excavations were conducted by the ERC in February-May 2001. Ten radiocarbon dates documented occupation extending from  $2860 \pm 40$  B.P. (GX-28307-AMS) to  $140 \pm 40$  B.P. (GX-28315-AMS). However, seven of these dates fell between  $2860 \pm 40$  B.P. and  $1990 \pm 40$  B.P. (GX-28309-AMS) suggesting that the site was used primarily during the late Frenchman Springs and Early Cayuse phases. Similarity in chipped stone tools, rough stone tools, and primary production materials was repeatedly demonstrated throughout six cultural components. Complete or identifiable projectile points included Nespelam Bar, Rabbit Island, and Columbia Corner-Notched. Representative tools included bifaces, formed scrapers, drills, bifacial- and unifacial-edged knives, unifacial-edged scrapers, burin/gravers, choppers, hammer stones, rough stone scrapers, and spall scrapers. Subsistence remains included freshwater mussel shell (*Margaritifera falcata*), deer, elk, antelope, and rabbit (which dominated the faunal assemblage). Hearths, refuse pits, and remnant living floors (composed of rocks, cobbles, and/or small boulders) were present, although no pit houses or other habitation structures were evident. This site was interpreted as a series of short-term, seasonal (i.e., spring through early summer) camps primarily devoted to small game and mussel shell procurement (Sharpe and Marceau 2002a). This site was determined eligible for listing in the National Register on December 4, 2002.

- 45BN888 – This is an open campsite situated on a high, steep-angled terrace on the south bank of the Columbia River south of the 100-D Area. Data recovery excavations were conducted by the ERC in April-May 2001. Seven radiocarbon dates extending from  $5880 \pm 70$  B.P. (GX-28428) to  $1450 \pm 40$  B.P. (GX-28425-AMS) documented intermittent occupation during the Cascade/Vantage, Frenchman Springs, and Early Cayuse phases. Similarity in chipped stone tools, rough stone tools, and primary production materials carried over across three cultural components. A complete post-Cascade Leaf-Shaped projectile point was noted within the lithic assemblage. Representative tools included bifaces, unifacial-edged knives, unifacial-edged scrapers, choppers, a hammer stone, rough stone scrapers, and spall scrapers. Subsistence remains included freshwater mussel shell (*Margaritifera falcata*), medium to large mammals such as deer and elk (which dominated the faunal assemblage), and rabbits. A large shell midden was the most prominent feature together with a remnant living floor (composed of rocks and cobbles). No pit houses or other habitation structures were evident. Occupations at this site were interpreted as short-term, seasonal (i.e., spring through early summer) encampments primarily devoted to medium to large game and mussel shell procurement (Sharpe and Marceau 2002a). As a post-review discovery, this site was determined eligible for listing in the National Register on January 31, 2001.
- 45BN432/431 – This is an open campsite situated on a steeply-sloped terrace on the south bank of the Columbia River northeast of the 100-F Area. Test excavations were conducted by the ERC in October-November 2001. Four radiocarbon dates provided a range of occupation extending from  $8860 \pm 80$  B.P. (GX-29272) to  $270 \pm 50$  B.P. (GX-29273), however, three of the four dates clustered within the Late Cayuse Phase between 660 and 220 B.P. indicating a relatively recent occupation. The assemblage was composed primarily of freshwater mussel shell (*Margaritifera falcata*), highly fragmented mammal bones, chipped stone and cobble tools, and debitage dominated by chert. Representative tools included fractured projectile points (not classifiable), bifaces, uniface-edged knives, uniface-edged scrapers, choppers, rough stone scrapers, and spall scrapers. Medium to large game animals, including bighorn sheep, accounted for the majority of the faunal remains recovered within the tested area. Small mammals, particularly rabbits, accounted for nearly another quarter of the total recovered, with fish providing an additional ten percent. Distributional analyses of these materials indicated that the site area sampled was multicomponent, with at least four occupations. The site area lacked habitation features (i.e., house pits) and appeared to be an open-air, seasonal camp devoted primarily to shellfish, fish, mammal, and plant procurement and processing (Sharpe and Marceau 2002b). As a post-review discovery, this site was determined eligible for listing the National Register on April 27, 2001.

In addition to excavations, subsurface deposits have been observed during long-term protection monitoring and construction monitoring. Numerous features, for example, have been identified in the Locke Island Archaeological District (Nickens 1998).

### 3.4.3.2 Large-Scale Excavations

Excavation has been limited to test excavations (see Section 3.4.3.1).

### 3.4.3.3 Excavation Status

There are no plans to conduct additional excavations at Hanford.

### 3.4.4 Structure and Facility Management

The designation of the Manhattan Project and Cold War era facilities at the Hanford Site as a historic district came about through a programmatic agreement between DOE and SHPO. In the early 1990s, it became apparent that the plutonium production complex at Hanford would be deactivated, decommissioned, and demolished in the coming decades. Management of the Manhattan Project and Cold War buildings as cultural resources began around 1990, and various mitigation efforts had taken place in response to specific building demolition. Based on these experiences, the cost and potential delays became a grave concern to DOE-RL. Following a review of existing management practices, DOE-RL initiated a new strategy that moved from project-by-project, building-by-building considerations to the development of a streamlined framework to direct the management of all Manhattan Project and Cold War era properties at Hanford and expedite preservation efforts while ensuring cleanup activities would not be delayed.

To formalize this framework, DOE-RL, SHPO, and the Advisory Council on Historic Preservation signed a programmatic agreement in 1996 that modified compliance with Sections 106 and 110 of the National Historic Preservation Act with respect to historic buildings on the Hanford Site (DOE 1996a). In deliberations leading to the programmatic agreement, DOE and SHPO first determined that the Hanford Site was a designed industrial landscape, whose buildings, grouped by function within designated geographic complexes, were united historically and thematically by the production of plutonium for national defense. Given this finding, DOE and SHPO agreed that the Hanford Site met the requirements for a historic district, as defined by the National Park Service, because it possessed a “significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically... by plan or physical development” (NPS 1991). By identifying the Hanford Site Manhattan Project and Cold War Era Historic District in the programmatic agreement, DOE and SHPO were able to replace documenting and mitigating each building at the Hanford Site with a systematic treatment of representative structures at the Hanford Site.

Key to this strategy was the development of property types and the identification of those buildings that best represented each type. The DOE selected the primary functions of fuel manufacturing, reactor operations, chemical separations, and plutonium finishing as well as the support functions of waste management, research and development, site security, military operations, health and safety, and infrastructure as categories in which the buildings would be classified. Using this classification matrix, DOE assigned 1,100 buildings to specific property types and evaluated each building for its eligibility for listing in the National Register as a contributing or non-contributing property within the historic district. Of the 527 buildings determined to be contributing properties, DOE and SHPO ultimately selected 190 (initially 187) properties for individual documentation using Historic American Engineering Records, ExHPIFs, or standard Historic Property Inventory Forms. These key properties collectively represented the events and activities that took place on the Hanford Site from 1943 to 1990. The *Hanford Site*

*Manhattan Project and Cold War Era Historic District Treatment Plan* (Marceau 1998) illustrates the original classification matrix of 1,100 buildings and the properties recommended for individual documentation and mitigation.

The DOE's current mission of environmental restoration, which includes the demolition of surplus properties, will have an adverse effect on the historic properties that the Hanford Site Manhattan Project and Cold War Era Historic District comprises. However, SHPO agreed that recording key events that occurred at the Hanford Site from 1943 to 1990 in an historic narrative and documenting each of the 190 representative properties would address the effects of decommissioning and environmental restoration. DOE agreed to write a "synthetic, integrated Hanford Site historic narrative" that would include:

- Contextual information about the different property types and processes associated with them
- Numbers and locations of buildings within property types – see Table A.5 in the *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan* (Marceau 1998)
- Descriptions of changes in technology, design, and use of property types over time
- Photographs, plans, and cross-sections of representative examples of the different property types.

The narrative was further defined in the treatment plan (Marceau 1998), which was written in compliance with Stipulation IV of the programmatic agreement. In scope, the historic narrative would be a "report which will chronicle the history of the Hanford Site, its technology, and the people who worked here" (Marceau 1998).

*The History of the Plutonium Production Facilities at the Hanford Historic District, 1943-1990* (DOE-RL 2002) provides a description of the facilities at the Hanford Site organized by the processes that define their reason for existence, mainly fuel manufacturing, reactor operations, chemical separations, plutonium finishing, and related activities. It complies with the requirements of the National Historic Preservation Act to document those facets of the properties that qualify them for listing in the National Register, and their role in the Manhattan Project and subsequent Cold War. It also corresponds with the intent of the National Register program to recognize physical properties and document their appearance and importance.

While the eventual removal of plutonium production facilities has been mitigated, there is still a desire by many to preserve elements of the complex for onsite interpretation, as mentioned in Chapter 4 of the mitigation document (DOE 2002). Contamination concerns and availability of funds restrict DOE-RL's ability to meet this goal. For example, after many years of planning on making B Reactor, the hallmark of Hanford history, a museum, DOE-RL has recently announced it will no longer pursue that option. It will consider that option if an organization with funding steps forward, however. Despite the decision concerning B Reactor, DOE-RL is evaluating other options concerning onsite interpretation of Hanford's plutonium production history.

### 3.4.5 Laboratory Treatment

The status of excavations conducted at Hanford was recently summarized by Noonan (2002). In reviewing the collections and associated records and reports, a grading scale was developed to indicate the urgency in conducting further research into specific archaeological collections; each site or isolates' grade was indicated in the last portion of the data sheet, "Recommendation & Grade." The scale is ordinal, from 1 – indicating a high research priority, to 5 – no further research needed. The grade for each collection was based on the following criteria:

1. Size of collection (over 100 artifacts is considered a priority for further research)
2. Types of artifacts contained within the collection (i.e., diagnostic, rare, etc.)
3. Lack of published data (internal or external) on excavation or surface collection
4. National or State Register status of the archaeological site (eligible, not eligible, not evaluated).

The number of collections (47,897 artifacts representing 75 sites) assigned to each grade is shown below

- Grade 1 = 16 sites (46,459 artifacts)
- Grade 2 = 5 sites (279 artifacts)
- Grade 3 = 11 sites (310 artifacts)
- Grade 4 = 14 sites (105 artifacts)
- Grade 5 = 29 sites (744 artifacts).

One byproduct of the excavations and monitoring efforts has been the collection of radiocarbon samples. Dates collected by the program staff are identified in Table 8; more recent dates from other contractors will be published in the near future. All dates are graphically depicted in Figure 5. The dates are currently being analyzed and the results will be published separately.

### 3.4.6 Curation

The Hanford Cultural and Historic Resources Program manages two broad classes of artifacts: archaeological collections recovered from archaeological sites through excavation or surface collections and historical collections related to the plutonium production complex and recovered from historic facilities.

#### Archaeological Collections

Before federal acquisition of the Hanford Area in 1943, artifacts and artifact collections were removed from archaeological sites and lands now situated within the administrative boundaries of the Site. Early collectors often considered their activities to be a recreational event. Professional archaeologists began their investigations in what was to become the Hanford Site during the early 1900s (Krieger 1927; Smith 1905). By the 1930s, the Inter-Agency Archaeological Salvage Program, River Basin Survey efforts had generated extensive survey and excavation data (Osborne 1949, 1957; Osborne and Shiner 1950, 1951; Shiner 1951, 1952a, 1952b, 1953, 1961).

**TABLE 8** Radiocarbon Dates from Hanford Archaeological Sites

Measured <sup>14</sup> C Age in Yr BP	Convention <sup>14</sup> C Age in Yr BP	Laboratory No.	Calibration to Calendar Years	Material	Stratigraphic Position	Site Number	Comments
50 ± 50	30 ± 50	Beta-107583	AD 1695 to 1725 and AD 1815 to 1920	Charred Material		Locke Island	801.1.
110 ± 50	110 ± 50	Beta-107580	AD 1670 to 1950	Charred Material		Locke Island	2/26/97 (radiometric-standard process).
130 ± 40	130 ± 40	Beta-95868	AD 1670 to 1950	Charred Material	26 cm below surface.	N/A	Charcoal sample taken from near surface on Island 3. Not a cultural feature (radiometric-standard process).
230 ± 40	230 ± 40	Beta-92477	AD 1640 to 1685 and AD 1740 to 1810 and AD 1930 to 1950	Charcoal	1.65 m below surface.	Locke Island	Sample 5 - Boat Launch taken 0.8 m above cultural layer - did not come from a cultural feature.
230 ± 60	230 ± 60	Beta-92906	AD 1515 to 1585 and AD 1625 to 1825 and AD 1835 to 1880 and AD 1915 to 1950	Charred Material	1.02 m below surface.	Locke Island	Sample #831.2 from Locke Island. Small sample size given extended counting time. Taken from hearth feature.
280 ± 50	240 ± 50	Beta-107589	AD 1520 to 1570 and AD 1630 to 1690 and AD 1735 to 1815 and AD 1925 to 1950	Charred Material		Cutbank	CB10 F1 (AMS process).
290 ± 80		Beta-33039		Charcoal	80-100 cm below unit datum or approximately 90-110 cm below surface; Test Unit 6, Level 8/9.	45GR306B	Charcoal sample, house floor big chunks conifer wood.
310 ± 40		Tx-No. 3331		Charcoal From Hearth	1.3-1.5 m below surface.	45BN257	On surface, Chinese ricebowl fragment; below surface, hearth w/dense concentration of 205 fire blackened/cracked rocks 2.5 x 0.75-0.90 m. Shell, sm mammal bone, 3 flakes & 3 cobble tools. Charcoal sample probably from sagebrush limb sections.
340 ± 50	310 ± 50	Beta-92478	AD 1460 to 1670	Charred Material	0.75 m below surface.	Locke Island	Sample #807 from hearth feature. Two samples taken from this feature one from north end, one from south end.
350 ± 50	310 ± 50	Beta-107582	AD 1460 to 1670	Charred Material		Locke Island	6/26/97 F1 (AMS Process).

**Table 8 (Cont.)**

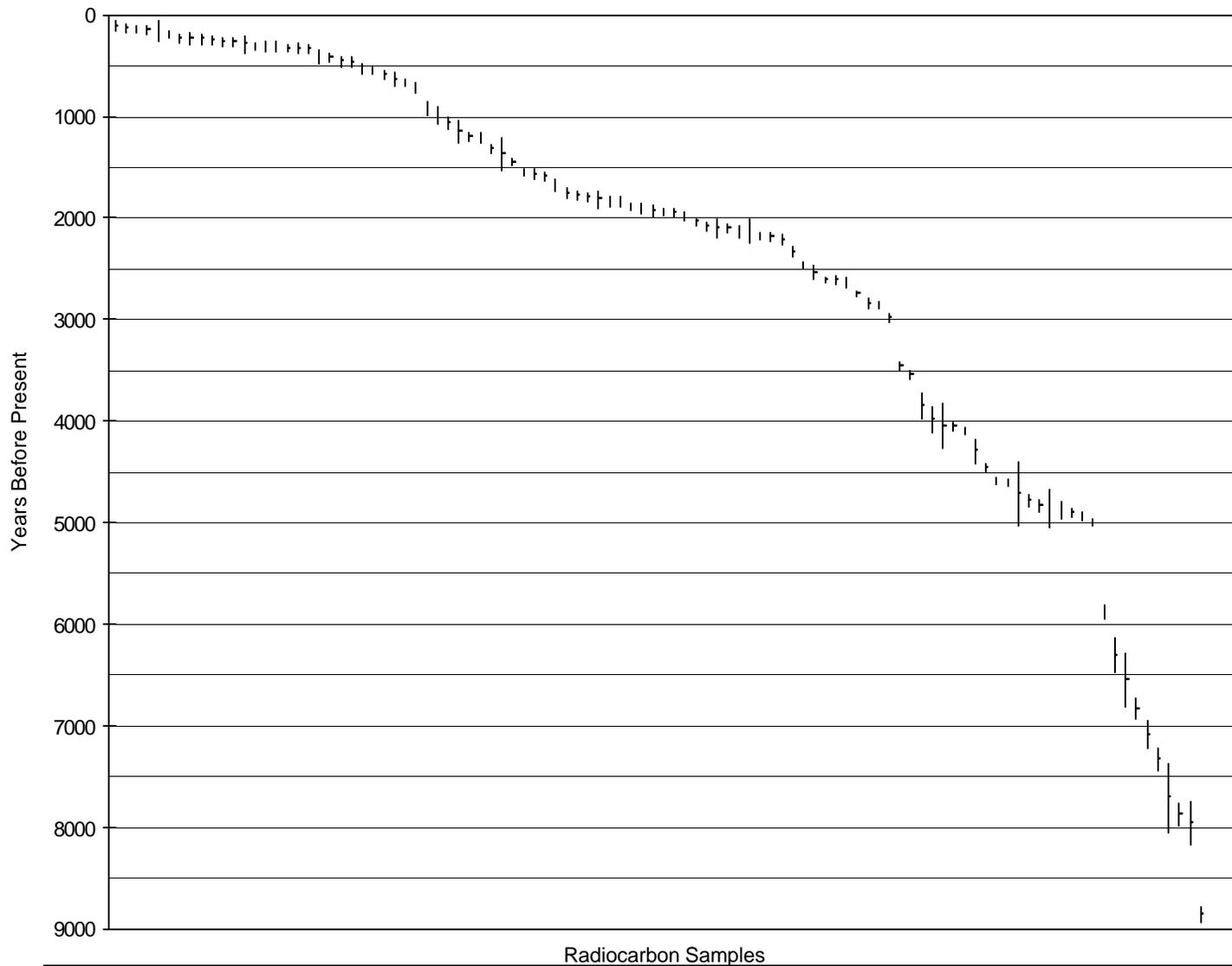
Measured <sup>14</sup> C Age in Yr BP	Convention <sup>14</sup> C Age in Yr BP	Laboratory No.	Calibration to Calendar Years	Material	Stratigraphic Position	Site Number	Comments
370 ± 50	330 ± 50	Beta-107588	BC 1135 to 890	Charred Material		Cutbank	CB8F3 (AMS Process).
460 ± 50	460 ± 50	Beta-112430	AD 1410 to 1505 and AD 1595 to 1620	Charred Material		Cutbank	CB8F1.
440 ± 50	340 ± 40	Beta-112432	AD 1455 to 1655	Charred Material		Cutbank	CB10F2.
510 ± 50	470 ± 50	Beta-107590	AD 1405 to 1495	Organic Sediment		Cutbank	F2 Hearth (AMS Process).
540 ± 50	530 ± 50	Beta-112431	AD 1310 to 1355 and AD 1385 to 1450	Charred Material		Cutbank	CB8F4.
640 ± 70	640 ± 70	Beta-92905	AD 1265 to 1425	Charred Material	0.75 m below surface.	Locke Island	Sample #907 from Locke Island. Small sample given extended counting time. Sample taken from hearth feature. Two samples taken from this feature, one from north end, one from south end.
770 ± 50	720 ± 50	Beta-107591	AD 1235 to 1315 and AD 1345 to 1390	Charred Material		Locke Island	T800 Floor (AMS Process).
990 ± 90		Beta-33036		Charcoal	130-140 cm below unit datum or approximately 135-145 cm below surface; Test Unit 4, Level 14.	45GR306B	Charcoal sample twig/branch, hardwood.
1070 ± 60	1070 ± 60	Beta-107584	AD 875 to 1040	Charred Material		Locke Island	804.3 (AMS Process).
1150 ± 110		Beta-33038		Charcoal	200-210 cm below unit datum or approximately 205-215 cm below surface; Test Unit 4, Level 21.	45GR306B	Charcoal sample, shrubwood, sagebrush.
1370 ± 160		Beta-33035		Charcoal	110-120 cm below unit datum or approximately 115-125 cm below surface; Test Unit 4, Level 12.	45GR306B	Charcoal sample conifer wood.
1570 ± 40	1550 ± 40	Beta-92473	AD 425 to 615	Charcoal	~1.8 m below surface.	Locke Island	Sample 1-806-1 was a composite sample taken from cultural strata IX.

**Table 8 (Cont.)**

Measured <sup>14</sup> C Age in Yr BP	Convention <sup>14</sup> C Age in Yr BP	Laboratory No.	Calibration to Calendar Years	Material	Stratigraphic Position	Site Number	Comments
1590 ± 50	1570 ± 50	Beta-92475	AD 405 to 615	Charcoal	~1.6 m below surface.	Locke Island	Sample 3-806-1 was not taken from a cultural feature.
1690 ± 60	1670 ± 60	Beta-92904	AD 245 to 540	Charcoal	3 m north of 806A line. Located ~95 cm below feature 806.1.	Locke Island	Sample 906A-1 taken from a "feature" 23 cm wide [long] and 10 cm [in] height (AMS Process).
1830 ± 90	1820 ± 90	Beta-21091		Charcoal	Grave fill.	45BN157	Charcoal sample.
1830 ± 90		Beta-44112		Tooth Enamel Carbonate Fraction	Surface.	45BN412	Tooth enamel selected from wind-blown surface deposits in "dune blowout." Beta Analytic provided 2 dates: 1830±90 BP for <sup>14</sup> C and 2100 ± 90BP for <sup>15</sup> C.
1870 ± 50 <sup>1</sup>	1840 ± 50	WSU-1421; dendrocorrected (Rice 1980c:84).		Shell	160-200 cm below surface (estimated from stratigraphic profile); at the base of Cayuse Component [Stratum 3b] (Rice 1973).	45BN179	Exact sample location not specified in field notes or other correspondence currently available for inspection. Approximately 10-20% of outer shell removed by WSU Radiocarbon Dating Laboratory before sample was processed.
1870 ± 50	1840 ± 50	Beta-92474	AD 75 to 330	Charcoal	~1.8 m below surface.	Locke Island	Sample 2-806-1 taken from cultural strata IX.
1900 ± 50	1910 ± 50	Beta-107581	AD 5 to 235	Charred Material		Locke Island	4/29/97 Feature -A.
1940 ± 40	1940 ± 40	Beta-92476	BC 5 to AD 145	Charcoal	2.45 m below surface.	Locke Island	Sample 4-806-1. Sample not taken from a cultural feature.
1960 ± 50	1950 ± 50	Beta 107585	BC 40 to AD 160	Charred Material	4.35 m below surface.	Locke Island	810.1 (AMS Process).
2110 ± 60	2130 ± 60	Beta-92903	BC 365 to AD 5	Charred Material	Toe of cutbank near broken projectile point and long bones encountered 4/4/96? Distance from surface not recorded.	Locke Island	Sample 804.1. Sample not taken from cultural feature (AMS Process).
2350 + 50	2340 + 50	Beta-107586	BC 505 to 360 and BC 280 to 250	Charred Material		Locke Island	Sample from White Bluffs burial pit.

**Table 8 (Cont.)**

Measured <sup>14</sup> C Age in Yr BP	Convention <sup>14</sup> C Age in Yr BP	Laboratory No.	Calibration to Calendar Years	Material	Stratigraphic Position	Site Number	Comments
2540 ± 70	2540 ± 70	Beta-93433		Organic Sediment	Hearth ~1.15 m below surface.	45BN162	Bulk soil sample from intact hearth inadvertently impacted during hand digging for a trench in the NE section of the 300 Area (AMS process).
2850 ± 50	2850 + 50	Beta-107587	BC 1135 to 890	Charred Material		Cutbank	CB1f1.
3850 ± 130		Beta-33041		Bulk Soil	98-117 cm below unit datum or approximately 118-127 cm below surface; Test Unit 7.	45GR306B	Two samples taken from Test Unit 7 shell and "carbon in earth."
4300 ± 110		WSU-1509; dendrocorrected (Rice 1980c:72).	2903 ± 117	Bone	175-218 cm (69-86 in.) below surface.	45BN157a	Exact sample location not specified in published accounts; sample taken from Vantage Component: Stratum 4, 5, and 6, 43 cm (17 in) thick (Rice 1980c:69, 72). WSU report of <sup>14</sup> C analysis not available for date.
7880 ± 110		Beta-33040		Shell	98-117 cm below unit datum or approximately 118-127 cm below surface; Test Unit 7.	45GR306B	Two samples taken from Test Unit 7 shell and "carbon in earth."
WSU = Washington State University.							



**FIGURE 5** Radiocarbon Dates Collected at Hanford Arranged Chronologically

Although interest in the archaeology of the region grew during the mid-1900s, lands inside the Hanford Site were restricted from public access as the nation's Manhattan Project and Cold War efforts expanded. By the late 1960s, federal legislation provided mandates directing federal agencies to consider the potential impacts of their undertakings on archaeological sites and other cultural resources. For the next several years, Hanford cultural resources were considered on a project-by-project basis by several different archaeologists and universities. In 1987, DOE-RL created a Hanford Cultural and Historic Resources Program to consolidate and standardize cultural resource management for the Hanford Site. After that point in time, archaeological objects and material remains recovered from the Hanford Site were curated for DOE-RL by PNNL.

Although most of DOE's archaeological collections were curated at PNNL, several of Hanford's archaeological collections were stored offsite by members of the Mid-Columbia Archaeological Society. In 1992, DOE-RL's Cultural and Historic Resources Program Manager initiated efforts to consolidate Hanford's archaeological collections. By 1993, nearly all DOE-RL's archaeological collections had been identified and returned to the Hanford Site.

DOE-RL's archaeological collections are currently curated by PNNL in Room 2209 of the Sigma V building, also called the Repository. Archaeological collections and isolated artifacts curated in the Repository include archaeological collections from 147 archaeological sites, four collections turned-in or confiscated from onsite workers, seven singleton artifacts or partial collections from non-Hanford locations (artifacts encountered in Mid-Columbia Archaeological Society collections returned to DOE-RL), and 33 non-provenienced artifacts and other objects. Records associated with DOE-RL's archaeological collections are also stored in the Repository. Noonan (2002) recently described and assessed the condition of collections related to excavations at Hanford.

The DOE-RL Hanford Cultural and Historic Resources Program also maintains a collections storage area for archaeological collections at the Consolidated Information Center, Washington State University–Tri-Cities. The storage facility is located in a laboratory where facilities are available for cleaning and analyzing Hanford collections. The DOE-RL shares this facility with the university.

### **Manhattan Project/Cold War Collections**

The Hanford curation strategy was developed by DOE to resolve outstanding issues surrounding the collection of Manhattan Project and Cold War era artifacts and records (DOE 1997d). Near- and long-term actions have been identified for successful application of the curation strategy and to convey the history of the Hanford Site. Near-term actions include provisions for identifying and protecting artifacts, and making them available for interpretive and educational purposes. DOE has sought partnerships with local heritage organizations, such as the Columbia River Exhibition of History, Science and Technology, B Reactor Museum Association, Washington State Historic Railroad Association, and local historical societies.

The Columbia River Exhibition of History, Science and Technology, the local museum, is under contract by DOE to manage Hanford's Manhattan Project and Cold War era collection. Unfortunately, the museum's temporary storage facilities are reaching full capacity. Artifacts and records under the care of the Columbia River Exhibition of History, Science and Technology must be transported considerable

distance between storage facilities and the museum. This situation puts a considerable amount of stress on fragile historic pieces, records as well as time and expense. The museum is working with DOE to secure long-term curation facilities on the Hanford Site.

A stipulation of the Programmatic Agreement for the built environment (DOE 1996a) requires DOE to assess the contents of Hanford's historic Manhattan Project and Cold War buildings and structures before commencement of deactivation, decontamination, decommissioning activities, major modifications to the building fabric, and/or removal of historic engineering/technological features and records. The purpose of these assessments is to locate and identify historic artifacts (e.g., equipment, control panels, signs, models) or records (e.g., memos, reports, photographs, videos) that may have research, interpretive, or educational value as exhibits within local, state, or national museums. A team of people with relevant expertise accomplishes the assessments by conducting walkthroughs of the contributing properties within the historic district. Teams comprise cultural resource specialists, historians, archivists/curators, and facility experts. The teams employ a screening criterion to select significant Manhattan Project/Cold War era artifacts for inclusion in the collection.

Recognizing that Site artifacts have great educational and public interpretive potential and are significant resources to scholars and researchers, DOE developed a Site-wide curation strategy for the management of Manhattan Project and Cold War era artifacts that established selection criteria for the identification and preservation of Manhattan Project/Cold War artifacts (DOE 1997d). The criteria developed included artifacts 1) associated with historically significant figures, 2) associated with historically important events, 3) that represent a significant leap in technology (innovations and spin-offs), and 4) that reflect social historical impact on twentieth-century American life. At least one of the above criteria must be met if an item is to be identified as a historic Manhattan Project/Cold War artifact. Finally, items made at the Site are considered a high priority for collection since Hanford is probably the only place they exist. They are one-of-a-kind technological items and are irreplaceable.

If an item meets the screening criteria, then the artifact is designated with a Hanford Artifact tag and assigned a number. The artifacts are photographed in their original setting before their removal for curation and storage. Sometimes artifacts are retained in-place if they are not threatened with modification. At the time of identification, the team attempts to collect documentation regarding the function, origins, operation, and general history of the selected artifact or artifacts.

Additionally, important objects that reflect the printed record of operations at Hanford, including photographs, maps, manuals, and drawings, are part of the historic archival record and are being assessed, collected, and preserved.

A considerable majority of the items in the collection are more representative of Hanford's secondary themes than the primary production processes. There are several reasons for this: artifacts representative of plutonium production are, in many cases, either too large and/or contaminated for exhibit purposes. Furthermore, because of major technological changes over the years, much of the production process equipment has been retrofitted or significantly modified, or no longer exists because of the changing mission of the Site from production to environmental restoration. Buildings have been decommissioned, deactivated, and/or demolished with their contents often removed and destroyed prior to the initiation of the curation strategy. Artifacts representative of the secondary themes have not been as readily discarded, or modified as frequently to accommodate technological changes.

A large percentage of the collection consists of archival items, such as publications, unpublished documents, photographs, drawings, models, museum/exhibit props, and panels. Three-dimensional artifacts, such as equipment, tools, vintage signs and posters, early office furniture, and workers safety items make up the balance of the collection. This collection offers numerous opportunities for creative, educational, and science-oriented exhibits.

### **3.4.7 Preservation**

Preservation of cultural resources at Hanford requires knowledge about the condition of the resources (i.e., what damages the resources have sustained and the threat of further damage in the future). Measures of damage and threat to the resources will help Site managers and decision makers decide where limited cultural resources funds should be best spent to protect and preserve Hanford's cultural resources. The following is an assessment of cultural resources at Hanford completed by the program. Each year, these assessments are updated with the current year's data gathered from site monitoring, construction monitoring, and Section 110 survey projects. As these assessments are adjusted, they should become further representative of the state of cultural resources on the Hanford Site.

To reflect the variety of cultural resources found in areas of the Hanford Site, the land was divided up into focus areas called Special Protection and Mitigation Units (SPMU). These units were based on existing National Register archaeological districts, landforms, or logical areas of similar cultural resources. Only those portions of Hanford where cultural resources have been damaged or threatened have been divided up into SPMUs. Some units are land-based (i.e., refer to geographic areas of the Site); others are activity based (i.e., refer to common types of resources).

After the Hanford Site was divided into SPMUs, each unit was analyzed by program staff to produce a final score that would be compared to other unit scores to determine relative damage and threats to cultural resources. In this way, protective actions needing to be taken could more easily be prioritized.

Each SPMU was analyzed by researching erosion, looting/ARPA violations, and recreational use. Researchers looked at each archaeological site within an SPMU to count the number of incidents of erosion, looting/ARPA violations, and recreational impacts to sites through time. Thus, if a particular site was monitored six times within the past 30 years, of which three monitoring visits reported recreational impacts, then three counts of recreational impacts would be ascribed to the SPMU in which the site lay. After all sites within a SPMU were counted, the totals of each category were listed on a SPMU form.

In addition to reporting the location of each SPMU, the unit form lists all sites within the SPMU area, impacts reported in the area, and management recommendations for the unit. Also, rivershore erosion monitoring data, historic photographs, and previous reports on area projects were consulted for data. A ranking order was assigned from 1 to four to describe the level of previous damage to cultural resources within the SPMU. Another rank was assigned to describe the level of perceived threat to cultural resources within the SPMU. These two ranks are incorporated on a summary table of all SPMUs to compare damage and future threat levels.

Twenty-seven SPMUs have been identified at the Hanford Site. Although most of these are geographical areas encompassing all similar archaeological sites, a few SPMUs comprise other cultural resources such

as Manhattan Project era worker interviews and farming era artifact collections. These SPMUs were ranked along with the archaeological SPMUs. Copies of all SPMU forms are on file with the program.

Land-based SPMUs are as follows:

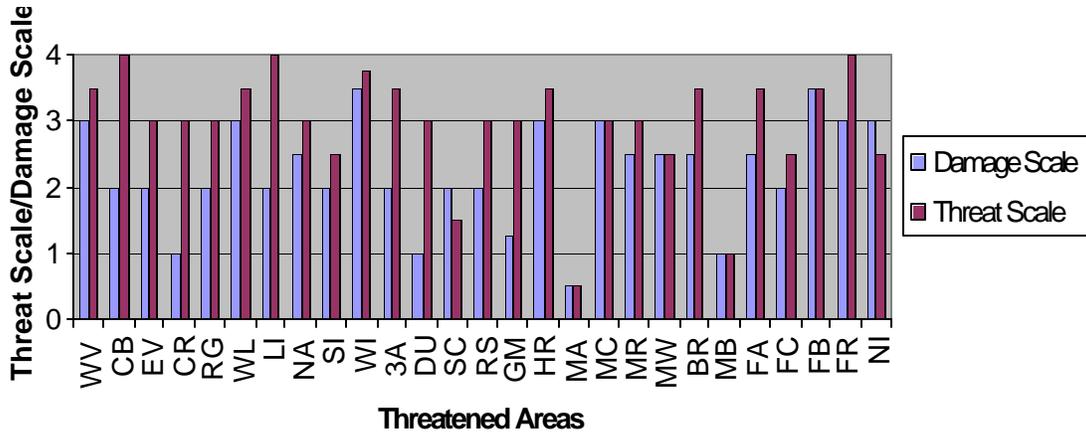
- China Bar
- Coyote Rapids
- The Dunes
- East Vernita Bridge
- Gable Mountain/Gable Butte
- Hanford North
- Horn Rapids
- Locke Island
- Rattlesnake Springs
- Ryegrass
- Savage Island
- Snively Canyon
- Wahluke
- West Vernita Bridge
- Wooded Island
- 300 Area.

Activity-based SPMUs are as follows:

- B Reactor
- Farming Archaeology
- Farming Buildings
- Farming Collections
- Farming-Related Interviews
- Nike/Anti-Aircraft Artillery Sites
- Manhattan Buildings
- Manhattan Cold War Archaeology
- Manhattan Collections
- Manhattan Records
- Manhattan Worker Interviews.

The rankings of all SPMUs are shown in Figure 6. Summaries of the SPMUs are on file with the program. Summaries of the findings are provided below.

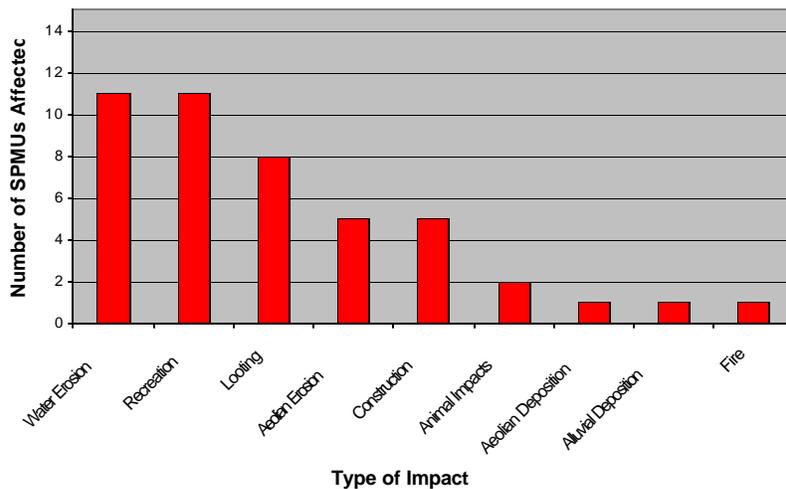
Many SPMUs face similar destructive forces. The impacts common to many SPMUs are quantified in Figure 7 and summarized below.



**Legend**

- |                                       |  |  |
|---------------------------------------|--|--|
| <b>WV</b> – West Vernita              | <b>SI</b> – Savage Island                      | <b>MA</b> – Manhattan/Cold War Arch.   |
| <b>CB</b> – China Bar                 | <b>WI</b> – Wooded Island                      | <b>MC</b> – Manhattan Collections      |
| <b>EV</b> – East Vernita              | <b>3A</b> – 300 Area                           | <b>MR</b> – Manhattan Records          |
| <b>CR</b> – Coyote Rapids             | <b>DU</b> – Dunes                              | <b>M</b> – Manhattan Worker Interviews |
| <b>RG</b> – Ryegrass                  | <b>SC</b> – Snively Canyon                     | <b>BR</b> – B Reactor                  |
| <b>WL</b> – Wahluke                   | <b>RS</b> – Rattlesnake Springs                | <b>MB</b> – Manhattan Buildings        |
| <b>LI</b> – Locke Island              | <b>GM</b> – Gable Mountain/Butte               | <b>FA</b> – Farming Archaeology        |
| <b>NA</b> – Hanford North Archaeology | <b>HR</b> – Horn Rapids                        | <b>FC</b> – Farming Collections        |
| <b>FB</b> – Farming Buildings         | <b>NI</b> – Nike/Anti-Aircraft Artillery Sites | <b>FR</b> – Farming-Related Interviews |

**FIGURE 6** FY 2001 Land-Based Special Protection and Mitigation Unit (SPMU) Rankings



**FIGURE 7** Summary of Impacts to Special Protection and Mitigation Units

A review of completed summaries for the land-based SPMUs showed that water erosion, recreational damage, and looting were the three most commonly reported impacts to SPMUs. Increased access to SPMU areas in recent years is evidently causing considerable damage to cultural resources. Water erosion and recreational damage were reported as impacts to 11 out of 15 total SPMUs. Looting was

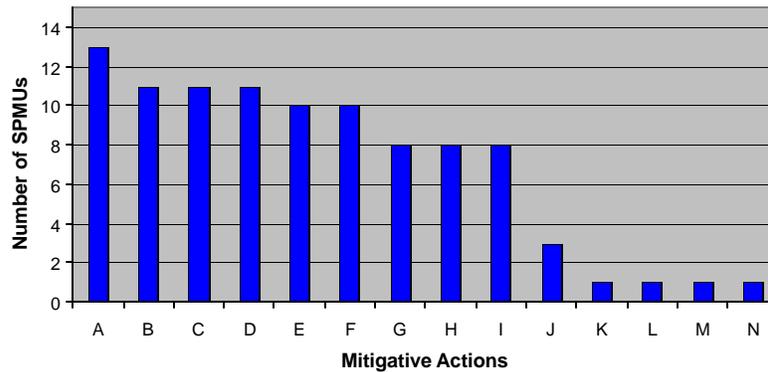
reported at eight SPMUs, while the impact of aeolian erosion and construction activity was recorded at 5 out of 15 total SPMUs. Animal impacts were noted at two SPMUs. Aeolian deposition, alluvial deposition, and the impact of fire were each noted at one SPMU.

Actions to mitigate these impacts were also made in the SPMU forms. The results are summarized in Figure 8 and discussed below.

The following tasks/actions are the first step towards reducing impacts to SPMUs and can be implemented according to the threat level at each SPMU.

The identified actions are the following:

- Take steps to limit access to SPMUs. Steps include increasing security patrols in the vicinity of SPMUs and improving DOE trespassing signage in SPMU areas, particularly where river access to SPMUs is possible. Existing fences in SPMU areas should be repaired as well.



**Key to Mitigative Actions:**

- |  |   |
|--|---|
| <b>A</b> Limit access to the SPMU  | <b>H</b> Post educational signage in public areas around Hanford and Richland             |
| <b>B</b> Survey the remainder of the SPMU  | <b>I</b> Decrease water fluctuations caused by dams on the Columbia River                 |
| <b>C</b> Record the remainder of sites within the SPMU                               | <b>J</b> Increase monitoring of SPMUs   |
| <b>D</b> Evaluate all sites within the SPMU for eligibility to the National Register | <b>K</b> Stabilize structures located in SPMUs  |
| <b>E</b> Increase security patrols   | <b>L</b> Repair existing fences   |
| <b>F</b> Collect oral histories about the SPMU                                       | <b>M</b> Set up erosion grids to monitor the impact of wind erosion                       |
| <b>G</b> Improve DOE trespassing signage   | <b>N</b> Conduct geographic positioning system mapping of SPMU as a form of data recovery |

**FIGURE 8** Summary of Mitigative Actions Identified for Special Protection and Mitigation Units (SPMUs)

- Post educational signage in public areas of Hanford and Richland, informing the public about the consequences of disturbing or destroying cultural resources (ARPA violations, Washington Administrative Codes, etc.). Increase monitoring of vulnerable sites within SPMUs to ascertain the rate of human impacts in site areas.
- Survey the remainder of unsurveyed land within the SPMUs, and record all sites that have not been recently or fully recorded. Include an evaluation of all sites within the SPMUs for eligibility to the National Register. Continue to collect oral histories about SPMUs as a part of the inventory process.
- If possible, decrease water fluctuations caused by dams on the Columbia River. These fluctuations are the main cause of water erosion in many SPMUs.
- Although aeolian erosion was only reported for 5 out of 15 total SPMUs, the number of archaeological resources impacted by this type of erosion is high. Erosion grids could be set up at selected sites where wind erosion was reported as an impact to measure the rate of erosion. Such information would aid in developing a wind erosion mitigation plan.

Survey and site recording activities should be carried out in cooperation with tribal cultural resource staff, particularly in more sensitive areas of cultural importance.

### **3.4.8 Research**

Research being conducted at Hanford by DOE-RL's Cultural and Historic Resources Program is applied in nature, meaning it is being conducted to improve DOE-RL's ability to manage and protect resources. Research may be conducted by outside researchers, but DOE-RL is unaware of any.

#### **Native American-Related Landscape Research**

A comprehensive research design has yet to be prepared for the Hanford Native American landscape. A series of broad research questions is presented in the prehistoric period (DOE 1997b), which generally guide the thoughts of cultural resource management professionals at Hanford.

Currently, the HCRL is in the process of developing a research strategy for evaluating the Pre-Contact Cultural Resource landscape using desktop geographic information system software in conjunction with a Microsoft® Access-founded site database. The thesis of this joined approach is that it allows the creation of an infinite number of archaeological data combinations derived from the Access database that can then be imported and represented graphically within the geographic information system. This archaeological data can then be viewed in the context of any environmental or geographic data set(s) the individual researcher requires. The strength of this design is that it does not have a single question focus. Rather, it makes concession for a wide range of research questions aimed at evaluating the multi-faceted relationship between pre-contact people and the environment. The result will be a better understanding of site distribution, both temporally and spatially.

Bechtel Hanford, Inc. is pursuing additional research in the area of ancestral waterways. Evidence indicates that the Columbia River followed different channels in the past. The research being conducted now is to identify channels where the river may have flowed within the last 12,000 years to identify areas where humans may have lived.

### **Ethnographic Research**

As discussed, ethnographic research is being conducted with Native Americans, primarily in the area of Native American TCPs, African American Hanford workers, and farming settlement.

### **Farming-Related Landscape Research**

The program has produced a research design to guide work on farming-related landscape research and to facilitate consultation (Stapp 2001). Long-term objectives are identified first. Then a research design for a pilot project is described that will assist in meeting the long-term objectives.

There is a sense of urgency in conducting this work. Previous efforts directed at the landscape have been irregular and haphazard. Projects are done when they need to be. There has been no overarching research agenda, design or approach to guide the work. Two primary reasons for doing this now are:

1. The descendant community is slowly passing on, and, within a decade, there will be few former residents around from whom to obtain information; information needs to be collected before it is gone forever.
2. The majority of farming resources are located in an area highly susceptible to fire; information needs to be collected before it is gone forever.

## **3.4.9 Outreach**

The program conducts public outreach activities that range from Hanford Site-related cultural issues meetings with tribal cultural resources technicians and the interested public to presentations and community involvement efforts to educate the public on cultural resources issues on and off the Hanford Site.

### **3.4.9.1 Activities on the DOE Site**

#### **Tribal Involvement**

Federal legislation and policies require programs such as DOE's Hanford program to solicit outside involvement, primarily as a way to ensure the program is successful. The purpose of this section is to review the major cultural resource-specific requirements for involvement.

The 1992 amendments of the National Historic Preservation Act strengthened the concept of places that have traditional religious and cultural importance to cultural groups such as Native Americans (Parker 1993). Commonly referred to as TCPs, these places often have no physical manifestations to those outside the culture to facilitate identification (in comparison, to say, archaeological sites, which have clear evidence of past human activity). Thus, to identify TCPs, an agency must involve groups with historical ties to lands currently being managed by an agency.

The National Historic Preservation Act requires involvement of Native Americans and other groups during the Section 106 process. If a resource eligible for listing on the National Register is to be adversely impacted by an agency action, consultation with interested tribes and others must occur. The agency must solicit and understand the impact of its decisions before it takes action.

Other legislative measure requiring tribal involvement include the ARPA and the Native American Graves and Repatriation Act (NAGPRA) of 1990. The ARPA requires tribal involvement before an agency issues a permit for archaeological excavation by an outside party. The NAGPRA clearly defines the processes that DOE will follow if there is an inadvertent discovery of human remains. It also requires DOE to work with the appropriate tribes to repatriate human remains and to examine existing collections for burial-related items or objects of cultural patrimony.

### **History of Tribal Involvement in Cultural Resources**

Tribal involvement at Hanford has increased dramatically over the last two decades, primarily in response to the increasing legislation calling for such involvement. The history of tribal involvement is divided into the following phases to facilitate discussion:

**1943 – 1987: Access, Protection, and Identification Phase**—When the government established Hanford in 1943, Colonel Matthias worked with the Wanapum Tribe to regulate their access. Agreements were made for site visits to fish and acquire firewood during the early years, but this access ended soon thereafter. Beginning in the 1950s, Atomic Energy Commission staff worked with Wanapum representatives to inspect and protect Wanapum cemeteries. Beginning in the 1960s, Dr. David Rice, working for various agencies, began meeting with the Wanapum as part of his archaeological and ethnohistoric surveys, thus beginning a relationship that lasts to this day. In the 1980s, in response to requests from the Yakama Nation and others, the DOE began facilitating access to sacred sites located on the Hanford Site for ceremonies.

**1987 – 1994: Review and Comment Phase**—The creation of the HCRL in 1987 marked the beginning of tribal involvement in the cultural resources program. Some of the funding for tribal participation came through annual grants from DOE to the three tribes with affected status, which established Environmental Restoration/Waste Management programs to coordinate tribal Hanford activities. Since 1987 (with occasional interruption), some funding has gone to support cultural resource efforts. An example of one major effort was the review of the draft Hanford Cultural Resources Management Plan. Tribes provided numerous comments on this draft. Also during this time, various cultural resource documents and cultural resource reviews were provided to tribal staffs for information and comment. Occasional visits to sacred sites continued during this phase. Most significant was the employment of a Confederated Tribes of the Umatilla Indian Reservation tribal member between 1989 and 1992. Miscellaneous efforts were

made to obtain information about Hanford from tribal members during this period. Toward the end of this phase, a few cultural resource surveys involved tribal members, especially from the Confederated Tribes of the Umatilla Indian Reservation.

**1994 – Present: Involvement Phase**—The start of this phase was marked by a series of tribal meetings held to discuss the revision of the Hanford Cultural Resources Management Plan (Chatters 1989). Meetings were held first with tribes individually, then collectively. A summary of these meetings indicates that discussions related more to the overall program and role of tribes than to the management plan (Stapp and Jones 1995). An outgrowth of these meetings was the concept of cooperative management. Although undefined, the concept implied that DOE and the tribes would work closer together to protect and manage Hanford cultural resources than they had in the past. A first attempt at cooperative management was the co-development of a 30-year plan for managing the cultural resources. Activities identified and scheduled included actions such as large-scale block surveys and management plans for areas such as Gable Mountain and Rattlesnake Mountain. During one of the first meetings to refine this plan in April 1994, the group was faced with an inadvertent discovery of human remains at the construction site for the Environmental and Molecular Sciences Laboratory. Over the next year, the concept of cooperative management was applied to resolve numerous issues concerning the Environmental and Molecular Sciences Laboratory discovery and related revegetation project. As the Environmental and Molecular Sciences Laboratory case was being resolved, tribes and DOE began meeting monthly using a forum referred to as the “issues meeting.” Agreements were made to provide earlier notification of upcoming projects and to find ways to involve tribal staff in the work. Beginning in 1995, subcontracts were issued to the Wanapum and the Nez Perce for cultural resource services. In 1997, tribal members were again hired as staff members after a 5-year hiatus. By the close of 1997, the basic components of an active tribal involvement plan were in place.

Tribal issues meetings are held regularly. Meetings include DOE-RL’s Hanford Cultural and Historic Resources Program Manager, DOE-RL’s cultural resources contractors, and tribal cultural resource representatives. The USFWS is invited and other agencies can attend as necessary. These meetings serve as the initial forum for resolving tribal cultural resource issues in a face-to-face setting. The tribal issues meetings function as an information exchange where impending projects are presented for consideration and alternatives are formulated. On average since 1995, the DOE-RL Hanford Cultural and Historic Resources Program has had six to eight tribal issues meetings a fiscal year.

### **Public Involvement**

Federal legislation and policies require programs such as DOE-RL’s Hanford Cultural and Historic Resources Program to solicit outside participation, primarily as a way to ensure that the program is successful. The Secretary of the Interior’s Standards and Guidelines for Archaeology and Historic Preservation identify several places where public involvement is required (48 FR 44716) in developing and maintaining a cultural resource management program. For example, public participation is a major component of the preservation planning process, calling for participation from local historical societies and professional historians and archaeologists. Peer review of draft reports is cited as another means for ensuring that state-of-the-art technical reports are produced (48 FR 44716). A final example from the Standards and Guidelines is the requirement that archaeological research designs should be “responsive to the concerns of local groups” (48 FR 44716).

## History of Public Involvement

Professional cultural resource management work for DOE's predecessor agency, the Atomic Energy Commission, began in the 1970s under the direction of Dr. David Rice, University of Idaho. Dr. Rice, who had previously worked along the Hanford Reach for the National Park Service, and others, worked extensively with the Mid-Columbia Archaeological Society. During the 1980s, the Mid-Columbia Archaeological Society became relatively inactive, thus curtailing this avenue for public involvement. Recently, the Mid-Columbia Archaeological Society has attempted to become active again and may begin to get involved in Hanford cultural resource management activities.

When DOE-RL created the program in 1987 to manage cultural resources at Hanford, an informal public involvement program commenced. For the general public, the program consisted of presentations to local schools and civic groups, preparation of a brochure, and production of a video explaining the program. Efforts were also taken to engage the professional archaeological community. For example, teaming arrangements were made with regional universities to conduct work at Hanford, and fellowships were provided to undergraduate and graduate students to work at Hanford or conduct research on Hanford materials. Papers have been published in professional journals such as *American Antiquity*, *Federal Archaeology*, and *Cultural Resource Management*, as well as professional society proceedings such as the George Wright Society. Staff have regularly made presentations at regional and national professional society conferences (Appendix E).

In 1995, the DOE-RL Hanford Cultural and Historic Resources Program began sending cultural resource reviews, programmatic documents, annual reports, and other materials generated by the program to the DOE reading rooms, located throughout the region. Access to these materials enables the public to become informed about DOE's cultural resources program.

In 1997, DOE-RL began a concerted public involvement program for cultural resources. At that time, DOE-RL commenced with a series of public workshops for special interest groups and the general public. Initially, early groups such as the B Reactor Museum Association, Washington State Historical Society, and the East Benton County Historical Society focused on the historic industrial landscape. There are many organizations who are interested in all of Hanford's historic landscapes. DOE-RL's Cultural and Historic Resources Program Manager meets regularly with interested parties to consult about site preservation issues and foster public participation in cultural resource management. Interested parties provide important guidance to DOE-RL on many preservation issues such as Locke Island erosion, re-use of historic structures, and the preparation of mitigative documents.

Also in 1997, DOE-RL established its Hanford Cultural and Historic Resources web site as a state-of-the-art way to inform its public constituencies about the resources and management activities. Provided on the web site are key historical and management documents. The web site is also used to facilitate the review of documents currently issued in draft form. The web site can be found at <http://www.hanford.gov/doe/culres/index.htm>.

## **Worker Education**

The DOE-RL Hanford Cultural and Historic Resources Program contractors promote project worker awareness of the presence of cultural materials in project areas by providing worker training. This training provides information on the cultural history of the Hanford Site and training in artifact and feature recognition. It is conducted to alert field workers to the potential resources that may be discovered during project activities and the actions that need to be taken should a discovery be made.

### **3.4.9.2 Activities Not on the DOE Site**

The program provides information about Hanford's cultural and historic resources to outside audiences. Examples include Washington State Archaeology month, classroom lectures, presentations to civic groups, and presentations at professional audiences.

### **3.4.9.3 Outreach Status**

Outreach activities are planned to continue as they have in the past.

## **3.5 LEGAL COMPLIANCE ACCOMPLISHMENTS**

The purpose of this section is to assess the current status of legal compliance with cultural resource legal authorities.

### **3.5.1 NHPA, Executive Order 11593, and 36 CFR Part 800**

For ease of discussion, this section is divided into two parts. The first part discusses the DOE-RL Hanford Cultural and Historic Resources Program accomplishments in developing procedures for taking into account the effects of projects on National Register-eligible properties. The second part describes the accomplishments in protecting and nominating National Register-eligible properties.

#### **3.5.1.1 NHPA, Sections 106 and 110 (f), and 36 CFR Part 800**

The DOE-RL Hanford Cultural and Historic Resources Program has procedures in place to ensure that undertakings at Hanford are not conducted without taking into consideration the potential effects on historic properties. These procedures are outlined more completely in Section 5. A programmatic agreement for the built environment is in place. Alternative procedures to streamline all Section 106 reviews at Hanford are under development.

### **3.5.1.2 NHPA, Sections 110(a)-(e) and (g)-(j), and Executive Order 11593, Section 2**

DOE-RL established the Hanford Cultural and Historic Resources Program in 1987. The program is also guided by the methods and procedures identified in Sections 4 and 5, respectively.

The DOE-RL Hanford Cultural and Historic Resources Program has performed site inventories annually since the program's inception. The accomplishments and approach are discussed in Section 3.4.2. National Register status is shown in Tables 3 and 4.

In general, National Register evaluations are not conducted at Hanford unless a site is to be impacted by a project. National Register evaluations typically require archaeological testing, and testing is expensive and destructive. Program staff are working with tribes to evaluate and nominate traditional cultural properties that the tribes would like nominated.

### **3.5.2 American Indian Religious Freedom Act and Executive Order 13007**

The American Indian Religious Freedom Act of 1978 established the United States policy to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise their traditional religions. This includes access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites. President Clinton further strengthened this policy in 1996 by issuing Executive Order 13007 – Indian Sacred Sites, which called on agencies to 1) accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and 2) avoid adversely affecting the physical integrity of such sacred sites.

The Hanford Historic and Cultural Resources Program assists DOE-RL in complying with the Act and the Order through its cultural resource review consultation process. Every undertaking performed at Hanford that has potential to effect cultural resources is subjected to a cultural resource review, a key part of which is notification to tribes with historical ties to Hanford. Any concerns relative to these undertakings can be provided to DOE-RL through this process and are considered prior to granting the undertaking a cultural resource review clearance under the National Environmental Policy Act and the National Historic Preservation Act. Concerning the issue of access, both the Cultural and Historic Resources Program and the DOE-RL Indian Nations Program have accommodated numerous requests for onsite visits to places of interest by tribal elders, tribal officials, tribal staff and tribal youth.

### **3.5.3 ARPA**

For ease of discussion, compliance with ARPA is divided into two parts. In the first part, activities related to increasing public awareness is discussed. In the second section, steps being taken to prioritize surveys of facility lands and document violations is discussed.

### **3.5.3.1 ARPA, Section 10(c)**

The DOE-RL Hanford Cultural and Historic Resources Program has a public education program, as documented in Section 3.4.9. In addition, the program also works with the Confederated Tribes of the Umatilla Indian Reservation to offer ARPA training for law enforcement at the Hanford Hazardous Materials Management of Emergency Resources training center.

### **3.5.3.2 ARPA, Section 14**

The DOE-RL Hanford Cultural and Historic Resources Program has a regular inventory program, as documented in Sections 3.4.2. Procedures are also in place for documenting ARPA violations as discussed in Section 5.2.

## **3.5.4 NAGPRA**

### **3.5.4.1 NAGPRA, Section 5**

By 1994, most archaeological collections resulting from past work on the Hanford Site had been coalesced into a curation facility, part of the HCRL. To provide DOE-RL with information needed to comply with the provisions of NAGPRA that call for notification, consultation, and possible repatriation of human remains and associated funerary objects, a summary of the collection was prepared in November 1993, followed by an inventory of human remains in November 1995. Additional human remains from the Hanford Site curated by the University of Idaho and in a private collection were discovered during the inventory process. These remains were included in the 1995 summary. Finally, an itemized inventory of the curated human skeletal remains and associated funerary objects was undertaken in April 1998 and reported to DOE-RL in December of the same year.

Excavations at the Wahluke archaeological site in 1926 by Smithsonian archaeologist Herbert Krieger resulted in sizable collection of human skeletal materials and burial offerings. Housed at the Smithsonian's National Museum of Natural History since that time, this inventory and repatriation of this collection of items that would normally fall under NAGPRA is instead handled via provisions in the National Museum of the American Indian Act (as amended in 1996). Thus, while NAGPRA applies to museums, universities, and federal agencies, the Smithsonian is specifically excluded from NAGPRA, meaning that repatriation of human remains and associated grave objects from the Wahluke Site must be coordinated directly between the Indian tribes and the Smithsonian Institution.

### **3.5.4.2 NAGPRA, Section 6**

A summary of the HCRL collection was prepared in November 1993 and an inventory of human remains in November of 1995. An additional written summary of the human remains in the HCRL collection was completed in 1998 (Nickens 1998). Following repatriation activities in 2000 and 2001, a summary of the HCRL collection was again prepared and the resulting report provided to tribes (Noonan 2002).

#### **3.5.4.3 NAGPRA, Section 7**

A notification of HCRL holdings was sent to tribes in November 1993 after a summary of the collection was prepared. In 1995, a letter followed this notification reporting on the repatriation activities at the Hanford Site. Tribes were asked to assist in determining the cultural affiliation of human remains held in the HCRL collection. Human remains from 45BN477 were repatriated to the Wanapum in May 2000, and additional remains were transferred to the tribes in April 2001.

#### **3.5.5 36 CFR Part 79**

Curation of artifacts is handled as reviewed in Sections 3 and 5. Existing collections are in good condition, although artifacts from the Manhattan Project/Cold War are still housed in operating facilities.