DOE/EA-1660F

Environmental Assessment

Combined Community Communications Facility and Infrastructure Cleanup on the Fitzner/Eberhardt Arid Lands Ecology Reserve, Hanford Site, Richland, Washington

U.S. Department of Energy
Richland Operations Office
Richland, Washington 99352

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Summary

Introduction. This Environmental Assessment (EA) provides information and analyses of proposed U.S. Department of Energy (DOE) activities associated with consolidating existing communications operations and removing excess facilities and infrastructure within the Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE) at the Hanford Site near the City of Richland, Washington.

Purpose and Need. To meet long-term federal agency missions, DOE needs to reduce indirect costs and potential safety impacts, as well as protect sensitive cultural and ecological resources, by reducing the impact of people and infrastructure within ALE. DOE proposes to reduce the facilities and infrastructure on ALE to those that are necessary to continue to provide operational or communications support to local, regional, state, and federal emergency service and commercial organizations. DOE also needs to appropriately manage the wastes resulting from activities that consolidate existing facilities and infrastructure, reducing the overall footprint on ALE.

Proposed Action. DOE proposes to remove most facilities on ALE, except for those needed by DOE and the U.S. Fish and Wildlife Service (USFWS), and communications equipment used by local governments and other organizations. Existing communications capabilities would be consolidated into a single facility on the ridgeline, consisting of an equipment building and two towers to support multiple antennas and radio repeaters. In addition, DOE would remove miscellaneous debris that is located across ALE from past activities and repair the ALE boundary fence as necessary.

Affected Environment. The affected environment for the proposed action consists of four major areas within ALE: 1) an area along the ridgeline of Rattlesnake Mountain, 2) the former Nike missile base at the northeastern base of the mountain, 3) the Rattlesnake Springs area near the northwestern base of the mountain, and 4) other areas within ALE between the former Nike missile base and the springs where various types of debris remain from previous uses.

The ridgeline area on Rattlesnake Mountain encompasses habitats and wildlife that are common to shallow stony soils found throughout eastern Washington. These shallow soils support scattered short-statured shrubs and grasses. The top of the ridge provides habitat for a variety of wildlife and is considered an important high-elevation stopover point for migratory birds. All of ALE is designated as an Important Bird Area by the Washington Department of Fish and Wildlife and Audubon Washington.

The base area on the lower slopes of the Rattlesnake ridgeline within ALE supports both shrub-steppe and native bunchgrass habitats. Wildfires that burned much of ALE in 2000 and 2007 have removed a large portion of the sagebrush-dominated habitat, leaving large areas of steppe vegetation. Vegetation and habitat in previously disturbed areas consist of mixtures of weedy and native species, except where crested wheatgrass was planted to stabilize soils. Wildlife using the steppe grasslands on ALE is diverse and includes small and large mammals, birds, and reptiles.

The aquatic ecology laboratory at the Rattlesnake Springs area sits between riparian vegetation associated with the stream and upland shrub-steppe vegetation. The roadway and parking area surrounding the building are mostly unvegetated, with occasional Russian thistle or cheatgrass. The riparian corridor is dominated by coyote willow, black cottonwood, and chokecherry along with numerous weedy species. The riparian area associated with Rattlesnake Springs provides important nesting and stopover habitat for

over 70 migratory and resident bird species. Elk and mule deer use this water source in addition to porcupine, badger, and other small mammals similar to those found elsewhere on ALE. The Great Basin spadefoot toad may be found within the riparian area and the adjoining uplands.

During recent ecological surveys, no federal- or state-threatened or endangered species, species proposed for listing, or critical habitats were observed in any of the areas potentially affected by the proposed action.

Cultural and historical resources have been identified within some portions of the areas affected by the proposed action, and appropriate measures for their management have been established.

According to the 2000 Census, the population residing within 80 kilometers (50 miles) of ALE was about 349,000, and the region contained some concentrations of minority and low-income populations. No prime farmland, scarce geological resources, or floodplains are within the proposed construction and cleanup sites.

Environmental Impacts of Proposed Action. Environmental impacts associated with construction of the proposed Combined Community Communications Facility (CCCF) are expected to be similar to those for any facility of comparable size. The facility would be located within a previously disturbed area and be compatible with existing land-use designations established by DOE and Benton County. Resources required for construction consist of commonly available materials and fuels that are not unique or in short supply, and the labor required represents a small fraction of the local market. Consolidation of existing communications facilities to a smaller footprint is expected to have a net positive effect on visual resources in the near field.

The proposed demolition and cleanup activities would further disturb the areas associated with facilities and debris, which are largely sites that have been disturbed at some time in the past, although some have remained undisturbed for several decades. Activities in these areas, therefore, present the opportunity for disruption of ecological resources that have become established in the interim or for discovery of cultural and historic sites that were previously unrecognized.

The proposed demolition and cleanup sites are not currently known to contain sensitive ecological resources or critical habitats that would be affected by the proposed activities. Restoration of previously disturbed areas would have a beneficial effect on ecological resources and habitats, and removal of unused facilities and debris is expected to have a net positive effect on visual resources in the near field. Management of known cultural and historic resources, as well as any discovered during construction and cleanup activities, would be in accordance with regulatory requirements and agreements among DOE and other responsible agencies or parties.

Health and safety risks to workers and members of the public from construction and cleanup activities are projected to be small, although the environment in the ridgeline area presents some unique hazards (such as adverse weather and road conditions) that are not normally present at other Hanford cleanup sites. The proposed activities might have short-term impacts on local traffic and noise levels, and temporary impacts on air quality could also occur. However, because of the remoteness of these activities from occupied areas, they would be unlikely to exceed regulatory standards for noise levels or air concentrations of criteria pollutants and particulates. Effluents and wastes generated during demolition and cleanup would be minimized to the extent practicable and would be managed using existing facilities.

Operational impacts are expected to be minimal, consisting of occasional use of the CCCF by communications providers and access for road maintenance. The workforce would remain at about current levels, resulting in little, if any, incremental impact on community infrastructure, socioeconomic, or transportation resources. Because the impacts from facility operations are projected to be small in all cases, there would be no opportunity for both high and disproportionate adverse impacts on minority or low-income populations, nor would noticeable cumulative impacts with other ongoing operations in the region be expected.

Mitigation of Environmental Impacts. Mitigation of environmental impacts associated with construction of the proposed CCCF and cleanup activities would take place as required by existing regulations, agreements, and policies. Restoration of disturbed areas would return them to a more natural state, and cultural and historic resources would be managed in consultation with regulatory agencies and Tribal Nations. Health and safety risks would be managed under existing Hanford Site policies and procedures with implementation of special measures as necessary to reduce the risks from working in the unique environment within ALE.

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Acronyms and Abbreviations

AASTA	Alliance for the Advancement of Science through Astronomy
ACHP	Advisory Council on Historic Preservation
ALE	The Fitzner/Eberhardt Arid Lands Ecology Reserve
BLS	Bureau of Labor Statistics
CAIRS	(DOE) Computerized Accident/Incident Reporting System
CCCF	Combined Community Communications Facility
CCP EIS	Hanford Reach National Monument Comprehensive Conservation Plan and Environmental Impact Statement
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DART	Days Away (from work), Restricted, or Transferred
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
FONSI	Finding of No Significant Impact
FR	Federal Register
ft	feet
ft^2	square feet
ft^3	cubic feet
ha	hectare(s)
HCP EIS	Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement
HVAC	Heating, Ventilation, and Air Conditioning (system)
km	kilometer(s)
LIGO	Laser Interferometer Gravitational-Wave Observatory
MBTA	Migratory Bird Treaty Act
m	meter(s)
m^2	square meter(s)
m^3	cubic meter(s)
MEI	maximally exposed individual
mi	mile(s)
MOA	Memorandum of Agreement
MSA	Metropolitan Statistical Area
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act

NPL	National Priorities List
OSHA	U.S. Occupational Safety and Health Administration
PA	Programmatic Agreement
PNNL	Pacific Northwest National Laboratory
PUD	Public Utility District
RCRA	Resource Conservation and Recovery Act of 1976
ROD	Record of Decision
SHPO	State Historic Preservation Office(r)
TC&WM EIS	The Tank Closure and Waste Management Environmental Impact Statement
TCP	Traditional Cultural Property
TRC	Total Recordable Case(s)
US	United States
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WCH	Washington Closure Hanford

Glossary

Construction site (proposed Combined Community Communications Facility [CCCF] construction site). A portion of the currently occupied portion of the ALE ridgeline area where the proposed CCCF would be constructed.

Hazardous chemical. Any chemical that is a physical or health hazard.

Physical hazard—any chemical for which there is scientifically valid evidence that it is a:

- flammable or combustible liquid
- compressed gas
- explosive
- flammable solid
- oxidizer
- peroxide
- pyrophoric
- unstable (reactive) or water-reactive substance.

Health hazard—any material for which there is statistically significant evidence that acute or chronic health effects may occur in exposed individuals. Such materials include:

- carcinogens
- mutagens
- teratogens
- toxic or acutely toxic agents
- reproductive or developmental toxins
- irritants
- corrosives
- sensitizers
- liver, kidney, and nervous system toxins
- agents that act on the blood-forming systems
- agents that damage the lungs, skin, eyes, or mucous membranes.

Hazardous waste. Waste that contains chemically hazardous constituents regulated under Subtitle C of the *Resource Conservation and Recovery Act* (RCRA), as amended (40 CFR 261) and regulated as a hazardous waste and/or mixed waste by the U.S. Environmental Protection Agency (EPA).

Low-level (radioactive) waste. Radioactive waste that is not high-level waste, spent nuclear fuel, transuranic waste, byproduct material (as defined in Section 11e[2] of the Atomic Energy Act of 1954, as amended), or naturally occurring radioactive material.

Mixed low-level waste. Low-level waste determined to contain both source, special nuclear, or byproduct material subject to the Atomic Energy Act of 1954, as amended, and a hazardous component subject to the RCRA, as amended, or Washington Administrative Code 173-303-140.

Pollution Prevention. The use of materials, processes, and practices that reduce or eliminate the generation and release of pollutants, contaminants, hazardous substances, and waste into land, water, and air. For the Department of Energy, this includes recycling activities.

Unit Conversion Chart

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
Inches	25.40	Millimeters	Millimeters	0.03937	inches
Inches	2.54	Centimeters	Centimeters	0.393701	inches
Feet	0.3048	Meters	Meters	3.28084	feet
Yards	0.9144	Meters	Meters	1.0936	yards
miles (statute)	1.60934	Kilometers	Kilometers	0.62137	miles (statute)
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.09290304	square meters	square meters	10.7639	square feet
square yards	0.8361274	square meters	square meters	1.19599	square yards
square miles	2.59	square kilometers	square kilometers	0.386102	square miles
Acres	0.404687	Hectares	Hectares	2.47104	acres
Mass (weight)			**Mass (weight)**		
ounces (avoir.)	28.34952	Grams	Grams	0.035274	ounces (avoir.)
pounds (avoir.)	0.45359237	Kilograms	Kilograms	2.204623	pounds (avoir.)
tons (short)	0.9071847	tons (metric)	tons (metric)	1.1023	tons (short)
Volume			**Volume**		
ounces (U.S., liquid)	29.57353	Milliliters	Milliliters	0.033814	ounces (U.S., liquid)
quarts (U.S., liquid)	0.9463529	Liters	Liters	1.0567	quarts (U.S., liquid)
gallons (U.S., liquid)	3.7854	Liters	Liters	0.26417	gallons (U.S., liquid)
cubic feet	0.02831685	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.7645549	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by $^{5}/_{9}^{ths}$	Celsius	Celsius	multiply by $^{9}/_{5}^{ths}$, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.94782	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force/Pressure			**Force/Pressure**		
pounds (force) per square inch	6.894757	Kilopascals	Kilopascals	0.14504	pounds per square inch
torr	133.32	Pascals	Pascals	0.0075	torr

06/2001

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE, Third Ed., 1993, Professional Publications, Inc., Belmont, California.

1.0 Introduction; Purpose and Need for Agency Action

This Environmental Assessment (EA) provides information and analysis of proposed U.S. Department of Energy (DOE) activities to consolidate existing facilities and reduce the footprint of facilities and infrastructure within the Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE) in Benton County, northwest of the City of Richland, Washington. Information contained in this EA will be used by DOE to determine if the proposed action is a major federal action significantly affecting the quality of the human environment. If the proposed action is determined to be a major action with potentially significant environmental impacts, an Environmental Impact Statement (EIS) would be required. If the proposed action is not determined to be a major action that could result in significant environmental impacts, a Finding of No Significant Impact (FONSI) would be issued, and the action may proceed. This EA is prepared in compliance with the *National Environmental Policy Act of 1969* (NEPA), as amended (42 USC 4321 *et seq.*); the *Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA* (Title 40, Code of Federal Regulations, Parts 1500–1508); and the DOE *National Environmental Policy Act Implementing Procedures* (Title 10, Code of Federal Regulations, Part 1021).

Purpose and Need for Agency Action. The purpose of the proposed action is to reduce indirect costs and potential safety impacts as well as to protect sensitive cultural and ecological resources by reducing the impact of people and infrastructure within ALE. DOE needs to reduce the number of facilities and infrastructure on ALE to those that are necessary to continue to provide operational or communications support to local, regional, state, and federal emergency services and commercial organizations. DOE also needs to appropriately manage the wastes resulting from activities that consolidate existing facilities and infrastructure, reducing the overall footprint on ALE.

The availability of *American Recovery and Reinvestment Act of 2009* funding has provided DOE with an opportunity to identify actions that could be accelerated and accomplished earlier than previously planned. DOE proposes to undertake this activity to ensure continued emergency communications for Energy Northwest, local, and regional agencies and to reduce the physical footprint by consolidating other communications facilities and removing other unneeded facilities and infrastructure located on ALE. The proposed action would also fulfill the DOE responsibility to preserve and protect important cultural, historical, and ecological resources. This is consistent with the Preservation land use designation for ALE in the record of decision (ROD) for the *Final Hanford Comprehensive Land-Use Plan EIS* (64 FR 61615) and the incorporation of the area within the Hanford Reach National Monument (65 FR 37253). The proposed activities are intended to produce net beneficial effects for this unique and sensitive environment as well as protect the public's interest in maintaining an effective emergency communications network.

2.0 Background

The proposed activities described in this EA would take place within the boundaries of ALE, as shown in Figure 2.1 and described in Section 4. Historically, parts of this area were privately owned and were used for agricultural purposes, ranching, and some natural gas exploration. Landowners were evicted in 1943 when the area was incorporated into the Hanford Site, which was established as part of the Manhattan Project during World War II. Initially, the area served as a safety and security buffer zone for Manhattan Project activities and contained facilities designed to defend Hanford Site operations from possible attack during and after the war. No weapons-production or waste-management activities were conducted on ALE.

Following the war, the area was used for various environmental research purposes, some of which continue to the present. The ALE was formally established by the U.S. Atomic Energy Commission in 1967 as a preservation area because of its unique habitat that had remained essentially undisturbed for several decades. In 1971, it became the Rattlesnake Hills Research Natural Area. It was proclaimed a National Environmental Research Park in 1977 and became the Fitzner/Eberhardt Arid Lands Ecology Reserve by an act of Congress in 1993. In 2000, most of ALE was incorporated into the Hanford Reach National Monument along with other designated units within the Hanford Site (65 FR 37253), and the U.S. Fish and Wildlife Service (USFWS) manages most of ALE.

Four major areas within ALE are the subject of proposed actions in this EA: 1) an area along the ridgeline of Rattlesnake Mountain, 2) the former Nike missile base at the northeastern base of the mountain, 3) the Rattlesnake Springs area near the northwestern base of the mountain, and 4) other areas within ALE between the former Nike missile base and the springs, mainly along a gravel road, referred to as the 1200-foot road, where various types of debris remain from previous uses. Historical uses of these areas, as related to the proposed action, are described briefly in the following sections.

2.1 Ridgeline Area

After World War II, the ridgeline of Rattlesnake Mountain was the site of a control station for a Nike missile base located at the base of the mountain with associated administrative and barracks buildings. The area currently contains concrete foundations and several buildings originally associated with the former Nike missile base control center. Since the 1960s, an astronomical observatory was constructed on the ridge as well as a meteorological station and communications towers and equipment buildings for various commercial and governmental entities. Wooden power poles and electrical lines along the ridge supply power to the facilities. The concrete foundation for a radio telescope remains just below the southeastern end of the ridgeline.

2.2 Base Area—Former Nike Missile Base

The area near the northeastern base of the mountain contained the Nike missile base that was established during the 1950s and abandoned in 1960 just prior to the closure of Camp Hanford in 1961. The base consisted of two underground missile storage areas and two launch sites with associated administration and service buildings, barracks, and recreation facilities. The launch site and buildings in this area later

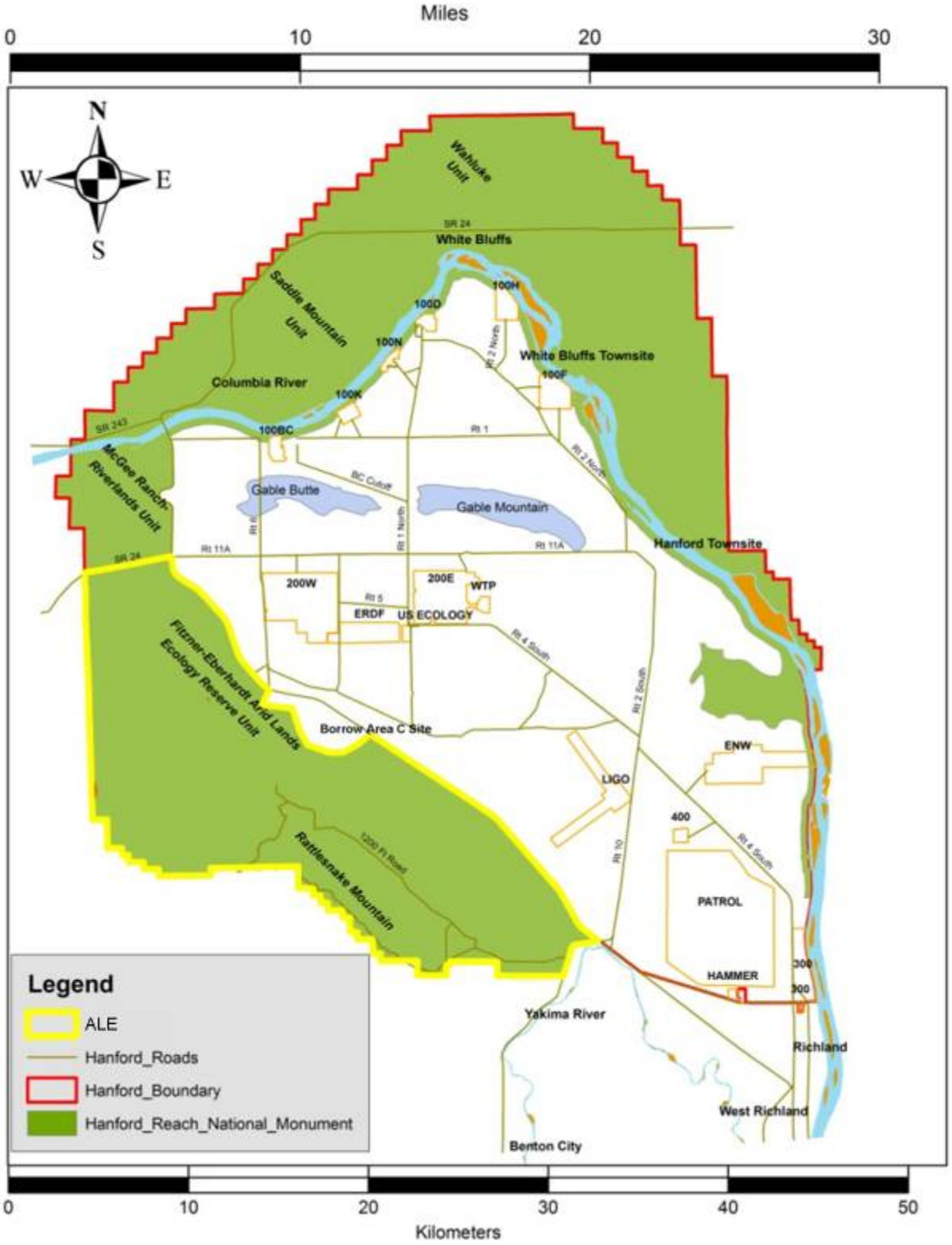

Figure 2.1. ALE and Surrounding Areas

became the ALE headquarters, which were used for environmental research from the 1970s into the early 1990s. The ALE was a preferred field ecological research site because it was relatively undisturbed (aside from grazing and a small amount of agriculture), had a closed intermittent stream, convenient access, roads, electrical power, and it was close to the City of Richland (Fritz et al. 2003). One of the underground missile storage facilities is currently being used for gravitational physics research, and other pre-existing and recently constructed buildings in this area are used by the USFWS.

2.3 Base Area—Rattlesnake Springs

A small metal structure near Rattlesnake Springs was used for research from the late 1960s through the early 1990s. Portions of the springs and surrounding shoreline have been fenced to provide a restoration and study area protected from damage by large wildlife. Miscellaneous debris also exists in the area near the former research building.

2.4 Debris Areas

The area along the base of the ridge has been used for a number of purposes over the years. Before World War II, the area was used for grazing livestock, agriculture, and some natural gas exploration. Later uses included areas for various types of environmental research, such as plant and animal ecology, climatology and meteorology, desert stream ecology, soil and water dynamics, hydrology, geology, and paleoecology. Structures and debris from these uses still remain in the area, including buildings, foundations and other cement structures, cisterns, asphalt debris, fencing, utility poles, electrical equipment, wire and cable, piping, a waste site known as the Horseshoe Landfill, and other miscellaneous items.

2.5 Related Actions under the National Environmental Policy Act (NEPA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, 42 USC 9601 et seq.)

DOE, in consultation and cooperation with other agencies, has evaluated options for cleanup and management of ALE in a number of previous and ongoing studies. Decisions and results arising from those studies are summarized in the following sections.

2.5.1 Decisions for the 1100 Area Operable Units under CERCLA

Two main areas within ALE were placed on the National Priorities List (NPL) as part of Operable Unit 1100-IU-1: the former Nike missile base control station at the ridgeline of Rattlesnake Mountain and the launch site and administration area for the former missile base. Limited field investigations were conducted based on the potential for contamination with hazardous substances near the former Nike missile base control station at the ridgeline area and the launch site at the base area. Both areas were potentially contaminated with hazardous materials, and radioactive materials were later used for research projects in and near facilities remaining from the former Nike missile launch site. The CERCLA record of decision (ROD) for the 1100-EM-2, -EM-3, and -IU-1 operable units specified offsite disposal of soils, debris, and structures contaminated with solvents, polychlorinated biphenyls, and other potentially hazardous substances. It also provided for continuation and expansion of groundwater monitoring to track attenuation of existing contamination. A later decision (EPA 1996) provided for onsite disposal of

certain wastes from Hanford cleanup activities in the Environmental Restoration Disposal Facility (ERDF), including wastes from the 1100 Area operable units that met ERDF waste acceptance criteria. Remediation of the sites was completed in 1995 by stabilization in place, incineration, or removal of hazardous substances and disposal in appropriate facilities. The sites were removed from the NPL in 1996 (61 FR 51019). Subsequent sampling activities at the Horseshoe Landfill resulted in removal of additional contaminated soil and onsite disposal at ERDF, which was completed by Washington Closure Hanford (WCH 2005).

2.5.2 Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement (HCP EIS)

The purpose of the HCP EIS was to facilitate decision-making about the Hanford Site's uses and facilities. DOE's decision attempted to balance its 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. Land use for most of ALE was designated as Preservation in the 1999 DOE ROD for the HCP EIS (64 FR 61615). The exception was a section in the north-central part of the reserve known as Borrow Area C, which was designated in the 1999 ROD as Conservation (Mining) to provide borrow materials for waste management activities at the Hanford Site.

In the HCP EIS, the land use designations related to ALE were defined as follows:

> **Preservation**: An area managed for the preservation of archeological, cultural, ecological, and natural resources. No new consumptive uses (i.e., mining or extraction of nonrenewable resources) would be allowed within this area. Limited public access would be consistent with resource preservation and DOE's need to provide a buffer zone.
>
> **Conservation (Mining)**: An area reserved for the management and protection of archeological, cultural, ecological, and natural resources. Limited and managed mining (e.g., quarrying for sand, gravel, basalt, and topsoil for governmental purposes only) could occur as a special use within appropriate areas. Limited public access would be consistent with resource conservation.

A Supplement Analysis (DOE 2008) and an amended ROD issued in 2008 (73 FR 55824) supported the conclusions and clarified the decisions published in the 1999 ROD. Although existing communications facilities on the ridgeline were grandfathered as existing uses at the time the final HCP EIS was issued in 1999, the actions evaluated in this EA would propose changes to the existing uses. As a result, the procedures for special uses described in the final HCP EIS would apply, including seeking input from cooperating agencies with land-use authorities. This EA, which includes opportunity for review by regional and local agencies, Tribes, stakeholders, and the public, is intended to satisfy these procedures.

2.5.3 Hanford Reach National Monument Comprehensive Conservation Plan and Environmental Impact Statement (CCP EIS)

The CCP EIS establishes USFWS goals and objectives for management of the Hanford Reach National Monument for the next 15 years (USFWS 2008). DOE participated in the preparation of the CCP EIS as a cooperating agency. The subsequent CCP to be issued by the USFWS is intended to provide the

framework for conserving natural, cultural, and recreational resources; managing visitor use; developing facilities; and addressing day-to-day operations of the Monument.

The ROD, signed on September 25, 2008, selected the USFWS-preferred alternative, which provided for protection and conservation of ecological, geological, paleontological, and cultural resources by creating extensive areas that are free of facility development (73 FR 72519). Restoration was a top priority, with some areas open to public use. New facilities and public access points would be consolidated to minimize impacts to the Monument and to provide economies of scale in management and maintenance. Vehicle access into the interior of the Monument would be limited primarily to routes that are currently available; however, much of the Monument would be open to nonmotorized access.

2.5.4 The Tank Closure and Waste Management Environmental Impact Statement (TC&WM EIS)

The draft TC&WM EIS is being prepared to address proposed actions relating to closure of single-shell tanks, current and expanded waste management activities, and the decommissioning of the Fast Flux Test Facility (71 FR 5655). It also provides a comprehensive analysis of the cumulative impacts of remediation activities taking place or planned at the Hanford Site, including those proposed for ALE. It considers the potential for consolidating or removing unneeded facilities and equipment on Rattlesnake Mountain and Gable Mountain, some of which are included within the scope of activities described in this EA. The EIS also includes analysis of potential impacts on cultural, historical, paleontological, and visual resources, as well as Native American interests; and it presents a discussion of potential mitigation actions that could be taken to reduce or minimize impacts associated with the proposed actions and alternatives. In parallel with the EIS, DOE has initiated the *National Historic Preservation Act* (NHPA) Section 106 process, based on a determination that the TC&WM EIS proposed actions would likely result in adverse effects as defined under that law. An initial draft Memorandum of Agreement (MOA) has been exchanged with the State Historic Preservation Officer (SHPO), Advisory Council on Historic Preservation (ACHP), and local area tribes. DOE plans to continue consultations on this draft MOA after considering the comments received on the draft EIS. A primary outcome of this process would be the development of appropriate stipulations to protect and further minimize the potential adverse effects to historic properties listed, or eligible for listing, on the National Register of Historic Places as a result of implementing any actions evaluated in the EIS.

DOE has prepared this interim action EA to facilitate completing the proposed actions on ALE in a timely manner, taking advantage of the unique funding opportunity provided by the *American Recovery and Reinvestment Act of 2009*. Consistent with the requirements of Council on Environmental Quality (CEQ) regulations (40 CFR 1506.1(c)), DOE does not anticipate that the proposed consolidation and remediation activities on ALE would prejudice its decision or limit its ability to select from among the proposed actions being evaluated in the TC&WM EIS concerning closure of the single-shell tanks; supplemental technologies to augment the high-level waste treatment process at the Waste Treatment Plant; continuing or expanding waste management capabilities; and determining an appropriate end state for the Fast Flux Test Facility.

The schedule for accomplishing the near-term consolidation and remediation activities described in this EA roughly coincides with the expected schedule for completion of the ongoing TC&WM EIS process. Implementing appropriate follow-on mitigation actions such as revegetation and recontouring may not be

fully completed until after the Final EIS and ROD are issued. The TC&WM EIS would address the potential mitigation actions that may be appropriate in order to implement the DOE-selected preferred alternative(s). Some of these mitigation actions may also benefit the areas within ALE that are the subject of this EA. The final TC&WM EIS and the final MOA under NHPA Section 106 would be based on DOE's consideration of all the Tribal Nation input and public comments that it receives. Any ROD issued based on the final TC&WM EIS analyses provides DOE with the opportunity to address any further mitigation concerns that may be associated with implementing the preferred alternative(s) or the consolidation and remediation activities proposed in this EA.

3.0 Description of the Proposed Action and Alternatives

This section describes DOE's proposed action and alternatives to the proposed action, including the No-Action Alternative. It should be noted that facility decommissioning plans and construction details described for the proposed action are based on conceptual plans. The final designs, plans, and schedules as ultimately approved for implementation may differ somewhat from those discussed in this EA. However, the nature, scope, and environmental impacts of the proposed action described here are expected to substantially reflect and adequately encompass those associated with actual project implementation.

3.1 Proposed Action

DOE proposes to demolish most of the facilities on ALE, except for those needed by DOE, USFWS, and communications providers. Existing emergency communications capability must be maintained. A facility would be constructed to combine communications operations at a single site to allow the demolition of most of the existing antennas and radio repeaters on the ridgeline. In addition, DOE would remove miscellaneous debris from past activities across ALE and repair the fence as necessary on the boundary of ALE. Refer to Figure 3.1 (Borrow Area C is excluded from the proposed action).

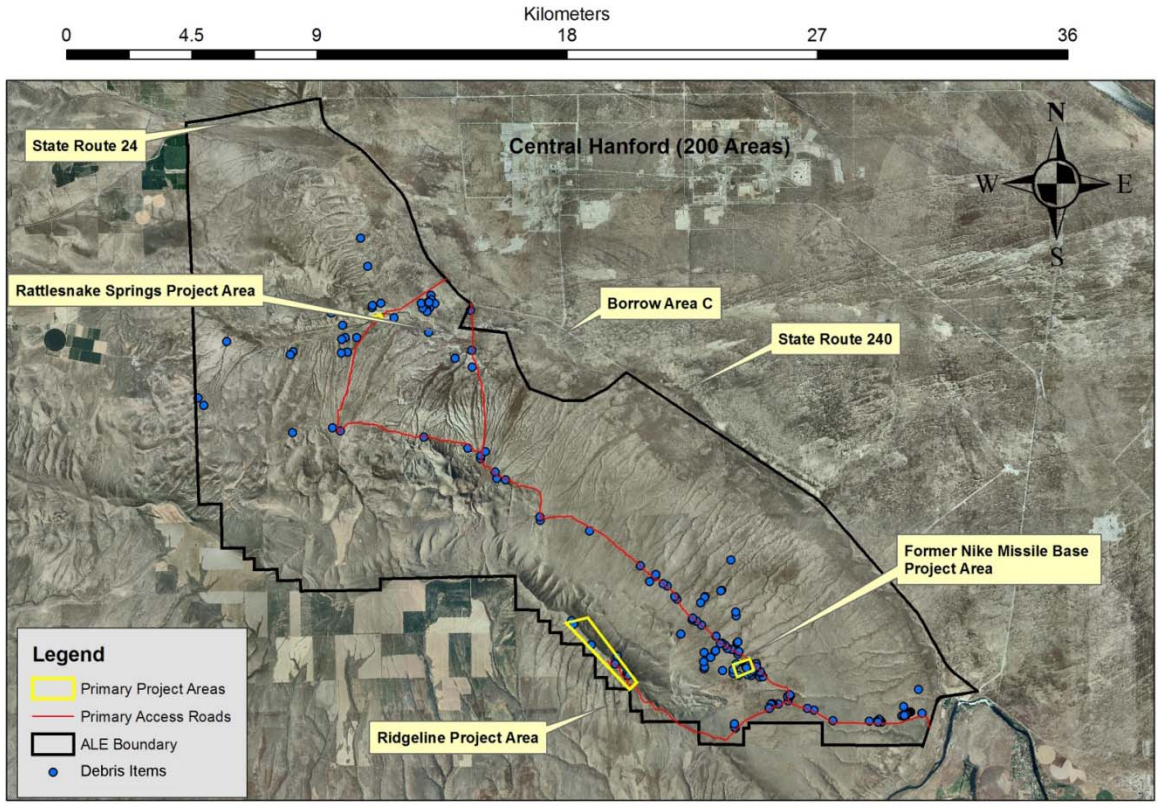

Figure 3.1. Three Principal Areas Proposed for Facility Consolidation and Cleanup: Ridgeline Area, Base Area—Former Nike Missile Base, and Base Area—Rattlesnake Springs Area, Overlaid on a 2006 Aerial Photograph

Because of the high elevation and the potential for high winds and bad weather on ALE, the field season for construction and demolition is relatively short. Therefore, depending on the decision reached by DOE regarding the proposed action, subsequent field activities could be limited to the summer months as well as shoulder months in the spring and fall.

In addition, because of the sensitive natural resources present on ALE and because the proposed action includes activities that traverse substantial acreage, ongoing cultural and ecological resource reviews could be conducted over several years. Although overall surveys of sensitive cultural and ecological resources have been conducted and are summarized in this EA, follow-on reviews of individual sites are expected to continue at appropriate times of the year and as necessary to support project schedules. Essentially, resource surveys would be phased to coordinate with project schedules and ensure that environmental data are available as they are needed to support implementing the proposed action and avoid or minimize impacts to sensitive resources.

3.1.1 Combined Community Communications Facility

There are eight emergency management and communications facilities and towers located on the ridgeline of Rattlesnake Mountain on ALE (seven towers, with two towers co-located at a single site, and a small structure for telephone service). This infrastructure provides public safety and emergency communications support for organizations such as DOE, Energy Northwest, Benton and Franklin counties, regional cities, and local, state, and federal agencies. In addition, a number of commercial entities use facilities on the ridgeline to provide communications for business and safety operations (Figure 3.2). A list of current users is provided in Appendix A.

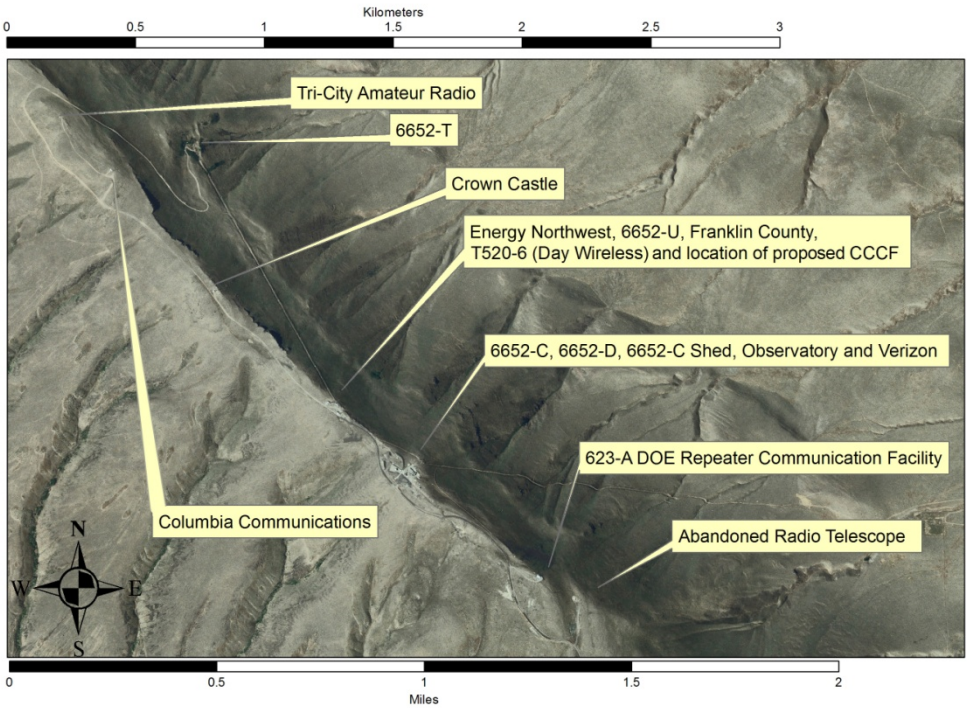

Figure 3.2. Communications Facilities Proposed for Demolition and Proposed Combined Community Communications Facility Site, Overlaid on a 2006 Aerial Photograph

DOE's proposed action would support continued communications operations on the ridgeline by consolidating and co-locating services to reduce the number of facilities and overall footprint, lessening both the visual impact and the impact of people on the sensitive habitat on the ridgeline. To combine communications facilities as much as possible, detailed information regarding frequencies, transmitter receiver specifications, effective transmitted power, antenna types, antenna gain, feedline type and length, and other information was collected to determine the requirements for the combined facility size and configuration.

Based on this information, a preliminary engineering study was conducted, focusing on radio frequency analysis, to determine what interference and/or propagation issues could influence the vertical alignment and spacing between antennas on each tower and specific harmonics that could introduce interference effects (Energy Northwest 2009). The study determined that two towers would be sufficient to support radio communications for multiple users without interfering with each other. One tower would be an existing 100-foot Energy Northwest tower that would be extended by 20 feet. The second would be a new 180-foot tower constructed near the first tower, which is an expansion of the existing facility. Both towers would be self-supporting metal lattice construction (without guy wires). A maintenance and operation building would be constructed between the towers. The building and new tower would be constructed on previously disturbed ground, within what is currently a graveled parking area. The new tower's foundation would require an excavation of about 6 to 10 feet deep in an area about 80 by 80 feet (new tower footprint). A borehole approximately 2 inches in diameter and about 20 feet deep may be necessary for soil analysis. A subsurface grounding system would run underneath the new tower to the building and connect with the existing tower's grounding system. In addition to the subsurface grounding grid, 8-foot ground rods would be driven vertically to establish an effective earth ground.

A new maintenance and operation building would be constructed to provide features such as power supply (primary and backup), equipment bays, fire protection, HVAC, telephone, and security for each user. Based on these requirements, a modular building with dimensions of about 9 by 18 m (30 by 60 ft) would be constructed between the towers. Conceptual designs indicate that the building and its foundation would be manufactured offsite and then moved by truck to the proposed site within the existing parking lot and erected. The foundation is expected to be a preformed concrete cell block-type structure to minimize the need for excavation. The building would provide a key-controlled bay area for each user to support maintenance, operations, and storage of components. The total footprint of the facility, including towers, grounding system, building, and parking area, is expected to be about 3700 m^2 [40,000 ft^2 (approximately 100 by 400 feet)], which would be entirely encompassed within the footprint of the previously disturbed area. Refer to Figure 3.3 and Figure 3.4 for the proposed location and conceptual design of the Combined Community Communications Facility (CCCF).

As a part of the proposed action, DOE would modify its existing property lease with Energy Northwest or provide a new real estate instrument to allow Energy Northwest to proceed with construction and operation of the CCCF.

Maintenance of the existing road to the ridgeline would be performed as necessary to support construction of the new tower and support building as well as to allow access for periodic maintenance requirements by communications facility users. The existing one-lane road is sufficient for these purposes, so maintenance is expected to largely consist of filling potholes, making minor repairs of the existing roadbed, and occasional snowplowing to keep the road in a safe and passable condition. The fence on the

boundary of ALE would also be repaired as needed and moved as necessary to accurately mark the property boundary.

Figure 3.3. Energy Northwest Communications Site. The Energy Northwest lattice tower is on the left; all of the other facilities are proposed to be demolished.

Figure 3.4. Conceptual Design of Proposed Combined Community Communications Facility.

3.1.2 Demolition of Public and Private Communications Facilities

The existing communications facilities on the ridgeline would be demolished after the CCCF is constructed. Refer to Table 3.1 for a list of existing communications facilities.

Table 3.1. Communications Towers Currently Located on the Ridgeline

Provider	Tower Height (Meters)	Tower Height (Feet)	Tower Type
Day Wireless	27	90	Guyed
Tri-Cities Amateur Radio Club	9	30	Guyed
	21	70	Guyed
Columbia Communications	23	75	Guyed
Energy Northwest (proposed for continued use)	30	100	Self-Supporting
Crown Castle	50	165	Guyed
623A (DOE)	30	100	Guyed
Total	**190**	**630**	

When the CCCF is operational, the following communications infrastructure would be removed from the ridgeline:

- Six existing towers and associated support buildings.
- One concrete structure used by Verizon for telephone service and an associated unneeded buried phone line that runs to sites with towers that would be demolished.
- Unneeded power lines that run to existing tower sites (about 2,300 linear meters or 7,500 linear feet).

- Several feeder roads to existing communications sites.

Approximately 460 m^2 (5,000 ft^2) of buildings and structures would be demolished. The resulting site footprint reduction would be from about 467,500 ft^2 [1] down to about 40,000 ft^2, which is a net reduction of about 427,500 ft^2, or about 91 percent. Approximately 630 vertical feet of towers presently on the ridgeline would be reduced to about 300 vertical feet.

Infrastructure removal over the project lifetime is expected to include the following steps:

- Set up equipment staging, parking, and material laydown areas.
- Remove any fluids, hazardous substances, and waste from the support buildings and any remaining equipment. Materials would be characterized, packaged, and transported for use, reuse, recycling, or disposal as waste.
- Remove potentially reusable assets such as towers, generators, and other equipment and transfer for use elsewhere.
- Demolish the buildings using standard demolition equipment, such as backhoes, trackhoes, and front-end loaders. Break into sections suitable for transport offsite, probably by truck. The materials could be recycled, reused, or disposed of as waste.
- Using a hydraulic hoe-ram or similar equipment, break up foundations into sections suitable for transport offsite, probably by truck. The materials could be recycled, used as fill elsewhere, or disposed of as waste.
- Remove the electrical lines in existing rights-of-way that currently serve existing tower sites. The wooden support poles would be removed as well, or a few might be left in place to serve as wildlife structures (e.g., elk scratching posts).
- Remove buried phone lines in existing rights-of-way to tower sites.
- Close unnecessary feeder roads.

3.1.3 Demolition of Inactive DOE Facilities/Structures

In addition to demolishing communications facilities, a number of DOE facilities would be removed on ALE, including several on the ridgeline, most of the buildings at the former Nike missile base area, and one building near the Rattlesnake Springs base area. Several still-serviceable structures would remain in place for use by the USFWS in management of the National Monument. The following buildings are among those expected to be demolished:

- Ridgeline Area Structures—the total square footage of DOE buildings at the ridgeline to be demolished is about 750 m^2 (8100 ft^2).
  - Rattlesnake Mountain observatory foundation and associated support structures (the observatory itself was recently dismantled by the owner for reassembly at another site for future use).
  - Excess transformer.

[1] Includes the area for support buildings, parking areas, towers, and the footprint under the guy wires for each tower.

- 6652-C and nearby shed (army barracks/administration building).
- Concrete structure (served radio telescope research).
- 6652-U (army upper pump house and tank).
- 6652-D (army pump house and tank).
- 6652-T and associated water lines (army fire protection lower pump house).

- Former Nike Missile Base Area—the total square footage of DOE buildings at and near the base area to be demolished is about 3300 m^2 (35,500 ft^2) (Figure 3.5).
  - 6652-G (army barracks).
  - 6652-H (army mess hall).
  - 6652-I (army administration, recreation, and storage building).
  - 6652-J (army barracks).
  - 6652-L (underground former Nike missile base storage and launch facility).
  - 6652-M (Type C army latrine).
  - 6652-S (army sentry post).
  - 6652-R (army paint shed)(DOE-RL 2002).

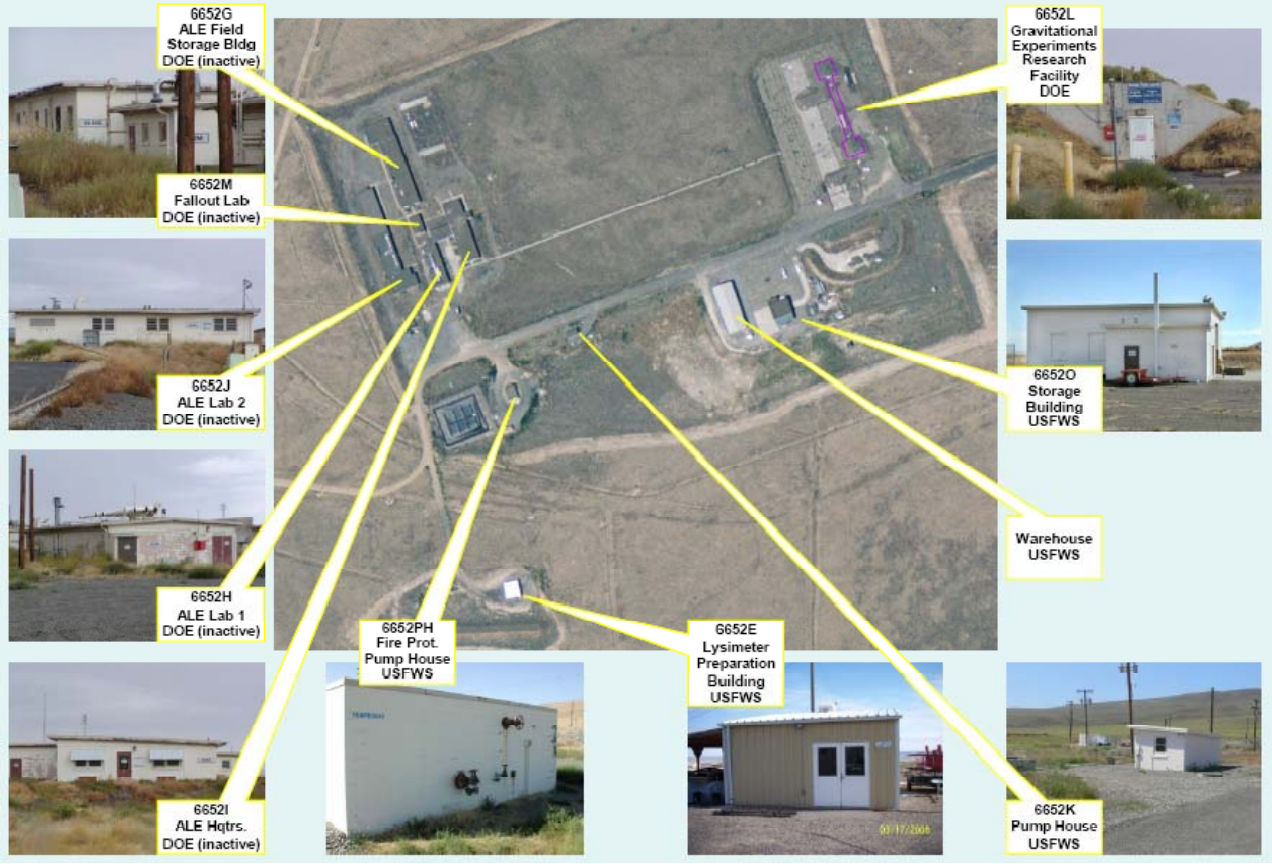

Figure 3.5. Facilities at the Former Nike Missile Base Area. Several buildings would remain in place to support USFWS management of the National Monument.

- Rattlesnake Springs Area
  - 646 (PNNL aquatic ecology field laboratory, 6 by 12 meters (20 by 40 feet) metal building, see Figure 3.6) (O'Connor and Rickard 2003).

Demolition over the project lifetime is expected to include the following activities:

- Set up equipment staging, parking, and material laydown areas.
- Establish temporary administrative trailers on pre-disturbed areas to facilitate demolition work
- Remove any fluids, hazardous substances, and waste from the buildings. Materials would be characterized, packaged, and transported for use, reuse, recycling, or disposal as waste.
- Remove potentially reusable assets and transfer for use elsewhere.
- Demolish the buildings using standard demolition equipment, such as backhoes, trackhoes, and front-end loaders. Break into sections suitable for transport offsite, probably by truck. The materials could be recycled, reused, or disposed of as waste.
- Use a hydraulic hoe-ram or similar equipment to break up foundations into sections suitable for transport offsite, probably by truck. The materials could be recycled, used as fill elsewhere, or disposed of as waste.
- Close unneeded wells.
- Close unnecessary feeder roads.

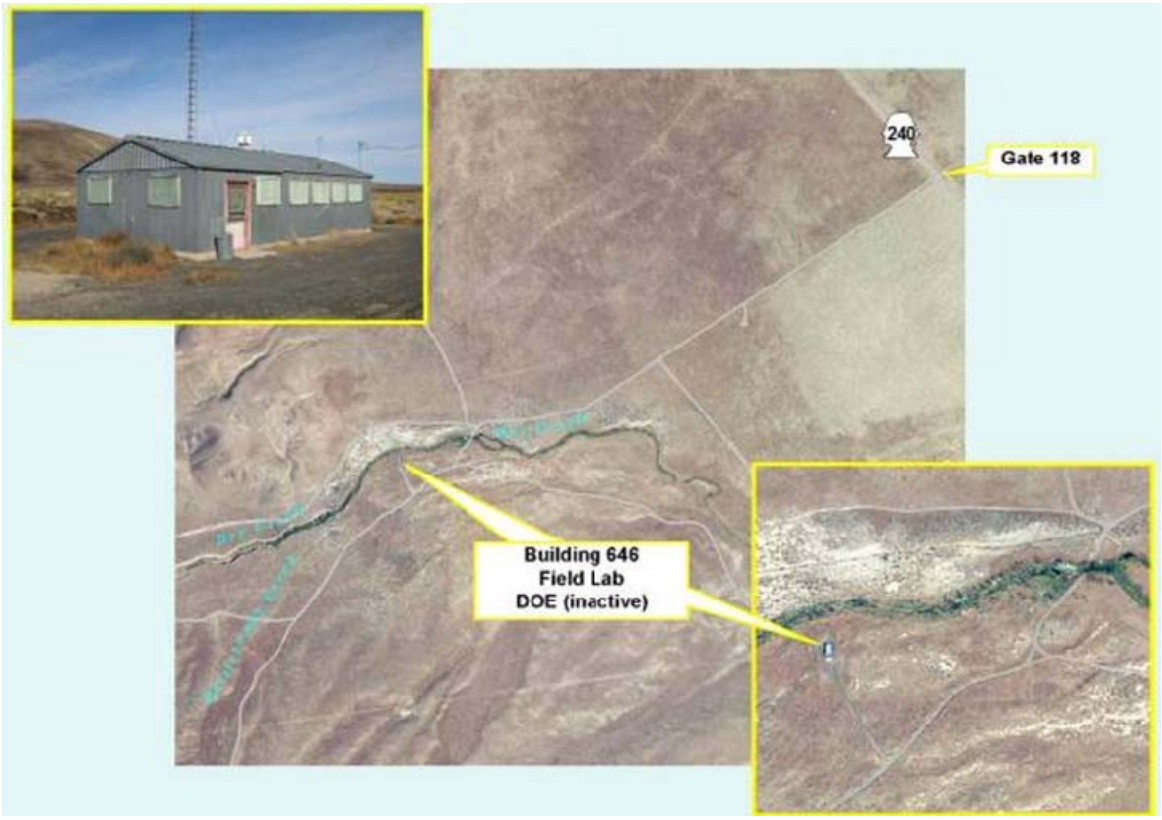

Figure 3.6. 646 Aquatic Ecology Field Laboratory, Rattlesnake Springs Base Area

In addition to demolishing unneeded DOE buildings, DOE intends to move the primary ALE access gate closer to State Route 225 to improve access control and increase security.

3.1.4 Cleanup of Miscellaneous Debris

Although several cleanups have occurred on ALE over the years, there are still isolated items located across the area. A number of these are still in use; for example, many fence posts are established to mark ecological transit routes and research areas, extensive corrals constitute elk and deer exclusion research areas, and several solar-powered telemetry antennas are used to track radio-collared wildlife. Because many of these features continue to be used for environmental research, it is expected that they would be left in place.

In addition to items still in use, there are a number of abandoned items. Examples include fence posts that were installed to support the Basalt-Waste Isolation Project in the 1980s, coiled remains of wire cable and barbed wire, conduit, rusted metal buckets and barrels, broken bricks, chunks of concrete, boards, and wooden posts. There are also larger items, including vehicles, a rock and cement foundation, several cisterns, and the concrete remains of past research projects. Refer to Figure 3.7 for the types and locations of debris on ALE.

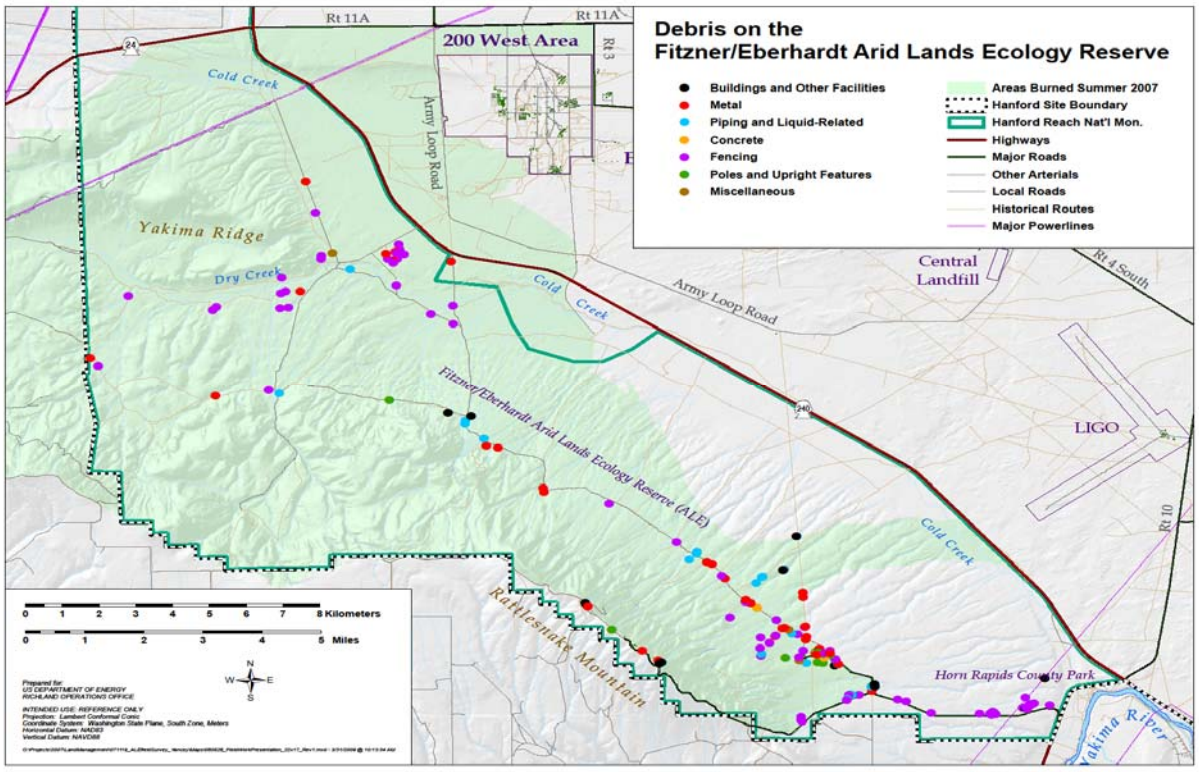

Figure 3.7. Location and Type of Debris Identified To Date on ALE

In addition to the known items, it is possible that additional debris could be found. This EA is intended to address future finds as well as identified debris as long as the general size and type of such items are similar to and essentially bounded by the types of debris found to date.

Because the habitat on ALE is quite sensitive to human disturbance, care must be taken to ensure that debris removal efforts do not result in more harm than the continued presence of the debris itself. In all cases, efforts would be taken to minimize damage to the ecosystem. The methods selected to perform the cleanup would depend on the size and weight of the item to be removed and the distance from the nearest road. Workers would collect items by hand when possible, returning collections to the nearest road for transport, or they might use fat-tired vehicles when necessary to minimize damage. It is likely that a truck might be required to collect some items. It is possible that a helicopter might be used to remove some items. If it is determined that the habitat damage caused by collecting the debris outweighs the environmental benefits of the cleanup, items might be left in place.

3.1.5 Recontouring and Revegetation

Removing buildings and foundations would result in numerous shallow depressions at the ridgeline and base areas. In addition, the unneeded feeder roads at the base and ridgeline, the buried water line from the 6652-T pump house and other buried utilities, and electrical power corridors are expected to require rehabilitation.

However, especially at the ridgeline, the environment is harsh, and the native plant communities are extremely susceptible to disturbance. Thus, the rehabilitation efforts themselves can have undesirable adverse ecological impacts. Therefore, rehabilitation plans would be developed for each site on an individual basis, focusing on recontouring and revegetating, and would be designed to minimize the overall environmental impacts. Appendix C provides additional information.

Specific recontouring procedures would depend on the severity of surface disturbance resulting from the demolition and the availability of suitable fill material. When practicable, nearby constructed berms might be used as fill material. At other locations, nearby rocks and fill material might be used to recontour the sites. Because of the risk of bringing in weed seeds and roots of noxious or alien plant species, fill material for recontouring from ALE would be preferentially used. However, especially at the base areas, it might be necessary to use suitable fill material from the Hanford Site or acquire clean soil offsite. Before implementation, these options would be evaluated to avoid disturbances to ALE sites.

Revegetation would be performed using appropriate native species that are typical of the site and surrounding plant communities. Plant materials used in revegetation would be locally derived. Boulders or other barriers might be used to prevent vehicle access during rehabilitation.

3.1.6 Pollution Prevention and Waste Minimization

Consistent with the requirements and guidance of regulations and executive orders, including the *Pollution Prevention Act of 1990* (42 USC 13101), DOE incorporates pollution prevention and waste minimization practices in construction and demolition activities. Pollution prevention is defined as the use of materials, processes, and practices that reduce or eliminate the generation and release of pollutants, contaminants, hazardous substances, and wastes into land, water, and air. Pollution prevention includes

practices that reduce the use of hazardous materials, energy, water, and other resources along with practices that protect natural resources through conservation or more efficient use. Within DOE, pollution prevention includes all aspects of source reduction as defined by The U.S. Environmental Protection Agency (EPA) and incorporates waste minimization by expanding beyond the EPA definition of pollution prevention to include recycling. Pollution prevention is applied to all DOE pollution-generating activities, including facility construction and demolition activities.

Pollution prevention would be achieved through:

- Equipment or technology selection or modification, process or procedure modification, reformulation or redesign of products, substitution of raw material, and waste segregation.
- Efficiency in the use of raw materials, energy, water, or other resources.
- Recycling to reduce the amount of waste materials and pollutants destined for release, treatment, storage, and disposal.

3.1.7 Emergency Preparedness

DOE Order 151.1C, *Comprehensive Emergency Management System* (DOE 2005), provides the framework for development, coordination, control, and directions of all emergency planning, preparedness, readiness assurance, response, and recovery actions. DOE staff members participate in regularly scheduled exercises to train emergency personnel who would respond to potential accidents and other events. Emergency services at ALE are provided by the Hanford Patrol, the Benton County Sheriff, and the Hanford Fire Department.

3.2 Alternatives Considered but Not Evaluated in Detail

Several alternatives to the proposed action were evaluated qualitatively, including two alternatives that are essentially subsets of the proposed action.

1. DOE could construct the CCCF and subsequently remove the other communications facilities on the ridgeline without removing the rest of the DOE structures at the base areas, or
2. DOE could remove unneeded DOE structures at the base areas without implementing the communications consolidation and subsequent removal of other communications facilities on the ridgeline.

After evaluation, DOE considers that the proposed action adequately encompasses these activities while still allowing program flexibility.

In addition, a third alternative was considered:

3. Moving the communications facilities to another promontory in the region. Although this alternative is not within the scope of DOE's authority, Energy Northwest funded a study to evaluate the possibility of moving the communications towers currently located on the ridgeline to another location within Benton or Franklin Counties. In 2008, the alternative siting study (LMSI 2008) evaluated the availability of the following features:
    - Adequate site elevation, allowing acceptable radio frequency propagation.

- Tower and support building siting availability.
- Year-round access road.
- Power and HVAC capabilities.

Nineteen sites were evaluated in the two counties, including Badger Mountain, Candy Mountain, Flat Top, Jump-Off Joe Butte, Wahitas Peak, Red Mountain, and Prosser Butte. Of the nineteen sites, nine were rejected because of inadequate radio frequency propagation; several sites were rejected because of a lack of access road or because of poor road conditions; and a few sites were determined to work for one or more communications users, but not for all of them. Use of the alternative sites would require intermodulation studies to ensure that the antennas would not interfere with existing operational radio systems, tower structural analyses, site development plans, and modifications to all 12 Energy Northwest emergency sirens and all 10 DOE river-based emergency sirens (e.g., replace some antennas, extend antennas higher on mast, or modify some siren radios).

Based on this study, it was determined that no location exists in Benton or Franklin County that could provide the broad level of coverage currently provided at the ALE ridgeline. An adequate level of coverage is required by the communications users to protect citizens, provide services, and, in the case of Energy Northwest, meet the regulatory requirements of the Columbia Generating Station Emergency Plan as approved by the U.S. Nuclear Regulatory Commission.

It is possible that in the future, new technologies might be developed that could eventually allow the removal of the CCCF on the ALE ridgeline. New technologies might conceivably extend the effective range of communications systems or allow tower placement on lower promontories.

3.3 No-Action Alternative

Under the No-Action Alternative, a CCCF would not be constructed. Instead, communications users would continue to use the seven towers and associated facilities and the telephone facility currently located on the ridgeline. DOE would continue to maintain and operate the towers, feeder roads, telephone cable, and power lines as necessary for emergency management and commercial communications requirements. The access road to the ridgeline would be maintained to allow users to access and maintain the communications equipment.

The unneeded DOE facilities present at the base areas and ridgeline would remain in place with little ongoing maintenance. The boundary fence would continue to degrade and in places, inaccurately identify the property boundary. The debris located across ALE would be left in place.

Environmental impacts of the No-Action Alternative are discussed in Section 5.11.

4.0 Affected Environment

Aspects of ALE and its environs that might be affected by the proposed action are described in this section. In accordance with DOE's "sliding scale" guidance (DOE 2004), the description of the affected environment in this section emphasizes the resource areas and considerations most likely to be affected by the proposed action and highlights information that is necessary to assess or understand the potential environmental impacts.

4.1 Land Use

The habitat at ALE has been protected since the 1940s, initially to serve as a buffer for Hanford operations and for the purposes of ecological research and education. Since then, there have been a number of land use designations and protections of ALE over the years:

- In 1950, the U.S. Army began development of a Nike Ajax missile defense system in the area, as a part of Camp Hanford, which was established to provide air defense of Hanford.
- In 1967, the area was reserved for desert ecology research and education by the Atomic Energy Commission.
- Four years later, in 1971, ALE was designated as a Federal Research Natural Area—the Rattlesnake Hills Research Natural Area—to provide examples of the shrub-steppe communities characteristic of the most arid portions of the Pacific Northwest (Franklin et al. 1972).
- In 1977, DOE dedicated portions of the Hanford Site, including all of ALE, as a National Environmental Research Park.
- In 1993, an act of Congress redesignated ALE as the Fitzner/Eberhardt Arid Lands Ecology Reserve to honor two research scientists who died in a plane crash while studying wildlife near Yakima, Washington.
- In 1997, DOE signed an agreement with the USFWS to manage ALE. Under the terms of the agreement, DOE remained owner of ALE, but the USFWS supervised it.
- Most of ALE was designated as Preservation land-use in a 1999 DOE ROD for the *Final Hanford Comprehensive Land-Use Plan EIS* (64 FR 61615). The exception was a section in the southeastern part of the reserve known as Borrow Area C, which was designated in the 1999 ROD as Conservation/Mining to provide borrow materials for waste management activities in the 200 Areas.
- On June 9, 2000, most of ALE became part of the newly created Hanford Reach National Monument. In June 2001, DOE and USFWS signed a Memorandum of Understanding that covered USFWS management (Duncan 2007).
- In 2008, USFWS decided to implement a comprehensive conservation plan for the Hanford Reach National Monument (including ALE) that provides a high level of resource protection while permitting public access and uses. This decision was established in a 2008 ROD for the *Hanford Reach National Monument Comprehensive Conservation Plan and Final EIS* (73 FR 72519). DOE was a cooperating agency during the development of the CCP EIS.

Over the years, these land-use designations have focused on the continued protection of the sensitive habitats and wildlife present on ALE. Since the establishment of the federal Hanford Site, the unique ecological and cultural characteristics of the area have been recognized.

4.1.1 Ridgeline Area

DOE has leased property at the ridgeline to others for the purposes of emergency and commercial communications since 1964. Refer to Appendix A for a list of tenants on the ridgeline. In addition, in 1971, Battelle erected an observatory on the ridgeline, installing a 0.8-meter Cassegrain reflecting telescope for astronomical research. In September 2005, ownership of the observatory was transferred to a nonprofit group, the Alliance for the Advancement of Science through Astronomy (AASTA). AASTA is made up of scientists, educators, and community leaders from southeast and southcentral Washington; its goal is to foster a cooperative relationship between students, educators, amateurs, and professionals to allow all groups to learn, interact, and actively participate in the exploration of the universe. AASTA, with help from Battelle, dismantled the observatory in June 2009 and plans to re-install it for use at another location in eastern Washington.

4.1.2 Base Area—Former Nike Missile Base

There are a number of buildings located at the former Nike missile base; most of them were constructed by the army in the 1950s in response to heightened Cold War tensions. These buildings functioned as the headquarters for ALE and provided laboratory space and offices for DOE's national laboratory staff engaged in research from the late 1970s to the mid 1990s. Nearly all are currently empty and unused, except for one that was constructed more recently by USFWS as well as support buildings that USFWS wishes to preserve, such as a pump house, a water tank, and a small building used for storage (6652-K, -O, and -E, respectively).

In addition, the 6652-L facility currently houses a long-term research effort funded by the National Science Foundation to measure the gravitational constant, G; test Einstein's weak equivalence principle; and evaluate whether or not a fifth force exists in the universe compared to the four known forces (strong, weak, electromagnetic, and gravitational). Team members include PNNL, University of California, and University of Washington. The current agreement between the team members and DOE allows the continued use of the facility for research purposes through May 2011.

4.1.3 Base Area—Rattlesnake Springs Area

The 646 Building is an aquatic ecology field laboratory and classroom located at the Rattlesnake Springs area. The building has not been used for at least 7 years. The building and associated road and graveled turnaround area are reached by an unimproved road that is used for routine access to the ALE site. Several large animal exclusion structures are located along the perennial stream in the same general vicinity.

4.1.4 Debris Areas

Research and operational debris remains in many locations across ALE, in areas reserved for ecological protection and research. Although much of the equipment and research plot markers was used for a

number of purposes over the years, the areas in which these items are located remain largely undisturbed. Some of the debris is left from pre-Hanford occupation of local farms, ranches, and roadways that existed before the land was condemned or otherwise acquired for the Manhattan Project.

4.2 Cultural and Historical Resources

The Hanford Site, including ALE, contains an extensive record of human occupation documenting a series of overlapping cultural landscapes stretching back thousands of years, each layer of which tells the story of how people have used the landscape. Three distinct landscapes are defined—the Native American Cultural Landscape, the Early Settlers and Farming Landscape, and the Manhattan Project and Cold War Era Cultural Landscape. A detailed description of how each of these landscapes is generally represented is derived from the *NEPA Characterization Report* (Duncan 2007) and from the *Hanford Cultural Resources Management Plan* (DOE-RL 2003a). This description is reproduced in Section 4.3 of the cultural resources review report found in Appendix B, which is a redacted version from which specific archaeological site locations have been removed in accordance with 43 CFR 7.

Historical land use patterns associated with each of these three landscapes are evidenced on ALE. According to the ethnographic literature, tribal elder interviews, and the archaeological resources that have been identified on ALE, this area has been in use for 13,000 years and is known to be associated with regional Tribes and the Plateau culture in the Columbia Basin. Rattlesnake Mountain is known in the Sahaptin language as *Laliik*, which means "standing above water" (Kennedy et al. 2008). Oral narratives indicate that *Laliik* was a place of refuge during an era of flooding, which may refer to the Pleistocene floods that occurred in the region as recently as 13,000 years ago (Kennedy et al. 2008). DOE recently determined that the portion of *Laliik* under its jurisdiction and control is eligible for inclusion in the National Register as a historical property, and that the property is a Traditional Cultural Property (TCP) (DOE-RL 2008). *Laliik* is also the location where several Washat prophets received the songs of the Seven Drums religion and revived the Washani religion in the region (Kennedy et al. 2008). It continues to play a role in the practice of the Washani religion today. Rock cairns are dispersed across the landscape, some of which are evidence of Plateau Indian spiritual and cultural practices that can be associated with vision questing (Kennedy et al. 2008). In addition, the area was an important resource-gathering area for hunting, lithic resources, plants, medicines, and roots. Several trails traverse ALE and connect these traditional resource-gathering areas, including Rattlesnake Springs, where an archaeological site complex consisting of pre-contact campsites is located at the crossroads between the White Bluffs Trail and the Cold Creek Valley Road. Sixty-seven archaeological sites evidencing this long-term use have been identified on *Laliik* to date.

The first euro-American settlers came to the area that is now ALE in the mid-1800s for cattle ranching, sheep grazing, and occasional homesteading, with the Benson, Snively, and Porter-Hartmann families establishing the earliest homesteads (Hinds and Rogers 1991). Homesteaders on ALE depended on reliable water sources at Rattlesnake and Snively Springs or wells, and succeeded in dryland farming and raising alfalfa, sheep, and cattle (Hinds and Rogers 1991). Archaeological evidence of this use (abandoned cisterns, foundations, remnants of the Benson and Snively ranch sites, and historical debris) is dispersed across ALE. Natural gas was first discovered on ALE in 1913, but was not developed for commercial use until 1929 (Hinds and Rogers 1991). Production ceased in 1941 when most of the gas was depleted. The remains of the gas wells and the dwellings are located in the vicinity of the 1200-foot road.

In 1943, when the U.S. Government condemned or otherwise acquired land for the Manhattan Project, the area was originally set aside as a buffer zone to provide additional protection from plutonium production and storage activities occurring within the interior and central areas of the Hanford Site. No plutonium production occurred on ALE (DOE-RL 2002). Early military use of ALE in 1943 included construction of infrastructure to support site security efforts (i.e., road building and construction of the T520-6 Building [Navy Mars Radio Station] on the ridgeline).

In 1955, in response to heightened Cold War tensions, the army supplemented the anti-aircraft artillery gun emplacements (located mostly in the interior and northern edge of the Hanford Site) with the Nike surface-to-air missiles (DOE-RL 2002). Two Nike missile facilities were constructed on ALE in 1955: the 6652-C Building on the ridgeline of Rattlesnake Mountain, which was the control site, and the 6652 Complex (6652-G, -H, -I, -J, K, -L, -M, -O, -R, and -S) at the base of Rattlesnake Mountain, which contained the launch site, missile fueling and warheading area, and various administrative, residential, and recreational facilities (DOE-RL 2002).

Also in the late 1950s, communications facilities were constructed at the ridgeline with the construction of the 623-A Building (Microwave Equipment Facility/Radio Relay). Various support facilities, such as pump houses (6652-T, 6652-U, and 6652-D), electrical lines, and telephone communications equipment (buried telephone wire and water pipe and above-ground electrical lines), were constructed to support the 6652-C facility and the 623-A Building on the ridgeline as well as at the 6652 Complex at the base area in the late 1950s. By 1961, the Nike base on ALE was deactivated. Many of the 6652 Complex buildings were later used as the ALE headquarters in the late 1960s and as offices and field laboratories by Battelle staff in the early 1990s.

The 646 Building (Radioecology Field Lab), a 20-foot-by-40-foot metal building and associated septic and electrical power, was constructed in 1961 to support early environmental research conducted on ALE to understand plant and soil radionuclide contamination (O'Connor and Rickard 2003). During later years, the 646 Building was also used for educational activities.

Research and educational activities continue to be a primary function on ALE today. As a result of restricted public access and limited construction, ALE contains substantial areas of pristine to near-pristine native habitat. Protection of the unique shrub-steppe habitat has been a primary focus at ALE since the 1960s, as evidenced in the different protective land designations that have occurred over the years.

4.2.1 Ridgeline Area

Various cultural resource investigations over the past 50 years have recorded several cultural resources in the ridgeline area of ALE (Kennedy et. al. 2009). These include nine archaeological sites eligible for the National Register associated with the pre-contact and ethnographic era that are contributing properties to the *Laliik* TCP. These archaeological sites consist of rock cairns, isolated lithic flakes and tools, a lithic scatter, and a temporary campsite near the ridgeline. These sites are located in pockets of undisturbed ground in close proximity to proposed action activities. Of note is the archaeological site near the ridgeline spring, which appears to have been partially disturbed by construction of one of the electrical lines and the 6652-T pump house. Several plant species that are valued by Tribes for traditional uses were observed at this location, suggesting that this area may be an important traditional resource-

gathering area. The ridgeline is also a culturally sensitive area that figures prominently in the historical and cultural significance of *Laliik* as a TCP.

The buildings on the ridgeline were evaluated as part of the Manhattan Project and Cold War Era Historic District analysis conducted by DOE and its cultural resources contractors between 1994 and 1998 (DOE-RL 2002). The *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan* (DOE-RL 1998) outlined how the future demolition of historic buildings associated with this district would be mitigated. These mitigations were implemented, including documentation on Historic Property Inventory Forms and detailed historical overviews of the scientific and engineering attributes of these buildings in a document entitled, *The History of the Plutonium Production Facilities at the Hanford Site Historic District, 1943-1990* (DOE-RL 2002). The results of this evaluation concluded that three of the ridgeline buildings are eligible for the National Register, based on their association with the Manhattan Project and Cold War Era Historic District. These include the T520-6 Mars Radio Station constructed in 1944, the 623-A Microwave Equipment Facility/Radio Relay constructed in 1957, and the 6652-C H-52 Nike Missile Base-Barracks/Administration Building constructed in 1956. Of these, only the 6652-C Building was recommended as requiring mitigation. Documentation was completed via a Historic Property Inventory Form and addressed in DOE-RL (2002) (see Table 4.1).

The road up to the ridgeline of Rattlesnake Mountain was constructed in 1943 and is also eligible for listing in the National Register as a contributing property to the Manhattan Project/Cold War Era Historic District. A Historic Property Inventory Form for the road was completed in 2007 (Stapp and Dage 2007). Additional details about the road are documented in DOE-RL (2002), Chapter 2, Section 11.

The remaining buildings and infrastructure located on the ridgeline are not eligible for the National Register, either because they do not meet the 50-year age criterion for historical designations, or they did not contribute to the Manhattan Project and Cold War Era Historic District.

4.2.2 Base Area—Former Nike Missile Base

There have been several cultural resources investigations at the base area over the past 15 years (Kennedy et al. 2009). No archaeological sites have been identified within the immediate proposed action area. Given the extensive disturbance at the base area, the potential for discovery of subsurface archaeological resources in this area is low. The former Nike missile base buildings and infrastructure were evaluated as part of the Manhattan Project and Cold War Era Historic District analysis conducted by DOE and its cultural resources contractors between 1994 and 1998 (DOE-RL 2002). The *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan* (DOE-RL 1998) outlined how the future demolition of historic buildings associated with this district would be mitigated. These mitigations were implemented, including documenting the history on Historic Property Inventory Forms and developing a detailed historical overview of the scientific and engineering attributes of the buildings in DOE-RL (2002). The results of this historical overview concluded that 14 of the former Nike missile base structures are eligible for the National Register associated with the Manhattan Project and Cold War Era Historic District. Of these, 12 are proposed to be demolished (see Table 4.1).

Table 4.1. National Register-eligible Former Nike Missile Base Buildings and Mitigation Status

Building Number and Description	Theme/Historic Function	Documentation Mitigation Required	Documentation/Mitigation Completed
T520-6 (Navy Mars Radio Station) – 1944	Site Security	No	NA
623-A (Microwave Equipment Facility/Radio Relay – 1957	Communication/ Administrative Support	No	NA
6652-C (H-52 Nike Missile Base – Barracks/Administration Building) – 1956	Military Operations	Yes	Historic Property Inventory Form and engineering history documented in DOE-RL (2002), Chapter 2, Section 9
6652-G (H-52 Nike Missile Base – Barracks) – 1956	Military Operations	Yes	Historic Property Inventory Form and engineering history documented in DOE-RL (2002), Chapter 2, Section 9
6652-H (H-52 Nike Missile Base – Mess Hall) – 1956	Military Operations	Yes	Historic Property Inventory Form and engineering history documented in DOE-RL (2002), Chapter 2, Section 9
6652-I (H-52 Nike Missile Base – Administration, Recreation, and Storage) – 1955	Military Operations	Yes	Historic Property Inventory Form and engineering history documented in DOE-RL (2002), Chapter 2, Section 9
6652-J (H-52 Nike Missile Base – Barracks) – 1955	Military Operations	Yes	Military Operations
6652-K (H-52 Nike Missile Base – Pump House) – 1955 (This building would be preserved for use by USFWS.)	Military Operations	Yes	Military Operations
6652-L (H-52 Nike Missile Base – Underground Missile Storage Facility) – 1955	Military Operations	Yes	Historic Property Inventory Form and engineering history documented in DOE-RL (2002), Chapter 2, Section 9
6652-M (H-52 Nike Missile Base – Type “C” Latrine) – 1955	Military Operations	Yes	Historic Property Inventory Form and engineering history documented in DOE-RL (2002), Chapter 2, Section 9
6652-O (H-52 Nike Missile Base – Missile Assembly and Test Building) – 1955 (This building would be preserved for use by USFWS.)	Military Operations	Yes	Historic Property Inventory Form and engineering history documented in DOE-RL (2002), Chapter 2, Section 9
6652-R (H-52 Nike Missile Base – Aluminum Paint Shed) – 1955	Military Operations	Yes	Historic Property Inventory Form and engineering history documented in DOE-RL (2002), Chapter 2, Section 9
6652-S (H-52 Nike Missile Base – Sentry Box/Guard Shack) – 1957	Military Operations	Yes	Historic Property Inventory Form and engineering history documented in DOE-RL (2002), Chapter 2, Section 9

Table 4.1. (contd**)**

Building Number and Description(a)	Theme/Historic Function	Documentation Mitigation Required	Documentation/Mitigation Completed
Fueling and Warheading Area (1955-1956)	Military Operations	Yes	Historic Property Inventory Form and engineering history documented in DOE-RL (2002) , Chapter 2, Section 9
Acid Storage Shed – 1956	Military Operations	Yes	Historic Property Inventory Form and engineering history documented in DOE-RL (2002) , Chapter 2, Section 9
Crow's Nest/Observation Post – 1956	Military Operations	Yes	Historic Property Inventory Form and engineering history documented in DOE-RL (2002) , Chapter 2, Section 9
J.P. Fuel Pad – 1956	Military Operations	Yes	Historic Property Inventory Form and engineering history documented in DOE-RL (2002), Chapter 2, Section 9

4.2.3 Rattlesnake Springs Area

The 646 Building at the Rattlesnake Springs area is located near a culturally sensitive area that contains archaeological and ethnographic resources (Kennedy et al. 2009). Located halfway between primary riverine and inland resource gathering areas at the crossroads between two historic trails, the Rattlesnake Springs area is the location of an archaeological site complex and resource-gathering area. The archaeological site complex includes the National Register-listed Rattlesnake Springs Campsites and three large lithic scatters and the White Bluffs Trail, all of which are eligible for the National Register.

4.2.4 Debris Areas

There are over 100 debris items dispersed across ALE that have been identified for cleanup. Most of these are located adjacent to existing roads and have not yet been surveyed for cultural resources. None of the debris evaluated to date overlap with previously recorded archaeological sites. Based on the descriptions and photographs, a few items are likely to be 50 years or older and might be recorded as archaeological sites or isolates and be evaluated for their potential to be eligible for listing in the National Register. Although the majority of debris items are less than 50 years old, a graded approach to assess the effects of cleanup of these items would be applied, as described in the cultural resource review in Appendix B (Sections 7.5 and 7.6).

Follow-on cultural resource surveys and reviews could be conducted in the future for the following aspects of the proposed action:

- Demolishing electrical lines and the 6652-T Building at the ridgeline.
- Demolishing a small feature known as Hodges Well located near the former Nike missile base area.
- Modifying fences and gates to enhance security and access control.
- Siting temporary trailers and laydown areas for demolition activities.
- Removing buried phone lines at the ridgeline.
- Cleaning up debris items.

4.3 Ecological Resources

The ecological resources found at the sites where proposed construction, demolition, and cleanup activities would occur vary with elevation and location on ALE. Ecological reviews of these areas were conducted in the spring of 2009, during the appropriate season and time to document the occurrence of important species and habitats. Results and a summary of the ecological reviews of individual areas that could be affected during the proposed actions are located in Appendix C (including genus and species names of plants and animals).

The state and federally listed threatened and endangered plant and animal species of potential interest were identified by examining published state and federal resource listings. Priority habitats and flora and fauna species of concern are identified by Washington Department of Fish and Wildlife (2008a, 2008b) and Washington State Department of Natural Resources (2008). Lists of animal and plant species considered endangered, threatened, proposed, or candidate by the USFWS are maintained at 50 CFR 17.11 and 50 CFR 17.12; the list of birds protected under the Migratory Bird Treaty Act is maintained at 50 CFR 10.13.

In addition, in 1994, The Nature Conservancy identified 11 native plant community element occurrences[2] on ALE as defined by the State of Washington Natural Heritage Program, including relatively large expanses of big sagebrush/bluebunch wheatgrass and threetip sagebrush/Idaho fescue elements (DOE-RL 2001). By tracking the location and quality of the various occurrences of a particular element, the Natural Heritage Program can assess the significance of a given occurrence relative to other occurrences in the state or region.

The following discussion includes descriptions of the species and habitats observed and likely to occur in areas affected by the proposed construction, demolition, and cleanup activities.

4.3.1 Ridgeline Area

The ridgeline of Rattlesnake Mountain encompasses habitats and wildlife that are common to shallow stony soils or lithosols found throughout eastern Washington (Daubenmire 1970). Basalt outcrops, cliffs, and loose rock at the base of cliffs or on slopes are found along the ridgeline and slopes of ALE (Downs et al. 1993). These shallow soils support scattered short-statured shrubs and grasses such as those typically found in the following habitat associations:

- Rock buckwheat/Sandberg's bluegrass.
- Thyme buckwheat/Sandberg's bluegrass.
- Rigid sagebrush/Sandberg's bluegrass.
- Narrowleaf goldenweed/Sandberg's bluegrass.

[2] Element occurrences represent a systematic approach to inventory and protect the state's natural diversity. An element is a basic unit of the biologic and geologic environment identified as a needed component of a system of natural areas. An element is an entire ecological system, such as a plant community, that includes the common plants and animals of that system.

Characteristic plant species found on ridgetops include rosy balsamroot, thyme buckwheat, Hood's phlox, and daggerpod (Sackschewsky and Downs 2001). However, vegetation in the immediate area surrounding the communications facilities, buildings, and parking lots or roadway access areas is very sparse and limited to a few hardy or weedy species.

The ridgeline provides habitat for a variety of wildlife and plants and is considered an important high-elevation stopover point for migratory birds. All of ALE is designated as an Important Bird Area by the Washington Department of Fish and Wildlife (2008b) and Audubon Washington (2009). Birds commonly seen along the ridgeline include the common raven, rock wrens, vesper sparrows, horned larks, American kestrel, northern harrier, and red-tailed hawks. Raptors such as ferruginous hawks and prairie falcons may nest on basalt outcrops along the ridgeline. Mammals such as the yellow-bellied marmot, white-tailed jackrabbit, least chipmunk, and woodrat commonly occur at the ridgeline and the adjacent habitat areas (Downs et al. 1993). Common reptiles found in lithosol habitats at the ridgeline include the pygmy short-horned lizard and the western rattlesnake.

4.3.2 Base Area—Former Nike Missile Base

The lower slopes on ALE support both shrub-steppe and native bunchgrass associations. The composition of these communities changes as the elevation changes. The buildings and debris items located between 800- and 1200-foot elevations lie primarily in the big sagebrush/bluebunch wheatgrass habitat association. Wildfires that burned much of ALE in 2000 and 2007 have removed a large portion of the sagebrush-dominated habitat, leaving large areas of grasslands. At the mid-level elevations, bluebunch wheatgrass, Sandberg's bluegrass, a variety of flowering plants, and a cryptogamic or biotic soil crust of lichens, moss, and algae comprise the habitat associations. The areas near existing buildings are largely disturbed or surfaced with gravel and hardened. Vegetation and habitat in these areas consist of mixtures of weedy and native species, except where crested wheatgrass was planted to stabilize soils. This introduced perennial grass was planted over several acres between the ALE headquarters buildings and the former Nike missile base bunker as well as within some power line rights of way and other areas used by the military during the 1950s.

Common birds that nest in the bluebunch wheatgrass steppe vegetation include the horned lark and the western meadowlark. Raptors such as red-tailed hawks and northern harriers hunt the grasslands for small mammals and snakes. Wildlife using the grasslands on ALE is diverse and includes small and large mammals. The Great Basin pocket mouse is the most common small mammal in this area, but the Townsend's ground squirrel, northern pocket gopher, and meadow voles may also be found in the mid elevations of ALE (Downs et al. 1993). Large mammals inhabiting the mid-elevation steppe include mule deer and Rocky Mountain elk as well as predators such as coyote and badger. Common reptiles include side-blotch lizards, Great Basin gopher snake, and the western rattlesnake.

4.3.3 Base Area—Rattlesnake Springs Area

The Rattlesnake Springs area supports several habitat types associated with the perennial stream flowing through the area. The 646 Building sits at the edge between riparian vegetation associated with the stream and upland shrub-steppe vegetation. The area immediately adjacent to the building and the roadway and parking area is mostly unvegetated with occasional Russian thistle or cheatgrass. The riparian corridor is dominated by coyote willow, black cottonwood, and chokecherry along with

numerous weedy species such as stinging nettle, pepperweeds, and knapweeds in the vicinity of the building. The upland vegetation adjacent to the existing building, driveway, and parking area consists of a transitional area between black greasewood and big sagebrush habitats. Elk use in the riparian area has increased as the size of the herd increases, and browsing and grazing has affected the growth and regrowth of woody species alongside the stream. The USFWS has constructed several elk exclosures along Rattlesnake Springs to protect recovering vegetation. The riparian area associated with Rattlesnake Springs provides important nesting and stopover habitat for a number of migratory and resident bird species. Survey records for the Rattlesnake Springs areas document more than 70 bird species that make use of the riparian areas, including passerines such as American goldfinch, Bewick's wren, eastern kingbird, golden-crowned kinglet, and rufous-sided towhee as well as upland game birds, raptors, and owls (PNNL 2008). Elk and deer make frequent use of this water source, and mammals such as porcupine and badger may also use the area. Small mammals using the riparian area are similar to those found elsewhere on ALE. The Great Basin spadefoot toad also may be found within the riparian area and the adjoining uplands.

4.3.4 Debris Areas

The debris identified for cleanup lie in a number of different habitats on ALE and can be classified according to elevation. Low-elevation habitats on ALE were originally dominated by big sagebrush/Sandberg's bluegrass vegetation or big sagebrush growing with either Indian ricegrass or needle-and-thread grass. These low-elevation communities have been severely affected by wildfires in 2000 and 2007, and few shrubs remain. Mid-elevation areas between 800- and 1600-feet elevations are primarily located in habitats characterized by bluebunch wheatgrass/Sandberg's bluegrass associations. In some cases, debris areas are located in weedy, abandoned old-field habitats as described by Sackschewsky and Downs (2001). Wildlife found in these areas are similar to those described as using the mid-elevation areas of ALE.

4.4 Transportation

The regional highway network in the vicinity of ALE consists of several main routes: a DOE-maintained road network within the Hanford Site and State Route 240, which is a two-lane highway that crosses the Hanford Site and in places forms the northern boundary of ALE. At peak periods, commuter traffic is often heavy on all primary routes to and from the Hanford Site, including State Route 240. The Washington State Department of Transportation recently widened State Route 240 between the cities of Richland and Kennewick and revised traffic flow to relieve congestion.

The access road to the ALE ridgeline consists of an access-limited two-lane blacktop road to the base area that is in fair condition. From the base area to the ridgeline, the paved access road narrows and becomes more deteriorated. At the ridgeline, the access road is paved in places and graveled in places. From the access road, the feeder roads to individual communications tower sites range from well-maintained to poorly-maintained gravel roads.

There is also a network of dirt roads interlacing ALE at the lower elevations. Some are in adequate condition; for example, the 1200-foot dirt road that passes near Rattlesnake Springs is passable by vehicles with sufficient ground clearance during most seasons. Other roads are used less often and are in poor condition.

4.5 Human Health and Safety

The DOE records occupational injuries and illnesses in two primary categories pertinent to DOE NEPA analysis:

- Total recordable cases (TRC) are the total number of work-related injuries or illnesses that resulted in death, days away from work, job transfer or restriction, or “other recordable case" as identified in the Occupational Safety and Health Administration (OSHA) Form 300, *Log of Work-Related Injury and Illness* (OSHA 2007).
- Lost workday cases represent the number of cases recorded resulting in days away from work or days of restricted work activity (DART), or both.

TRC rates for DOE, Richland Operations Office averaged 1.1 cases per 200,000 worker hours during the period from 2003 through 2008, and DART rates averaged 0.5 per 200,000 worker hours. Comparable average rates over the same period for all DOE offices and contractors were 1.6 TRC and 0.7 DART cases per 200,000 worker hours. Rates for construction activities at DOE facilities were slightly higher during the same period, at 1.8 and 0.7 cases per 200,000 worker hours, respectively (DOE 2009). For comparison, rates for U.S. industry during 2003–2007 were 4.6 TRC and 2.4 DART cases per 200,000 worker hours (BLS 2008).

4.6 Waste Management

There are currently little or no active waste management activities at ALE. Communications providers on the ridgeline and others are responsible for removing their wastes from the site. Most of the unoccupied DOE facilities have undergone a preliminary cleanout. Hazardous chemicals, such as fuels and other liquids, have been removed for proper disposition. In the late 1990s, PNNL conducted environmental legacy evaluations of several of the ALE facilities. A number of potential vulnerabilities were identified, including the presence of asbestos insulation, mercury in thermostat switches, fluorescent light tubes, and possibly lead in paint.

As a part of the proposed action, it is expected that permitted waste disposal facilities would be used for nonhazardous demolition debris and potentially hazardous waste. The following facilities are among those likely to be used:

- The City of Richland’s municipal landfill could be used to dispose of most nonradioactive, nonhazardous demolition rubble. The 46-ha (114-acre) landfill has a nominal trench depth of 15 m (50 ft), with a capacity of about 7,000,000 m^3 (8,000,000 $yards^3$). The city estimates the landfill has sufficient capacity to accommodate municipal wastes for the next 50 years (City of Richland 2004).
- The Environmental Restoration Disposal Facility at Hanford is composed of double-lined cells and can be expanded as necessary to accommodate wastes from environmental remediation activities at the Hanford Site. The facility can accept hazardous waste, low-level radioactive waste, and mixed low-level waste (containing both radioactive and hazardous constituents) that meets the facility’s waste acceptance criteria.
- Offsite permitted disposal facilities, such as the Chemical Waste Management of NW facility, in Arlington, Oregon, could be used for nonradioactive hazardous wastes.

4.7 Visual Resources

The land in the vicinity of ALE is generally flat. Rattlesnake Mountain rises to about 1060 m (3477 ft) above mean sea level and is therefore a notable promontory for the entire region. The slopes are as steep as 60 percent and have been incised by numerous watercourses that seasonally flow into Dry Creek or Cold Creek. The view toward ALE is visually pleasing, especially in the springtime when wildflowers bloom and in winter when the snowy ridgeline rises above the plain. There are also hundreds of ice-rafted bergmounds that cover the surface between 600 and 1000 feet in elevation above sea level (USFWS 2008). The communications towers on the ridgeline are visible from State Route 240, though none of the towers are tall enough to require lighting at night in accordance with Federal Aviation Administration requirements.

4.8 Other Resource Areas

In accordance with DOE's NEPA guidance on development of the Affected Environment section and applying the "sliding scale" approach in this guidance (DOE 2004), DOE has determined that the following resource areas are not as likely to be affected by the proposed action and are therefore presented in less detail.

4.8.1 Air Quality

Air quality within the region is generally good with occasional exceptions caused by blowing dust. Atmospheric dispersion is relatively good with infrequent periods of stagnation occurring mostly during winter months. Air quality within Benton County has been designated as being in attainment with all EPA and State of Washington nonradiological air quality standards.

4.8.2 Geology and Soils

Most of the geologic features visible in the Columbia Basin occurred during the last 18 million years when layers of molten lava began flooding across the Northwest, creating what is now one of the largest continental volcanic provinces. Cataclysmic floods millions of years later cut through the basalt layers. Rattlesnake Mountain is basaltic bedrock that has faulted and been folded in a narrow, asymmetrical anticlinal ridge.

A number of different soil types occur on ALE, varying according to elevation. On the lower and middle slopes, soils consist primarily of Warden and Ritzville Silt Loams. Stony Silt Loams occur on the upper slopes. Soils on the ridgeline are thin with basalt outcrops constituting much of the surface. The plains along the bottom of the mountain contain sandy soils such as Burbank Sandy Loam (Duncan 2007).

4.8.3 Noise

Because of the distance from roads and activities, man-made noise is rarely intrusive at ALE. However, the high wind events that are common at the ridgeline can result in substantial noise.

4.8.4 Floodplains and Wetlands

Springs are found on the slopes of ALE. In particular, Rattlesnake and Snively Springs form small surface streams. Water discharged from Rattlesnake Springs flows in Dry Creek for about 3 km (1.6 miles) before disappearing into the ground. Cold Creek and its tributary, Dry Creek, are ephemeral streams within the Yakima River drainage system. When surface flow occurs, it infiltrates rapidly and disappears into the surface sediments (Duncan 2007). While these springs are small, their environmental contribution is substantial; they provide water sources for a variety of wildlife and allow the growth of trees for songbird and raptor use as nest sites, sanctuaries, and hunting perches.

4.8.5 Socioeconomics and Environmental Justice

Activities on the Hanford Site play a substantial role in the socioeconomics of the Tri-Cities. DOE and its contractors comprise the largest single source of employment in the Tri-Cities. Fiscal year (FY) 2006 year-end employment for all DOE contractors was 9,707. In addition to these totals, Bechtel National, Inc., which is responsible for the design, building, and start up of the Waste Treatment Plant, employed 1,647 staff at the end of FY 2006. Based on employee records as of April 2007, over 90 percent of DOE contractor employees live in Benton and Franklin counties (Duncan 2007).

An estimated 160,600 people lived in Benton County and 64,200 lived in Franklin County during 2006, totaling 224,800, an increase of over 17 percent from the Census 2000 figure. During 2006, Benton and Franklin counties accounted for 3.5 percent of Washington's population (Duncan 2007).

Population estimates and percentages by race and Hispanic origin for Benton, Franklin, Grant, Adams, and Yakima counties and within the 80-km (50-mile) radius of the Hanford Site from the 2000 Census indicate Asians and individuals of Hispanic origin from Benton and Franklin counties represent lower and higher proportions of the population, respectively, than in the State of Washington as a whole (Duncan 2007). Additional information, including a detailed breakdown of minority and low-income populations in the vicinity, can be found in Elliott et al. (2004).

5.0 Impacts of Proposed Action and the No-Action Alternative

DOE would modify its existing property lease with Energy Northwest or provide a new real estate instrument to allow Energy Northwest to proceed with construction and operation of the CCCF. Other existing towers, related support facilities, and unneeded phone and power lines would be removed, along with unused facilities dating back to World War II and the post-war era at both the ridgeline and base areas. Facilities such as the observatory foundation, the radio telescope foundation, and the building at Rattlesnake Springs that were constructed later for research purposes would also be removed. Several still-serviceable structures would remain in place for use by the USFWS in management of the National Monument.

The environmental consequences described in this section would result principally from consolidation and relocation of existing activities that have had minimal environmental impacts over the past 40 years, or from removal of unused facilities and debris. Potential impacts in the environs of ALE as a result of implementing the proposed action or the No-Action Alternative are described in the following sections.

5.1 Land Use

Property within the proposed CCCF construction site as well as the ridgeline and base areas where existing facilities and debris would be removed were designated as Preservation in a 1999 DOE ROD for the *Final Hanford Comprehensive Land-Use Plan EIS* (64 FR 61615). The USFWS decision for management of the Hanford Reach National Monument also provided for conservation of natural and cultural resources within ALE and other monument lands (73 FR 72519). The proposed actions in this EA would be consistent with the conservation and restoration missions of both DOE and USFWS by removing unneeded facilities and debris, reclaiming previously disturbed areas, and reducing the infrastructure within ALE.

Land use in areas adjacent to ALE consists of agricultural activities on the southern slope of Rattlesnake Mountain, recreational use to the south at Horn Rapids Park, the Hanford Site to the north and east, and additional monument lands to the north and west. The proposed actions at ALE would be consistent with those uses and would not constrain existing uses or future activities within those adjacent areas.

5.1.1 Ridgeline Area

The proposed action would result in the removal of 750 m^2 (8,100 ft^2) of existing facilities and an additional quantity of debris, as well as unneeded power and phone lines. The new CCCF would occupy about 3,700 m^2 (40,000 ft^2), largely within an area that had been previously disturbed. There is a potential for disturbance of some additional areas during construction, removal, and restoration activities. Land use for the CCCF would be consistent with existing uses for the ridgeline area, whereas the restored areas would revert to a preservation zone. The proposed activities would reduce the overall facility and infrastructure footprint from about 467,500 ft^2 down to about 40,000 ft^2, which represents a net reduction of about 91 percent. The area to be restored consists of about 1,900 m^2 (20,000 ft^2).

5.1.2 Base Area—Former Nike Missile Base

The proposed action would result in the removal of 3,300 m^2 (35,500 ft^2) of existing facilities and an additional quantity of debris, largely within an area that had been previously disturbed. There is a potential for disturbance of some additional areas during removal and restoration activities. A limited number of facilities currently in use would remain over the near term. Land use for facilities remaining in the base area would be consistent with existing uses, whereas the restored areas would revert to a preservation zone. The area to be restored consists of about 74,000 m^2 (800,000 ft^2).

5.1.3 Base Area—Rattlesnake Springs

The proposed action would result in the removal of an existing building occupying about 74 m^2 (800 ft^2) and associated debris, largely within an area that had been previously disturbed. There is a potential for disturbance of some additional areas during removal and restoration activities. Fencing established by USFWS around part of the spring and shoreline to reduce wildlife damage would remain. Land use for the restored areas would revert to a preservation zone.

5.1.4 Debris Areas

The proposed action would result in the removal of existing debris and structures remaining from previous occupation and research projects. There is a potential for disturbance of some additional areas during removal and restoration activities. Land use for the restored areas would revert to a preservation zone.

5.2 Cultural and Historical Resources

The portion of Rattlesnake Mountain under DOE jurisdiction and control has been determined to be a National Register-eligible TCP and contains historic properties as defined under the NHPA. Removal of the buildings and infrastructure from ALE would reduce the extent of affected areas on *Laliik*, which could be viewed as having a net beneficial effect on the overall spiritual qualities and visual and natural setting. Building demolition, and construction and operation of the proposed CCCF, could be viewed as creating temporary alterations to the visual and natural setting for which mitigation might be appropriate. A final proposed MOA that proposes mitigation measures to protect historic and cultural resources during those activities has been prepared under the NHPA Section 106 and applicable regulations, and is included in Appendix B.

5.2.1 Ridgeline Area

Seven archaeological sites and two isolated finds have been identified in the vicinity of the ridgeline area, all of which are contributing properties to the National Register-eligible *Laliik* TCP and are therefore historic properties. With the exception of the archaeological site near the ridgeline spring, these sites would not be adversely affected by the proposed action. Further archaeological investigation would need to occur at the archaeological site near the ridgeline spring to assess the impacts of demolition of the 6652-T Building and the Benton PUD electrical line on this resource.

Four buildings and associated infrastructure identified on the ridgeline area have been determined to be National Register-eligible as contributing properties to the Manhattan Project and Cold War Era Historic District and are therefore historic properties (T520-6, 623-A, 6652-C and the Rattlesnake Mountain Road). In anticipation of Hanford Site demolition activities, the *Manhattan Project and Cold War Era Historic District Treatment Plan* (DOE-RL 1998) mitigated all historic Hanford Site buildings. This plan outlined specific mitigation for these buildings: documentation on Historic Property Inventory Forms and in *The History of the Plutonium Production Facilities at the Hanford Site Historic District, 1943-1990* (DOE-RL 2002), which explores in more detail the history of the Manhattan Project and Cold War at Hanford and the role the buildings and infrastructure played in this history (DOE-RL 1998). Mitigation was recommended for the 6652-C, but not the T520-and 623-A Buildings. Mitigation for the 6652-C Building was completed in the form of a Historic Property Inventory Form and in DOE-RL (2002). Details associated with the history of the T520-6 and 623-A Building (i.e., site security and communication) are documented in DOE-RL (2002). The documentation has been completed; therefore, potential adverse effects to those buildings have been mitigated. Minor upgrades to the Rattlesnake Mountain Road should not result in an adverse effect because the road is considered to be a historic site based on its association with the Manhattan Project/Cold War era history. The road was also documented on a Historic Property Inventory Form and is mentioned in DOE-RL (2002).

The remaining buildings and infrastructure are not eligible for the National Register, either because they do not meet the 50-year age criterion (i.e., Tri-Cities Amateur Radio Club, Columbia Communications, Energy Northwest, Franklin County, Crown Castle, Rattlesnake Mountain Observatory, abandoned radio telescope base, and the Verizon telephone structure), or they have been determined to be noncontributing to the Manhattan Project and Cold War Era Historic District (i.e., 6652-T, 6652-D, 6652-U, 6652-C Shed, and the Benton PUD line). The proposed action would not have adverse effects on those structures because they are not historic properties.

5.2.2 Base Area—Former Nike Missile Base

There are no archaeological sites located within the base area, and the potential for subsurface archaeological material to be present is expected to be low. Fourteen buildings and associated infrastructure (see Table 4.1) identified at the base area are eligible for the National Register as contributing properties to the Manhattan Project and Cold War Era Historic District and are therefore historic properties. Twelve of these facilities are proposed to be demolished. In anticipation of Hanford Site demolition activities, the Manhattan Project and Cold War Era Historic District Treatment Plan mitigated potential adverse effects for all historic Hanford Site buildings (DOE-RL 1998).

5.2.3 Base Area—Rattlesnake Springs

The 646 Building is not a contributing property to the Manhattan Project and Cold War era Historic District and is therefore not a historic property. However, five archaeological sites have been identified in the vicinity of the Rattlesnake Springs area that are contributing properties to the National Register-eligible *Laliik* TCP and are therefore historic properties. These sites would be avoided by the proposed demolition activities. Additional mitigation actions that could be taken are addressed in a final proposed MOA included in Appendix B.

5.2.4 Debris Areas

DOE plans to take a graded approach to address sensitive cultural resources during the cleanup of debris items on ALE. Details of this graded approach are provided in the cultural resources review located in Appendix B.

5.3 Ecological Resources

Because most of the proposed actions would occur in areas that have been previously disturbed, or would include simple recovery of debris, the potential for effects on sensitive ecological resources is expected to be minimal. Reviews would be carried out before work begins in areas where there is a potential for adverse impacts to sensitive or rare biological resources, consistent with existing routine procedures (DOE-RL 2006). Procedures to avoid or mitigate damage to sensitive areas identified during the reviews would be established before work begins.

A list of federally threatened and endangered plant and animal species of potential interest within the area of the proposed action were identified through the USFWS Threatened and Endangered Species System (USFWS 2009).

5.3.1 Ridgeline Area

Ecological surveys of the proposed construction site were conducted during the spring of 2009. No federal or state threatened or endangered species, species proposed for listing, or critical habitat were observed during those surveys.

In general, it is expected that the communications towers and other facilities on the ridgeline can be removed without significant damage to ecological resources of concern. The immediate vicinity of most of the facilities on the ridgeline of Rattlesnake Mountain is relatively disturbed, with compacted gravel surfaces for vehicle access, and in some cases, asphalt parking lots. No nests were observed on the towers or buildings, and the immediate vicinity of each facility has relatively little vegetation. The site of the proposed new CCCF is already highly disturbed, with compacted gravel surfaces. Therefore, construction of the new tower and new support building at this site is not likely to adversely affect existing ecological resources.

Workers and vehicles would stay on established road and parking areas to the maximum extent practicable, and efforts would be made to minimize surface disturbances around the facility areas. Rehabilitation plans would be developed for each facility site on an individual basis and would be designed to minimize the overall environmental impacts of the facility removal and the restoration effort. Locally derived plant material would be used for revegetation.

5.3.2 Base Area—Former Nike Missile Base

Demolition of the buildings and other facilities at the former Nike missile base and nearby areas is not likely to adversely affect biological resources. Most of the plant communities adjacent to facilities and buildings consist of either invasive alien species or planted non-native grasses. No federal or state threatened or endangered species, species proposed for listing, or critical habitat were observed during the

field surveys. Planners would minimize the disturbance beyond the existing fence lines, and once the proposed actions are completed, the site would be revegetated using locally derived native species. An additional ecological review would be conducted before cleaning up the asphalt piles north of the base compound to avoid disturbance to previous rehabilitation plantings.

Development of staging areas at the intersection of the 1200-foot road and the Rattlesnake Mountain road and at the Gate 106 entrance to ALE would disturb approximately 10 ac and 5 ac, respectively. Neither of these sites is located within high quality plant communities; nevertheless, the footprint would be minimized at each site to the extent possible, and the sites would be revegetated with locally derived native species once the demolition and cleanup actions are completed.

5.3.3 Base Area—Rattlesnake Springs

The empty laboratory and storage building at Rattlesnake Springs would be removed with little adverse ecological impacts if workers and equipment are kept to the compacted gravel and disturbed areas. Once the demolition is completed, the area would be revegetated using locally derived native species. Removal of the power line that feeds the building would require additional ecological review. No federal or state threatened or endangered species, species proposed for listing, or critical habitat were observed during spring 2009 field surveys. The riparian habitat associated with the springs and shoreline would be avoided during removal of the 646 Building, which lies in a previously disturbed area.

5.3.4 Debris Areas

Ecological surveys of the proposed debris cleanup sites were conducted during the spring of 2009. No federal or state threatened or endangered species, species proposed for listing, or critical habitat were observed during these surveys, although a Washington State Sensitive species, Piper's daisy, was observed near several of the debris sites. Many of the debris sites have relatively small collections of material that could be removed without undue disturbance of the surrounding area. However, debris cleanup that would require travel of vehicles off of maintained roadways or the use of other heavy equipment and/or excavation would require site-specific evaluation and review of the biological resources at the time the work is scheduled. Examples include, but are not limited to, the need to take vehicles off-road to recover significant quantities of debris far from an established roadway, such as the Gate 118 ecological research area, or excavation to remove or fill cisterns or gas well facilities. If off-road travel is necessary during cleanup, additional disturbance would be minimized to the extent possible and planned to avoid any sensitive ecological resources identified within the areas.

5.4 Transportation

Potential impacts on traffic and transportation associated with construction and operation of the proposed CCCF and cleanup of unneeded facilities on ALE are described in the following section. For purposes of this analysis, it was estimated that there would be an average of about 20 workers employed over the life of the project. During construction and operation of the proposed CCCF, vehicle traffic to the ridge line would be minimized as practicable. During cleanup, workers would be transported to the ridgeline in government vehicles, and use of private vehicles would be minimized to the extent feasible.

Heavy equipment, such as trucks, would be used to haul construction materials to the ridgeline and demolition debris off of ALE for the proposed action. The materials to be used in construction of the CCCF are common construction materials and fossil fuels to transport workers and materials to the construction site.

Accident, injury, and fatality statistics from traffic accidents involving transport of construction materials and wastes were compiled in Saricks and Tompkins (1999). In that document, the composite accident, injury, and fatality rates for heavy-combination trucks on all road types in the State of Washington were 2.05E-07 accidents/truck-km, 1.4E-07 injuries/truck-km, and 5.3E-09 fatalities/truck-km. Work within ALE presents some unique hazards, such as adverse weather and road conditions, particularly in the ridgeline area. Because of the limited amount of traffic generated by the proposed actions, traffic accidents, injuries, or fatalities would not be expected from transporting construction materials or workers to the CCCF site, or from debris removal following dismantling of existing structures. Traffic levels required to maintain existing roads and equipment within the ALE areas would be minimal and would not be expected to impact regional traffic patterns or to be associated with measureable risk.

5.5 Human Health and Safety

The CCCF would likely be purchased as a modular facility that would require about 6,700 labor hours for construction, transport, and installation; and the demolition and debris removal activities is estimated to require an additional 40,000 labor hours. Based on DOE construction experience of 1.8 cases of recordable injury/illness per 200,000 labor hours during 2003 to 2008 (DOE 2009), no injuries or occupational illness are expected to occur as a result of the proposed actions.

Potential Radiological Contamination. Radiological materials were used at times in previous research performed on ALE. The research activities can be broken down into two groups: ecological research (i.e., field research) that used radioactive isotopes as tracers and lysimeter studies that monitored the uptake of actinides by plants. Radionuclides used in the tracer studies have short half-lives and have decayed away, whereas the radionuclides used in the lysimeter studies have longer half-lives.

Although the radionuclide levels at the lysimeter plots on ALE were determined to be at or below background levels, those areas have some potential for residual radioactive material to be present. A 1996 close-out report for the ALE Unit (DOE-RL 1996) identified the lysimeter plots as potential sources of radiological contamination. The report also stated that two separate sets of characterization samples collected on the lysimeter plots were analyzed for radiological contamination. At the conclusion of the second study, a small amount of soil (0.2 cubic meters) was removed from one lysimeter plot (Fritz et al. 2003).

Several buildings (6652-G, 6652-H, 6652-I, 6652-J, and 6652-M) on ALE housed research activities that may have involved the use of radiological material and therefore have some potential for residual contamination (Fritz et al. 2003). If radioactive materials are discovered during the demolition process, appropriate measures would be taken to contain them and prevent exposure to workers or members of the public.

In general, comparison of environmental measurements on or near ALE to other locations unlikely to be affected by Hanford operations (reference background locations) revealed that radionuclide concentrations from both areas were similar (Fritz et al. 2003). Removal and disposal of low levels of

radioactive waste from the areas considered in this EA are therefore unlikely to result in any measureable radiation exposure to workers or members of the public.

Potential Contamination with Hazardous Materials. Although the majority of hazardous materials was previously removed from facilities proposed to be demolished as part of this action during CERCLA remediation, residual amounts may still remain (see section 2.5.1). If hazardous substances are encountered during demolition of facilities, appropriate measures would be taken to protect workers and contain the materials for disposal at permitted facilities.

5.6 Waste Management

DOE is implementing Executive Order 13123 (64 FR 30851), *Greening the Government Through Efficient Energy Management*; Executive Order 13148 (65 FR 24595), *Greening the Government Through Leadership in Environmental Management*; and associated DOE orders or guidelines, by reducing toxic chemical use and encouraging the development and use of clean and energy-efficient technologies. Program components include waste minimization, recycling, source reduction, energy-efficient building construction, and buying practices that give preference to products made from recycled materials. Construction of the CCCF, demolition, and waste management activities would be conducted in accordance with this program. Implementation of the pollution prevention and waste minimization programs would also minimize the generation of secondary wastes.

Demolition of facilities and cleanup of debris would use procedures similar to those employed for other Hanford Site remediation projects. Construction and demolition wastes would be recycled where possible. Debris and waste from construction, demolition, and restoration activities would consist of concrete, structural steel, asphalt, wood, and other nonhazardous construction materials. About 5,300 m^3 (6,900 $yards^3$) of clean (nonradioactive, nonhazardous) demolition waste and other debris might be disposed of in the City of Richland sanitary landfill. A portion of this could also be used as fill material at the former Nike missile base. Based on the available City of Richland landfill capacity, it is concluded that construction and demolition wastes would have minimal impact on municipal disposal facilities. Because of the age of many facilities and the types of activities that were conducted for various research projects, demolition of the facilities might generate about 40 m^3 (50 $yards^3$) of waste containing asbestos and other hazardous materials, and about 15 m^3 (20 $yards^3$) of radioactive materials. Radioactive and mixed waste would be disposed of in appropriate facilities at the Hanford Site, such as the ERDF. Nonradioactive waste would likely be disposed of at a permitted offsite disposal facility.

Liquid wastes, primarily consisting of waste water and sanitary sewage generated using portable facilities during construction of the CCCF, demolition of unneeded facilities, and debris cleanup, would likely be collected by a commercial vendor and sent to the City of Richland's Publicly Owned Treatment Works for processing. Routine operations at the facilities would not generate liquid wastes.

5.7 Visual Resources

Activities proposed in this EA are expected to reduce the impact on visual resources by removing excess facilities, infrastructure, and debris from ALE. Because of the remoteness of the areas that contain existing facilities, their visual impact from outside the ALE boundary is minimal. However, those facilities could be visible to some potential users from locations within the monument lands. Depending

on the interests and purposes of those future users, consolidation or removal of unneeded facilities might be perceived as desirable to minimize the impact of constructed structures on viewscapes.

5.8 Other Impacts

Activities proposed in this EA are expected to result in environmental consequences similar to those of most routine construction and demolition projects. For many types of resources, these impacts are expected to be negligible because of their temporary nature and the remote locations at which the activities would take place. The anticipated impacts on other resources are discussed in the following sections.

5.8.1 Air Quality

Operation of trucks and diesel-powered construction equipment would be expected to introduce quantities of SO_2, NO_2, particulates, and other pollutants to the atmosphere, typical of similar-sized construction and demolition projects. These releases would not be expected to cause any air-quality standards to be exceeded at locations that are routinely occupied for any substantial period of time. As needed, dust generated during demolition activities and vehicle movement over unpaved areas would be minimized by watering or other dust-control measures. Routine traffic to maintain roads and equipment may occasionally generate dust, depending on wind conditions during transit; however, no substantial air-quality impacts associated with implementing the proposed action would be expected.

5.8.2 Floodplains, Wetlands, and Water Quality

The ALE areas included in the proposed action are well above the elevation for the probable maximum flood (DOE 1999); hence, it is not in a floodplain within the meaning of Executive Order No. 11988 (42 FR 26951). As a consequence, there would be no impacts on facilities or floodplains associated with implementing the proposed action.

Rattlesnake Springs is a permanent surface water body that feeds an ephemeral stream, and the area surrounding the springs and upper streambed contains wetlands. However, activities required to remove the existing structures and debris, which are outside the wetlands, are unlikely to affect water quality or the habitat within the springs area. If activities within the wetlands are required, measures would be implemented as necessary to minimize their impact.

5.8.3 Geology and Soils

No impacts would be expected on geological resources, which consist principally of basalt outcrops, Rupert Sand, and Burbank Loamy Sand, underlain by Ice Age Flood gravels, which are locally abundant. Some recontouring of disturbed sites may be required following demolition and removal of structures and debris; however, the quantities of materials involved would be relatively small and are readily available from the local area.

5.8.4 Noise

Construction and demolition activities would generate noise typical of using heavy equipment and transport of materials. Noise impacts are assessed by establishing regions of influence for residential, commercial, and industrial receptors, with maximum allowable noise levels established for each region (WAC 173-60). Because of the remote locations at which the proposed actions would occur, all receptors would be located well beyond the applicable "region of influence," within which noise levels are limited to specified levels.

Ground vibrations from trucks and other heavy equipment might have some impact on operation of the Laser Interferometer Gravitational-Wave Observatory (LIGO), located northeast of the former Nike missile base area site. Ongoing gravitational physics experiments in the 6652-L facility may also be affected by demolition activities in the area. Notice to the operators of both facilities would be provided to advise them of periods of heavy equipment usage so that extraneous ground vibrations from the proposed activities could be taken into account.

After construction and demolition activities are completed, neither routine operations at the CCCF by communications facility users nor USFWS management activities would be expected to increase noise levels over current ambient external background levels.

5.8.5 Socioeconomics and Environmental Justice

For purposes of this analysis, it was estimated that about 47,000 labor hours would be required to complete the proposed actions over the life of the project. The work is expected to be accomplished largely using employees from the local workforce. Total nonagricultural employment in Benton and Franklin Counties is over 100,000 people (Schau 2006), so even if construction creates additional service sector jobs, the total increase in employment as a result of the proposed action would be less than 1 percent of the current employment level. Increases of less than 5 percent of an existing labor force have been determined to have minimal effect on an existing community (DHUD 1976).

Per Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (59 FR 7629), DOE seeks to ensure that no group of people bears a disproportionate share of negative environmental consequences resulting from proposed federal actions. DOE has also considered the guidance issued by the CEQ in preparing its analysis of environmental justice for this EA (CEQ 1997a).

Because access to the Hanford Site is restricted to the public, the majority of potential environmental impacts from the proposed action would be associated with onsite activities and would not affect populations residing offsite; thus, the potential for environmental justice concerns is small. There are no impacts associated with proposed activities at ALE that could reasonably be determined to affect any member of the public; therefore, they would not have the potential for high and disproportionately adverse impacts on minority or low-income groups.

5.8.6 Resource Use

The proposed action would require relatively small quantities of resources for construction of the CCCF, operation of equipment, transportation of materials and waste, and road maintenance. Construction of the

CCCF is expected to require about 1100 m^3 (38,000 ft^3) of concrete, about 300 m^3 (11,000 ft^3) of gravel, about 3,400 linear m (11,000 linear ft) of wire cable (much of it used for the grounding system), and 60 m (200 ft) of four-legged steel tower sections. In addition, components such as HVAC, fire suppression, and security monitoring systems would be incorporated in the CCCF. The materials required are common structural materials and fossil fuels to operate vehicles and backup electrical generators, none of which are unique or in limited supply. Therefore, their use would not be expected to affect availability of these resources regionally or locally. Consumption of electricity by operations at the CCCF would be comparable to, or lower than, requirements for operating existing equipment.

5.9 Cumulative Impacts

Cumulative impacts that might be associated with implementing the proposed construction and operation of the CCCF, and cleanup of unneeded facilities and debris, are summarized in this section.

In 40 CFR 1508.7, the CEQ defines cumulative impact as:

> …the impact on the environment from the incremental impact of the action when added to other past, present, and reasonably future actions regardless of what agency (federal or nonfederal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

However, CEQ cautioned that, "The continuing challenge of cumulative effects analysis is to focus on important cumulative issues…" (CEQ 1997b).

Based on the results of analyses presented in the previous sections, impacts in all resource areas were projected to be minimal.

Other ongoing or planned actions that might have impacts on the same area of interest would include those associated with the following operations:

- CERCLA remediation projects.
- Ongoing waste management and cleanup of the Hanford Site in general.

Impacts from constructing the proposed CCCF, such as additional traffic and construction emissions, would be temporary and similar to those associated with any other commercial building of comparable size. Construction is not expected to affect resources that are unique, in short supply, or otherwise sensitive; therefore, cumulative impacts on such resources would be negligible. Impacts from operating the CCCF would generally be similar to, or lower than, those from existing communications facilities. Therefore, construction and operation of the CCCF would result in minimal net change to cumulative impacts on the surrounding environment.

Consequences of removing unneeded facilities and infrastructure from the ridgeline and base areas are expected to be similar to those associated with cleanup of other sites within Hanford. Activities are expected to be accomplished using the local workforce and would not impact regional or sitewide labor availability. Because of the temporary nature of the activities and their remote location, cumulative impacts on air quality or noise with other Hanford or regional construction and cleanup projects would be minimal. Wastes generated during the proposed activities would be manageable within the capacities of

existing facilities. Restoration of formerly disturbed areas to a more natural state is expected to result in a net benefit to the ecological and visual resources within the region.

5.10 Mitigation of Potential Impacts of the Proposed Action

Various types of mitigation might be required for activities proposed in this EA, depending on the nature of specific actions to be carried out, and the outcomes of surveys conducted before and during operations. DOE has established policies and procedures for management of ecological and cultural resources and mitigation as necessary when actions might affect such resources (DOE-RL 2001, 2003a, 2003b).

Several mitigations are proposed to address potential adverse effects of CCCF operations on the spiritual qualities and the visual and natural setting on ALE in the final proposed MOA prepared under NHPA Section 106 (Appendix B). Additional suggested mitigation is provided in the cultural resources review (Appendix B) to ensure that adverse effects from construction activities associated with the CCCF and demolition activities on the ridgeline that could result in temporary alterations to the visual and natural setting are avoided.

General methods are suggested in the ecological resource review (Appendix C) to minimize potential adverse effects of cleanup activities on sensitive plant and animal species present on ALE. Possible mitigations include actions such as conducting work during the colder months and outside of migratory bird nesting season; limiting use of heavy equipment and vehicles to areas that are graveled, paved, and/or previously disturbed when practicable; developing site restoration plans on a site-by-site basis; revegetating with native species and/or locally derived plant material; and minimizing the chance of transporting weed seeds on the undercarriages of vehicles.

Health and safety procedures established by site contractors would mitigate risks to workers from the proposed activities, and special procedures would be imposed where needed to manage risks from working in the unique environment at ALE. Examples would include limiting traffic on the ridgeline road and other primitive onsite roads by providing parking near the ALE entrances and ferrying workers to job sites. Travel controls would be employed; for example, travel could be restricted to one-way traffic with flaggers and lead vehicles during transport of oversize loads. Work on the ridgeline would also be discontinued during periods of adverse weather or road conditions.

5.11 Environmental Impacts of the No-Action Alternative

In the No-Action Alternative, the CCCF would not be constructed, and current tenants would continue to use existing communication equipment at the ridgeline area. The unneeded facilities located on the ridgeline and along the base area would not be removed, and debris sites would not be cleaned up. The impacts of this alternative would be similar to those that currently exist, although deterioration of the facilities could increase health and safety risks associated with demolition and cleanup in the future.

The evaluation of proposed activities discussed in this EA was not scheduled to take place until 2020 as part of the overall Hanford Site remediation effort. However, the actions proposed in this EA provide an opportunity to use short-term funding under the *American Recovery and Reinvestment Act*, which would accelerate completion of the activities with net beneficial impacts and reduce the cost and potential health and safety risks associated with carrying them out at a later time.

6.0 Environmental Permits and Regulatory Requirements

It is the policy of DOE to carry out its operations in compliance with all federal, state, and local laws and regulations; Presidential executive orders; DOE orders; and procedures. Both federal and state laws apply to construction of the CCCF, demolition of most of the facilities located on ALE, and cleanup of debris. Based on the types of activities to be conducted, it is anticipated that the following environmental requirements would be most applicable.

- **Hazardous Waste Management.** The *Resource Conservation and Recovery Act* (RCRA; 42 USC 6901 et seq.) and *State of Washington Dangerous Waste Regulations* (WAC 173-303) apply to the generation, transport, treatment, storage, and disposal of hazardous and dangerous wastes. RCRA regulations require treatment of many hazardous wastes before they can be disposed of in landfills. RCRA permits are required for the treatment, storage, or disposal of hazardous wastes. The State of Washington Department of Ecology has been authorized by EPA to administer the RCRA program within Washington, using its own dangerous waste regulation program in lieu of major portions of the RCRA program. The state regulations include a larger universe of regulated materials than the federal hazardous waste program.
- **Protection of Plant and Animal Species**. The *Endangered Species Act* (16 USC 1531 et seq.), *Bald and Golden Eagle Protection Act* (16 USC 668 et seq.), and *Migratory Bird Treaty Act* (16 USC 703-712) all identify requirements that must be met to protect native plant and animal species and the ecosystems upon which they depend. Two laws are most pertinent to the proposed action: 1) the *Endangered Species Act* requires that if a federal action may affect a threatened or endangered species or designated critical habitat, the agency must consult with the USFWS or National Marine Fisheries Service to ensure the action is not likely to jeopardize the continued existence of these species, and 2) the *Migratory Bird Treaty Act* prohibits harm[3] to migratory birds, their nests, or eggs.
- **Cultural and Historical Resource Protection**. Federal agencies must preserve and protect cultural resources in a spirit of stewardship to the extent feasible given the agency's mission. DOE responsibilities are defined by a number of regulations and policies, including the *National Historic Preservation Act* (16 USC 470 et seq.), the *Archaeological Resources Protection Act of 1979* (16 USC 470aa et seq.), the *Native American Graves Protection and Repatriation Act* (25 USC 3001 et seq.), and the *DOE Native American Indian & Alaska Native Tribal Government Policy* (DOE 1992, 2006c). The *National Historic Preservation Act* is the law most relevant to the proposed action; it requires that agencies consider the effects of their actions on historic properties included in or eligible for inclusion in the National Register of Historic Places. A final proposed MOA and an associated cultural resources review that implement requirements of NHPA Section 106 for this proposed action are included in Appendix B.
- **Air Pollutant Notice of Construction Approval Order**. These regulations require the submission of a Notice of Construction application to the Benton Clean Air Authority, and its review and

[3] Unless permitted by regulations, it is prohibited to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird… or any part, nest, or egg of any such bird." (16 USC 703)

approval, before a new emission source such as a diesel generator may be installed and operated. The application must demonstrate that installed equipment uses the Best Available Control Technology for regulated air emissions. The regulatory drivers are 40 CFR 61, *National Emission Standards for Hazardous Air Pollutants*; WAC 173-400, *General Regulations for Air Pollution Sources*; WAC 173-401, *Operating Permit Regulations*; WAC 173-460, *Controls for New Sources of Toxic Air Pollutants;* and Benton Clean Air Authority Regulation 1 (Benton Clean Air Authority 2005). The responsible agency is the Benton Clean Air Authority.

7.0 Notice to Tribal and Government Agencies and Other Interested Parties

Advance notice of DOE's intent to prepare this EA and briefings as requested were provided to various Tribal governments, agencies, and other organizations. In addition, the draft EA was provided to the following for review and comment.

- Nez Perce Tribe
- Confederated Tribes of the Umatilla Indian Reservation
- Confederated Tribes and Bands of the Yakama Nation
- Confederated Tribes of the Colville Indian Reservation
- Wanapum
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- Washington State Department of Ecology
- Oregon Department of Energy
- Franklin County
- Hanford Advisory Board
- Benton County
- City of Richland
- Bonneville Power Administration
- Rattlesnake Mountain Communication Tenants

The Final EA is available in the DOE Public Reading Room (Consolidated Information Center at Washington State University-Tri-Cities) and through the DOE Richland Operations Office website (http://www.hanford.gov/rl/?page=86&parent=52).

8.0 References

8.1 Regulations, Notices, and Laws

8.1.1 Code of Federal Regulations (CFR) (Online at http://www.gpoaccess.gov/cfr/index.html)

10 CFR 1021. "National Environmental Policy Act Implementing Procedures." *Code of Federal Regulations*. U.S. Department of Energy.

36 CFR Part 800. 2000. "Protection of Historic Properties." *Code of Federal Regulations*. Advisory Council on Historic Preservation.

40 CFR 61. "National Emission Standards for Hazardous Air Pollutants." *Code of Federal Regulations*. U.S. Environmental Protection Agency.

40 CFR 1500-1508. "Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act." *Code of Federal Regulations*. U.S. Environmental Protection Agency.

43 CFR 7. "Protection of Archaeological Resources." *Code of Federal Regulations*. U.S. Department of the Interior.

8.1.2 Federal Register (FR) Notices (Online at http://www.gpoaccess.gov/fr/index.html)

42 FR 26951. "Executive Order 11988 of May 24, 1977: Flood Plain Management." *Federal Register* (May 25, 1977).

59 FR 7629. "Executive Order 12898 of February 11, 1994: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." *Federal Register* (February 16, 1994).

61 FR 51019. "National Oil and Hazardous Substances Pollution Contingency Plan; National Priorities List Update." *Federal Register* (September 30, 1996).

64 FR 30851. "Executive Order 13123 of June 3, 1999: Greening the Government through Efficient Energy Management." *Federal Register* (June 8, 1999).

64 FR 61615. November 12, 1999. "Record of Decision: Hanford Comprehensive Land-Use Environmental Impact Statement." *Federal Register* (November 12, 1999).

65 FR 24595. "Executive Order 13148 of April 21, 2000: Greening the Government through Leadership in Environmental Management." *Federal Register* (April 26, 2000).

65 FR 37253. "Proclamation 7319 of June 9, 2000. Establishment of the Hanford Reach National Monument." *Federal Register* (June 13, 2000).

71 FR 5655. "Notice of Intent To Prepare the Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington." *Federal Register* (February 2, 2006).

73 FR 55824. "Amended Record of Decision for the Hanford Comprehensive Land-Use Plan Environmental Impact Statement." *Federal Register* (September 26, 2008).

73 FR 72519. "Hanford Reach National Monument; Adams, Benton, Franklin, and Grant Counties, Washington." *Federal Register* (November 28, 2008).

8.1.3 United States Code (USC) (Online at http://www.gpoaccess.gov/uscode/index.html)

16 USC 470 et seq. *National Historic Preservation Act of 1966.* Public Law 89-665, as amended.

16 USC 470aa et seq. *Archaeological Resources Protection Act of 1979*. Public Law 96-95, as amended.

16 USC 668 et seq. *Bald and Golden Eagle Protection Act of 1940*. Public Law 95-616, as amended.

16 USC 703-712. *Migratory Bird Treaty Act,* Ch. 128, as amended.

16 USC 1531 et seq. *Endangered Species Act of 1973*. Public Law 100-478, as amended.

25 USC 3001 et seq. *Native American Graves Protection and Repatriation Act*. Public Law 101-601.

42 USC 4321 et seq. *National Environmental Policy Act of 1969*. Public Law 91-190, as amended.

42 USC 6901 et seq. *Resource Conservation and Recovery Act of 1976*. Public Law 94-580.

42 USC 9601 et seq. *Comprehensive Environmental Response, Compensation, and Liability (Superfund) of 1980*. Public Law 107-118, as amended.

42 USC 13101 et seq. *Pollution Prevention Act of 1990*.

8.1.4 State of Washington Administrative Code (WAC) (Online at http://apps.leg.wa.gov/wac/)

WAC 173-60. "Maximum Environmental Noise levels." *Washington Administrative Code*, Olympia, Washington.

WAC 173-303. "Dangerous Waste Regulations." *Washington Administrative Code*, Olympia, Washington.

WAC 173-400. "General Regulations for Air Pollution Sources." *Washington Administrative Code*, Olympia, Washington.

WAC 173-401. "Operating Permit Regulation." *Washington Administrative Code*, Olympia, Washington.

WAC 173-460. "Controls for New Sources of Toxic Air Pollutants." *Washington Administrative Code*, Olympia, Washington.

8.2 Reference Documents

Audubon Washington. 2009. Important Bird Areas in Washington, National Audubon Society, Seattle, Washington. (Web page dated 2009, Accessed May 2009).
Online at http://wa.audubon.org/science_IBAWashington.html.

Benton Clean Air Authority. 2005. "Regulation 1 of the Benton Clean Air Authority." Benton Clean Air Authority, Richland, Washington.

BLS. 2008. *Industry Injury and Illness Data*. U.S. Department of Labor, Bureau of Labor Statistics, Washington D.C. (Data October 23, 2008, Accessed May 2009).
Online at http://www.bls.gov/iif/oshsum.htm.

CEQ. 1997a. *Environmental Justice Guidance Under the National Environmental Policy Act*. Council on Environmental Quality, Executive Office of the President, Washington, D.C. Online at http://gc.energy.gov/NEPA/nepa_documents/TOOLS/GUIDANCE/Volume1/4-12-ceq-environjustice.pdf.

CEQ. 1997b. *Considering Cumulative Effects Under the National Environmental Policy Act*. Council on Environmental Quality, Executive Office of the President, Washington, D.C.
Online at http://gc.energy.gov/NEPA/nepa_documents/TOOLS/GUIDANCE/Volume1/4-11.1-ceq-cumulative-effects.pdf.

City of Richland. 2004. "Solid Waste Landfill Tour." Solid Waste Division, City of Richland, Richland, Washington. (Web page dated 1/6/2004, Accessed July 2006).
Online at http://www.ci.richland.wa.us/RICHLAND/Utilities/index.cfm?PageNum=89.

Daubenmire, R. 1970. *Steppe Vegetation of Washington*. Technical Bulletin 62. Washington Agricultural Experiment Station, College of Agriculture, Washington State University.

DHUD. 1976. *Rapid Growth from Energy Projects, Ideas for State and Local Action*. Report HUD-CPD-140. U.S. Department of Housing and Urban Development, Washington, D.C.

DOE. 1992. "American Indian Tribal Government Policy." DOE Order 1230.2. U.S. Department of Energy, Washington, D.C. Online at http://www.directives.doe.gov.

DOE. 1999. *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement*. DOE/EIS-0222F. U.S. Department of Energy, Richland Operations Office, Richland, Washington.
Online at http://www.hanford.gov/doe/eis/hraeis/hraeis.htm.

DOE. 2004. *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements*, 2nd edition, U.S. Department of Energy, Washington, D.C. Online at http://gc.energy.gov/NEPA/nepa_documents/TOOLS/GUIDANCE/Volume2/2-10-greenbook-recommendations.pdf.

DOE. 2005. "Comprehensive Emergency Management System." DOE Order 151.1C. U.S. Department of Energy, Washington, D.C. Online at http://www.directives.doe.gov.

DOE. 2006. "Change to DOE Order 1230.2, Attachment 1. DOE American Indian and Alaska Natives Tribal Government Policy." DOE Notice 144.1. U.S. Department of Energy, Washington, D.C. Online at http://www.directives.doe.gov/pdfs/doe/doetext/neword/144/n1441.html.

DOE. 2008. *Supplement Analysis. Hanford Comprehensive Land-Use Plan Environmental Impact Statement*. DOE/EIS-0222-SA-01. U.S. Department of Energy, Richland, Washington.

DOE. 2009. *DOE Computerized Accident/Incident Reporting System (CAIRS)*. U.S. Department of Energy. (Web page dated April 2009, Accessed April 16, 2009). Online at http://www.hss.energy.gov/csa/analysis/cairs/.

DOE-RL. 1996. *Close-Out Report. Fitzner-Eberhardt Arid Lands Ecology Reserve Remedial Action, Hanford, Washington*. DOE/RL-94-140, Bechtel Hanford, Richland, Washington.

DOE-RL. 1998. *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan*. DOE/RL-97-56, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL. 2001. *Hanford Site Biological Resources Management Plan*. DOE/RL 96-32, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Online at http://www.pnl.gov/ecomon/Docs/brmap/BRMAP.html.

DOE-RL 2002. *Hanford Site Historic District: History of the Plutonium Production Facilities, 1943-1990.* DOE-RL-97-1047, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Online at http://www.hanford.gov/doe/history/docs/rl-97-1047/index.pdf.

DOE-RL. 2003a. *Hanford Cultural Resources Management Plan*. DOE/RL-98-10, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL. 2003b. *Hanford Site Biological Resources Mitigation Strategy*. DOE/RL-96-88, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Online at http://www.pnl.gov/ecomon/docs/BRMiS.pdf.

DOE-RL. 2006. *Ecological Compliance Assessment Management Plan*. DOE/RL-95-11 Rev. 2. U.S. Department of Energy, Richland Operations Office, Richland, Washington. Online at http://www.pnl.gov/ecology/ecomon/ECAMP/DOE-RL-95-11_Rev_2

DOE-RL. 2008. Letter from David Brockman, Department of Energy, Richland Operations Office Manager, to Dr. Allyson Brooks, State Historic Preservation Officer, November 19, 2008. "Transmittal of Amended National Register of Historic Places Registration Form for the Laliik Portion of Rattlesnake Mountain." Richland, Washington.

Downs, J.L., W.H. Rickard, C.A. Brandt, L.L. Cadwell, C.E. Cushing, D.R. Geist, R.M. Mazaika, D.A. Neitzel, L.E. Rogers, M.R. Sackschewsky, and J.J. Nugent. 1993. *Habitat Types on the Hanford Site: Wildlife and Plant Species of Concern*. PNL-8942, Pacific Northwest Laboratory, Richland, Washington. Online at http://www2.hanford.gov/arpir/?content=findpage&AKey=D196016618.

Duncan, J.P. (ed). 2007. *Hanford Site National Environmental Policy Act (NEPA) Characterization.* PNNL-6415, Rev. 18. Pacific Northwest National Laboratory, Richland, Washington. Online at http://www.pnl.gov/main/publications/external/technical_reports/PNNL-6415Rev18.pdf.

Elliot, D.B., M.J. Scott, E.J. Antonio, and K. Rhoads. 2004. *Hanford Area 2000 Population*. PNNL-14428. Pacific Northwest National Laboratory, Richland, Washington. Online at http://www.pnl.gov/main/publications/external/technical_reports/PNNL-14428.pdf.

Energy Northwest. 2009. *Rattlesnake Mountain Combined Community Communication Facility Execution Plan*, revised 1/28/2009.

EPA. 1996. *EPA Superfund Explanation of Significant Differences: Hanford 1100-Area (USDOE).* EPA/ESD/R10-96/145. Hanford Project Office, Region 10, U.S. Environmental Protection Agency, Richland, Washington.

Franklin, J.E., F.C. Hall, T. Dyrness, and C. Maser. 1972. *Federal Research Natural Areas in Oregon and Washington: A Guidebook for Scientists and Educators – Rattlesnake Hills Research Natural Area*. Pacific Northwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, Portland, Oregon.

Fritz, B.G., R.L. Dirkes, T.M. Poston, and R.W. Hanf. 2003. *Historical Site Assessment: Select Hanford Reach National Monument Lands – Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE), McGee Ranch/Riverlands, and North Slope Units*. PNNL-13989. Pacific Northwest National Laboratory, Richland, Washington. Online at http://www.pnl.gov/main/publications/external/technical_reports/PNNL-13989.pdf.

Hinds, N.R. and L.E. Rogers. 1991. *Ecological Perspectives of Land Use History: The Arid Lands Ecology (ALE) Reserve.* PNL-7750, Pacific Northwest Laboratory, Richland, Washington. Online at http://www2.hanford.gov/arpir/?content=findpage&AKey=D199050031.

Kennedy, E.P., L. Aleck, D. Miller, G. Cleveland, D. McFarland, and K. Valdez. 2008. *National Register of Historic Places Determination of Eligibility Form for Laliik.* U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Kennedy, E.P., D.P. McFarland, R.S. Weeks, A.R. Till, J.L. Downs and M.S. Sackschewsky. 2009. *Cultural Resources Review for the Combined Community Communication Facility and Infrastructure Cleanup on the Fitzner/Eberhardt Arid Lands Ecology Reserve, 600 Area, Hanford Site, Washington State HCRC#2008-600-004.* Pacific Northwest National Laboratory, Richland, Washington.

LMSI. 2008. *Energy Northwest Alternative Repeater Site Evaluation*, Lockheed Martin Services Inc., revised December 2, 2008. Richland, Washington.

O'Connor, G, and W. Rickard. 2003. *A History of the Fitzner/Eberhardt Arid Lands Ecology Reserve – Four Decades of Environmental Research*, PNNL-SA-39326, Pacific Northwest National Laboratory, Richland, Washington. Online at http://www.osti.gov/energycitations/servlets/purl/887455-C3N6rX/887455.pdf.

OSHA. 2007. *Log of Work-Related Injury and Illnesses*. U.S. Department of Labor, Occupational Safety and Health Administration, Washington, D.C. Online at http://www.osha.gov/recordkeeping/new-osha300form1-1-04.pdf.

PNNL. 2008. *Bird Species by Transect: Riparian.* Pacific Northwest National Laboratory, Richland Washington. (Web page dated June 2008, Accessed May 2009).
Online at http://www.pnl.gov/ecomon/Birds/riparian_list.asp.

Sackschewsky, M.R. and J.L Downs. 2001. *Vascular Plants of the Hanford Site,* PNNL-13688, Pacific Northwest National Laboratory, Richland, Washington.
Online at http://www.pnl.gov/main/publications/external/technical_reports/pnnl-13688.pdf.

Saricks, C.L., and M.M. Tompkins. 1999. *State-Level Accident Rates of Surface Freight Transportation: A Reexamination*. ANL/ESD/TM-150. Argonne National Laboratory, Argonne, Illinois.
Online at http://www.osti.gov/bridge/product.biblio.jsp?query_id=0&page=2&osti_id=12051.

Schau, D. 2006. *Kennewick-Richland-Pasco MSA (Benton and Franklin Counties) Labor Area Summary, March 2006*. Washington State Employment Security Division. (Accessed September 2006).
Online at http://www.workforceexplorer.com/article.asp?pageid=4&subid=&articleid=6572&segmentid=2.

Stapp, D.C. and C.S. Dage. 2007. Historic Property Inventory Form for Rattlesnake Mountain Road. Pacific Northwest National Laboratory, Richland, Washington.

USFWS. 2008. *Hanford Reach National Monument Comprehensive Conservation Plan and Environmental Impact Statement.* U.S. Fish and Wildlife Service, Portland, Oregon.
Online at http://www.fws.gov/hanfordreach/planning.html.

USFWS. 2009. *Threatened and Endangered Species System (TESS).* U.S. Fish and Wildlife Service.
Online at http://ecos.fws.gov/tess_public/pub/stateListingIndividual.jsp?state=WA&status=listed.
(Accessed April 27, 2009)

Washington Department of Fish and Wildlife. 2008a. Species of Concern in Washington State. (Web page dated June 30, 2008, accessed May 2009), Olympia, Washington.
Online at http://wdfw.wa.gov/wlm/diversty/soc/soc.htm.

Washington Department of Fish and Wildlife. 2008b. Priority Habitats and Species. List (Web page dated August 2008, accessed May 2009), Olympia, Washington.
Online at http://wdfw.wa.gov/hab/phshabs.htm.

Washington State Department of Natural Resources. 2009. Washington Natural Heritage Program Plant Ranks. (Web page dated January 2009, accessed May 2009), Olympia, Washington.
Online at http://www1.dnr.wa.gov/nhp/refdesk/lists/plantrnk.html.

WCH. 2005. Results of Remediation and Verification Sampling for the 600-270 Horseshoe Landfill. WCH-28, Rev. 0. Washington Closure Hanford, Richland, Washington.
Online at http://www2.hanford.gov/arpir/?content=findpage&AKey=DA01648975.

Appendix A

Rattlesnake Ridgeline Communications Providers

Appendix A

The following organizations currently have communications infrastructure on the ridgeline of Rattlesnake Mountain. Many, but not all, are expected to participate in the CCCF.

A.1 Public Safety/Emergency Services Tenants

- Benton County
  - Emergency Services—Provides the communications for the Benton County Sheriff Department, Benton County Jail, Richland Police Department, West Richland Police Department, Kennewick Police Department, and other smaller agencies.
- Franklin County
  - Emergency Services—Provides communications for the Franklin County Sherriff Department and Pasco Police Department.
- Washington State Emergency Management
  - Provides backhaul microwave communications for local municipalities to communicate at farther distances and is the backbone for Benton County's 800 MHz trunk system.

A.1.1 Local Agency Tenants

The following agencies maintain a form of radio system on the ridgeline that provides communication within their city/county departments

- Benton Franklin Transit
- Benton County PUD
- City of Richland
- Franklin County Public Works
- Franklin County PUD.

A.1.2 State/Regional Agency Tenants

- Energy Northwest—Radio system provides communication for daily operations, security, and interoperability with other agencies. It also provides siren activation for Hanford's river areas and paging to all Energy Northwest workers when offsite.
- State of Washington—The agencies listed below have a form of radio system that provides communication within their respective departments
  - Department of Transportation
  - Department of Natural Resources.
- Washington State University—Not currently active.

A.1.3 Federal Agency Tenants

The following Federal agencies have a form of radio system on the ridgeline that provides communication within their department and/or are links across the state:

- Department of Homeland Security
  - U.S. Border Patrol
  - U.S. Customs Service
  - U.S. Coast Guard
- DOE Hanford Emergency Services
- U.S. Department of Justice
- U.S. Drug Enforcement Administration
- U.S. Fish & Wildlife Service
- Bureau of Alcohol, Tobacco and Firearms
- National Oceanic and Atmospheric Administration
- DOE Pacific Northwest National Laboratory
- DOE Hanford Operations and Maintenance Services (Radio Service Company).

A.1.3.1 Commercial Tenants

The agencies listed below all have a form of radio system that provides communication for local commercial entities for their business and safety operations

- Basin Disposal
- Columbia Communications
- Communications Tech/ Mid Columbia
- Cook Paging
- Crown Castle
- Day Wireless
- Telewaves.

A.1.4 Other Tenants

- Tri-City Amateur Radio
- Civil Air Patrol—This radio system is used for a nonprofit organization that does 95% of search and rescue missions when needed.

Appendix B

Cultural Resources

This appendix contains the following documents:

- The final proposed Memorandum of Agreement prepared under the NHPA Section 106.
- The cultural resources review, redacted in accordance with 43 CFR 7.

**MEMORANDUM OF AGREEMENT (MOA)
FOR THE RATTLESNAKE MOUNTAIN COMBINED COMMUNITY COMMUNICATION FACILITY AND INFRASTRUCTURE CLEANUP ON THE FITZNER/EBERHARDT ARID LANDS ECOLOGY RESERVE HANFORD SITE, RICHLAND, WASHINGTON
BETWEEN THE U. S. DEPARTMENT OF ENERGY AND
THE WASHINGTON STATE HISTORIC PRESERVATION OFFICE
WITH THE PARTICIPATION OF CONSULTING PARTIES: CONFEDERATED TRIBES AND BANDS OF THE YAKAMA NATION, CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION, THE NEZ PERCE TRIBE, AND THE WANAPUM**

PURPOSE

The purpose of this MOA is to implement mitigation strategies to resolve adverse effects resulting from the subject undertaking. The proposed undertaking by DOE, the Federal landowner, is to consolidate communication facilities and clean up and demolish facilities and infrastructure located on the Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE), including the ridgeline of Rattlesnake Mountain, in south-central Washington. Under this project, most of the existing facilities and infrastructure will be removed and the area restored as close as possible to its natural condition. The undertaking also entails a proposed new Combined Community Communications Facility (CCCF) which will be designed and constructed by Energy Northwest (licensee and operator of the CCCF) to consolidate the remaining emergency communications capabilities for local, regional, state, and federal emergency service and commercial organizations in a single facility.

The proposed undertaking has many purposes:

1. Reduce the active footprint of the ALE site consistent with DOE's 2015 vision to reduce indirect costs and potential safety impacts.
2. Protect sensitive cultural and ecological resources by reducing the impacts of people and infrastructure on ALE.
3. Support DOE's efforts to protect those portions of *Laliik* under DOE jurisdiction and control, including its contributing elements.
4. Provide operational or communications support to local, regional, state, and federal energy service and commercial organizations.

DOE made a finding of adverse effect based on the *Cultural Resources Review for the Rattlesnake Mountain Combined Community Communications Facility and Infrastructure Cleanup on the Fitzner/Eberhardt Arid Lands Ecology Reserve,600 Area, Hanford Site, Washington Sate (HCRC#2008-600-004).* Adverse effects resulting from the proposed undertaking identified in the cultural resources review include potential impacts to the spiritual qualities and the visual and natural setting.[4] DOE notified the Washington State Historic Preservation Office (SHPO) of its finding in a letter dated May 27, 2009.

[4] A supplemental cultural resources review will be completed for additional areas that have been identified as part of the demolition and cleanup scope.

The parties acknowledge the following basis for the MOA:

WHEREAS, area Tribes (Confederated Tribes and Bands of the Yakama Nation, Confederated Tribes of the Umatilla Indian Reservation, the Nez Perce Tribe, and the Wanapum, herein referred to as [Tribes]) each attach religious and cultural significance to lands identified by Tribes as *Laliik.* The American Indian Religious Freedom Act (AIRFA) (1979) and Executive Order 13007 protect the rights of Indian Tribes to exercise their traditional religions. DOE consults with the Tribes to accommodate access to and ceremonial use of sacred sites, where not inconsistent with law or essential agency functions and in a manner that respects the government-to-government relationship with the Tribes; and

WHEREAS, DOE has consulted with the aforementioned Tribes in the preparation of the cultural resource review, the determination of adverse effect, and this MOA in accordance with Section 106 of the National Historic Preservation Act, 36 CFR Part 800.6(a), and the aforementioned Tribes have been invited to concur on this MOA; and

WHEREAS, DOE has consulted with the Washington State Historic Preservation Officer (SHPO) and notified the Advisory Council on Historic Preservation (ACHP), in accordance with Section 106 of the National Historic Preservation Act, 36 CFR Part 800.6(a) to resolve adverse effects on historic properties; and

WHEREAS, DOE has taken public views into consideration concerning the proposed undertaking on the ALE through meetings with private property owners, county representatives and elected officials, and through the National Environmental Policy Act process; and

WHEREAS, all adverse effects to the Manhattan Project and Cold War Era buildings and associated infrastructure targeted for removal by this project have been mitigated in accordance with the Manhattan Project and Cold War Historic District Treatment Plan (DOE 1998) ; and

WHEREAS, DOE seeks to resolve and avoid adverse effects associated with the proposed undertaking.

NOW, **THEREFORE**, the signatories agree that DOE's implementation of the following stipulations will resolve the adverse effects of the proposed undertaking on historic properties.

STIPULATIONS

DOE will implement the following stipulations during construction of the CCCF, operation of the CCCF, demolition activities, inadvertent discovery, and reporting (Sections A through E) to resolve adverse effects, including adverse effects to spiritual qualities, visual and natural settings:

A. Minimize Adverse Effects During Construction of the CCCF

1. DOE will require the building to be designed to minimize visual, audible and environmental impacts.
2. DOE will require appropriate dust control measures.

3. Consistent with its responsibilities under AIRFA, Executive Order 13007, and its government-to-government relationship with the Tribes, DOE will provide continued access and coordinate operation activities to avoid unnecessary interference with Tribal ceremonial activities and religious use of the portion of *Laliik* under DOE's jurisdiction where not inconsistent with the law or essential agency functions.
4. DOE will require that all project activities and vehicle access including laydown and staging areas be confined to paved, graveled, and disturbed areas, to the extent feasible.
5. DOE will provide an initial seven-calendar-day advanced notice in accordance with the agreed to notification matrix to Tribes prior to commencement of project construction activities.
6. DOE will provide cultural resource sensitivity awareness training (e.g., training schedule) for all contractors that perform construction activities.
7. DOE will use an appropriately qualified cultural resources specialist to conduct intermittent construction monitoring of project activities.
8. DOE will work with cultural resources personnel to create temporary physical barriers for archaeological sites and culturally sensitive plants located on the ridgeline. Culturally sensitive plants identified will be addressed on a case by case basis. If historical resources cannot be avoided, additional consultation with Tribal staff will be conducted to mitigate for any adverse effects.
9. DOE's cultural resources program will conduct annual cultural resources monitoring of historical resources located near the project area.

B. Minimize Adverse Effects During Operations of CCCF

1. Consistent with its responsibilities under AIRFA, Executive Order 13007, and its government-to-government relationship with the Tribes, DOE will provide continued access and coordinate operation activities to avoid unnecessary interference with Tribal ceremonial activities and religious use of the portion of *Laliik* under DOE's jurisdiction where not inconsistent with the law or essential agency functions.
2. DOE will require the licensee on ALE to periodically evaluate technologies that may become available and would allow relocation of communications and provide continued emergency management of communications and response capabilities.
3. DOE will require that all project activities and vehicle access including laydown and staging areas be confined to paved, graveled, and disturbed areas, to the extent feasible.
4. DOE will provide cultural resources sensitivity awareness training for all contractors that perform ongoing operation and maintenance activities.
5. DOE will use an appropriately qualified cultural resources specialist to conduct intermittent construction monitoring of project activities.
6. DOE's cultural resources program will conduct annual cultural resources monitoring of historical/archaeological sites located near the project area.

C. Minimize Adverse Effects During Demolition Activities

1. DOE will require appropriate dust control measures.
2. Consistent with its responsibilities under AIRFA, Executive Order 13007, and its government-to-government relationship with the Tribes, DOE will provide continued access and coordinate operation activities to avoid unnecessary interference with Tribal ceremonial activities and religious use of the portion of *Laliik* under DOE's jurisdiction where not inconsistent with the law or essential agency functions.
3. DOE will require that all project activities and vehicle access, including laydown and staging areas be confined to paved, graveled, and disturbed areas, to the extent feasible.
4. DOE will provide cultural resources sensitivity awareness training for all contractors that perform demolition activities.
5. DOE will work with cultural resources personnel to create temporary physical barriers for historical/archaeological sites and culturally sensitive plants located on the ridgeline. Culturally sensitive plants identified will be addressed on a case by case basis. If historical/archaeological resources cannot be avoided, additional consultation with Tribes will be conducted to mitigate for any adverse effects.
6. DOE will develop and implement site-specific recontouring and native plant revegetation strategies using guidance from the Hanford Site Biological Resources Management Plan and in consultation with Tribes.
7. DOE will use an appropriately qualified cultural resources specialist to conduct intermittent construction monitoring of project activities
8. DOE's cultural resources program will conduct annual cultural resources monitoring of historical/archaeological sites located near the project areas.

D. Inadvertent Discovery

1. DOE will adhere to the Inadvertent Discovery of Human Remains Protocols and Unanticipated Discovery Protocols outlined in the U.S. Department of Energy, Richland Operations Office, Hanford Cultural Resources Management Plan (DOE 2003) and in compliance with the Native American Graves Protection and Repatriation Act (NAGPRA) 1990 and 36 CFR 800.13.

E. Reporting

1. DOE will provide quarterly electronic reporting to all parties on the implementation of the stipulations in this MOA over the duration of the project.

ADMINISTRATIVE PROVISIONS

A. Dispute Resolutions

DOE, SHPO, consulting, and concurring parties will work collaboratively to resolve any differences or disputes informally. If necessary, significant disputes will be elevated to the appropriate management levels of the respective parties for resolution. At this point the following steps will be followed:

1. Should the SHPO raise an objection to an action taken under the MOA, or have a dispute regarding fulfillment of the terms of this MOA, they will file a written notice with DOE.

2. Upon receipt of a written notice from the SHPO, DOE will consult with signatories, consulting and concurring parties to resolve the dispute.

3. If DOE cannot resolve the objection or dispute within 60 calendar days of receipt of the written notice, DOE will forward to the ACHP documentation of the dispute, a written proposal for its resolution, and request the ACHP's comment.

4. Within 30 calendar days of receipt of the written submittal, the ACHP shall either:

    a. Notify DOE that it will not consider the dispute or provide recommendations, in which case the Agency may proceed with the proposed action; or

    b. Concur with DOE's proposed response to the dispute, whereupon DOE may proceed in accordance with the agreed-upon response; or

    c. Provide DOE with recommendations, which DOE will consider in good faith in reaching a final decision regarding a response to the dispute.

5. DOE shall take into account any SHPO, ACHP, consulting, or concurring parties' recommendation or comments provided in accordance with this stipulation with reference only to the subject of the objection or dispute. The DOE's responsibility to carry out all actions under this MOA that are not the subject(s) of the objection or dispute shall remain unchanged. While the dispute is being resolved, the MOA continues in effect without change or suspension.

6. If the SHPO or ACHP is contacted by a concurring party Tribe or by a member of the public to discuss a significant concern or objection about implementation of the terms of this MOA, DOE will also be notified of the issue.

7. DOE will keep the consulting and concurring parties, and the public, as appropriate, apprised of any concerns or objections raised and how the concern is resolved.

B. Amendments

The signatories may propose, in writing, and will consider amendments to this MOA. Concurring parties may also recommend amendments to the signatories who will consider such recommendations. Notice of any proposed amendments will also be provided to the other parties to this MOA.

C. Effective Date and Termination

This MOA will become effective on the date that it has been signed by all signatory parties. Any signatory party who wishes to terminate the MOA must do so in accordance with the regulations at 36 CFR 800.6(c)(8). The MOA will be terminated at the end of the project activities.

D. Coordination

DOE will ensure that each signatory, consulting and concurring party is provided a copy of the fully executed MOA.

Signatory Parties:

U.S. Department of Energy

By:_____Date:_____
David A. Brockman
Manager

Washington State Department of Archaeology and Historic Preservation

By:_____Date:_____
Dr. Allyson Brooks
Washington State Historic Preservation Officer

Concurring Parties:

Confederated Tribes of the Umatilla Indian Reservation

By: _____ Date:_____

Confederated Tribes and Bands of the Yakama Nation

By: _____ Date:_____

Nez Perce Tribe

By: _____Date:_____

Wanapum

By: _____Date:_____

Energy Northwest

By: _____Date:_____

U.S. DEPARTMENT OF ENERGY

PNNL-18408

Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

Cultural Resources Review for the Rattlesnake Mountain Combined Community Communication Facility and Infrastructure Cleanup on the Fitzner/Eberhardt Arid Lands Ecology Reserve, 600 Area, Hanford Site, Washington State (HCRC# 2008-600-004)

EP Kennedy
DP McFarland
RS Weeks
AR Till
JL Downs
MS Sackschewsky

May 2009

Pacific Northwest
NATIONAL LABORATORY

DISCLAIMER

PACIFIC NORTHWEST NATIONAL LABORATORY
operated by
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May 2009

Prepared for
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under Contract DE-AC05-76RL01830

Pacific Northwest National Laboratory
Richland, Washington 99352

Summary

In 2008, the U.S. Department of Energy Richland Operations Office (DOE-RL) initiated planning for a project to consolidate communication facilities and clean up and demolish facilities and infrastructure located on the ridgeline of Rattlesnake Mountain, which is located on the Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE) in south-central Washington. This effort is in part a result of DOE-RL's 2015 vision to reduce the active footprint on the Hanford Site. Under this project, most of the existing facilities and infrastructure will be removed and the area restored to its natural condition. A new facility will be designed and constructed by Energy Northwest to consolidate the remaining emergency communications capabilities for local, regional, state, and federal emergency service and commercial organizations in a single facility. By reducing the environmental footprint of the ALE site by approximately 91%, this action will reduce indirect costs and potential safety impacts, and it will protect sensitive cultural and biological resources by reducing the impacts of people and infrastructure on the mountain. The latter achievement also supports DOE-RL efforts to address Tribal concerns about the long-term protection of Rattlesnake Mountain (*Laliik*)—a National Register-eligible Traditional Cultural Property.[1]

At DOE-RL's request, Pacific Northwest National Laboratory conducted a cultural resources assessment of the consolidation and cleanup project. This report documents the results of the assessment, which was conducted to comply with the National Historic Preservation Act of 1966, Section 106, in accordance with Title 36 of the *Code of Federal Regulations* Part 800 (36 CFR 800), and in consultation with Hanford area Tribes.[2,3] The Area of Potential Effect was defined as the Fitzner/Eberhardt Arid Lands Ecology Reserve, in particular the ridgeline of Rattlesnake Mountain, the former Nike Missile Base area, and the Rattlesnake Springs area.

In addition to identifying *Laliik* as a National Register-eligible Traditional Cultural Property, the cultural resources assessment identified several historic properties, including pre-contact archaeological sites and Manhattan Project Cold War Era buildings located within the Area of Potential Effect. Several stipulations are suggested as a means for avoiding and resolving any adverse effects on these properties. These should be formalized in a Memorandum of Agreement.

[1] Note: Only the portions of *Laliik* under DOE's jurisdiction and control have been determined to be eligible for listing in the National Register.
[2] National Historic Preservation Act of 1966. 2000. Public Law 89-665, as amended, 16 USC 470 et seq.
[3] 36 CFR 800. 2000. "Protection of Historic Properties." *Code of Federal Regulations.* Advisory Council on Historic Preservation.

Abbreviations and Acronyms

AASTA	Alliance for the Advancement of Science Through Astronomy
AEC	Atomic Energy Commission
AIRFA	American Indian Religious Freedom Act
ALE	Fitzner/Eberhardt Arid Lands Ecology Reserve
APE	Area of Potential Effect
ARPA	Archaeological Resources Protection Act of 1979
CCCF	Combined Community Communication Facility
CFR	*Code of Federal Regulations*
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
DOE-RL	U.S. Department of Energy Richland Operations Office
EN	Energy Northwest
GLO	General Land Office
HCRC	Hanford Cultural Resources Compliance
HCRMP	Hanford Cultural Resources Management Plan
HCRP	Hanford Cultural Resources Project
HDTP	Historic District Treatment Plan
HRNM	Hanford Reach National Monument
HVAC	heating, ventilation, and air-conditioning
MOA	Memorandum of Agreement
NEPA	National Environmental Policy Act
NERP	National Environmental Research Park
NHPA	National Historic Preservation Act of 1966
PNNL	Pacific Northwest National Laboratory
PUD	Public Utility District
ROD	Record of Decision
SHPO	(Washington) State Historic Preservation Office(r)
TCP	Traditional Cultural Property
THPO	Tribal Historic Preservation Officer
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Contents

Figures

Tables

1.0 Introduction

The U.S. Department of Energy Richland Operations Office (DOE-RL) initiated planning for a project in 2008 to consolidate communication facilities and clean up and demolish facilities and infrastructure located at the top of Rattlesnake Mountain on the Fitzner/Eberhardt Arid Lands Ecology Reserve in south-central Washington. Under this project, the communications facilities and infrastructure on the mountain will be reduced to those that are necessary to maintain existing emergency communications capabilities for emergency service and commercial organizations. These capabilities will be consolidated in a single facility designed and installed by Energy Northwest (EN). Reducing the environmental footprint of the current site by approximately 91% (a net reduction of 427,500 square feet) in this way is expected to derive twofold gains: 1) to reduce indirect costs and potential safety impacts; and 2) to protect sensitive cultural and biological resources by reducing the impacts of people and infrastructure on the reserve. The latter supports DOE-RL efforts to address Tribal concerns about the long-term protection of Rattlesnake Mountain (*Laliik*)—a National Register-eligible Traditional Cultural Property.[1]

A cultural resources assessment of the project for EN (as the agency responsible for the consolidated facility) and DOE-RL (as the lead federal agency for this undertaking) was required to comply with Title 36 of the *Code of Federal Regulations* Part 800 (36 CFR 800) and the National Historic Preservation Act of 1966 (NHPA), Section 106. Pacific Northwest National Laboratory (PNNL)[2] conducted the assessment of the associated Area of Potential Effect (APE)—the Fitzner/Eberhardt Arid Lands Ecology Reserve, which encompasses Rattlesnake Mountain. The reserve is owned by DOE-RL and has been managed by the U.S. Fish and Wildlife Service (USFWS) as part of the Hanford Reach National Monument. The Monument includes the Arid Lands Ecology Reserve within its boundaries. It is located along the western edge of DOE-RL's Hanford Site, in Benton County, northwest of Richland, Washington (Figure 1.1).

1.1 Cultural Resources Assessment

The cultural resources assessment process began with a review of the proposed project and a determination of the project APE. In this case, the APE was defined as the Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE; see Figure 1.1). Under this project, the ridgeline of Rattlesnake Mountain, the former Nike Missile Base area, and the Rattlesnake Springs area of ALE, in particular, were targeted for infrastructure consolidation and/or removal, including the removal of debris piles scattered across ALE. Notifications for tribal involvement in the assessment were made, and the environmental and cultural settings of the project were defined relative to the larger Hanford Site region and the APE. A literature review was conducted to identify historic properties and cultural resource field trips were conducted to investigate and understand the project scope and assess impacts on cultural resources located within the separate numbered locales of the Rattlesnake Mountain ridgeline area. Finally, potential findings of effect were documented for presentation in this report.

[1] Note: Only the portions of *Laliik* under DOE's jurisdiction and control have been determined to be eligible for listing in the National Register.
[2] Pacific Northwest National Laboratory is operated by Battelle for the U.S. Department of Energy under Contract DE-AC05-76RL01830.

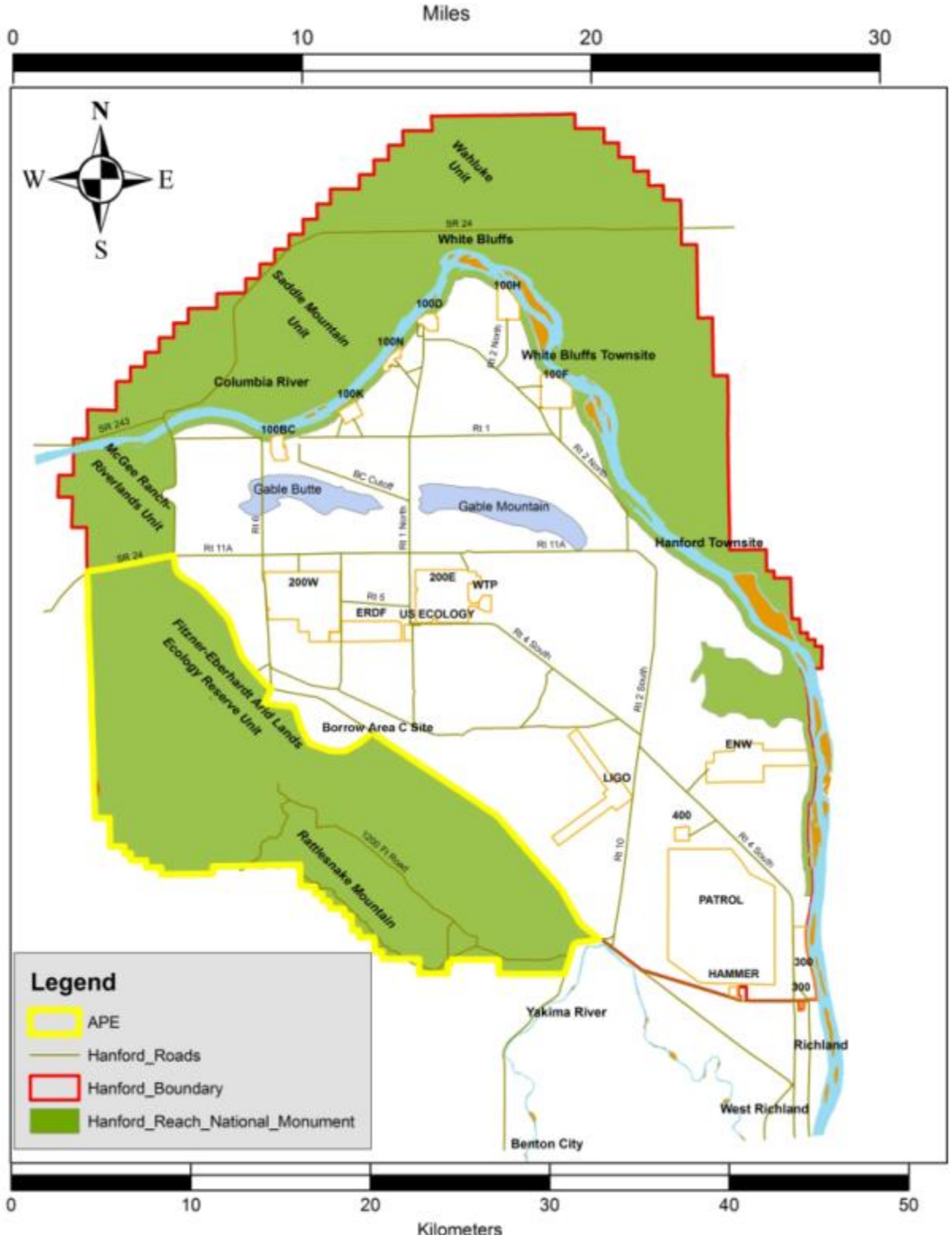


Figure 1.1. The Area of Potential Effect in Relation to the Hanford Site

Final copies of this report will be transmitted to DOE-RL for official distribution to area Tribes and the Washington State Historic Preservation Office (SHPO) for their files in accordance with 36 CFR 800. The DOE-RL Cultural and Historical Resources Program maintains copies and associated records in the Hanford Cultural Resources Project Archive Room, located at the Sigma V Building, 3110 Port of Benton Boulevard, Richland, Washington.

1.2 Report Contents and Organization

The ensuing sections of this report reflect the steps identified in the description of the assessment process. The proposed infrastructure consolidation and cleanup project is described in greater detail in Section 2.0. Notification of the APE and tribal involvement in the assessment is described in Section 3.0, which also further delineates specific project areas within the APE that have emerged as the project design and scope have developed. The environmental and cultural setting of the region and project APE are described in Section 4.0, followed by the results of the literature review and identification of historic properties in Section 5.0. The results of cultural resource tours are provided in Section 6.0. Section 7.0 presents the findings of the determination of adverse effect. Section 8.0 contains the list of references cited in the text. Finally, Appendix A contains photographs and maps of the ALE viewshed, and Appendix B contains before-and-after photos of the consolidated facility designed for installation on the ridgeline of Rattlesnake Mountain.

2.0 Description of Project

Under this infrastructure consolidation and cleanup project—as further defined and evaluated in the separate Environmental Assessment being prepared under the National Environmental Policy Act (NEPA)—DOE-RL proposes to reduce the number of facilities and infrastructure on the ridgeline of Rattlesnake Mountain and ALE to those that are necessary to continue to maintain existing emergency communications capabilities by providing operational and/or communications support to local, regional, state, and federal emergency service and commercial organizations. This action is intended to reduce indirect costs and potential safety impacts and to protect sensitive cultural and biological resources by reducing the impacts of people and infrastructure on the reserve. The protection of sensitive cultural and biological resources is consistent with DOE-RL's statutory responsibilities under several federal laws, including the NHPA, Archaeological Resources Protection Act of 1979 (ARPA), American Indian Religious Freedom Act (AIRFA), Hanford Cultural Resources Management Plan (HCRMP) [DOE-RL 2003], and NEPA, as well as through Tribal consultation to return Rattlesnake Mountain to its natural condition. Prior to demolishing most of the unneeded buildings, DOE-RL proposes to move the primary ALE access gate and associated fence line about 50 feet closer to State Route 225 to improve access control and increase security.

The infrastructure targeted for removal from ALE is located in three primary areas: on the ridgeline of Rattlesnake Mountain, in the former Nike Missile Base area (once an army Nike missile site, subsequently used as ALE headquarters), and in the Rattlesnake Springs area (Figure 2.1). The infrastructure on the ridgeline includes active public and private communications facilities targeted for consolidation as well as inactive facilities and structures targeted for removal; the other two areas contain buildings and miscellaneous debris from past activities that also are targeted for removal. To demolish most of the existing antennas and radio repeaters on the ridgeline, a new facility—the Combined Community Communication Facility (CCCF)—will be constructed so that communication operations can be combined in a single facility that reduces the overall environmental footprint of ongoing activities on ALE. DOE-RL will manage any wastes associated with consolidating the existing facilities and infrastructure and anticipates that some areas may be recontoured and revegetated to restore them to natural conditions. Five buildings at the base of the mountain are being actively used by USFWS in the management of the Hanford Reach National Monument (HRNM) and will not be demolished as part of this project.

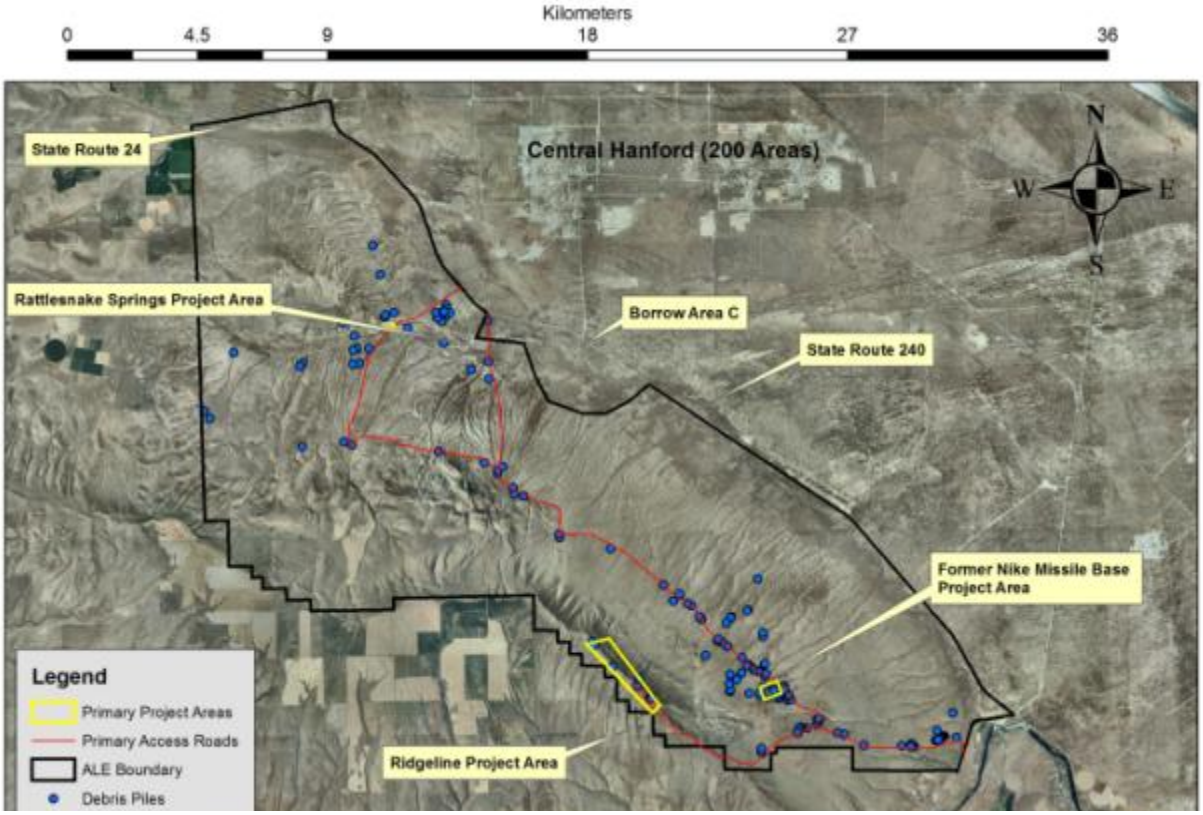


Figure 2.1. Three Primary Areas Targeted for Consolidation and/or Cleanup: Ridgeline Area, Former Nike Missile Base Area, and Rattlesnake Springs Area Overlaid on a 2006 Aerial Photograph

2.1 Combined Community Communications Facility

Eight emergency management and communications facilities, consisting of towers and associated support buildings, are located on the ridgeline of Rattlesnake Mountain. Figure 2.2 shows the general locations of the ridgeline facilities that are proposed for demolition and subsequent installation of the proposed CCCF in the same footprint (designated as Locale 4). The existing facilities provide public safety and emergency communications support for numerous organizations, including DOE-RL, EN, Benton and Franklin counties, regional cities, and local, state, and federal agencies. In addition, a number of commercial entities use facilities on the ridgeline. Figure 2.3 shows the existing facilities at the ridgeline—the proposed location of the CCCF. Figures 2.4, 2.5, and 2.6, respectively, show conceptual rendering, a conceptual plan, and an elevation view of the proposed location of the CCCF.

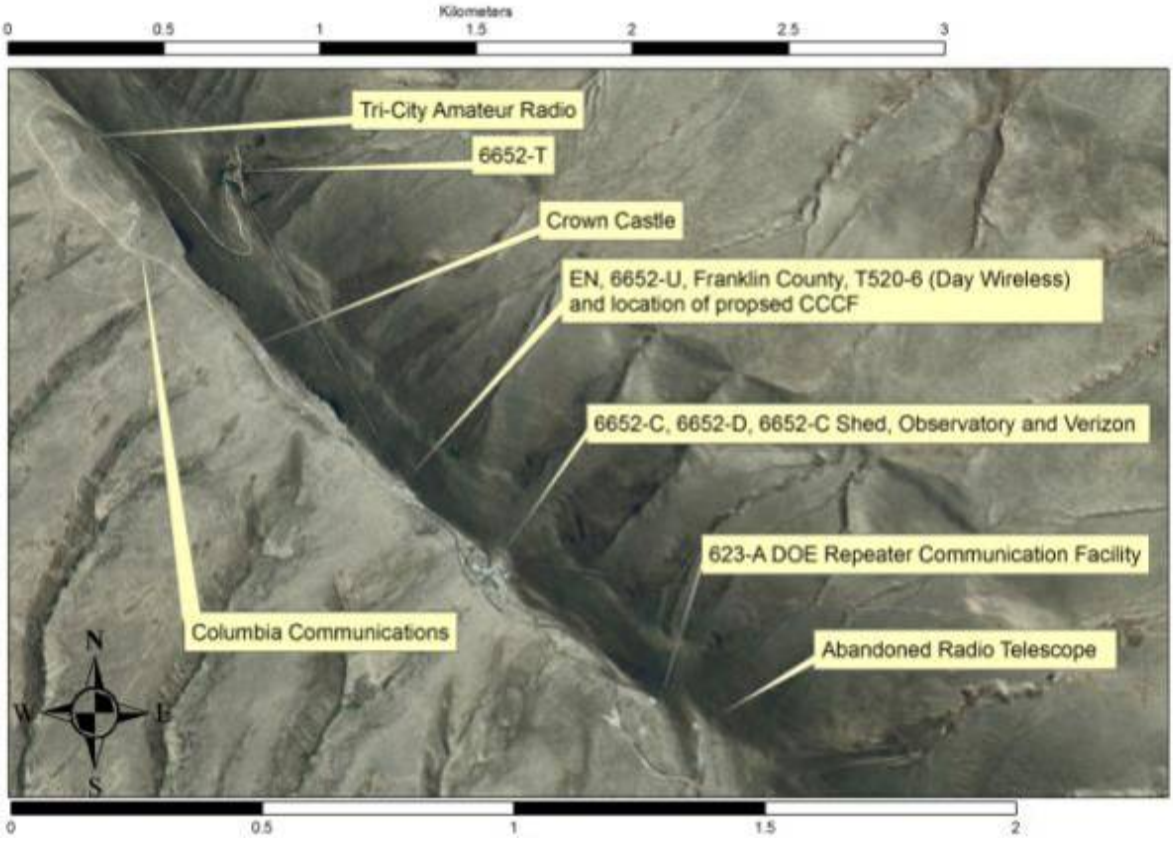


Figure 2.2. General Locations of the Ridgeline Facilities that Are Proposed for Demolition and the Proposed CCCF Overlaid on a 2006 Aerial Photograph

Figure 2.3. The Proposed Location of the CCCF. The EN Building and tower are on the left, then (moving clockwise) the 6652-U Building, Franklin County Building, and T520-6 Building.

Figure 2.4. Conceptual Rendering of the Proposed CCCF

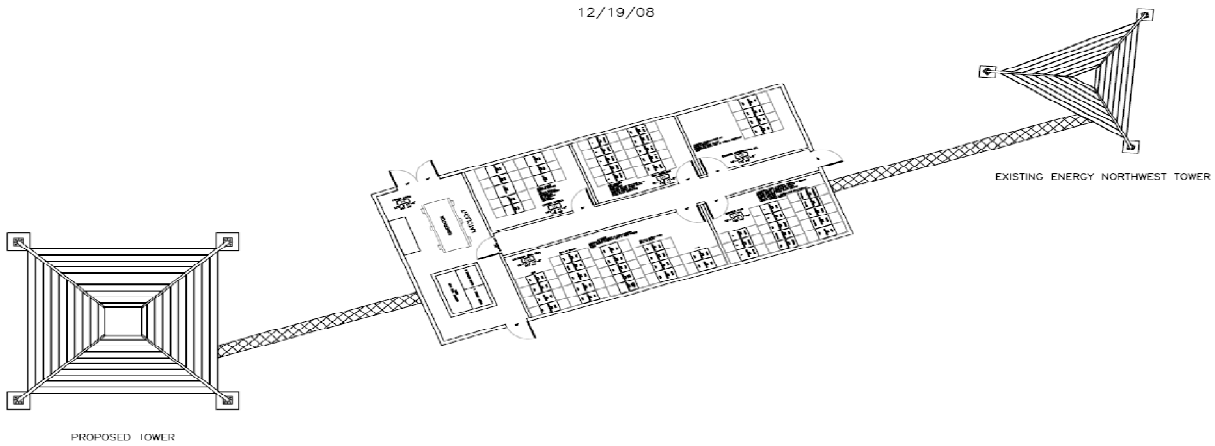


Figure 2.5. Conceptual Plan View of the Proposed CCCF

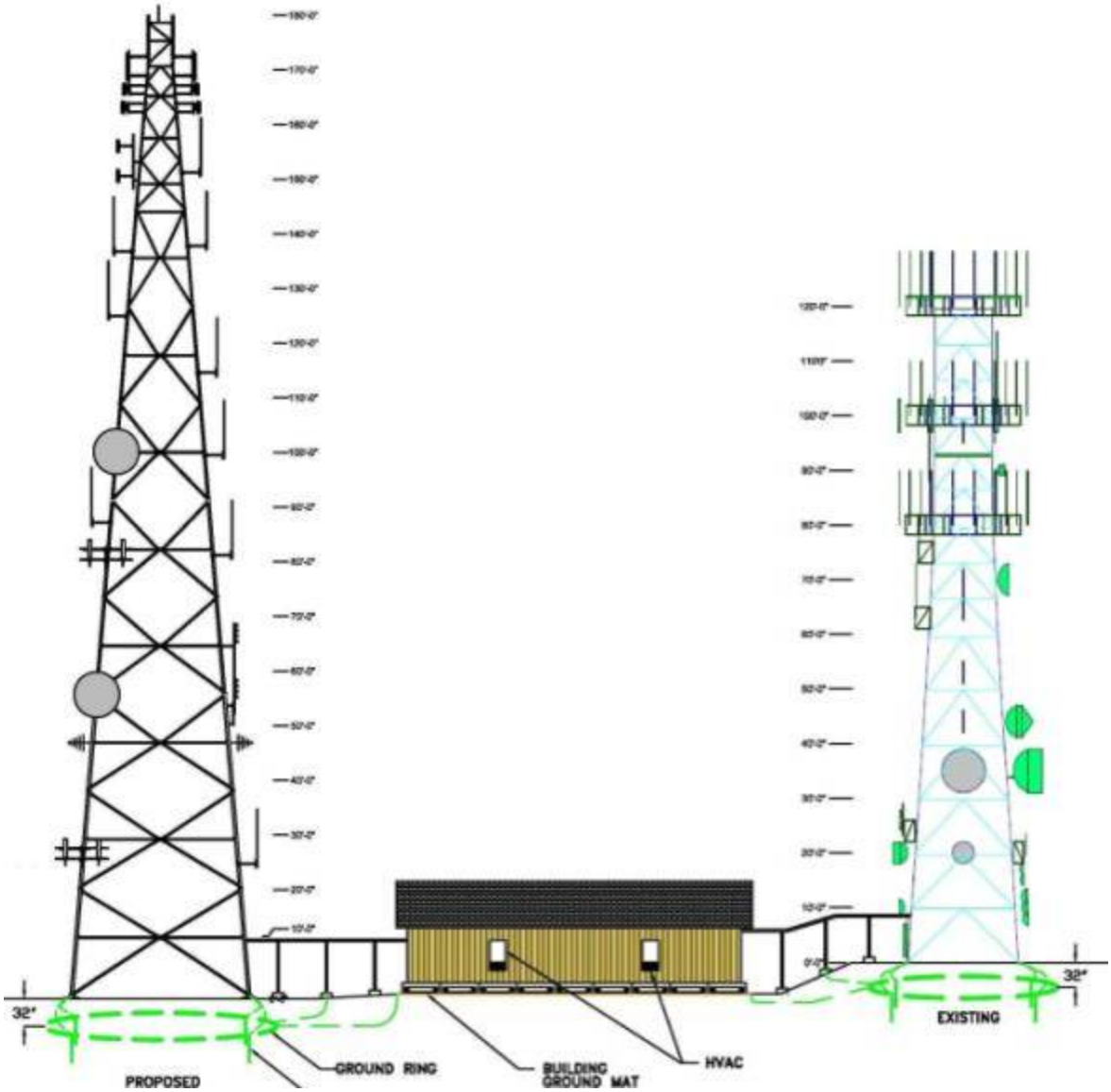


Figure 2.6. Elevation View of the Proposed CCCF

The CCCF will consist of a modular building that is approximately 30 feet wide by 60 feet long. Conceptual designs indicate that the building and its foundation would be manufactured offsite, then moved by truck or helicopter to the proposed site within the existing parking lot and erected. The foundation would be a preformed concrete cell block-type structure to minimize the need for excavation. The building would provide a key-controlled bay area for access by each user to support maintenance, operations, and storage of components. The existing 100-foot EN tower would be extended by 20 feet. A new 180-foot tower would be constructed near the first tower. Both towers would be of self-supporting metal lattice construction (without guy wires). The total footprint of the facility, including towers, grounding system, support building, and parking area, is expected to be about 40,000 square feet

(approximately 100 by 400 feet). It would be entirely encompassed within the footprint of the previously disturbed area.

The support building and new tower would be constructed on previously disturbed ground, within what is currently a graveled parking area. The new tower's foundation would require an excavation approximately 6 to 8 feet deep in an approximately 80-by-80-feet area (the new tower footprint). A subsurface grounding system would run underneath the new tower to the support building and connect with the grounding system of the existing tower. In addition to the subsurface grounding grid, two 8-foot ground rods would be driven vertically into the ground to establish an effective earth ground. The support building would be constructed to provide features such as power supply (primary and backup); equipment bays; fire protection; heating, ventilation, and air-conditioning (HVAC); and security for each user.

As part of the proposed action, DOE-RL would modify its existing property lease with EN or provide a new real estate instrument to allow EN to proceed with construction and operation of the CCCF.

Maintenance of the existing road to the ridgeline would be performed as needed to support construction of the new tower and support building and to allow access for periodic maintenance by communication facility users. The existing one-lane road is sufficient for these purposes, so maintenance is expected to consist largely of filling potholes and occasional snowplowing to keep the road in a safe and passable condition.

2.2 Demolition of Public and Private Communication Facilities

Consolidation of existing communication facilities currently located on the ridgeline of Rattlesnake Mountain into the single CCCF with two towers and a support building, as discussed above, will allow for removal of most of the existing communications facilities (buildings and towers) from the ridgeline, including the following:

- eight communication facilities and associated support buildings, some with associated towers (the 623-A Building, Franklin County Building, EN Building, the T520-6 Building, and those associated with Crown Castle, Columbia Communications, Verizon, and the Tri-City Amateur Radio Club). (See Figures 2.2 and 2.7 and Table 2.1.)
- four unneeded electrical lines (~7500 feet) operated by the Benton Public Utility District (PUD).
- several feeder roads to existing communications sites.

Table 2.1. Communication Towers to Be Removed from the Ridgeline of Rattlesnake Mountain

Tenant	Tower Height (Feet)	Tower Type
Day Wireless (T520-6 Building)	90	Guyed
Tri-Cities Amateur Radio Club	30	Guyed
	70	Guyed
Columbia Communications	75	Guyed
Energy Northwest (proposed for continued use)	100	Self-Supporting

Crown Castle	165	Guyed
DOE-RL (623-A Communications Tower)	100	Guyed
Total	630	

Figure 2.7. Photographs (June 2008) of Communications Facilities to Be Demolished and Removed from the Ridgeline

Figure 2.7. (contd)

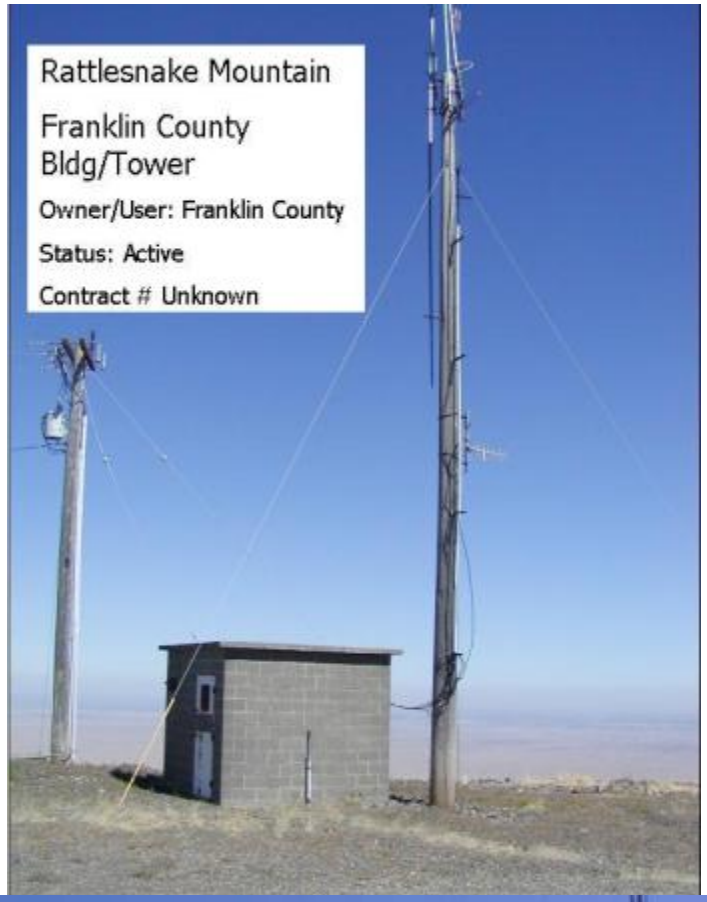


Figure 2.7. (contd)

Figure 2.7. (contd)

Approximately 5000 square feet of buildings and structures would be demolished and removed. The resulting reduction of the site footprint would be from approximately 467,500 square feet[1] to 40,000 square feet, which is a net reduction of approximately 427,500 square feet, or about 91%. The approximately 630 vertical feet of towers presently on the ridgeline would be reduced to approximately 300 vertical feet.

Infrastructure removal is projected to occur over a period of several months to several years and could include the following steps:

- Remove any fluids, hazardous substances, and waste from the support buildings and any remaining equipment. Characterize, package, and transport materials for use, reuse, recycling, or disposal as waste.
- Remove potentially reusable assets such as towers, generators, and other equipment, and transfer them for use elsewhere.
- Demolish the buildings using standard demolition equipment, such as backhoes, trackhoes, and front-end loaders. Break buildings into sections suitable for transport offsite, probably by truck. Recycle, reuse, or dispose of materials as waste.
- Using a hydraulic hoe-ram or similar equipment, break up foundations into sections suitable for transportation offsite, probably by truck. Recycle materials, use them as fill elsewhere, or dispose of them as waste.
- Remove the electrical lines that currently serve the existing tower sites.
- Close unnecessary wells.
- Close unnecessary feeder roads.

2.3 Demolition of Inactive DOE-RL Facilities and/or Structures

A number of DOE-RL facilities (non-communication related) would also be removed from ALE. The facilities include most of the facilities at the ridgeline of Rattlesnake Mountain and at the former Nike Missile Base area, and one building at the Rattlesnake Springs area. Several still-serviceable structures located at the former Nike Missile Base area would remain in place for use by the USFWS. The following buildings on the ridgeline would be demolished (Figure 2.3):

- Rattlesnake Mountain observatory foundation and associated support structures (the observatory itself will be dismantled by the owner and reassembled at an offsite location for future use).
- 6652-C Building and nearby shed (army barracks/administration building)
- an abandoned concrete foundation that used to support a radio telescope
- 6652-U pump house and tank
- 6652-D fire pump house and tank

[1] This area includes the support buildings, parking areas, towers, and the footprint under the guy wires for each tower.

- 6652-T spring pump house

The total square footage of DOE-RL buildings[1] at the ridgeline to be demolished is about 7720 square feet. The total square footage of DOE-RL buildings at the former Nike Missile Base area to be demolished is about 33,300 square feet. This includes the following buildings and associated infrastructure that are proposed to be demolished (Figure 2.8 and 2.9):

- 6652-G ALE field storage building (former Nike Missile Base barracks)
- 6652-H ALE Lab 1 (former Nike Missile Base mess hall)
- 6652-I ALE Headquarters (former Nike Missile Base administration, recreation, and storage building)
- 6652-J ALE Lab 2 (former Nike Missile Base barracks)
- 6652-L Gravitational and Experimental Research Facility and associated underground bunker area (former Nike Missile Base underground missile storage facility)
- 6652-M Fallout Lab (former Nike Missile Base Type 'C' Latrine)
- 6652-R former Nike Missile Base paint shed
- 6652-S former Nike Missile Base sentry box/guard shack
- former Nike Missile Base fueling and warheading area, missile refueling area berms, and any associated subsurface infrastructure
- former Nike Missile Base acid storage shed
- debris associated with the former Nike Missile Base crow's nest observation post (burned in the 2000 Command 24 Fire)
- J.P. Fuel pad and any associated buried tanks and pipes
- all buried infrastructure associated with the former Nike Missile Base such as buried utilities, etc.

Five buildings located at the former Nike Missile Base project area are owned and operated by the USFWS and will not be demolished. These include the

- 6652-PH fire protection pump house
- 6652-E lysimeter preparation building
- 6652-K (former Nike Missile Base pump house)
- 6652-O storage building (former Nike Missile Base Missile Assembly and Testing Building)
- USFWS warehouse (recently constructed), which is owned and operated by the USFWS.

[1] This does not include DOE-RL communication tower 623A, addressed in Section 2.1.

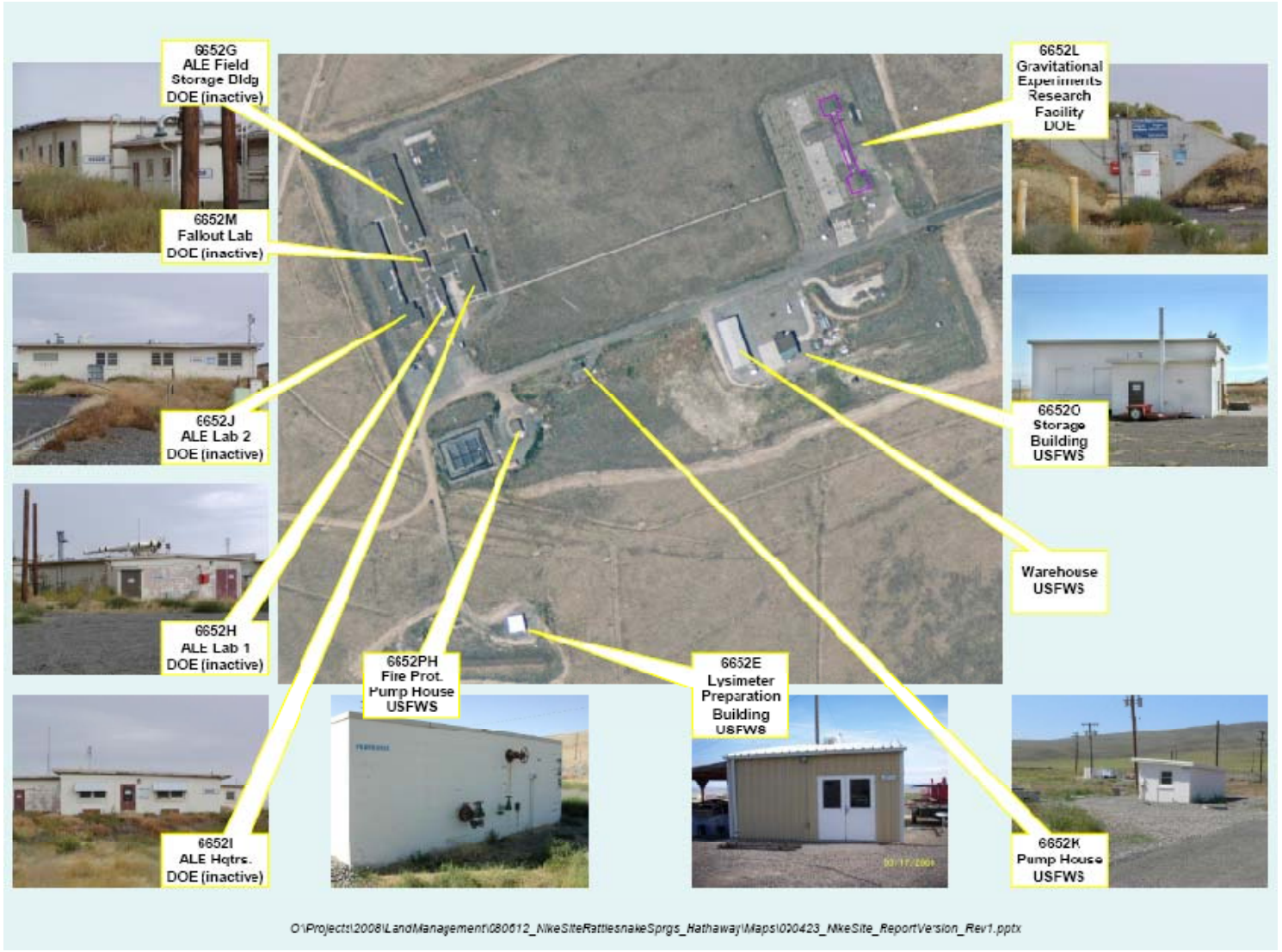


Figure 2.8. Current Facilities Located at the Former Nike Missile Base. Note the USFWS buildings that will not be demolished.

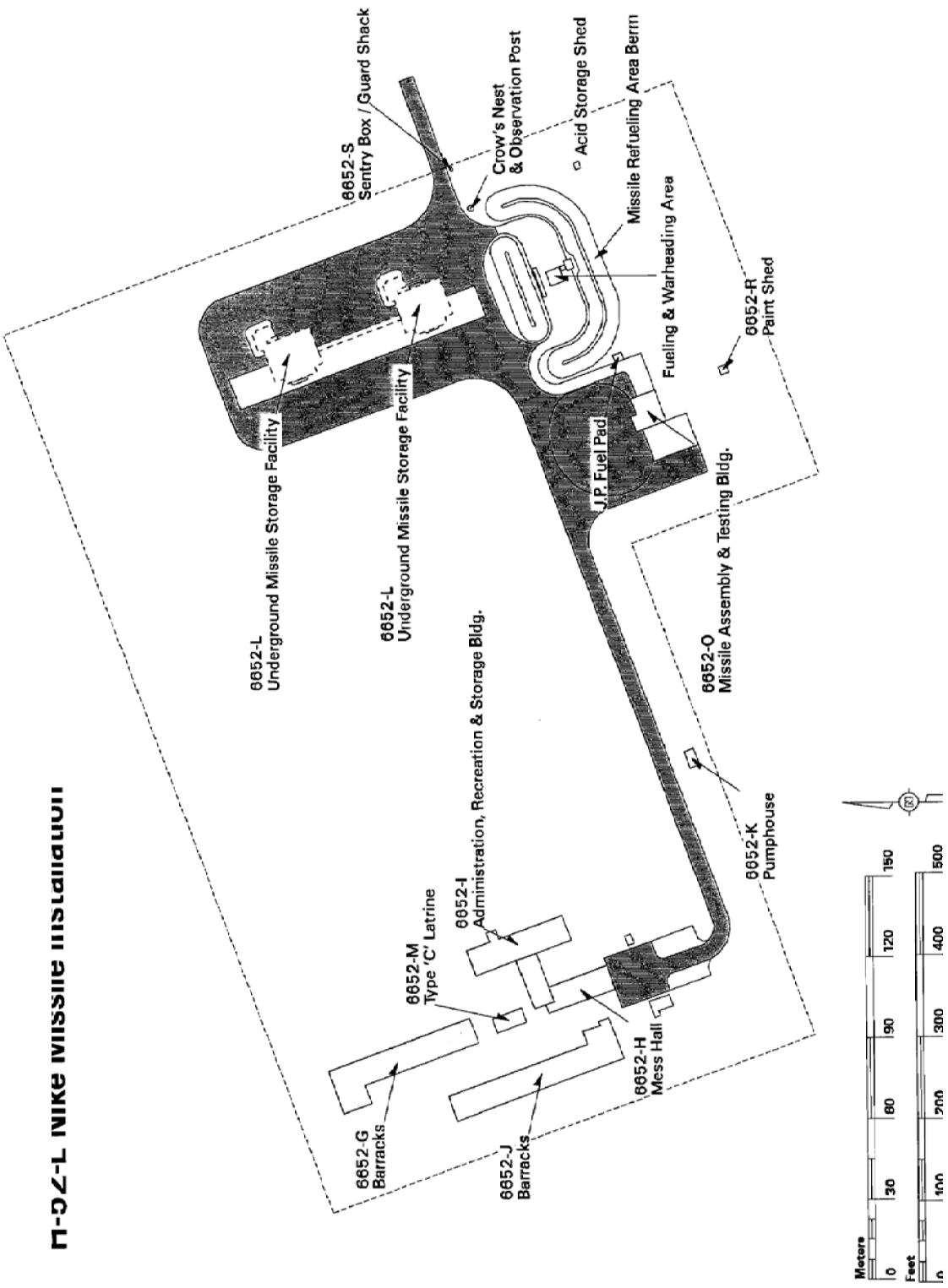


Figure 2.9. Former Nike Missile Base Layout as It Was in the Late 1950s

The 646 Building (a 20-foot-by-40-foot metal structure), located near Rattlesnake Springs, is also proposed to be demolished (Figure 2.10). Demolition is projected to occur over a period of about two years and involve the following steps:

- Remove any fluids, hazardous substances, and waste from the buildings. Characterize, package, and transport materials for use, reuse, recycling, or disposal as waste.
- Remove potentially reusable assets and transfer them for use elsewhere.
- Demolish the buildings using standard demolition equipment, such as backhoes, trackhoes, and front-end loaders. Break buildings into sections suitable for transport offsite, probably by truck. Recycle, reuse, or dispose of materials as waste.
- Using a hydraulic hoe-ram or similar equipment, break up foundations into sections suitable for transport offsite, probably by truck. Recycle materials, use them as fill elsewhere, or dispose of them as waste.
- Remove the electrical lines that currently serve the existing tower sites. Remove the wooden support poles as well or leave a few in place to serve as wildlife structures (raptor perches and elk scratching posts).
- Close unnecessary wells.
- Close unnecessary feeder roads.
- Locate temporary administrative trailers on pre-disturbed areas to facilitate demolition work on ALE.

Figure 2.10. The 646 Building at Rattlesnake Springs

2.4 Cleanup of Miscellaneous Debris

Although cleanup has occurred on ALE over the years, isolated miscellaneous items, herein referred to as debris piles, are still scattered across the area. A number of items are still in use; e.g., many fence posts mark ecological transit routes and research areas, extensive corrals constitute elk and deer exclusion research areas, and several solar-powered telemetry antennas are used to track radio-collared wildlife. Because many of these features continue to be used for ecological research, it is expected that they would be left in place for future use. However, a number of abandoned items also exist; e.g., fence posts that were installed to support the Basalt-Waste Isolation Pilot Project study in the 1980s, coiled remains of wire cable and barbed wire, conduit, rusted metal buckets and barrels, broken bricks, chunks of concrete, boards, and wooden posts. There are also larger items, including a wrecked and abandoned truck, a rock and cement foundation, several cisterns, and the concrete remains of past research projects that are targeted for removal (Figure 2.3 shows the locations of debris piles that will be removed).

Because the habitat on ALE is quite sensitive to human disturbance, care must be taken to assure that all debris-removal efforts do not cause more harm than good. In all cases, efforts would be made to minimize damage to the ecosystem. To the extent practicable, work to remove items located far from existing dirt roads would be conducted during colder months, when vegetation is not actively growing and when birds are not nesting. The methods selected to perform the cleanup would depend on the size and weight of the item to be removed and its distance from the nearest road. Workers would collect items by hand when possible, returning collections to the nearest road for transport, or they might use fat-tired vehicles when necessary to minimize damage. It is likely that a truck might be required to collect some items. A helicopter also could be used to remove some items. If it is determined that the habitat damage caused by collecting the debris outweighs the environmental benefits of the cleanup, items may be left in place.

2.5 Recontouring and Revegetation

Removing buildings and foundations would result in numerous shallow depressions at the ridgeline and base areas. Additionally, the unnecessary feeder roads at the base and ridgeline, buried water line from the 6652-T pump house and other buried utilities, and electrical power corridors are expected to require rehabilitation.

However, especially at the ridgeline, the environment is harsh and the native plant communities are extremely susceptible to disturbance. Thus, the rehabilitation efforts themselves can have undesirable adverse ecological impacts. Therefore, rehabilitation plans would be developed for each site on an individual basis, focusing on recontouring and revegetating, and would be designed to minimize the overall environmental impacts.

Specific recontouring procedures would depend on the severity of surface disturbance resulting from the demolition and the availability of suitable fill material. Excess berm material not used in these other areas would be recontoured to a natural shape. When practicable, nearby constructed berms might be used as fill material. At other locations, nearby rocks and fill material might be used to recontour the sites. Because of the risk of bringing in weed seeds and roots of noxious or alien plant species, fill material

from ALE should be used. However, it could be necessary to use suitable fill material from the Hanford Site in already disturbed areas (e.g., existing pits) or acquire clean soil from offsite. These options should be considered to avoid even the least amount of disturbances on the property.

Revegetation would be performed using appropriate native species that are typical of the site and surrounding plant communities. Plant materials used in revegetation would be locally derived. Boulders or other barriers might be used to prevent vehicle access during rehabilitation.

3.0 Notification of Area of Potential Effect and Tribal Involvement

In accordance with 36 CFR 800, the SHPO and area Tribes (Confederated Tribes of the Umatilla Indian Reservation [CTUIR], Yakama Nation, Nez Perce Tribe, Wanapum, and the Confederated Tribes of the Colville Reservation) were notified on March 5, 2009, of the DOE-RL initiation of a cultural resources review and APE. The APE was defined as the land within the boundary of ALE, as delineated in Figure 3.1. SHPO concurred with this APE on March 23, 2009.

As the project design and scope have developed, specific project areas have been further defined within the APE (Figure 3.1). Three primary areas will be affected by project activities. As indicated previously, these areas are the ridgeline of Rattlesnake Mountain (Township 11N, Range 26E, Sections 30, 31 and 32) shown in Figure 3.2; the base, which includes the former Nike Missile Base (Township 11N, Range 26E, Section 34, 35) shown in Figure 3.3; and the Rattlesnake Springs area, which includes the 646 Building (Township 12N, Range 25E, Section 20) shown in Figure 3.4. The expected footprint of impact for project activities at each of these areas will be confined to locations where previous surface and subsurface disturbances have occurred. Existing access roads to each of the project areas at these locations will be used as well as areas of previous disturbance for laydown and staging areas. Additional project areas include the Rattlesnake Mountain Ridgeline Road (Township 10N, Range 26E, Sections 2, 3, 4, 5, 9, 10) and multiple debris piles that have been identified for cleanup to date (Figures 2.6 and 2.7) dispersed in various locations within the APE as shown in Figure 3.1.

The project has been discussed at two DOE-RL tribal cultural resources meetings (in March and April 2009). DOE-RL and EN have also held several consultation meetings and conference calls with the Tribes between January and May of 2009 to gather input about this project. DOE-RL held a conference call with the Wanapum, CTUIR, Yakama Nation, and Nez Perce on January 30, 2009, to discuss the path forward and the schedule for the CCCF cleanup on ALE. Two additional meetings were held. One was held on February 20, 2009, at the EN office in Richland with DOE-RL, EN, and representatives from the Yakama Nation, CTUIR, Nez Perce, and Wanapum. The meeting was held to discuss the EN alternative sites study for communication sites on Rattlesnake Mountain. A second meeting was held on April 7, 2009, with the CTUIR Cultural Resources Committee in Mission, Oregon. DOE-RL and EN briefed the Committee on the project details.

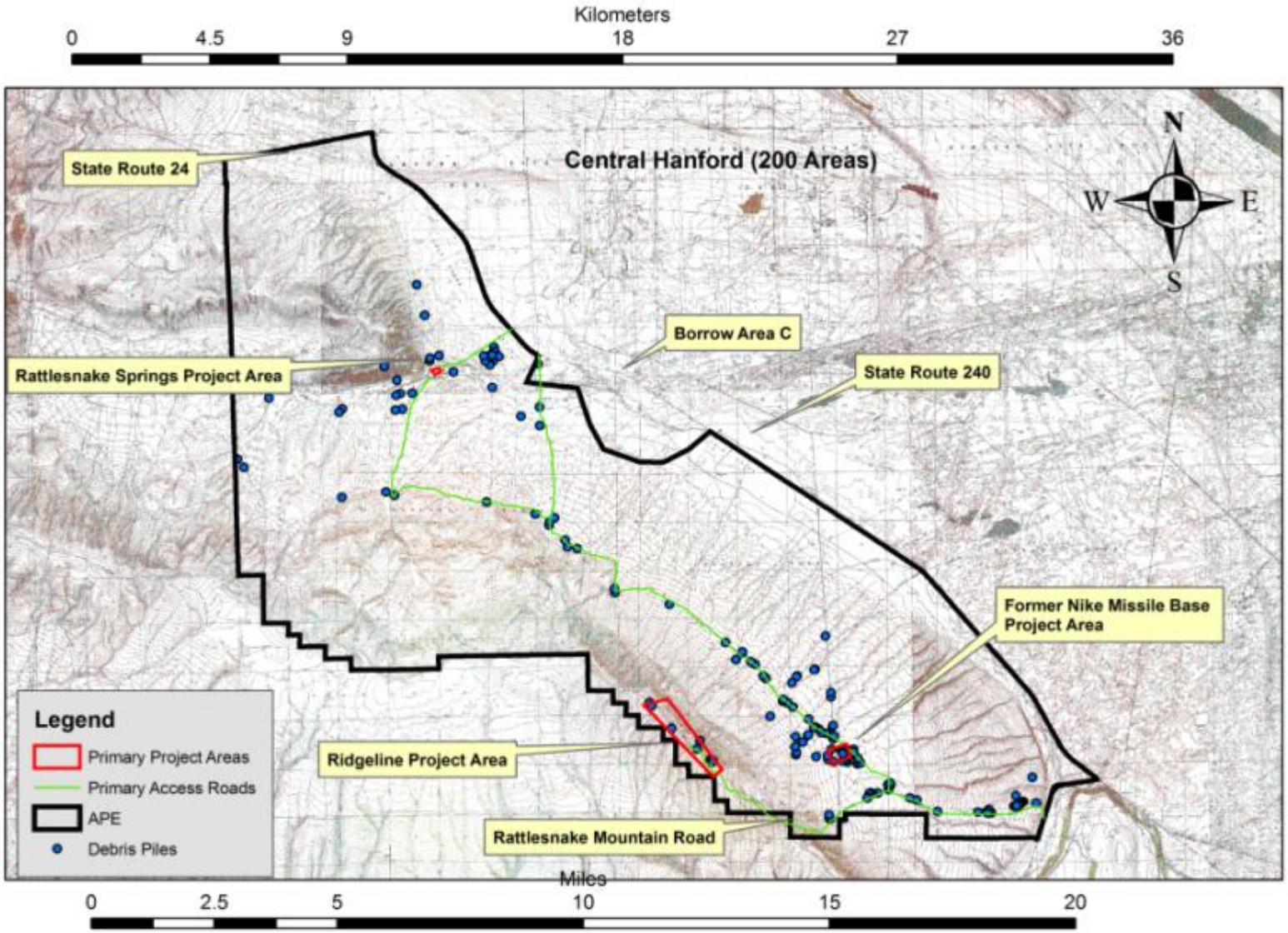


Figure 3.1. The Area of Potential Effect and Specific Project Areas Overlaid on a 7.5' U.S. Geological Survey (USGS) Topographic Map

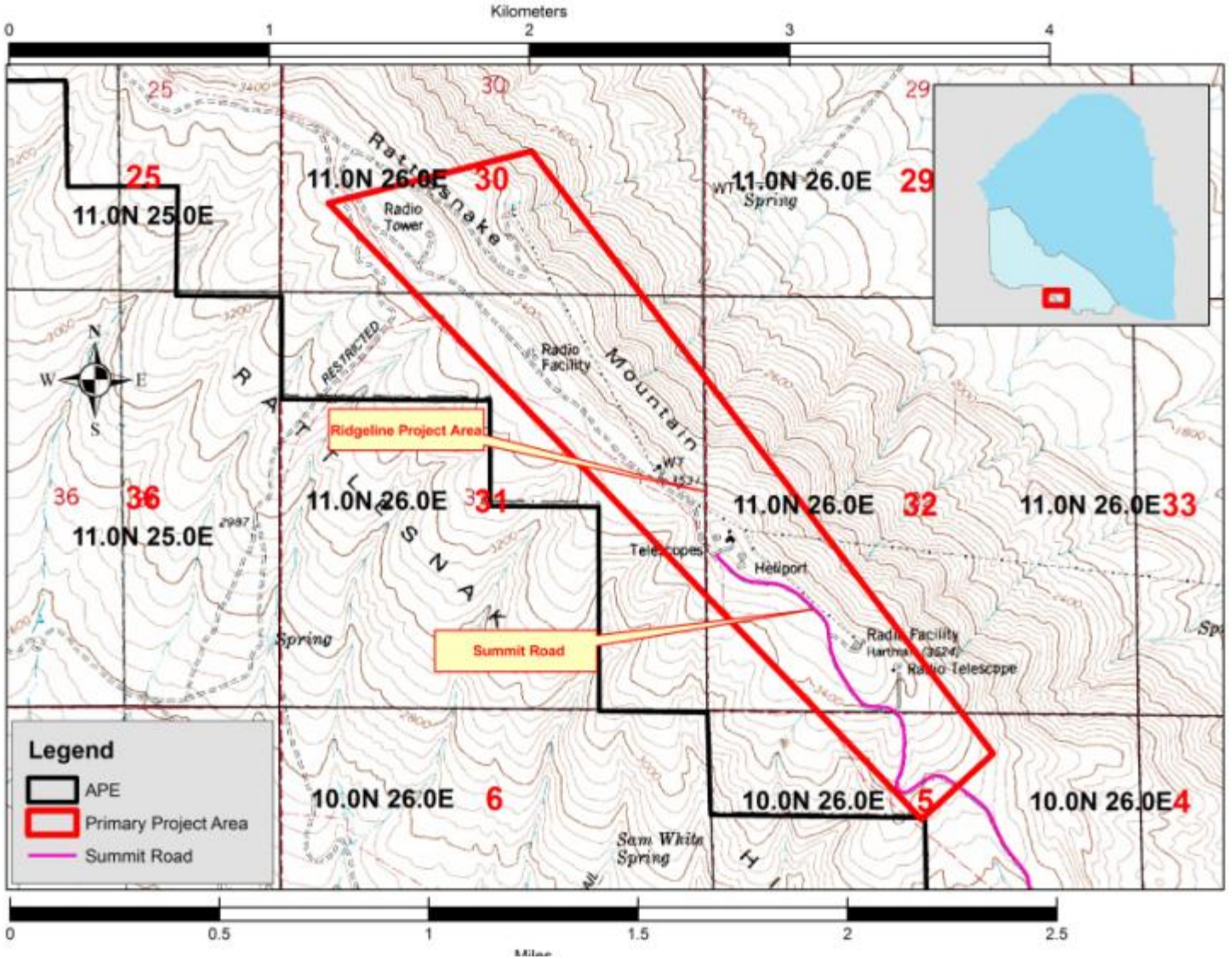


Figure 3.2. The Ridgeline Project Area and Access Road Overlaid on a 7.5' USGS Topographic Map, Washington State, Iowa Quadrangle

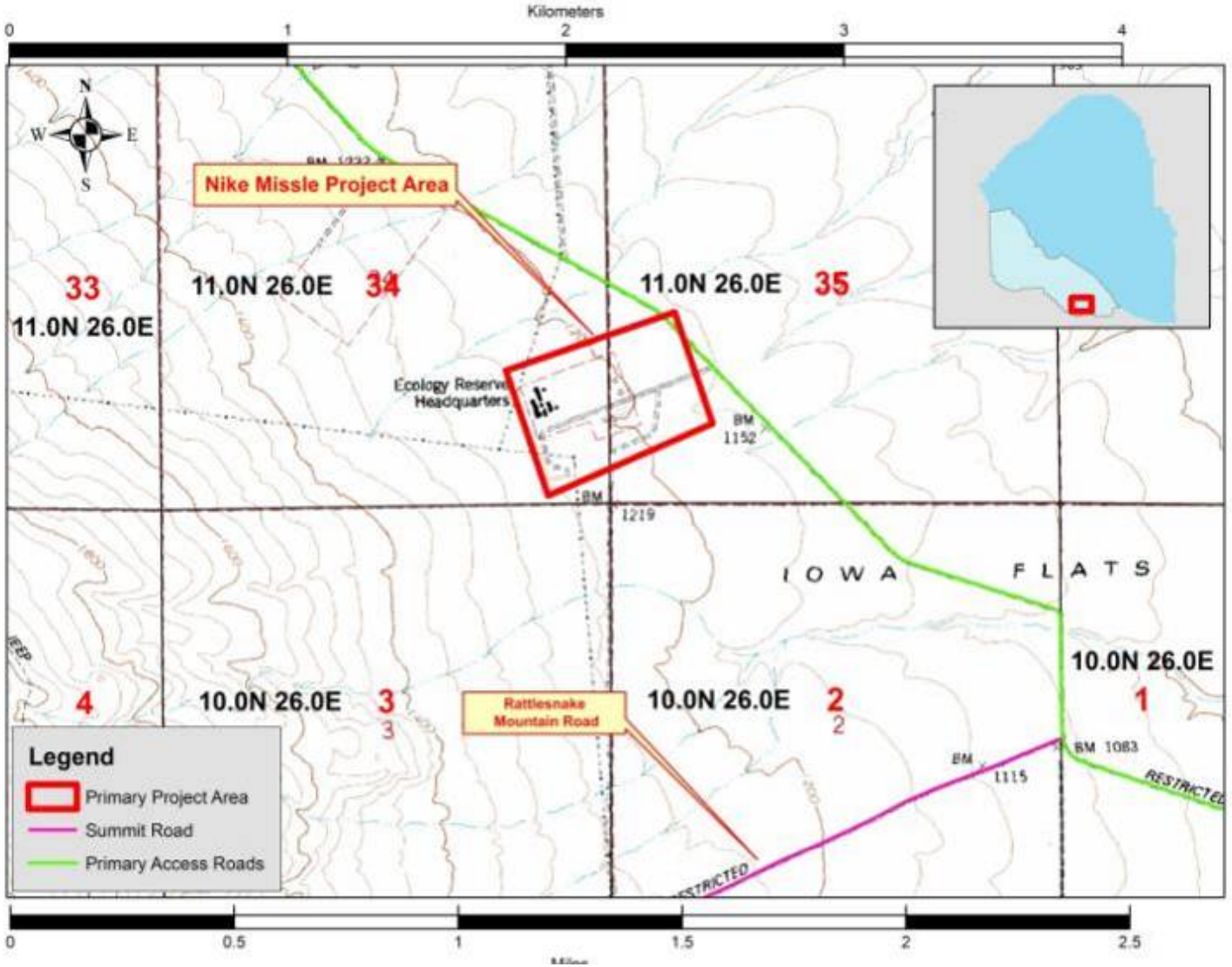


Figure 3.3. The Former Nike Missile Base Project Area and Access Roads Overlaid on a 7.5' USGS Topographic Map, Washington State, Iowa Quadrangle

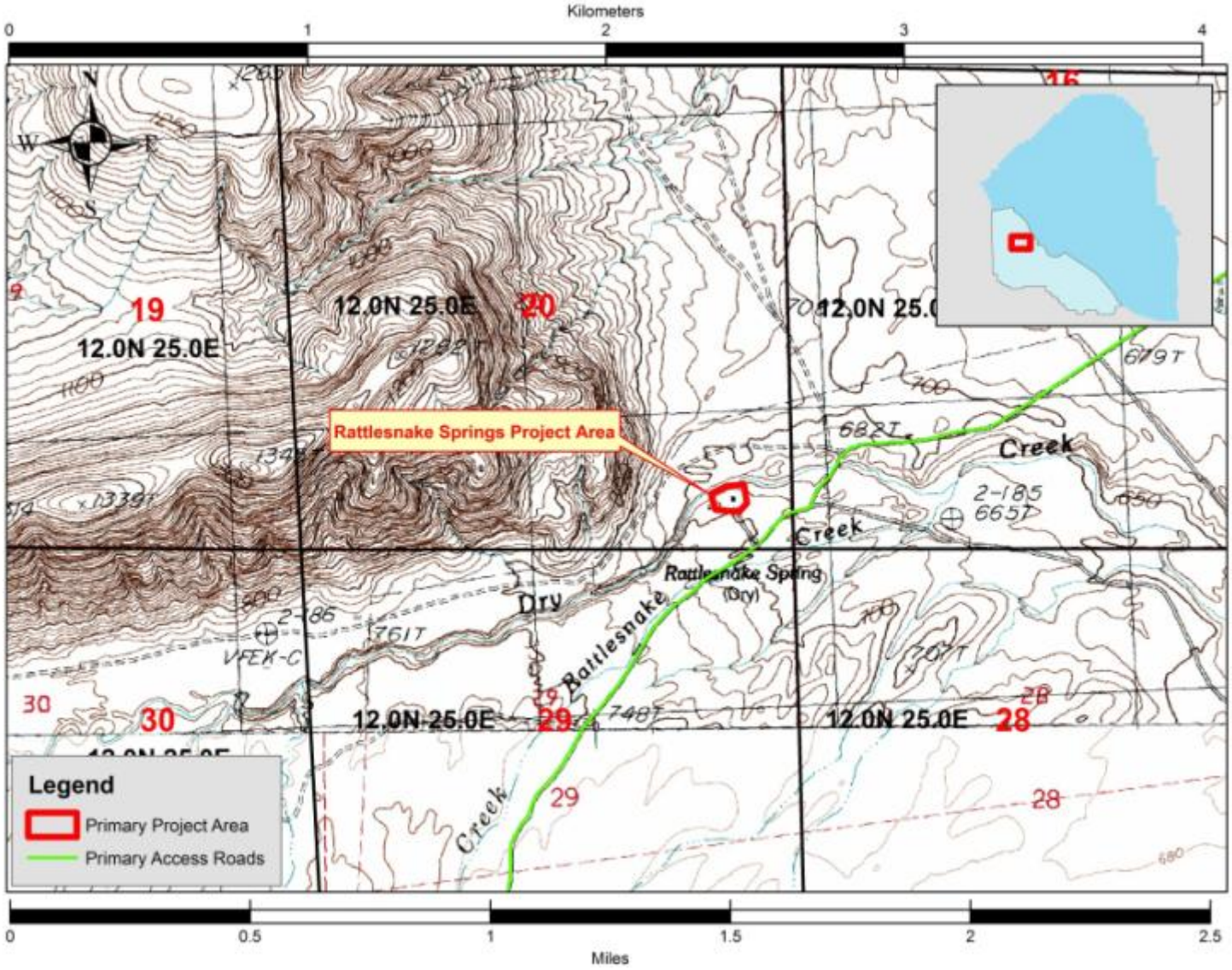


Figure 3.4. The Rattlesnake Springs Project Area and Access Roads Overlaid on a 7.5' USGS Topographic Map, Washington State, Riverland Quadrangle

4.0 Environmental and Cultural Setting

Much of the information provided in this section is derived from the report titled *Hanford Site National Environmental Policy Act (NEPA) Characterization* (Duncan et al. 2007) and the *Hanford Cultural Resources Management Plan* (DOE-RL 2003).

4.1 Regional Environmental Setting

The Hanford Site lies within the Columbia Basin ecoregion (Quigley et al. 1996) and consists of relatively undisturbed shrub-steppe habitats with narrow riparian corridors along the Columbia River and along several intermittent streams and waterways. The climate is typified by hot dry summers with cold wet winters, during which more than 50% of the annual precipitation occurs. Shrub-steppe on the Columbia Plateau is usually dominated by stands of big sagebrush (*Artemisia tridentata*) growing in association with various perennial cool-season bunchgrasses. Other common shrubs include gray and green rabbitbrush (*Ericameria nauseosa* and *Chrysothamnus viscidiflorus*) and spiny hopsage (*Grayia spinosa*), which grows intermixed with big sagebrush. Antelope bitterbrush (*Purshia tridentata*) is usually the dominant shrub on coarser, sandier soils on the site. Where the ground has been disturbed for agriculture or past livestock grazing before Hanford was set aside for nuclear production, the understory may be dominated by cheatgrass (*Bromus tectorum*). This winter annual grass is a successful invasive exotic competitor with native bunchgrasses and can increase after burning or other types of ground disturbance.

Wildfires are not uncommon in the semi-arid shrub-steppe, and the Hanford Site has been subjected to several large fires during the past three decades. These fires act to initially remove the sagebrush from the plant association but are generally not harmful to the perennial native bunchgrasses and forbs. Large acreages on the site (>50,000 acres) were burned in 1981, 1984, 2000, and 2007. Recovery of big sagebrush and other shrub species has occurred in the areas burned in the 1984 fires, but little to no recovery of big sagebrush has occurred where the 1981, 2000, and 2007 fire footprints have overlapped.

The Hanford Site contains similar geologic characteristics to those found throughout the Columbia River Basin (DOE 1988). Five major geologic events occurring over millions of years formed the soil, rocks, and geologic features (ridges and valleys) in the Columbia River Basin. The area was flooded with numerous basaltic lava flows between 17 and 6 million years ago, forming the Columbia River Basalt Group. Concurrent with and following this basalt volcanism, tectonic forces folded the basalt, creating sharp east-west anticlinal ridges and broad synclinal valleys characteristic of the Yakima Fold Belt subprovince of the Columbia Plateau (Myers and Price 1979, p. II-72). In this landscape, the ancestral Columbia River and its tributaries flowed across the area, leaving behind layers of sediment interbedded with some of the younger basalt flows. Following cessation of the basalt volcanism, the ancestral rivers continued to deposit sediments in the structural and topographic lows, forming the Ringold Formation (Newcomb et al. 1972). About 3.4 million years ago, western North America underwent regional uplift, resulting in a major drop in the hydraulic base level for the ancestral Columbia River system and an end to deposition of Ringold sediments. The base level change resulted in regional erosion and downcutting of the ancestral rivers into the Ringold Formation, leaving higher elevations exposed to the arid climate, which caused formation of thick calcic paleosols. On the basin margins, sidestreams were actively

eroding rocks and sediments from the emerging ridges and depositing gravel (mainly basalt clasts), sand, and silt into ancestral sidestreams such as in the Cold Creek and Dry Creek valleys. Ancestral river sediments and windblown loess also were deposited in lower elevations of the basin. The paleosols and sediments superimposed disconformably on the erosional surface of the Ringold Formation are informally called the Cold Creek Unit (DOE-RL 2002b). With the onset of the last major Ice Age some 2.6 million years ago, the area was inundated by a series of cataclysmic Ice Age floods (including the Missoula floods), which deposited a thick sequence of sediment in what is referred to informally as the Hanford Formation (DOE-RL 2002b; Bjornstad 2006). As many as 100 separate flood events have been postulated to have occurred during the last glacial cycle, 15,000 to 20,000 years ago (Waitt 1994). The largest of these floods had flow rates of up to about 17 million cubic meters per second, 10 times the combined flow rate of all of the modern rivers of the world, making them arguably the largest recorded floods known to have occurred on Earth (O'Conner and Costa 2004). Temporary ponding of the Ice Age floodwaters behind Wallula Gap left behind ice-rafted erratic boulders and mounds of iceberg debris (berg mounds) as well as fossils of mammoths and other creatures caught up in the floods (Barton 1999; Last and Winsor 2007). During the last 15,000 years, fluvial and eolian processes further shaped the landscape and deposited locally derived sediments. Thin blankets of volcanic ash from Cascade volcanoes also were deposited.

4.2 Environmental Setting of Project Area of Potential of Effect

The project APE is located along the south and western edge of the Hanford Site north of Richland, in Benton County, Washington. It is bounded to the west and south by the Hanford Site property boundary, to the east by State Route 240, except Borrow Area C, and to the north by State Route 24. Rattlesnake Mountain along the western Pasco Basin is a basaltic anticlinal ridge that rises 915 meters (3000 feet) above the basin floor and lies within the Yakima Fold Belt. The view toward Rattlesnake Mountain is visually pleasing, especially during the springtime when wildflowers are in bloom. Large rolling hills are located to the west and far north (Figure 4.1). Rattlesnake Mountain is bounded to the northeast by the Cold Creek Valley, to the north by Dry Creek, and to the southeast by the Yakima River. The ridge has a long geologic history extending back at least 17 million years and was one of the few places high enough (above 1200 feet in elevation) to remain above the Missoula Flood waters caused by periodic breaks in ice dams that held back a huge impoundment of glacial meltwater near Missoula, Montana, at the close of the Pleistocene era. From 2 million to 1 million years ago to as recently as 13,000 years ago these intermittent floods shaped the region. The three major landforms for Rattlesnake Mountain are the 1) ridge top, 2) lower slope, and 3) basin valley (Fecht et al. 1984).

The ridge top areas of interest are the basaltic ridge crests and upper slopes of northwest trending Rattlesnake Mountain. This geomorphic area contains the work pertaining to construction of the new CCCF to consolidate communication infrastructure and to demolish the remaining buildings and infrastructure, including the upper slope pump house and existing electrical lines operated by Benton PUD. The lower slope area of interest is in Iowa Flats, which contains the former Nike Missile Base that is to be demolished. The basin and valley area of interest is the Dry Creek Canyon that contains the 646 Building that is to be demolished. The ridge terrain consists of basaltic ridge outcrops and crests and upper ridge slopes. The anticlinal basalt ridge is asymmetrical with south slopes approximating 5 to 15 degrees and north slopes exceeding 30 degrees. This geometry contributes to the morphology of both the upper, middle, and lower slope on the north side through mass wasting of slump blocks, incision of deep

gullies, and formation of benches through preferential erosion of individual basalt flows. The lower slope is characterized by more gentle slopes (5 to 15 degrees) and marked by a parallel drainage network. On the northern flank of the mountain the interfluves between parallel drainages consist primarily of sediments aggraded from the slope above intermixed with loess. Missoula Flood deposits blanket the slope below the 1200-foot elevation. Prominent in this deposition is the presence of the Touchet Beds and other catastrophic flood deposits. These slackwater and alluvial flood deposits are capped with ice-rafted erratics and bergmounds in the Iowa Flats area. In the basin and valley terrain, catastrophic floods and ephemeral streams, as well as eolian deposition have left deposits that deepen as you move east into the basin. In addition to the Touchet Beds, this dynamic depositional environment has aggraded gravels, sands, and silts from slopewash, and intermittent alluvial activity. This series of alluvial deposits is broken up by two distinct volcanic ash deposits and capped with eolian silts and sands (Mackley et al. 2005).

The following discussion includes descriptions of the species and habitats observed and likely to occur in areas affected by the proposed construction, demolition, and cleanup activities. The ridgeline of Rattlesnake Ridge encompasses habitats and wildlife that are common to shallow stony soils or lithosols found throughout eastern Washington (Daubenmire 1970). Basalt outcrops, cliffs, and loose rock at the base of cliffs or on slopes are found along the ridgeline and slopes of ALE (Downs et al. 1993). These shallow soils support scattered short-statured shrubs and grasses such as those typically found in the following habitat associations:

- Rock buckwheat/Sandberg's bluegrass
- Thyme buckwheat/Sandberg's bluegrass
- Rigid sagebrush/Sandberg's bluegrass
- Narrowleaf goldenweed/Sandberg's bluegrass.

Characteristic plant species found on ridge tops include rosy balsamroot, thyme buckwheat, Hood's phlox, and daggerpod (Sackschewsky and Downs 2001). The lower slopes on ALE support both shrub-steppe and native bunchgrass associations. The composition of these communities changes as the elevation changes. The ALE headquarters buildings and research remains located between 800- and 1200-foot elevation lie primarily in the big sagebrush /bluebunch wheatgrass habitat association. Wildfires that burned much of ALE in 2000 and 2007 have removed a large portion of the sagebrush-dominated habitat, leaving large areas of grasslands. At the mid-level elevations, bluebunch wheatgrass, Sandberg's bluegrass, a variety of flowering plants, and a cryptogamic or biotic soil crust of lichens, moss, and algae comprise the habitat associations. The areas near existing buildings are largely disturbed or surfaced with gravel and hardened. Vegetation and habitat in these areas consist of mixtures of weedy and native species, except where crested wheatgrass was planted to stabilize soils. This introduced perennial grass was planted over several acres between the ALE headquarters buildings and the Nike missile bunker as well as within some powerline right-of-ways and other areas used by the military during the 1950s.

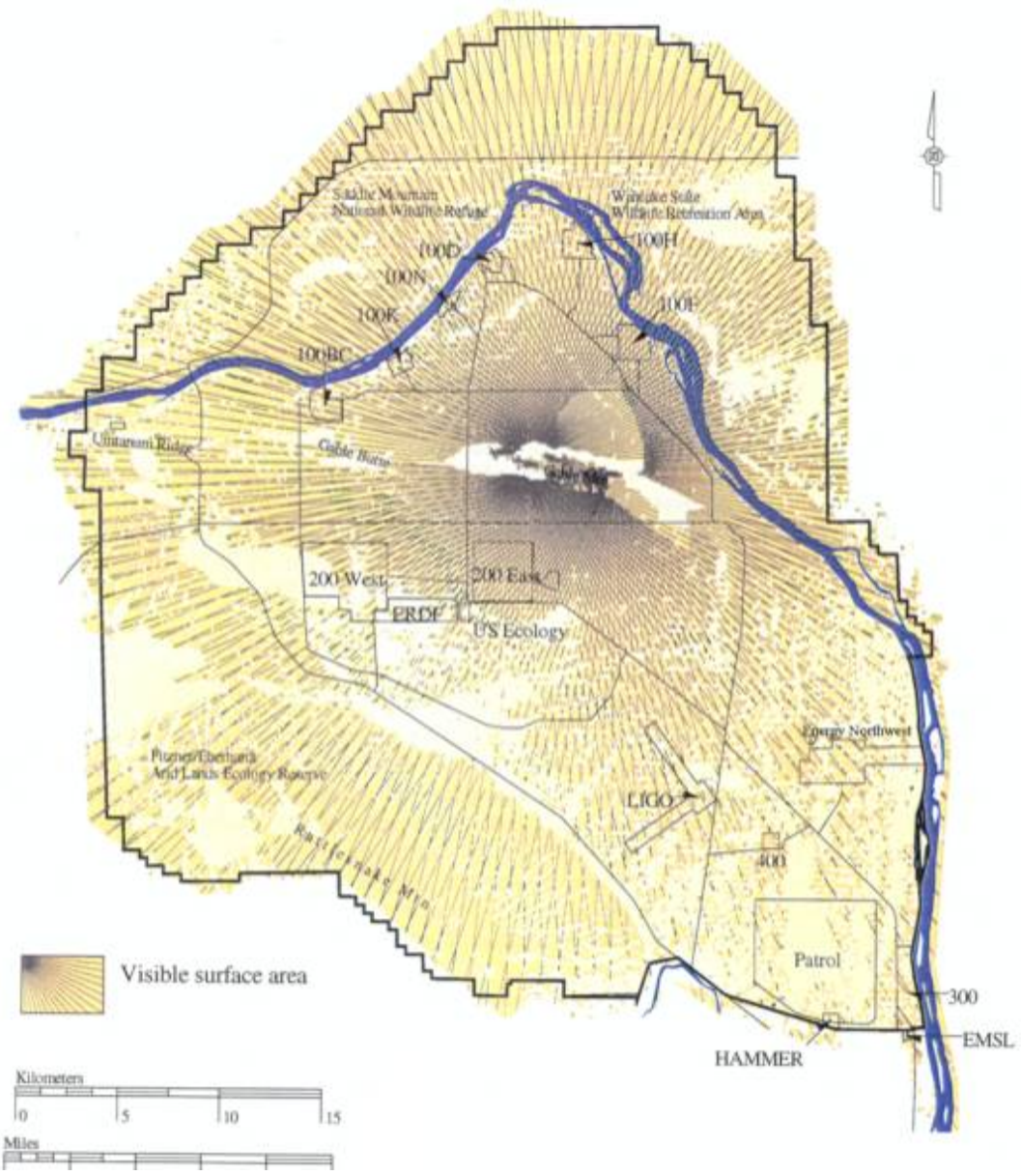


Figure 4.1. Viewshed from Gable Mountain Toward Rattlesnake Mountain on the Hanford Site, Washington (modified from DOE-RL 1999)

The Rattlesnake Springs area supports several habitat types associated with the perennial stream flowing through the area. The 646 Building sits at the edge between riparian vegetation associated with the stream and upland shrub-steppe vegetation. The area immediately adjacent to the building and the roadway and parking area are mostly unvegetated with occasional Russian thistle or cheatgrass. The riparian corridor is dominated by coyote willow, black cottonwood, and chokecherry along with numerous weedy species such as stinging nettle, pepperweeds, and knapweeds in the vicinity of the building. The upland vegetation adjacent to the existing building, driveway, and parking area consists of a transitional area between black greasewood and big sagebrush habitats. Elk use in the riparian area has

increased as the size of the herd has increased, and browsing and grazing has affected the growth and regrowth of woody species alongside the stream. The USFWS has constructed several exclosures along Rattlesnake Springs to protect recovering vegetation.

The debris identified for cleanup lie in a number of different habitats on ALE and can be classified according to elevation. Low-elevation habitats on ALE were originally dominated by big sagebrush/Sandberg's bluegrass vegetation or big sagebrush growing with either Indian ricegrass or needle-and-thread grass. These low-elevation communities have been severely affected by wildfires in 2000 and 2007, and few shrubs remain. Mid-elevation areas between the 800-feet and 1600-feet elevation are primarily located in habitats characterized by bluebunch wheatgrass/Sandberg's bluegrass associations. In some cases, debris areas are located in weedy, abandoned old-field habitats as described by Sackschewsky and Downs (2001).

4.3 Regional Cultural Setting

The following discussion derived from the *Hanford Site NEPA Characterization Report* (Duncan et. al. 2008) and the HCRMP (DOE 2003) provides a historical overview and context for the Hanford Site The Hanford Site's cultural resources are diverse, ranging from early pre-contact times to the atomic age. The Hanford Site contains an extensive record of human occupation documenting a series of overlapping cultural landscapes stretching back thousands of years, each layer of which tells the story of how people have used the landscape. Three distinct landscapes are defined—the Native American Cultural Landscape, the Early Settlers and Farming Landscape, and the Manhattan Project and Cold War Era Cultural Landscape.

4.3.1 Native American Landscape

For thousands of years, American Indians have used the lands both within and around the Hanford Site (Spier 1936; Relander 1956; Walker 1998). When Euro-American explorers arrived in the early 1800s, peoples currently referred to as the Wanapum were observed inhabiting numerous villages and fishing camps scattered throughout this segment of the mid-Columbia River Basin. 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, Confederated Tribes and Bands of the Yakama Nation, CTUIR, Nez Perce Tribe of Idaho, or the Confederated Tribes of the Colville Reservation, and they retain traditional, cultural, and religious ties to Hanford Site places and resources. The record of Native American use and history is reflected in the archaeological sites and traditional cultural places that are located across the Hanford Site.

More than 8000 years of pre-contact human activity in the largely arid environment of the mid-Columbia River Basin region have left extensive archaeological deposits along the river shores (Leonhardy and Rice 1970; Greengo 1982; DOE-RL 2003). Well-watered areas inland from the river also show evidence of concentrated human activity (Daugherty 1952; Leonhardy and Rice 1970; Greene 1975; Rice 1980; Chatters 1982; DOE-RL 2003) and recent research (Woody 2003) has indicated ephemeral use of arid lowlands for hunting and other resource procurement activities. Throughout most of the region, hydroelectric development, agricultural activities, and domestic and industrial construction have

destroyed or covered many of these deposits. Amateur artifact collectors have impacted numerous sites. Because the areas within the Hanford Site were restricted to public access, archaeological deposits found in the Hanford Reach of the Columbia River and on adjacent plateaus and mountains are more protected than in many other areas.

Approximately 720 archaeological sites and isolated finds associated with the pre-contact period have been recorded on the Hanford Site; of these, 80 contain historic components as well. Pre-contact period sites common to the Hanford Site include pit house 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; Rice 1980); 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 pre-contact period of the Hanford Site has been prepared as part of a National Register of Historic Places (National Register) Multiple Property Documentation form to assist with the evaluation of the National Register eligibility of pre-contact archaeological resources (DOE-RL 1997).

Based on consultation with affected tribal members and interviews with tribal elders, it is known that prominent landforms such as Rattlesnake Mountain, Gable Mountain, and Gable Butte, as well as various sites along and including the Columbia River, remain sacred to them. American Indian traditional cultural places 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 Indian history and culture, places of persistence and resistance, and landscapes of the heart (Bard 1997). Because affected tribal members consider these places sacred, many traditional cultural sites remain unidentified. DOE-RL and Hanford Cultural Resources Project (HCRP) staff continue to consult with Hanford Tribes for input about these locations.

A historic context for the ethnographic/contact periods 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 American Indian ethnographic resources (DOE-RL 1997).

4.3.2 Early Settlers/Farming Landscape

The Early Settlers/Farming landscape is composed of the areas on the Hanford Site where people, mainly of European descent, and some of other ethnicity, settled on the Columbia River Plateau prior to the start of the Manhattan Project during 1943. Non-Native American presence in the mid-Columbia began during 1805 with the arrival of the Lewis and Clark expedition. It was not until the late 19th and early 20th 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, traditional cultural places, and buildings and structures that are located throughout the Hanford Site.

A historic context for the Euro-American resettlement period (pre-Hanford 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, traditional cultural places, and historic structures (DOE-RL 1997).

The first Euro-Americans to pass near the Hanford Site were part of the Lewis and Clark expedition, whose members traveled along the Columbia and Snake rivers during their 1803 through 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, and miners who traveled through the Hanford Site on their way to lands up and down the Columbia River and across the Columbia River 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 began to work the gravel bars for gold during the 1860s. Cattle ranches were established in the 1880s, and farmers followed during the next two decades. Agricultural development, irrigation districts, and roads were established in the eastern portion of what is now the central Hanford Site. Several small towns, including Hanford, White Bluffs, Richland, and Ringold, grew up along the riverbanks during the early 20th century. The communities' accessibility to outside markets expanded with the arrival during 1913 of the Chicago, Milwaukee, St. Paul, and Pacific 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 during 1943 (Rice 1980; ERTEC 1981; DOE-RL 2003).

Approximately 650 historic archaeological sites associated with the Early Settlers/Farming landscape, including an assortment of towns, farmsteads, corrals, and domestic debris, have been recorded by the HCRP staff since 1987. Approximately 80 of these sites contain pre-contact components as well. Archaeological resources from the Early Settlers/Farming period are scattered over the entire Hanford Site and include numerous areas of gold mining features along the riverbanks of the Columbia and remains of homesteads, building foundations, agricultural equipment and fields, ranches, and irrigation features. Archaeological properties from this period include the Hanford Irrigation Canal; Hanford townsite; Wahluke Ferry; White Bluffs townsite; Vernita Ferry; White Bluffs Road; and Chicago, Milwaukee, St. Paul, and Pacific Railroad (Priest Rapids-Hanford Line) and associated stops.

Traditional cultural places associated with the Early Settlers/Farming landscape that are located on the Hanford Site include structures and places that are important to descendants of pre-1943 settlers in the region. These places are deeply rooted in the memories of local residents and include, but are not limited to, numerous home sites and townsites, orchards, fields, and places of former community activities, e.g., swimming holes and town squares. Previous residents of the region and their descendents visit their homes annually with friends and family.

Although most of the Early Settlers/Farming structures were demolished by the U.S. Government to build infrastructure for the Hanford Engineer Works during 1943 (Rice 1980; ERTEC 1981; DOE-RL 2003), a small number of buildings associated with the Early Settlers/Farming landscape remain standing today. They include the Hanford Irrigation and Power Company pumping plant at Coyote Rapids, the high school and the electrical substation at the Hanford townsite, First Bank of White Bluffs, Bruggemann's fruit warehouse, and the blacksmith cabin at the East White Bluffs ferry landing. These structures are located near the Columbia River.

4.3.3 Manhattan Project and Cold War Cultural Landscape

The Manhattan Project and Cold War era landscape features cultural resources associated with plutonium production, military operations, research and development, waste management, and environmental monitoring activities that took place beginning with the establishment of the Hanford Site (Hanford Engineer Works) from 1943 to the end of the Cold War during 1990.

The Hanford Site built environment is an industrial landscape that consists of buildings and structures constructed during the Manhattan Project and Cold War period. This industrial landscape makes up the Hanford Site Manhattan Project and Cold War Era Historic District. DOE-RL, SHPO, and the Federal Advisory Council on Historic Preservation, through a programmatic agreement to manage the Manhattan Project and Cold War built environment, determined that a historic district afforded the best means to inventory, assess, and mitigate the future demolition of the most significant buildings and structures constructed during the Manhattan Project and Cold War. Industrial, scientific, administrative, environmental monitoring, waste management, infrastructure, and military facilities constructed during the Manhattan Project and Cold War era can be found in all of the Hanford Site areas.

Although buildings and structures representing this era are located throughout the site, evidence of military operations consists mostly of archaeological remains. Military operations in various forms took place on the site from World War II through the early 1960s. Most of the military operations, however, took place beginning with the establishment of Camp Hanford by the U.S. Army during 1950–1951 until its closure in 1961. Camp Hanford was a military outpost, with the main cantonment located in North Richland and forward positions situated throughout the site consisting of anti-aircraft artillery sites and Nike missile installations.

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-RL 1997).

Additionally, 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 2002a). Within the historic district, 528 Manhattan Project and Cold War era buildings, structures, and complexes are eligible for listing in the National Register as contributing properties. Of that number, 190 are recommended for individual documentation. DOE-RL has undertaken assessments of the contents of the contributing buildings and structures to locate and identify any Manhattan Project and Cold War era artifacts that may have interpretive or educational value for museum exhibit purposes (DOE-RL 1998).

Archaeological remains of military sites associated with the Manhattan Project and Cold War landscape are scattered throughout the Hanford Site 600 Area. These archaeological resources are located primarily within the former Camp Hanford forward positions, the 16 anti-aircraft artillery sites that encircled the 100 and 200 Areas, and the 3 Nike missile installations on Wahluke Slope. A fourth Nike position is located at the base of Rattlesnake Mountain on ALE. The Nike position on ALE is 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 are eligible for listing in the National Register.

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

The archaeological remains of the Atmospheric Dispersion Test Facility Grid are located on the Hanford Site east of the 200-West Area. The facility was used for monitoring airborne waste dispersions during the operation of the plutonium production facilities on the Hanford Site.

Historic built resources documented from the Manhattan Project and Cold War eras include buildings and structures found in the 100, 200, 300, 400, 600, 700, and 1100 Areas. The most significant of these are the plutonium production and test reactors, chemical separation and plutonium finishing buildings, and fuel fabrication and 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 dropped on Nagasaki, Japan, at the end of 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 C, DR, and F reactors have been considerably modified.

4.4 Cultural Setting and Context of the Area of Potential Effect

According to the ethnographic literature, tribal elder interviews, and the archaeological resources that have been identified on ALE, this area has been in use for 13,000 years and is known to be highly significant and sacred to regional Tribes and the Plateau culture in the Columbia Basin. Rattlesnake Mountain, the primary geologic feature contained within ALE, is known in the Sahaptin language as *Laliik*, which means "standing above water" (Kennedy et al. 2008). Oral narratives indicate that *Laliik* was a place of refuge during an era of flooding, which may refer to the Pleistocene floods that occurred in the region as recently as 13,000 years ago (Kennedy et al. 2008). DOE-RL recently determined that the portions of *Laliik* under its jurisdiction and control are eligible for inclusion in the National Register as a Traditional Cultural Property (TCP). *Laliik* is the location where several Washat prophets received the songs of the seven drums religion and revived the Washani religion in the region (Kennedy et al. 2008). It continues to play a significant role in the practice of the Washani religion today. Rock cairns are dispersed across the landscape, some of which "are evidence of Plateau Indian spiritual and cultural practices that can be associated with vision questing" (Kennedy et al. 2008:10). Additionally, the area was an important resource-gathering area for hunting and lithic resources, plants, medicines, and roots. Several trails traverse ALE and connect these traditional resource-gathering areas, including Rattlesnake Springs where a significant archaeological site complex consisting of pre-contact campsites is located at the crossroads between the White Bluffs Trail and the Cold Creek Valley Road. Sixty-seven archaeological sites are evidence of this long-term use that have been identified on *Laliik* to date.

The first Euro-American settlers came to the area that is now ALE in the mid-1800s for purposes of cattle ranching, sheep grazing, and occasional homesteading with the Benson, Snively, and Porter-Hartmann families establishing the earliest homesteads (Hinds and Rogers 1991). Homesteaders on ALE land depended on reliable water sources at Rattlesnake and Snively springs or wells, and succeeded in both dryland farming and raising alfalfa, sheep, and cattle (Hinds and Rogers 1991). Archaeological evidence

of this use (abandoned cisterns, foundations, remnants of the Benson and Snively ranch sites, and historical debris) is dispersed across ALE. Natural gas was first discovered on ALE land in 1913, but was not developed for commercial use until 1929 (Hinds and Rogers 1991). Production ceased in 1941 when most of the gas was depleted. The remains of the gas wells and associated dwellings are located on ALE in the vicinity of the 1200-foot road. A review of 1880 General Land Office (GLO) maps, 1916 Coyote Rapids and 1917 Prosser topographic maps, 1943 aerial photographs, and the 1943 Hanford Engineer Works real estate ownership maps confirms that pre-1943 historic use of the area was confined predominantly to homesteading, ranching, grazing, gas well exploration, and trail/road development. Several roads and trails are depicted on the 1880 GLO and 1916 maps, including the White Bluffs Trail (road from Yakima to White Bluffs) and the Cold Creek Road from Ellensburg to Yakima River, as well as various unnamed trails. A road that corresponds to the current 1200-foot road and the locations of a few gas wells are depicted on the 1917 maps. The Hodges, Benson, and Snively ranches also are depicted on the 1917 maps along with several intermittent springs, which are noted along the north face of the ridgeline and the base.

These maps do not show evidence of permanent pre-1943 historic settlement in the ridgeline area or at the base area. Significant land use is apparent, however, in the Rattlesnake Springs area. Specifically, the 1880 GLO maps not only depict the White Bluffs Trail and Cold Creek Road, but several trails and a cabin near the location of the 646 Building. The 1916 Coyote Rapids topographic map depicts these same roads, evidence of a structure, and the Benson Ditch, which likely piped water from Rattlesnake Springs to Benson Ranch, located within 2 miles south of this area. The 1943 Hanford Engineer Works real estate maps indicate that land ownership in the three project areas was associated predominantly with public entities including Washington State and USA. Within the base, ridgeline, and springs area, the only private ownership is by RP Newborn near the base area.

In 1943, when the U.S. Government condemned or withdrew the land for the Manhattan Project, the area was originally set aside as a buffer zone to provide additional protection from plutonium production and storage activities occurring within the interior and central areas of the Hanford Site. No major plutonium production occurred on ALE (DOE-RL 2002a). According to 1943 aerial photographs and early Hanford records, the U.S. Army constructed a road to the ridgeline of Rattlesnake Mountain, referred to as the Rattlesnake Mountain Road, for security patrol purposes. The T520-6 Building (Navy Mars Radio Station) located on the ridgeline was constructed in 1944 for site security purposes. Aerial photographs taken in 1948 show the location of the T520-6 Building as being extensively disturbed and bladed. Historic aerial photographs of the base site also show evidence of military activity.

In 1955, in response to heightened Cold War tensions, the Army supplemented the anti-aircraft artillery gun emplacements (located mostly in the interior and northern edge of the Hanford Site) with the Nike surface-to-air missiles (DOE-RL 2002a, p. 2-9.7). Two Nike missile facilities were constructed on ALE in 1955: the 6652-C Building on the ridgeline of Rattlesnake Mountain, which was the control site, and the 6652 Complex (6652-G, -H, -I, -J, K, -L, -M, -O, -R, -S) at the base of Rattlesnake Mountain, which contained the launch site, missile fueling and warheading area, and various administrative, residential, and recreational facilities (DOE-RL 2002a, p. 2-9.7).

Also in the late 1950s, communications facilities were constructed at the ridgeline with the construction of the 623-A Building (Microwave Equipment Facility/Radio Relay). Various support facilities, such as pump houses (6652-T, 6652-U, and 6652-D) and electricity and telephone communications equipment (buried telephone wire and water pipe and above ground electrical lines), were constructed to support the 6652-C facility and the 623-A Building on the ridgeline as well as at the 6652 Complex at the base in the late 1950s. By 1961, the Nike installations on Hanford were deactivated. Many of the 6652 Complex buildings were later used as the Ecological Reserve Headquarters in the late 1960s and as offices and field laboratories by PNNL cultural resources and ecological staff in the early 1990s.

The 646 Building (Radioecology Field Lab), a 20-foot-by-40-foot metal building and associated septic and electrical power, was constructed in 1961 as part of early environmental and ecological research conducted on ALE to understand plant and soil radionuclide contamination (O'Connor and Rickard 2003, pp. 38-39). Today, the building is no longer in use. Over the next 40 years, environmental research expanded to include educational activities. Research and educational activities continue to be a primary function on ALE today. As a result of restricted public access and limited construction, ALE contains significant areas of pristine to near-pristine native habitat. Protection of the unique shrub-steppe habitat has been a primary focus at ALE since the 1960s, as evidenced in the different protective land designations that have occurred over the years.

In 1967, the Atomic Energy Commission (AEC) designated the area as the Arid Lands Ecology Reserve to be preserved for desert ecology research and education (O'Connor and Rickard 2003). Four years later, in 1971, the area was designated the Rattlesnake Hills Research Natural Area, to assist in preserving the natural diversity of Oregon and Washington. In 1977, DOE-RL dedicated portions of the Hanford Site, including ALE in its entirety, as a National Environmental Research Park (NERP). The mission of a NERP is to conduct educational and research activities in an outdoor laboratory setting (O'Connor and Rickard 2003, p. 21). In 1997, DOE-RL signed an agreement with USFWS to operate ALE. Under the terms of the agreement, DOE-RL remained the owner of ALE, but the USFWS operates it under permit to DOE-RL. Most of ALE was designated as Preservation land-use in a 1999 DOE-RL Record of Decision (ROD) for the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (64 FR 61615). The exception was a section in the southeastern part of the reserve known as Area C, which was designated in the 1999 ROD as Conservation/Mining to provide borrow materials for waste management activities in the 200 Areas. Except for the designated mining area, on June 9, 2000, ALE became part of the newly created HRNM (Hanford Reach National Monument). In June 2001, DOE-RL and USFWS signed a Memorandum of Understanding that covered management responsibilities for the Monument, including ALE (Duncan et al. 2007). However, DOE-RL retains ownership of ALE. In 2008, USFWS decided to implement a comprehensive conservation plan for the HRNM (including ALE) that provides a high level of resource protection while permitting public access and uses. This decision was established in a 2008 ROD for the *Hanford Reach National Monument Comprehensive Conservation Plan and Final Environmental Impact Statement* (73 FR 72519).

DOE-RL has leased property at the ridgeline for the purposes of emergency and commercial communications since 1964. In addition, in 1971, Battelle erected an observatory on the ridgeline, installing a 0.8-meter Cassegrain reflecting telescope. In September 2005, the observatory was transferred to a non-profit group, the Alliance for the Advancement of Science Through Astronomy (AASTA). AASTA is made up of scientists, educators, and community leaders from southeast and south-central Washington; their goal is to foster a cooperative relationship between students, educators,

amateurs, and professionals to allow all groups to learn, interact, and actively participate in the exploration of the universe. AASTA, with help from Battelle, proposes to dismantle the observatory and re-install it for use at another location in eastern Washington.

Nearly all of the buildings on ALE are currently empty and unused, except for a few that were constructed more recently by USFWS and support buildings that USFWS wishes to preserve, such as a pump house, water tank, and lysimeter preparation building. In addition, the 6652-L facility currently houses a long-term research effort funded by the National Science Foundation to measure the gravitational constant, G, test Einstein's weak equivalence principle, and evaluate whether or not a fifth force exists in the universe compared to the four known forces (strong, weak, electromagnetic, gravitational). Team members include PNNL, the University of California, and the University of Washington. The current agreement between the team members and DOE-RL allows the continued use of the facility for research purposes through May 2011.

5.0 Literature Review and Identification of Historic Properties

A search of records and the literature was conducted to identify previous cultural resources investigations conducted in the project area and to determine if any cultural resources are located within the project area; i.e., on ALE, including on the ridgeline of Rattlesnake Mountain, in the former Nike Missile Base area, and in the Rattlesnake Springs area.

5.1 Arid Lands Ecology Reserve

Project activities are located within the *Laliik* TCP (see Figure 5.1). Portions of *Laliik* meet the National Register criterion of significance A (associated with events that have made a significant contribution to the broad patterns of our history) and B (associated with the lives of persons significant in our past) (NPS 1991). According to the 2008 determination of eligibility documentation:

> Criterion A is met because of the longstanding role of *Lalíik* as a spiritual location of primary importance to groups of American Indians within the region. Specifically, *Lalíik* is culturally significant for its long association with these traditional, spiritual, cosmological, religious and cultural practices and beliefs of the Washani community. To many tribal people, the formation of *Lalíik* was an important event in their history; the mountain served as a refuge for people during the cataclysmic floods of 13,000 years ago, and the mountain served and continues to serve as an important place for vision questing and other cultural activities. Criterion B is met because of the association with Smohalla, an important 19th century prophet in a long line of Plateau prophets. Smohalla had a vision on *Lalíik* about 1850, which later inspired him to revitalize the Washani religion, a revitalization that has important implications to many Indian peoples of the Plateau. *Lalíik* continues to serve as an important place to many members of local Tribes, continuing traditions that extend back 13,000 years or more (Kennedy et al. 2008:16).

ALE also has been the subject of various cultural resources investigations mostly associated with NHPA compliance activities, resulting in over 5000 acres of land being inventoried for cultural resources and the recording of over 150 archaeological sites and isolates. All of the archaeological sites and isolates that have been recorded are associated with the prehistoric contact era themes identified in Section 4.4 and include lithic scatters, rock cairns, historic trails, pre-contact and ethnographic camp sites, talus pits, abandoned ranches, gas wells, cisterns, foundations, and historic domestic and industrial debris piles. Of these, 67 pre-contact and ethnographic archaeological sites and isolates have been determined eligible for National Register listing as contributing resources to the National Register-eligible TCP, *Laliik* (Rattlesnake Mountain).[1] Included in the 67 sites that are contributing to *Laliik* are White Bluffs Trail (determined to be eligible in 1994); 45BN170 and 45BN171, part of the Rattlesnake Springs Archeological District; and 45BN172 and 45BN173, part of the Snively Archaeological District listed in the National Register in 1976. The remaining 80+ archaeological sites that have been recorded on ALE

[1] An amended, the National Register determination of eligibility for *Laliik* was submitted by DOE-RL in 2008 (DOE 2008).

are associated with the historic era include remnants of historic ranches, gas well exploration, and military activities. None of the sites has been evaluated for National Register eligibility.

Several buildings and associated infrastructure identified for demolition have also been determined to be eligible as contributing properties to the Manhattan Project/Cold War Era Historic District, many of them with documentation required. Documentation for the district was completed between 1994 and 1998 in accordance with the *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan* (HDTP) (DOE 1998) (see Table 5.1). In accordance with the HDTP, walkthroughs were conducted of these buildings to identify historic artifacts of educational or interpretive value in 1997. None were identified.

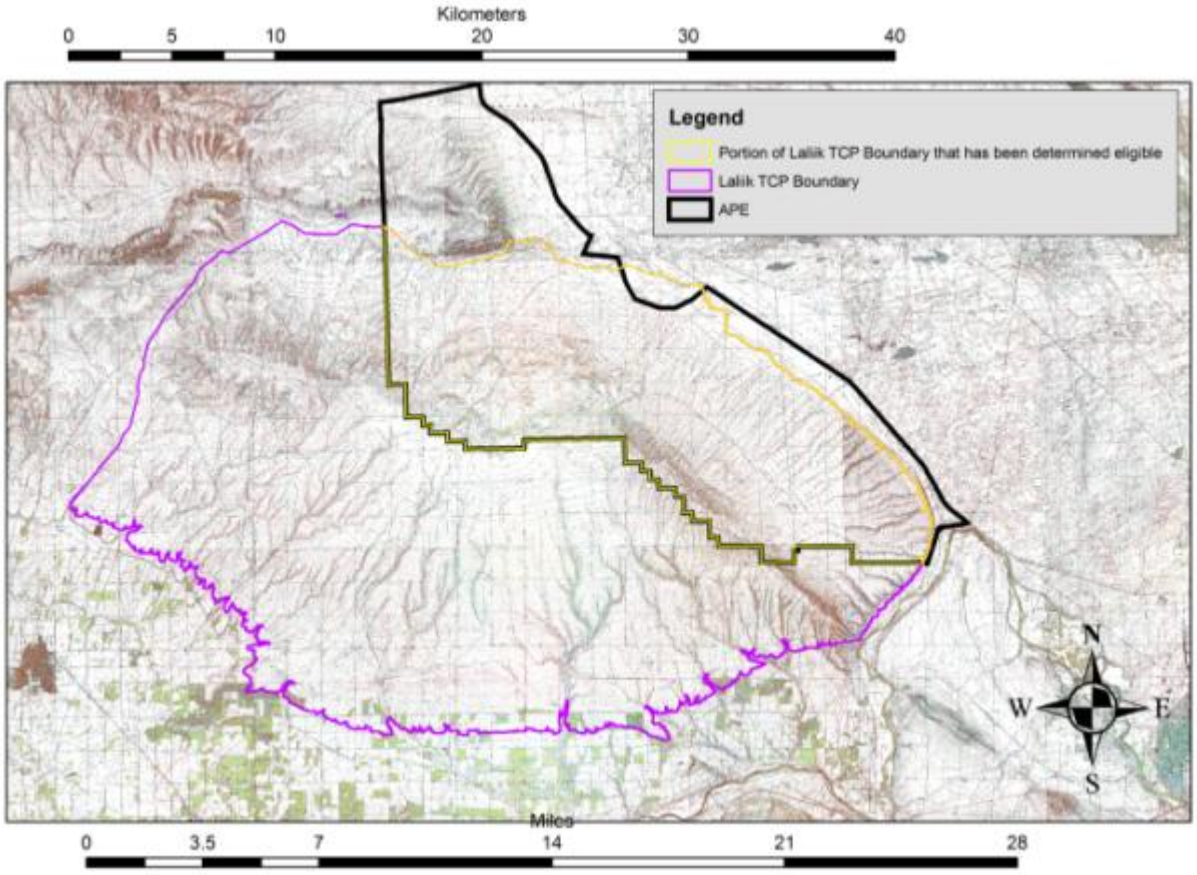


Figure 5.1. *Laliik* Traditional Cultural Property Boundary in Relation to the Project APE Overlaid on a USGS Topographic Map

Table 5.1. Documentation for Buildings Associated with Early Communications and Site Security Efforts

Building Number and Description[(a)]	Theme/Historic Function	Documentation Mitigation Required	Documentation/Mitigation Completed	Project Area Location
T520-6 (Navy Mars Radio Station) – 1944	Site Security	No	NA	Ridgeline
623-A (Microwave Equipment Facility/Radio Relay –1957	Communication/ Administrative Support	No	NA	Ridgeline
6652-C (H-52 Nike Missile Base – Barracks/ Administration Building) – 1956	Military Operations	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 9	Ridgeline
6652-G (H-52 Nike Missile Base- Barracks) – 1956	Military Operations	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 9	Former Nike Missile Base
6652-H (H-52 Nike Missile Base – Mess Hall) – 1956	Military Operations	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 9	Former Nike Missile Base
6652-I (H-52 Nike Missile Base – Administration, Recreation, and Storage) – 1955	Military Operations	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 9	Former Nike Missile Base
6652-J (H-52 Nike Missile Base – Barracks) – 1955	Military Operations	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 9	Former Nike Missile Base

Table 5.1. (contd)

Building Number and Description[(a)]	Theme/Historic Function	Documentation Mitigation Required	Documentation/Mitigation Completed	Project Area Location
6652-K (H-52 Nike Missile Base – Pump House) – 1955 (USFWS will continue to use this building.)	Military Operations	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 9	Former Nike Missile Base
6652-L (H-52 Nike Missile Base – Underground Missile Storage Facility) – 1955	Military Operations	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 9	Former Nike Missile Base
6652-M (H-52 Nike Missile Base – Type "C" Latrine) – 1955	Military Operations	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 9	Former Nike Missile Base
6652-O (H-52 Nike Missile Base – Missile Assembly and Test Building) – 1955 (USFWS will continue to use this building.)	Military Operations	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 9	Former Nike Missile Base
6652-R (H-52 Nike Missile Base - Aluminum Paint Shed) – 1955	Military Operations	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 9	Former Nike Missile Base
6652-S (H-52 Nike Missile Base – Sentry Box/Guard Shack) – 1957	Military Operations	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 9	Former Nike Missile Base
Fueling and Warheading Area (1955-1956)	Military Operations	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 9	Former Nike Missile Base

Table 5.1. (contd)

Building Number and Description[(a)]	Theme/Historic Function	Documentation Mitigation Required	Documentation/Mitigation Completed	Project Area Location
Acid Storage Shed –1956	Military Operations	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 9	Former Nike Missile Base
Crow's Nest/Observation Post-1956	Military Operations	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 9	Former Nike Missile Base
J.P. Fuel Pad – 1956	Military Operations	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 9	Former Nike Missile Base
Rattlesnake Mountain Road	Transportation	Yes	Historic Property Inventory Form and significant engineering history documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 11	Former Nike Missile Base and Ridgeline

(a) Buildings 6652-K and 6652-O belong to the USFWS and will not be demolished.
NA = not applicable

5.2 Rattlesnake Mountain Ridgeline

Most of the main project areas were inventoried for cultural resources between 1968 and 2001. With the exception of the location of the radio-telescope base ([redacted]), the 623-A Building ([redacted]) and portions of the Benton PUD electrical line ([redacted]), all of the ridgeline area ([redacted]) has been either formally surveyed for cultural resources or examined by an archaeologist. The results of these surveys are summarized here ([redacted]).

In 1988, an area in the vicinity of the 6652-D and 6652-C buildings ([redacted]) was surveyed under HCRC# 88-600-004, locating 45BN636, an isolated cryptocrystalline flake, just downslope from these buildings (Cadoret and Chattters 1988). The flake was collected in 1988, and the author noted that Rattlesnake Mountain is sacred to the Wanapum and Yakama Indian people. In 1990, an area [redacted]

[redacted] near[1] the 6652-C Building ([redacted]) was surveyed under HCRC# 90-600-029 for a proposed anemometer tower (Gard and Chatters 1990), locating HI-90-013, an isolated projectile point, and 45BN426, a rock cairn. The projectile point was collected. The authors also noted the religious sensitivity of the area to local Tribes. In 1993, a more extensive systematic survey was conducted under HCRC# 93-600-042 for proposed remediation of hazardous waste and conditions on ALE, which included portions of the ridgeline at and between [redacted] (Draper et al. 1993). 45BN426 was not relocated and a historic isolate described as a historic foundation was recorded; however, HCRP staff members were unable to locate any documentation describing this historic isolate. Additional observations made in 1993 indicate that the area is heavily disturbed by "road and building construction, fuel tank installation, septic tank and drain field construction, and disposal pits. Virtually all areas that might have contained surface deposits have been bladed to bedrock…" (Draper et al. 1993, p. 25). Draper also noted that the area may be eligible for listing in the National Register as a TCP. In 1993, another portion of the Ridgeline project area [redacted] was surveyed under HCRC# 94-600-009 for the installation of a communications facility (Wright 1993). No archaeological resources were recorded, but Wright noted that the area was likely a National Register-eligible TCP and needed to be formally evaluated. Correspondence in the file indicates that DOE-RL consulted with the Wanapum, Yakama Nation, Nez Perce, and the Umatilla and concluded that the project would not result in an adverse effect on the integrity of Rattlesnake Mountain. In 2001, under HCRC# 2001-600-008, [redacted] the rest of the Ridgeline project area were surveyed, relocating 45BN426 and newly recording 45BN1391 and 45BN1392, both rock cairn sites in the vicinity of Locales 5 and 7 (Hale 2001).

Although not through formal survey, an isolated rock cairn and an isolated cryptocrystalline flake were recorded by HCRC# 2004-600-008 in the vicinity of the Ridgeline project area [redacted] (45BN1365 and 45BN1369), respectively (Fallon 2004). [redacted] The vicinity of the 6652-T pump house [redacted] has also not been formally surveyed, but Dr. David Rice, a retired archaeologist with the U.S. Army Corps of Engineers Seattle District who conducted various cultural resources investigations on the Hanford Site in the late 1960s and mid-1980s, visited this location in 1968. Dr. Rice recorded archaeological site 45BN175 as an open campsite located at the ridgeline spring, consisting of lithic flakes that have been "largely disturbed by construction of a pump house and bulldozing for a road and a transmission line" (Rice 1968b, p. 15). In an interview with David Rice in 2003, Dr. Rice recalled visiting this site in 1968 at the request of the AEC Director of Real Estate Division, Norm Fuller, who had heard from AEC security staff that artifacts had been observed at the ridgeline spring:

> It has been heavily disturbed by the Army construction [pumping station], but contained definite evidence of sporadic prehistoric visitation. I personally noted flakes of obsidian, cryptocrystalline rock types, opal and petrified wood. There were also the preserved remains of freshwater mussel shell in the still intact midden deposit (O'Connor and Rickard 2003, p. 14).

Additionally, 45BN634, a pre-contact lithic scatter recorded by PNNL cultural resources staff in 1996, is located in the vicinity of [redacted] Ridgeline project area [redacted]. In summary, there are three isolated finds consisting of lithic flakes, two of which have been collected (45BN636, HI-90-013, and 45BN1369) and four rock cairn sites (45BN426, 45BN1391, 45BN1392, and

[1] Blue Arial font text has been added to help clarify redacted sentences.

45BN1365), one campsite (45BN175), and one lithic scatter (45BN634) located in close proximity to the project areas located on the ridgeline. All nine sites and isolates have been determined to be eligible for listing in the National Register as contributing to the *Laliik* TCP (DOE-RL 2008). See Table 5.1 for a list of historic structures associated with the Manhattan Project/Cold War Era Historic District that are located on the ridgeline. The remaining buildings, structures, and infrastructures located on the ridgeline that are not identified in Table 5.1 have been determined to be non-contributing to the Manhattan Project/Cold War Era Historic District and are not considered to be eligible for listing in the National Register.

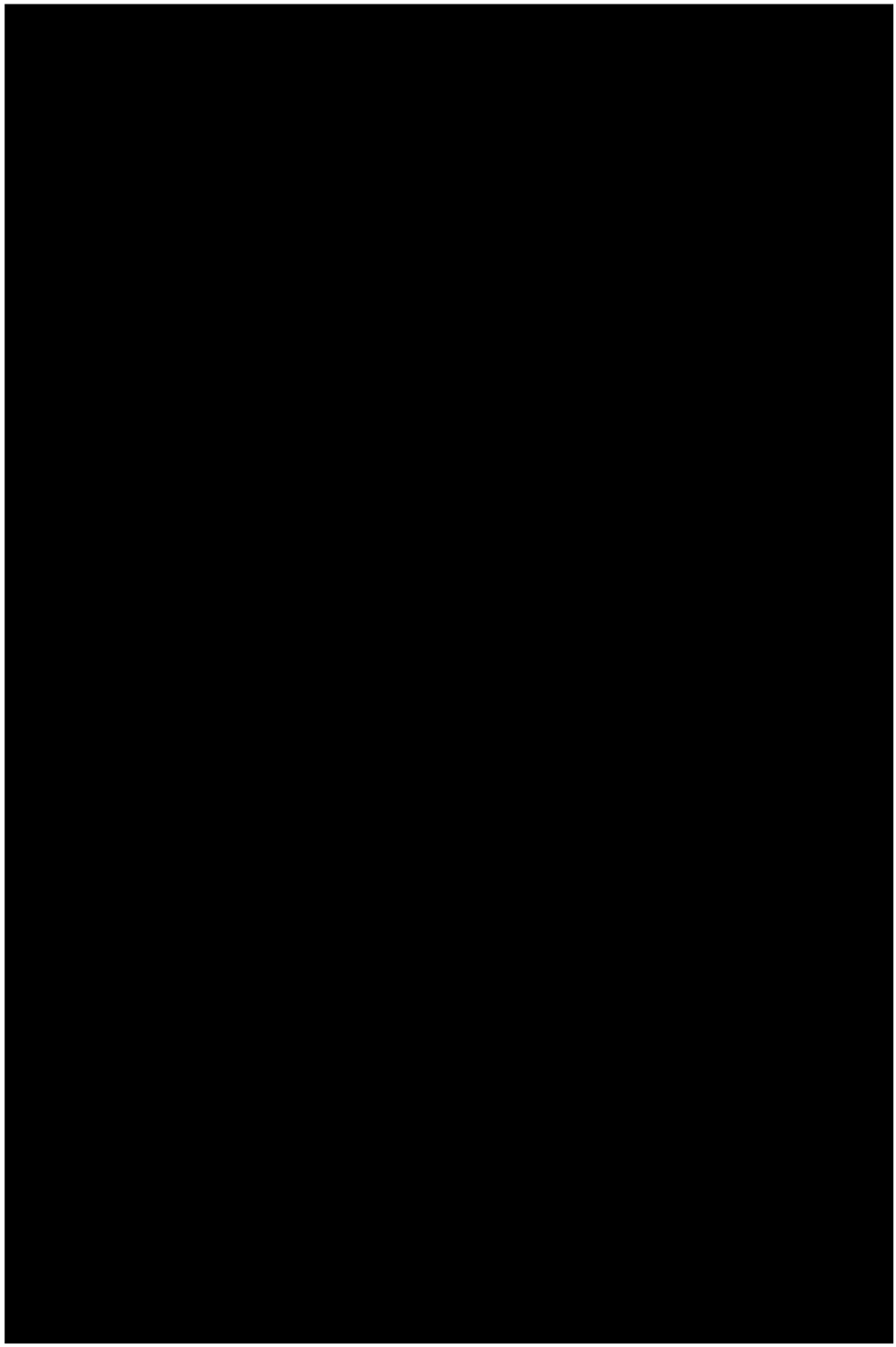


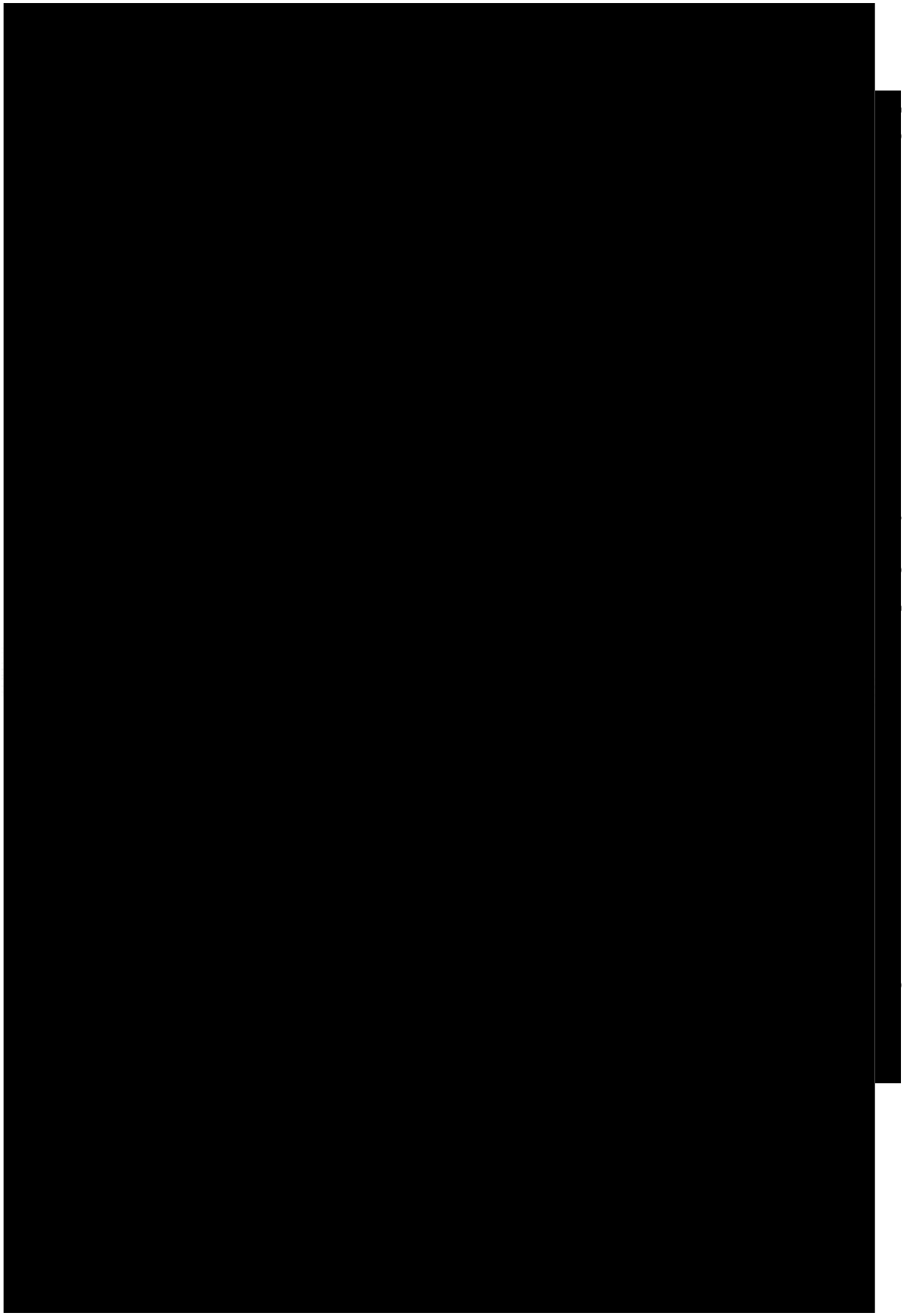
Figure 5.2.

5.3 Former Nike Missile Base Area

In 1992, a corridor along the road that leads into the former Nike Missile Base was inventoried for the purposes of installing an integrated voice/data telecommunications system cable (Myers and McIntire 1993). No archaeological resources were recorded by this survey in the vicinity of the former Nike Missile Base. The former Nike Missile Base area was intensely surveyed in 1993 under HCRC# 93-600-042 (Draper et al. 1993). Observations made at this location indicate that most of the area was extensively disturbed by past construction activities. No prehistoric or historic cultural material was identified by the survey. The report did recommend that the former Nike Missile Base structures were likely National Register eligible and should be evaluated (Draper et al. 1993, pp. 60–62). As described above and outlined in Table 5.1, these structures have since been evaluated and many have been determined to be contributing properties to the Manhattan Project/Cold War Era Historic District (see Table 5.1).

5.4 Rattlesnake Springs Area

The vicinity of the Rattlesnake Springs project area was first visited by Dr. David Rice in 1968, when he recorded archaeological sites 45BN170, a lithic scatter and camp rock concentrations, and 45BN171, a large open campsite along the north bank of the Rattlesnake Springs (Rice 1968b, pp. 14–15). Both sites are part of the Rattlesnake Springs Archaeological District, listed in the National Register. In 1999, PNNL cultural resources staff conducted an extensive archaeological survey of the area under HCRC# 99-600-001, resulting in updates to the 45BN170/171 site complex and recording of several additional pre-contact sites, consisting mostly of lithic scatters and fire-cracked rock features south of the springs and a segment of the National Register White Bluffs Trail (H3-121) located [redacted] near the project area (Hale 1999). [redacted] Three large lithic scatters [redacted] (45BN826, 45BN827, and 45BN445) are also located near the Rattlesnake Springs project area. All six sites have been determined to be eligible for listing in the National Register as contributing to the *Laliik* TCP. Figure 5.3 is a map showing the locations of the archaeological sites in close proximity to the 646 Building. The 646 Building was constructed in 1961 and was concluded to be non-contributing to the Manhattan Project/Cold War Era Historic District and is not eligible for listing in the National Register (DOE 1998).



5.5 Rattlesnake Mountain Road

Rattlesnake Mountain Road, which travels up to the ridgeline of the mountain, was constructed in 1943 and has been determined to be eligible for listing in the National Register as a contributing property to the Manhattan Project/Cold War Era Historic District with documentation required (DOE-RL 2008). A Historic Property Inventory Form was completed in 2007. Additional details about the road are documented in *The Hanford Site Historic District* report (DOE-RL 2002a), Chapter 2, Section 11.

5.6 Debris Piles

There are over 100 debris piles dispersed across ALE that have been identified for cleanup. Most of these are located adjacent to existing roads and have not been surveyed for cultural resources. Currently, of those that have been identified, none overlaps with previously recorded archaeological sites. However, based on the descriptions and photographs, a few are likely 50 years old or older and will need to be recorded as archaeological sites or isolates and be evaluated for their potential to be eligible for listing in the National Register. The majority, however, are obviously less than 50 years old. As described in more detail in Section 7.0, a graded approach will be developed for assuring that cleanup of these debris piles will not affect historic properties.

6.0 Results of Cultural Resources Field Tours

On March 19, 2009, staff from PNNL, EN, Lockheed Martin, DOE-RL, and tribal cultural resources staff of the Yakama Nation, Nez Perce Tribe, and CTUIR conducted a field tour of the specific project areas to be affected by the project scope (see Table 6.1 for a list of tour participants). During the tour, details of demolition at all three primary project areas were discussed and inspected. The 6652-T ([redacted]) and the Benton PUD line ([redacted]) were briefly discussed but not inspected during the field tour. The PNNL cultural resources staff took several photographs of the project areas, including viewshed photos that are provided in Figures A.1–A.40 of Appendix A of this report. Observations made during this field tour confirmed extensive surface disturbance along the access roads [redacted] on the ridgeline and the Rattlesnake Springs area. Extensive surface and subsurface disturbance is also evident [redacted] on the ridgeline and at the base area. On the ridgeline, previously recorded rock cairns were observed in the vicinity [redacted]. No archaeological resources were observed at the base or in the project area at the Rattlesnake Springs area. Driving between each location afforded an opportunity to view the access roads, the Rattlesnake Mountain Road, and some of the debris piles, especially along the 1200-foot road. Many debris piles appear to be T-fence posts and surface scatters of post-1960s debris (metal scraps, electrical equipment, etc.).

On March 20, 2009, an attempt was made by PNNL cultural resources staff with tribal participants to complete a cultural resources inventory of the 6652-T Building ([redacted]) and the Benton PUD electrical lines ([redacted]; see photographs A.41–A.44 in Appendix A). See Table 6.2 for a list of tour participants. Due to snow coverage and project schedule, details and results of the inventory will be not be provided here. They will be reported in a separate document as part of the supplemental cultural review being completed for this project. Preliminary observations made [redacted] indicate that the general area contains plentiful riparian vegetation, much of which includes traditional foods and medicine. The presence of these plant resources suggests that in addition to being an archaeological campsite, the area is also likely to be a traditional plant- and root-gathering area. [redacted]. Evidence of archaeological site 45BN175 was observed. Further cultural resources investigations at 45BN175 will be necessary to assess the impacts of project activities on 45BN175, which has already been determined to be National Register-eligible as a contributing resource to the *Laliik* TCP, but it may also be eligible for its archaeological value (DOE-RL 2008). The cultural resources inventory [redacted]) will be completed later in the spring or early summer (2009) and will be reported in the supplemental cultural resources report.

Table 6.1. List of Individuals who Participated on Field Tour Conducted on March 19, 2009

Organization	Personnel
CH2M Hill Plateau Remediation Company	Dave Fort Michael Stevens
Confederated Tribes of the Umatilla Indian Reservation	Julie Longenecker
Energy Northwest	Keith Cooke Jacque Fuller
Lockheed Martin	Kevin Clarke Mike Hansen Dave Havens Lynn Tanasse
Nez Perce Tribe	Darla Jackson
Pacific Northwest National Laboratory	Janelle Downs Doug McFarland Ellen Prendergast-Kennedy Kathy Rhoads Glen Thornton Regan Weeks
U.S. Department of Energy	Kim Ballinger Boyd Hathaway Steve Weil
U.S. Fish and Wildlife Service	Jeff Howland
Yakama Nation	Leah Aleck Dana Miller Wade Riggsbee

Table 6.2. List of Individuals who Participated in the Preliminary Cultural Resources Survey of Locales 8 and 9A–9D on March 20, 2009

Organization	Personnel	Position
Confederated Tribes of the Umatilla Indian Reservation	Julie Longenecker	Tribal cultural resources personnel
Pacific Northwest National Laboratory	Ellen Prendergast-Kennedy Doug McFarland	Principal investigator, lead author Archaeologist/geographic information system assistant, and contributing author
Yakama Nation	Leah Aleck Dana Miller	Tribal cultural resources personnel

7.0 Finding of Effect

In accordance with 36 CFR 800.4d (2), historic properties have been identified within the project APE that may be affected by this undertaking. These include portions of the *Laliik* TCP, Manhattan Project and Cold War era buildings and infrastructure, and several archaeological sites. The next step in the 36 CFR 800 process is to assess whether these effects will be adverse. The process for evaluating adverse effects on historic properties is described in 36 CFR 800.5, Assessment of Adverse Effect, cited below:

> An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

7.1 Archaeological Resources

Twelve archaeological sites have been identified in the vicinity of the project areas, all of which are contributing properties to the National Register-eligible *Laliik* TCP and are therefore historic properties. They include seven archaeological sites consisting of rock cairns, lithic scatters and isolated flakes located on in the vicinity of the ridgeline project area (45BN426, 45BN1365, 45BN1369, 45BN634, 45BN175, 45BN1391, and 45BN1392) and five archaeological sites located in close proximity to the Rattlesnake Springs area (45BN826, 45BN827, 45BN445, 45BN170/171 and H3-121). To avoid adverse effects on these archaeological sites, archaeological monitoring should occur. Additionally, project staff and cultural resources staff can work together to create temporary physical barriers around these resources to assure that they are not adversely affected. Because additional archaeological investigations will need to occur at 45BN175 in order to assess the effects of this undertaking on this site, impacts on archaeological site 45BN175 is not addressed in this cultural resources review, but it will be addressed in a supplemental cultural resources review.

7.2 Historic Buildings and Infrastructure

Eighteen buildings and associated infrastructure (see Table 5.1) identified on the ridgeline and at the base area have been determined to be National Register-eligible as contributing properties to the Manhattan Project and Cold War Era Historic District and are therefore historic properties. Demolition of these historic properties will result in an adverse effect because demolition will remove all physical evidence of these buildings. In anticipation of Hanford Site demolition activities, the Manhattan Project and Cold War Era Historic District Treatment Plan was written to develop a means for programmatically mitigating any adverse effects of the future demolition of all Hanford Site buildings. The Treatment Plan outlined specific mitigation for the buildings; documentation on Historic Property Inventory Forms and in a district book explores in more detail the history of the Manhattan Project and Cold War at Hanford and the role the buildings and infrastructure played in this history (DOE-RL 2002a; DOE 1998).

The Treatment Plan recommended mitigation in the form of documentation, as described, for 16 of the 18 above-ground historic properties that will be affected by project activities (see Table 5.1). The documentation has been completed; therefore, adverse effects resulting from this project have already been mitigated.

The remaining buildings and infrastructure are not National Register-eligible properties, either because they do not meet the 50-year criterion (i.e., Tri-Cities Amateur Radio Club, Columbia Communications, EN Building, Franklin County, Crown Castle, Rattlesnake Mountain Observatory, abandoned concrete radio-telescope base, and the Verizon telephone structure), or they have been determined to be non-contributing to the Manhattan Project and Cold War Era Historic District (i.e., 646 Building, 6652-T, 6652-D, 6652-U, 6652-C Shed, and the Benton PUD line). This project will not have adverse effects on these properties because they are not historic properties.

7.3 Traditional Cultural Properties

The project is located within *Laliik*, a National Register-eligible TCP and therefore a historic property. According to the National Register Determination of Eligibility documentation statement of significance:

> *Laliik* is a TCP eligible for listing on the National Register because of its local significance as defined by Criterion A and B. Criterion A is met because of the longstanding role of *Lalíik* as a spiritual location of primary importance to groups of American Indians within the region. Specifically, *Lalíik* is culturally significant for its long association with these traditional, spiritual, cosmological, religious and cultural practices and beliefs of the Washani community. To many tribal people, the formation of *Lalíik* was an important event in their history; the mountain served as a refuge for people during the cataclysmic floods of 13,000 years ago, and the mountain served and continues to serve as an important place for vision questing and other cultural activities. Criterion B is met because of the association with Smohalla, an important 19th century prophet in a long line of Plateau prophets. Smohalla had a vision on *Lalíik* about 1850, which later inspired him to revitalize the Washani religion, a revitalization that has important implications to many Indian peoples of the Plateau. *Lalíik* continues to serve as an important place to many members of local Tribes, continuing traditions that extend back 13,000 years or more (Kennedy et al. 2008:16).

The National Register determination of eligibility documentation further describes characteristics that contribute to the significance of *Laliik*. The characteristics include the following:

- Integrity of feeling, which contributes to the spiritual qualities of *Laliik*. The feeling on *Laliik* evokes a sense of tribal spiritual life. Protection of this characteristic enables Tribes to conduct traditional cultural practices such as ceremonies, vision questing, and resource gathering in a manner that is consistent with their religious beliefs.
- Integrity of the natural and visual setting, which contributes to the spiritual qualities of *Laliik*. The natural and visual setting is integral to the character in which this property played a significant traditional, historical, and cultural role. Protection of the natural habitat and a visibly pleasing viewshed unmarred by intrusions enables Tribes to conduct traditional cultural practices such as

ceremonies, vision questing, and resource gathering in a manner that is consistent with their religious beliefs.

- Continued tribal access and use of *Laliik* to conduct and perpetuate traditional cultural practices and beliefs.

DOE-RL's proposal to consolidate communication facilities into one building, thereby reducing the overall footprint of disturbance and visual impacts on the ALE, and to restore and revegetate these areas is based in part on the recognition of the cultural sensitivity of *Laliik* to area Tribes and on the recognition of the need to preserve the integrity (i.e., natural and visual setting) of *Laliik.* Removal of the buildings and infrastructure and the proposed restoration and revegetation activities will reduce the total footprint of disturbed areas and increase the total footprint of natural habitat on ALE. These activities will further minimize and mitigate cumulative adverse effects, because the project in its entirety will result in a positive effect on the natural and visual setting on *Laliik*. Temporary alterations to the visual setting will result during demolition activities and during construction of the new CCCF and may be considered an adverse effect. Construction and ongoing operation of the new CCCF will result in alterations to the spiritual qualities and the visual and natural setting on *Laliik* and are therefore collectively considered to be an adverse effect. It is recommended that a Memorandum of Agreement (MOA) be developed in consultation with Hanford Tribes and the SHPO to resolve these adverse effects. Suggested stipulations to minimize and avoid the adverse effects resulting from the project as a whole are listed in Section 7.4.2. Discussions held between PNNL cultural resources staff, DOE-RL staff, and tribal cultural resources technical staff of the Wanapum (on April 10, 2009), and the Yakama Nation, Nez Perce Tribe, and the CTUIR (on May 5, 2009) indicate that there is concurrence with this finding of adverse effect. Some input was also provided on suggested stipulations for resolving the adverse effect which are described below.

7.4 Suggested Stipulations for Avoiding and Resolving Adverse Effects

This section presents recommended stipulations that may be incorporated into a MOA to avoid and resolve adverse effects resulting from the construction and operation of the CCCF and associated demolition activities.

7.4.1 Construction of the CCCF

Avoiding and resolving adverse effects involves consideration of the CCCF design and viewshed, alternative sites, and how to minimize the effects of construction activities on any associated archaeological sites and the visual and natural setting.

7.4.1.1 Design and Viewshed Considerations

DOE-RL and EN have held several meetings and discussions with Tribes regarding this project to seek input on the design of the new CCCF to find ways to minimize and avoid impacts on Laliik. As a result of the meetings, the overall CCCF design has incorporated tribal concerns to minimize effects on the visual and natural setting. These details are included in this discussion to document the overall design changes and are presented to capture efforts already made to minimize adverse effects resulting from the

CCCF. Design details include the selection of a color for the building to blend in with the environment, no lighting required for the 180-foot tower, exterior motion-sensing lights for the building, and use of a propane tank for the emergency generator rather than use of diesel to avoid accidental spills. EN also anticipates using existing road access or a helicopter to transport the building parts to the site for onsite assembly. Construction of the new tower will require excavation, but only in an area that has already experienced extensive subsurface disturbance. The tower also will be self-supporting and will not require the use of guy wires for support, further minimizing the horizontal footprint of the tower. EN has taken viewshed photographs from the base of Rattlesnake Mountain along State Route 240 to simulate the cumulative visual impact of the CCCF and removal of all other buildings and infrastructure on the ridgeline. These photographs are provided in Appendix B.

7.4.1.2 Alternative Siting Study

EN also funded a study to evaluate the possibility of moving the communication towers currently located on the ridgeline to another location within Benton or Franklin county (Lockheed Martin 2008). In 2008, the alternative siting study was developed to evaluate the availability of the following features:

- adequate site elevation, allowing acceptable radio-frequency propagation
- tower and support building siting availability
- year-round access road
- power and HVAC capability.

Nineteen sites were evaluated in the two counties, including Badger Mountain, Candy Mountain, Flat Top, Jump-Off Joe Butte, Wahitas Peak, Red Mountain, and Prosser Butte. Of the 19 sites, 9 were rejected because of inadequate radio-frequency propagation; several sites were rejected because of lack of an access road or because of poor road conditions; and a few sites were determined to work for one or more communications users, but not for all of them. Use of the alternative sites would require intermodulation studies to assure that the antennas would not interfere with existing operational radio systems; tower structural analyses; site development plans; and modifications to all 12 EN emergency sirens and all 10 DOE-RL river-based emergency sirens (e.g., replace some antennas, extend antennas higher on mast, modify some siren radios).

Based on the results of this study, it was determined that no location exists in Benton or Franklin county that could provide the broad level of coverage that is currently provided at the ridgeline of Rattlesnake Mountain. Adequate level of coverage is required by the communications users to protect citizens, provide services, and, in the case of EN, meet the regulatory requirements of the Columbia Generating Station Emergency Plan as approved by the U.S. Nuclear Regulatory Commission.

7.4.1.3 Minimization of Effects on National Register-Eligible Archaeological Sites and on the Visual and Natural Setting During Construction of the CCCF

Construction activities associated with the CCCF may result in temporary alterations to the visual and natural setting. National Register-eligible archaeological sites that are located on the ridgeline will also

need to be avoided. Suggested stipulations to minimize and avoid any effects during construction of the CCCF are identified below:

- Minimize dust during construction.
- Minimize noise during construction
- In all construction/laydown areas, use existing roads and stay on existing disturbed/graveled areas during construction.
- Provide cultural sensitivity awareness training for contractors that perform the construction.
- Assure continued tribal access to Rattlesnake Mountain during construction and a means for communicating their needs with construction personnel within reasonable time frames.
- Work with cultural resources personnel to create temporary physical barriers to assure that National Register-eligible archaeological sites located on the ridgeline (45BN426, 45BN1365, 45BN1369, 45BN634, 45BN175, 45BN1391, and 45BN1392[1]) and sensitive plants are avoided during construction and operation.
- Enable intermittent cultural resources monitoring of construction activities by tribal representatives and a DOE-RL contractor cultural resources specialist to assure that archaeological resources and *Laliik* are not adversely affected.

7.4.2 Operation of the CCCF

Suggested stipulations to minimize and avoid the effects of CCCF operations on the spiritual qualities and the visual and natural setting on *Laliik* are listed below. National Register-eligible archaeological sites that are located on the ridgeline will also need to be avoided.

- Assure that a long-term commitment to continued access to Rattlesnake Mountain is provided to Tribes.
- Assure a long-term commitment to investigate a means for the eventual removal of the CCCF and associated infrastructure from Rattlesnake Mountain by investigating new technologies or locations that would support removal.
- Minimize noise during operation.
- Use existing roads and stay on existing disturbed/graveled areas during operations.
- Provide cultural sensitivity awareness training for contractors that perform ongoing operation and maintenance activities.

[1] 45BN636 and HT-90-013 are not listed, because these isolated finds are no longer located on the ridgeline; they were collected at the time they were recorded.

- Avoid National Register-eligible archaeological sites located on the ridgeline (45BN426, 45BN1365, 45BN1369, 45BN634, 45BN175, 45BN1391, and 45BN1392[1]) and sensitive plants during operation.
- Conduct long-term cultural resources monitoring of archaeological sites that have been identified on the ridgeline to monitor conditions and provide protective measures.
- Ensure that the intent of the above stipulations is upheld as they are interpreted at the time of this report.
- Review stipulations every five years.

7.4.3 Demolition Activities

Demolition activities will result in reduction of impacted areas on *Laliik* and this reduction is viewed to have a beneficial effect on the overall spiritual qualities and visual and natural setting. However, these activities may also result in temporary alterations to the visual and natural setting. Suggested stipulations to minimize and avoid these effects on *Laliik* and other National Register-eligible archaeological sites that have been identified on the ridgeline and in the Rattlesnake Springs area are listed below.

- Minimize dust during demolition activities.
- Minimize noise during demolition activities.
- In all demolition/laydown areas and access corridors, use existing roads and stay on existing disturbed/graveled areas.
- Provide cultural sensitivity awareness training for contractors that perform the work.
- Assure continued tribal access to Rattlesnake Mountain during demolition or means for communicating needs within reasonable time frame.
- Work with cultural resources personnel to create temporary physical barriers to assure that National Register-eligible archaeological sites on the ridgeline (45BN426, 45BN1365, 45BN1369, 45BN634, 45BN1391, 45BN1392 and 45BN175[2]) and at Rattlesnake Springs (45BN826, 45BN827, 45BN445, 45BN170/45BN171, and H3-121) as well as sensitive plants during demolition.
- Assure tribal involvement and consultation in the development of the site-specific recontouring and revegetation plans at each of the demolition areas.
- Enable intermittent cultural resources monitoring of demolition activities, particularly at the ridgeline and at the Rattlesnake Springs area by tribal representatives and a DOE-RL contractor cultural resources specialist to assure that archaeological resources at these locations and *Laliik* are not adversely affected.

[1] 45BN636 and HT-90-013 are not listed, because these isolated finds are no longer located on the ridgeline; they were collected at the time they were recorded.
[2] Further archaeological investigation will need to occur at 45BN175 to assess the impacts of demolition of the 6652-T Building and the Benton PUD electrical line on this resource.

- Conduct long-term cultural resources monitoring of archaeological sites that have been identified on the ridgeline and at Rattlesnake Springs to monitor conditions and provide protective measures.
- Conduct annual monitoring of the success of the site-specific revegetation plans at the ridgeline, base, and in the Rattlesnake Springs area.

7.5 Graded Approach for Assessing Effects Resulting from Cleanup of Debris Piles

Given the extent of the number of debris piles to be cleaned up (over 150 identified at this time), and the varying levels of impacts that may result from their cleanup, it is recommended that a graded cultural resources review process be developed for addressing cleanup of the debris piles that have been identified, as well as those that will be identified in the future, to assure that adverse effects on these archaeological sites and on *Laliik* are avoided. Three general categories of debris piles need to be considered for cultural resources review, as summarized below.

- The majority of the debris piles is less than 50 years old and are therefore not considered to be historic properties, so they will not be affected by cleanup. Most of these debris piles can be easily removed from the ground surface without requiring ground disturbance and do not require off-road driving, so their removal should not result in any adverse effects on *Laliik* or any National Register-eligible archaeological sites. Debris piles that fall into this category are covered by this cultural resources review, but the details will be documented in the supplemental cultural resources review.
- A few of the debris piles that have been identified appear to be 50 years old or older and/or may require extensive ground disturbance to remove. These debris piles will need to be assessed in the supplemental cultural resources review.
- The remaining debris piles are similar to those described in the second bullet, but are located in remote areas requiring off-road driving that may affect previously unrecorded archaeological sites and the natural setting of *Laliik*. Or they are located within close proximity to known archaeological sites and cleanup has the potential to affect these resources. Effects will likely be avoided provided that access routes are examined and cultural resources monitoring occurs. Debris piles that fall into this category will also need to be assessed in the supplemental cultural resources review.

7.6 Supplemental Cultural Resources Assessment

A few project areas and scopes have been identified for this project that have not been addressed in this cultural resources assessment document. A supplemental cultural resources assessment and any additional archaeological field investigations will be completed for them. Project scopes include the following:

- Demolition of the Benton PUD electrical lines and the 6652-T Building
- Demolition of another building known as Hodges Well that was inadvertently left out of the original project scope

- Modification of fences and gates to enhance access controls
- Installation of additional laydown areas that are not located in pre-disturbed areas
- Potential removal of buried inactive phone lines located within existing easement areas
- Removal of former inactive gas wells, if required
- Assessment of debris removal.

7.7 Administrative Process for Compliance with 36 CFR 800

This report will be transmitted to DOE-RL which is the federal agency responsible for making an official determination on the findings of effect for this undertaking. DOE-RL will submit its findings to Tribes and SHPO for their review as part of the consultation process outlined in 36 CFR 800. In accordance with 36 CFR 800.5, Assessment of Adverse Effects, ongoing consultation between DOE-RL "with the SHPO/THPO [Tribal Historic Preservation Officer] and any Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to identified historic properties" may result in additional input into the cultural resources assessment and potential findings of effect as documented in this report.

8.0 References

36 CFR Part 800. 2000. "Protection of Historic Properties." *Code of Federal Regulations*. Advisory Council on Historic Preservation.

64 FR 61615. 1999. DOE Record of Decision for the "Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement." *Federal Register*, U.S. Department of Energy.

73 FR 72519. 2008. "Hanford Reach National Monument; Adams, Benton, Franklin, and Grant Counties, WA." *Federal Register*. U.S. Fish and Wildlife Service.

16 USC 470aa et seq. *Archaeological Resources Protection Act of 1979*. Public Law 96-95, as amended.

42 USC 4321 et seq. *National Environmental Policy Act of 1969*. Public Law 91-190, as amended.

American Indian Religious Freedom Act (AIRFA). 1978. Public Law 95-341, as amended, 42 USC 1996, 1996 note.

Bard, JC. 1997. "Ethnographic/Contact Period (Lewis and Clark 1805 – Hanford Engineer Works 1943) of the Hanford Site, Washington." In *National Register of Historic Places Multiple Property Documentation Form – Historic, Archaeological and Traditional Cultural Properties of the Hanford Site, Washington.* DOE/RL-97-02, U.S. Department of Energy Richland Operations Office, Richland, Washington.

Barton BR. 1999. "Some Notable Finds of Columbian Mammoths from Washington State." *Washington Geology* 27(2/3/4):23–27.

Bjornstad, BN. 2006. *On the Trail of the Ice Age Floods: A Geological Field Guide to the Mid-Columbia Basin*. Keokee Co. Publishing, Inc., Sandpoint, Idaho.

Cadoret, NA and JC Chatters. 1988. *Cultural Resources Review of the Rattlesnake Mountain Propane Tank.* HCRC# 88-600-004, Pacific Northwest Laboratory, Richland, Washington.

Chatters JC. 1982. "Prehistoric Settlement and Land Use in the Dry Columbia Basin." *Northwest Anthropological Research Notes* 16:125–147.

Daubenmire, R. 1970. "Steppe Vegetation of Washington." Technical Bulletin 62, Washington Agricultural Experiment Station, College of Agriculture, Washington State University, Pullman, Washington.

Daugherty, RD. 1952. "Archaeological Investigations of O'Sullivan Reservoir, Grant County, Washington." *American Antiquity* 17: 274–278.

Draper, JA, DL Olson, and EM Draper. 1993. *Results of a Cultural Resources Survey of Selected Portions of the Arid Lands Ecology (ALE) Reserve, Hanford Reservation, South-Central Washington.* HCRC# 93-600-042, Pacific Northwest Laboratory, Richland, Washington.

Downs, JL, WH Rickard, CA Brandt, LL Cadwell, CE Cushing, DR Geist, RM Mazaika, DA Neitzel, LE Rogers, MR Sackschewsky, and JJ Nugent. 1993. *Habitat Types on the Hanford Site: Wildlife and Plant Species of Concern*. PNL-8942, Pacific Northwest Laboratory, Richland, Washington.

Duncan JP, KW Burk, MA Chamness, RA Fowler, BG Fritz, PL Hendrickson, EP Kennedy, GV Last, TM Poston, MR Sackschewsky, MJ Scott, SF Snyder, MD Sweeney, and PD Thorne. 2007. *Hanford Site National Environmental Policy Act (NEPA) Characterization*. PNNL-6415, Rev. 18, Pacific Northwest National Laboratory, Richland, Washington.

ERTEC. 1981. *Cultural Resources Survey and Exploratory Excavations for the Skagit-Hanford Nuclear Power Project*. ERTEC Northwest, Seattle, Washington.

Fallon, M. 2004. *HCRC Project # 2004-600-008 BLM Boundary Survey Monitoring Rattlesnake Mountain Area.* Pacific Northwest Laboratory, Richland, Washington.

Fecht, KR, RE Gephart, DL Graham, SP Reidel, and AC Rohay. 1984. *Summary of Geotechnical Information in the Rattlesnake Mountain Area.* Pacific Northwest Laboratory, Richland, Washington.

Gard, H and JC Chatters. 1990. *Cultural Resources Review of the Rattlesnake Mountain Anemometer Tower.* HCRC# 90-600-029, Pacific Northwest Laboratory, Richland, Washington.

Greene, GS. 1975. *Prehistoric Utilization of the Channeled Scablands of Eastern Washington*. Doctoral Dissertation, Department of Anthropology, Washington State University, Pullman, Washington.

Greengo, RE. 1982. *Studies in Prehistory: Priest Rapids and Wanapum Reservoir Areas, Columbia River, Washington*. Department of Anthropology, University of Washington, Seattle, Washington.

Hale, LL. 1999. *Cultural Resources Report Narrative – The Rattlesnake Springs Survey.* HCRC# 99-600-001, Pacific Northwest Laboratory, Richland, Washington.

Hale, LL. 2001. *Fiscal Year 2001 Monitoring Report for Archaeological Sites, Cemeteries and Places with Human Remains, Pre-1943 Historic Structures, and Shoreline Cut Banks.* HCRC# 2001-600-008, Pacific Northwest Laboratory, Richland, Washington.

Hinds, NR and LE Rogers. 1991. *Ecological Perspectives of Land Use History: The Arid Lands Ecology (ALE) Reserve.* Pacific Northwest Laboratory, Richland, Washington.

Kennedy, EP, L Aleck, D Miller, G Cleveland, D McFarland, and K Valdez. 2008. *National Register of Historic Places Determination of Eligibility Form for Laliik.* U.S. Department of Energy, Richland Operations Office, Richland, Washington

Last GV and K Winsor. 2007. "Impacts of Ice Age Floods on Pleistocene Mammoths of Southeastern Washington." Geological Society of America, *Abstracts with Program*. Cordilleran Section - 103rd Annual Meeting (4–6 May 2007), Bellingham, Washington.

Leonhardy FC and DG Rice. 1970. "A Proposed Cultural Typology for the Lower Snake River Region, Southeastern Washington." *Northwest Anthropological Research Notes* 4(1):1-29.

Lockheed Martin. 2008. *Energy Northwest Alternative Repeater Site Evaluation.* Richland, Washington.

Mackley, RD, GV Last, MJ Fayer, and BN Bjornstad. 2005. *Reconnaissance of the Dry Creek Area for Use as a Potential Analog for Surface Barrier Materials*. Pacific Northwest Laboratory, Richland, Washington.

Myers, CW and SM Price (Eds). 1979. *Geologic Studies of the Columbia Plateau, A Status Report*. RHO-BWI-ST-4, Rockwell Hanford Operations, Richland, Washington.

Myers, JW and WD McIntire. 1993. *Integrated Voice/Data Telecommunications System Survey: A Cultural Resources Survey Report.* HCRC# 92-600-030, Pacific Northwest Laboratory, Richland, Washington.

National Historic Preservation Act (NHPA) 1966. Public Law 89-665, as amended, 16 USC et seq.

National Park Service (NPS). 1991. "How to Apply the National Register Criteria for Evaluation." *National Register Bulletin 15,* U.S. Department of the Interior, Washington D.C.

Newcomb, RC, JR Strand, and FJ Frank. 1972. "Geology and Ground-Water Characteristics of the Hanford Reservation of the U.S. Atomic Energy Commission, Washington." Geological Survey Professional Paper 717, U.S. Geological Survey, Reston, Virginia.

O'Conner, JE and JE Costa. 2004. "The World's Largest Floods, Past and Present – Their Causes and Magnitudes." U.S. Geological Survey Circular 1254, U.S. Geological Survey, Reston, Virginia.

O'Connor, G and W Rickard. 2003. "A History of the Fitzner/Eberhardt Arid Lands Ecology Reserve: Four Decades of Environmental Research." Pacific Northwest Laboratory, Richland, Washington.

Quigley, TM, RW Haynes, and RT Grasham (Eds). 1996. *Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin*. General Technical Report, PNW-GTR-382, Pacific Northwest Research Station, U.S. Department of Agriculture Forest Service, Portland, Oregon.

Relander, C. 1956. *Drummers and Dreamers.* Caxton Printers, Caldwell, Idaho.

Rice, DG. 1968a. *Archaeological Reconnaissance: Ben Franklin Reservoir Area, 1968.* Laboratory of Anthropology, Washington State University, Pullman, Washington.

Rice, DG. 1968b. *Archaeological Reconnaissance: Hanford Atomic Works.* U.S. Atomic Energy Commission, National Park Service, and Washington State University, Pullman, Washington.

Rice, DG. 1980. *Overview of Cultural Resources on the Hanford Reservation in South Central Washington State*. Report submitted to U.S. Department of Energy Richland Operations Office, Richland, Washington.

Sackschewsky, MR and JL Downs. 2001. *Vascular Plants of the Hanford Site*. PNNL-13688, Pacific Northwest National Laboratory, Richland, Washington.

Spier, L. 1936. *Tribal Distribution in Washington.* General Services in Anthropology No 3, George Banta Publishing Co., Menasha, Wisconsin.

U.S. Department of Energy (DOE). 1988. *Consultation Draft, Site Characterization Plan, Reference Repository Location, Hanford Site, Washington*. DOE/RW-0164, U.S. Department of Energy Office of Civilian Radioactive Waste Management, Washington, D.C.

U.S. Department of Energy Richland Operations Office (DOE-RL). 1997 *National Register of Historic Places Multiple Property Documentation Form – Historic, Archaeological and Traditional Cultural Properties of the Hanford Site, Washington.* DOE/RL-97-02, Richland, Washington.

U.S. Department of Energy Richland Operations Office (DOE-RL). 1998. *Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan.* DOE/RL-97-56, Rev. 1, Richland, Washington.

U.S. Department of Energy Richland Operations Office (DOE-RL). 1999. *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement.* DOE/EIS-0222-F, Richland, Washington. Online at http://www.hanford.gov/doe/eis/hraeis/hraeis.htm

U.S. Department of Energy Richland Operations Office (DOE-RL). 2002a. *History of the Plutonium Production Facilities at the Hanford Site Historic District, 1943-1990.* DOE-RL-97-1047, Richland, Washington.

U.S. Department of Energy Richland Operations Office (DOE-RL). 2002b. *Standardized Stratigraphic Nomenclature for Post-Ringold Formation Sediments Within the Central Pasco Basin*. DOE/RL-2002-39, Rev. 0, Richland, Washington.

U.S. Department of Energy Richland Operations Office (DOE-RL). 2003. *Hanford Cultural Resources Management Plan*. DOE/RL-98-10, Rev. 0, Richland, Washington.

U.S. Department of Energy Richland Operations Office (DOE-RL). 2008. Letter from David Brockman, Department of Energy, Richland Operations Office Manager, to Dr. Allyson Brooks, State Historic Preservation Officer, November 19, 2009. "Transmittal of Amended National Register of Historic Places Registration Form for the Laliik Portion of Rattlesnake Mountain." Richland, Washington.

Waitt, RB. 1994. "Scores of Gigantic, Successively Smaller Lake Missoula Floods Through Channeled Scabland and Columbia Valley." In *Geologic Field Trips in the Pacific Northwest*, Eds. DA Swanson and RA Haugerud, pp. 1K-1–1K-88. Geological Society of America, Boulder, Colorado.

Walker, DE, Jr. 1998. *Handbook of North American Indians. Volume 12: Plateau.* Smithsonian Institution, Washington, D.C.

Wright, MK. 1993. *Cultural Resources Report Narrative for Rattlesnake Mountain Emergency Communication System Benton County PUD.* HCRC# 94-600-009, Pacific Northwest Laboratory, Richland, Washington.

Woody, D. 2003. *A Proposed Model of Pre-Contact Land Use of the Hanford Site and Its Cultural Resource Management Applications.* Pacific Northwest National Laboratory, Richland, Washington.

Appendix A

Photographs of Project Areas

Figure A.1. Trailers Near the Observatory (Locale 3) to be Removed. Photo taken at 350 degrees on 3/19/09 by Doug McFarland.

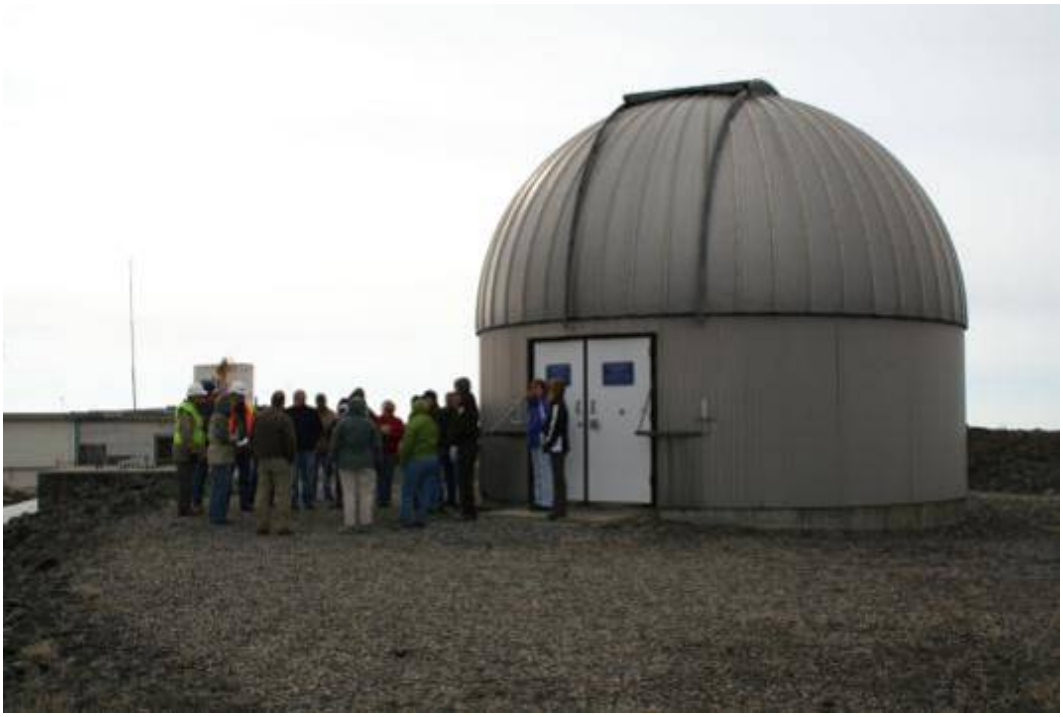


Figure A.2. Picture of the Observatory (Locale 3) Taken from the Nearest Trailer. Photo taken at 160 degrees on 3/19/09 by Doug McFarland.

Figure A.3. Observatory and Small Outbuilding (Locale 3). Photo taken at 340 degrees on 3/19/09 by Doug McFarland.

Figure A.4. 6652-C Building (Locale 3). Photo taken at 50 degrees on 3/19/09 by Doug McFarland.

Figure A.5. 6652-C Building and Small Out-Buildings (Locale 3). Photo taken at 80 degrees on 3/19/09 by Doug McFarland.

Figure A.6. View of 6652-C Building from the Ridge Edge Looking Up (Locale 3). Photo taken at 80 degrees on 3/19/09 by Doug McFarland.

Figure A.7. Power Line (Locale 9D) to the 623-A Building (Locale 2). Photo taken at 140 degrees on 3/19/09 by Doug McFarland.

Figure A.8. Current Buildings and Proposed Location of the CCCF Structure and New Antenna (Locale 4). Photo taken at 20 degrees on 3/19/09 by Doug McFarland.

Figure A.9. Current Buildings and Proposed Location of the CCCF Structure and New Antenna (Locale 4). Photo taken at 30 degrees on 3/19/09 by Doug McFarland.

Figure A.10. Viewshed from the Proposed CCCF Location (Locale 4). Photo taken at 340 degrees on 3/19/09 by Doug McFarland.

Figure A.11. Viewshed from the Proposed CCCF Location (Locale 4). Photo taken at 40 degrees on 3/19/09 by Doug McFarland.

Figure A.12. Viewshed from the Proposed CCCF Location (Locale 4). Photo taken at 100 degrees on 3/19/09 by Doug McFarland.

Figure A.13. Crown Castle Viewshed (Locale 5). Photo taken at 320 degrees on 3/19/09 by Doug McFarland.

Figure A.14. Crown Castle Viewshed (Locale 5). Photo taken at 20 degrees on 3/19/09 by Doug McFarland.

Figure A.15. Crown Castle Viewshed (Locale 5). The photo also shows the Benton PUD line (Locales 9C and 9A). Photo taken at 50 degrees on 3/19/09 by Doug McFarland.

Figure A.16. Crown Castle Viewshed (Locale 5). Photo taken at 70 degrees on 3/19/09 by Doug McFarland.

Figure A.17. Crown Castle Building and Tower (Locale 5). Photo taken at 250 degrees on 3/19/09 by Doug McFarland.

Figure A.18. Columbia Communications Tower (Locale 6). Photo taken at 345 degrees on 3/19/09 by Doug McFarland.

Figure A.19. Columbia Communications Viewshed (Locale 6). Photo taken at 355 degrees on 3/19/09 by Doug McFarland.

Figure A.20. Columbia Communications Viewshed (Locale 6). Photo taken at 30 degrees on 3/19/09 by Doug McFarland.

Figure A.21. Columbia Communications Viewshed (Locale 6). Photo taken at 80 degrees on 3/19/09 by Doug McFarland.

Figure A.22. Columbia Communications Viewshed (Locale 6). Photo taken at 120 degrees on 3/19/09 by Doug McFarland.

Figure A.23. Amateur Radio Tower (Locale 7). Photo taken at 5 degrees on 3/19/09 by Doug McFarland.

Figure A.24. Viewshed from Northern End of Locale 7. Photo taken at 200 degrees on 3/19/09 by Doug McFarland.

Figure A.25. Viewshed from Northern End of Locale 7. Photo taken at 355 degrees on 3/19/09 by Doug McFarland.

Figure A.26. Viewshed from Northern End of Locale 7. Photo taken at 60 degrees on 3/19/09 by Doug McFarland.

Figure A.27. Viewshed from Northern End of Locale 7. Photo taken at 120 degrees on 3/19/09 by Doug McFarland.

Figure A.28. 623-A Building and Tower (Locale 2). Photo taken at 320 degrees on 3/19/09 by Doug McFarland.

Figure A.29. 623-A Viewshed (Locale 2). Photo taken at 320 degrees on 3/19/09 by Doug McFarland.

Figure A.30. 623-A Viewshed (Locale 2). Photo taken at 30 degrees on 3/19/09 by Doug McFarland.

Figure A.31. 623-A Viewshed (Locale 2). Photo taken at 70 degrees on 3/19/09 by Doug McFarland.

Figure A.32. 623-A Viewshed (Locale 2). Photo taken at 120 degrees on 3/19/09 by Doug McFarland.

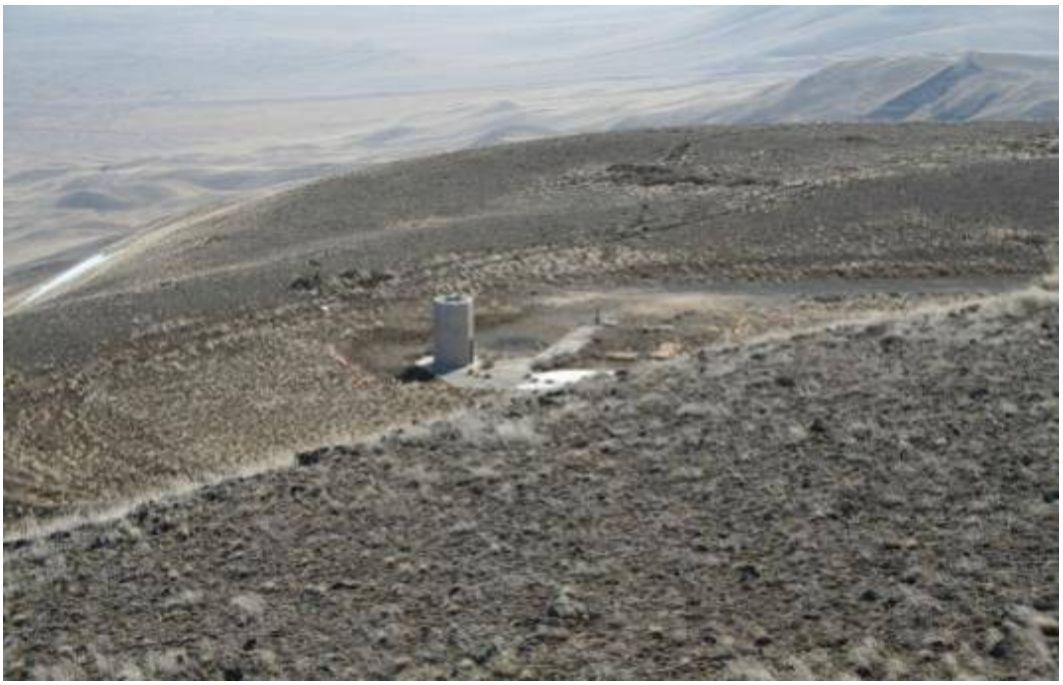


Figure A.33. Foundation for Radio Telescope (Locale 1). Photo taken at 125 degrees on 3/19/09 by Doug McFarland.

Figure A.34. Nike Bunkers and Radio Towers (Base Area). Photo taken at 20 degrees on 3/19/09 by Doug McFarland.

Figure A.35. Nike Buildings to Be Demolished. Photo taken at 280 degrees on 3/19/09 by Doug McFarland.

Figure A.36. Photo of Nike Buildings Taken Between Bunkers and Buildings (Base Area). Photo taken at 255 degrees on 3/19/09 by Doug McFarland.

Figure A.37. Nike Offices (Base Area). Photo taken at 180 degrees on 3/19/09 by Doug McFarland.

Figure A.38. Nike Offices (Base Area). Photo taken at 230 degrees on 3/19/09 by Doug McFarland.

Figure A.39. Nike Offices (Base Area). Photo taken at 300 degrees on 3/19/09 by Doug McFarland.

Figure A.40. Building 646 (Rattlesnake Springs Area) with Rattlesnake Mountain in Background. Photo taken at 150 degrees on 3/19/09 by Doug McFarland.

Figure A.41. Benton PUD Electrical Line (Locale 9A) from CCCF (Locale 4) to 6652-T (Locale 8). Photo taken at 150 degrees on 3/20/09 by Doug McFarland.

Figure A.42. Benton PUD Electrical Line (Locale 9A). Photo taken at 330 degrees on 3/20/09 by Doug McFarland.

Figure A.43. Benton PUD Electrical Line (Locale 9B). Photo taken at 245 degrees on 3/20/09 by Doug McFarland.

Figure A.44. Benton PUD Electrical Line (Locale 9A) and 6652-T (Locale 8) (half-way down). Photo taken at 330 degrees on 3/20/09 by Doug McFarland.

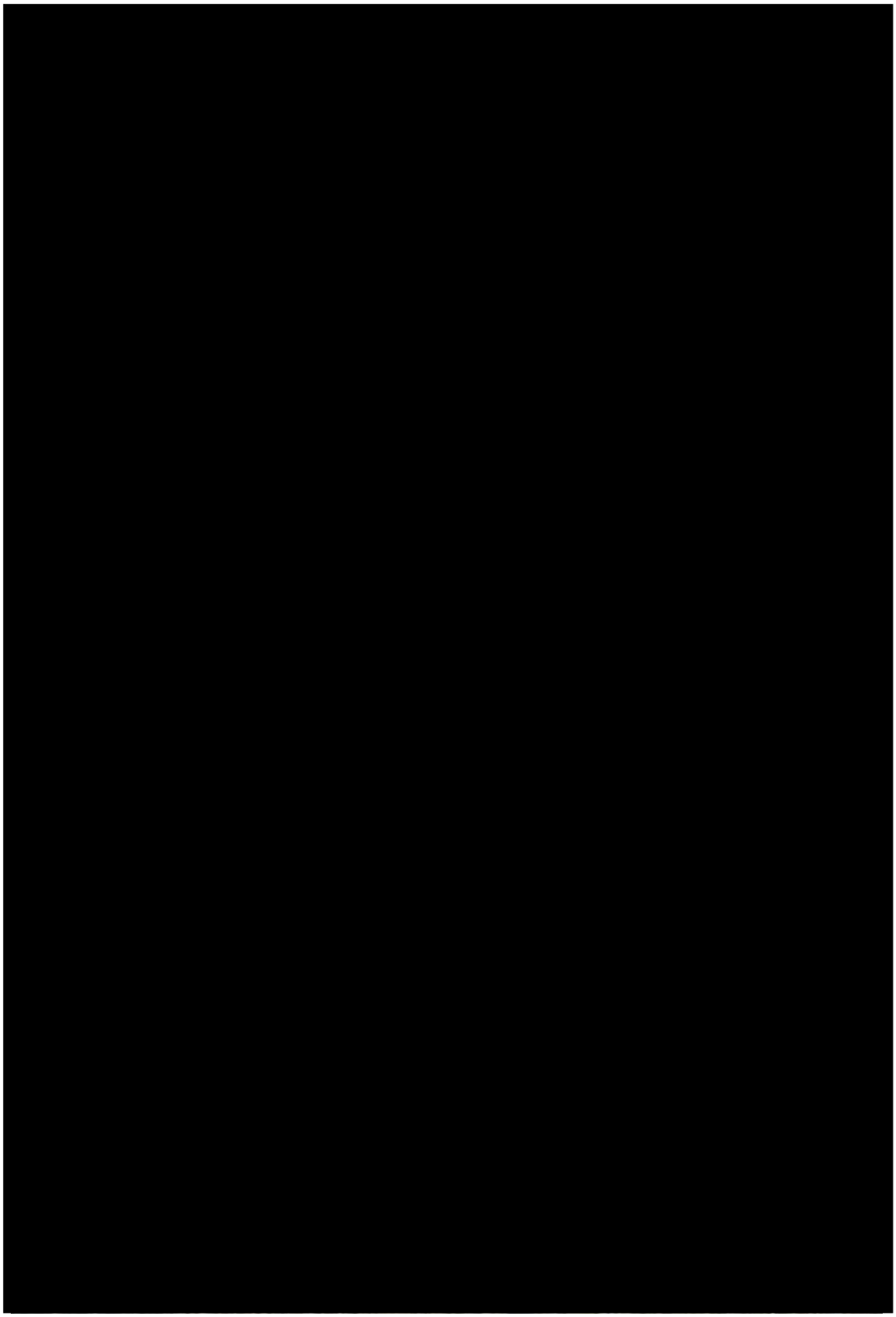


Figure A.45. [redacted].

Figure A.46. [redacted].

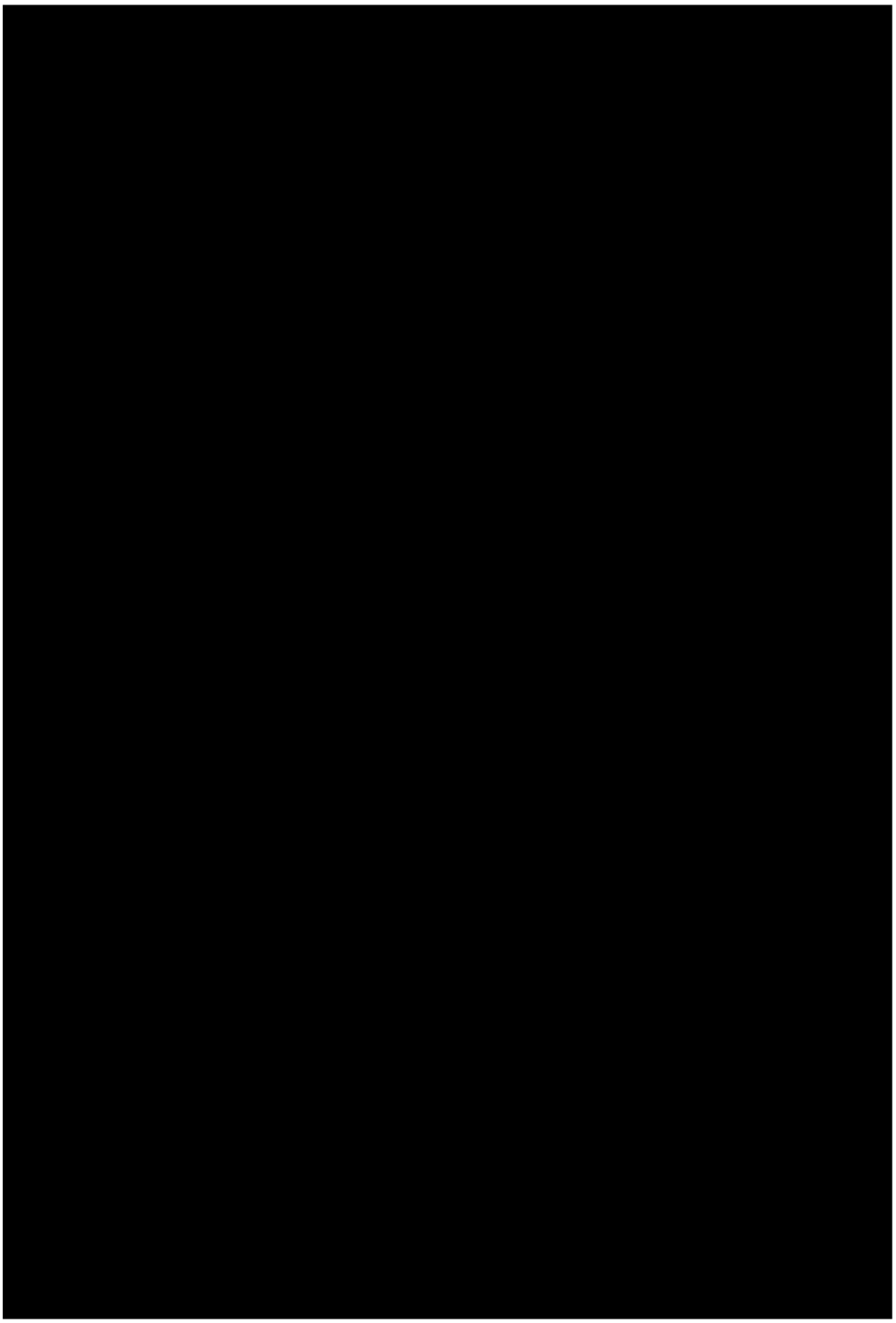


Figure A.47. [redacted].

Figure A.48. [redacted].

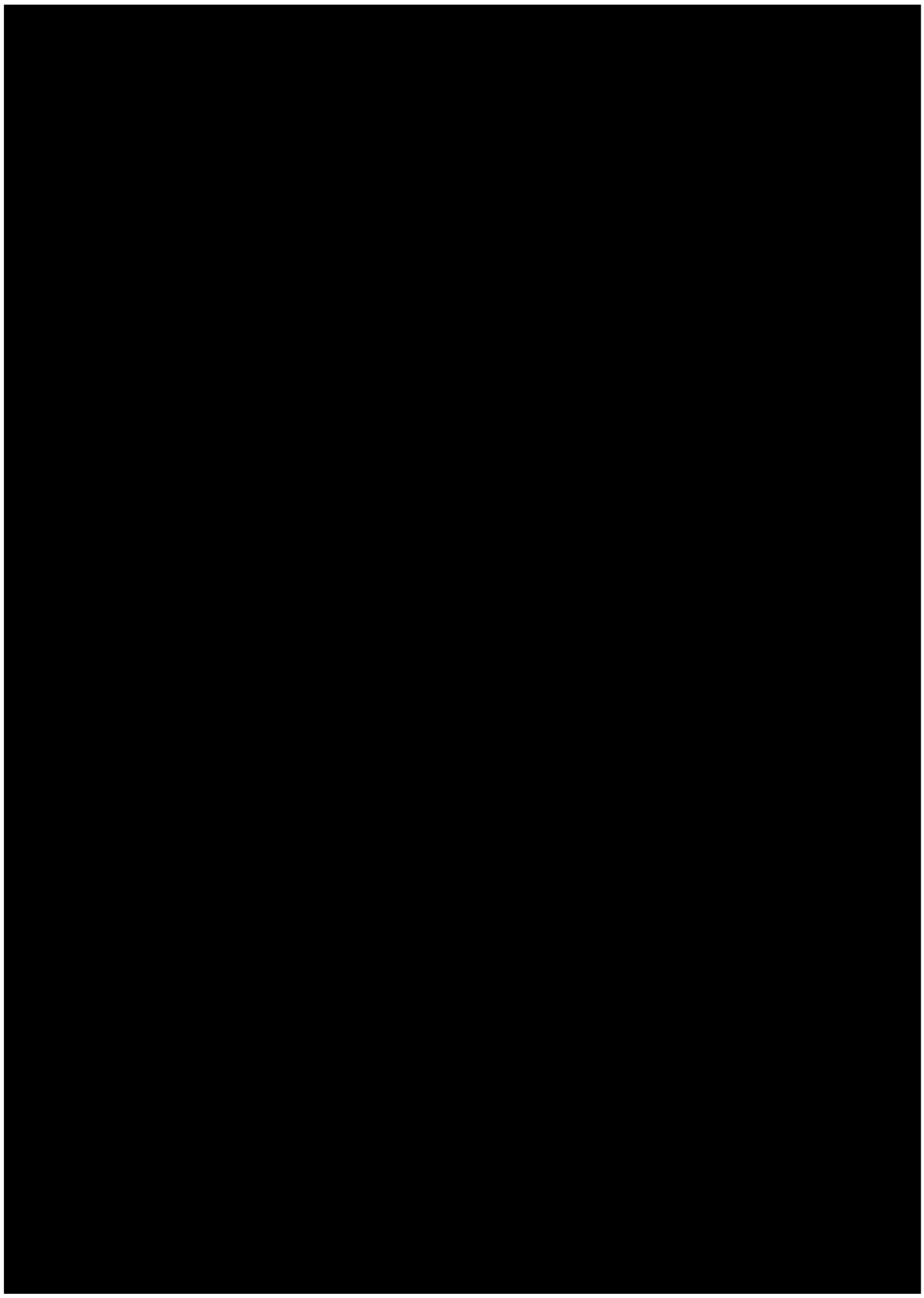


Figure A.49. [redacted].

Appendix B

Before-and-After Viewshed Photographs of the CCCF on Rattlesnake Mountain

Picture from SR 240 at Mile Marker 19

Current

Future

Picture 241

Picture from SR 240 at Mile Marker 16

Current

Future

Picture 251

May 2009

Picture from SR 225 at Mile Marker 11

Current

Future

Three White Lines running parallel to mountain are BPA Power Lines

Picture 259

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Appendix C

Ecological Resources

ECOLOGICAL REVIEW OF THE RATTLESNAKE MOUNTAIN COMBINED COMMUNITY COMMUNICATIONS FACILITIY AND INFRASTRUCTURE CLEAUNUP ON THE FITZNER/EBERHARDT ARID LANDS ECOLOGY RESERVE PROJECT, 600 AREA, Ecological Compliance Review #2008-600-004.

Michael R. Sackschewsky
Janelle L. Downs

Project Description:

The Department of Energy proposes to perform several actions to reduce the number of facilities and infrastructure on the ridgeline of Rattlesnake Mountain and elsewhere on the Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE), clean up debris across ALE, and make modifications to the existing fence line and access gates.

The infrastructure targeted for removal from ALE is located in three primary areas: on the ridgeline of Rattlesnake Mountain, in the Nike Missile Base area (formerly an army Nike missile site, subsequently used as ALE headquarters), and in the Rattlesnake Springs area (Figure 1). The infrastructure on the ridgeline includes active public and private communications facilities targeted for consolidation as well as inactive facilities and structures targeted for removal (Figure 2). Most of the existing antennas and radio repeaters on the ridgeline would be demolished, and a new facility, the Combined Community Communications Facility (CCCF), would be constructed so that communication operations can be combined in a single facility that reduces the overall environmental footprint of ongoing activities on ALE. Energy Northwest would construct the CCCF, and this review covers the construction of the CCCF as well as the proposed DOE activities on the ridgeline and elsewhere on ALE. DOE would manage any wastes associated with consolidating the existing facilities and infrastructure and anticipates that some areas may be recontoured and revegetated to restore them to natural conditions.

A number of DOE facilities (non-communication related) would also be removed from ALE. These facilities include most of the buildings on the ridgeline of Rattlesnake Mountain and at the former Nike missile base area, and one building at the Rattlesnake Springs area. Several still-serviceable structures would remain in place for use by the USFWS. The following buildings on the ridgeline would be demolished: Rattlesnake Mountain observatory foundation and associated support structures (the observatory itself would be dismantled by the owner and reassembled at an offsite location for future

use), 6652-C Building and nearby shed (army barracks/administration building), radio-telescope foundation, 6652-U pump house and tank, 6652-D fire pump house and tank, and the 6652-T (spring pump house). DOE would also remove the existing power lines between 6652-U and 623-A and between 6652-U and the 6652T pump house, as well as the power line spurs to the Crown Castle and Tri-City Amateur Radio towers.

All former Nike missile base buildings and associated debris and infrastructure would be demolished with the exception of the 6652-PH (fire protection pump house), the 6652-E (lysimeter preparation building), 6652-K (pump house), and 6652-O buildings (storage building and recently constructed USFWS warehouse), which are managed by the USFWS (Figure 3). Associated infrastructure would also be removed and decommissioned (i.e., the J.P. fuel pad area, fueling and warheading area, 6652-R paint shed and acid storage shed, as well as septic drain fields and other debris and/or waste sites within or adjacent to the compound, and Hodges Well, located along the Rattlesnake Mountain road south of the former Nike missile base area. The 646 Building (a 20-foot by 40-foot metal structure), located near the Rattlesnake Springs, also would be demolished (Figure 4).

To support the facility removal actions, DOE proposes to prepare a temporary staging area with administrative trailers and parking space at the intersection of the 1200-foot road and the Rattlesnake Mountain road. This staging area would be approximately 4 ha (10 ac). DOE also may develop a 2 ha (5 ac) area at the intersection of the ALE Gate 106 road with State Route 225 (Horn Road) to provide additional parking and to control access to ALE during the period of demolition activities.

Although cleanup has occurred on the ALE reserve over the years, isolated items (debris piles) are still scattered across the reserve. A number of items are still in use; e.g., many fence posts mark ecological transit routes and research areas, extensive corrals constitute elk and deer exclusion research areas, and several solar-powered telemetry antennas are used to track radio-collared wildlife. Because many of these features continue to be used for ecological research, it is expected that they would be left in place for future use. However, a number of abandoned items also exist; e.g., fence posts that were installed to support the Basalt-Waste Isolation Plant study in the 1980s, coiled remains of wire cable and barbed wire, conduit, rusted metal buckets and barrels, broken bricks, chunks of concrete, boards and wooden posts. These would be removed. There are also larger items, including a wrecked and abandoned truck, a rock and cement foundation, several cisterns, and the concrete remains of past research projects that are targeted for removal. These are scattered throughout the ALE reserve in a variety of habitats.

Removing buildings and foundations would result in numerous shallow depressions on the ridgeline and base areas. Additionally, the unneeded feeder roads at the base and ridgeline, buried water line from the 6652-T pump house and other buried utilities, and electrical power corridors are expected to require rehabilitation.

Specific recontouring procedures would depend on the severity of surface disturbance resulting from the demolition and the availability of suitable fill material. When practicable, nearby constructed berms might be used as fill material. At other locations, nearby rocks and fill material might be used to recontour the sites. Because of the risk of bringing in weed seeds and roots of noxious or alien plant species, fill material from ALE should be used. However, it might be necessary to use suitable fill material from the Hanford Site in already disturbed areas (e.g., existing pits) or acquire clean soil offsite. These options should be considered to avoid the least amount of disturbances to native habitats on the property.

Revegetation would be performed using appropriate native species that are typical of the site and surrounding plant communities. Plant materials used in revegetation would be locally derived. Boulders or other barriers might be used to prevent vehicle access during rehabilitation.

DOE may eventually realign portions of the ALE fences to match the true boundary lines; and the primary ALE access gate (Gate 106) would be replaced and moved about 50 feet closer to State Route 225 to improve access control and increase security.

Survey Objectives:

- Determine the occurrence in the project area of plant and animal species protected under the Endangered Species Act (ESA), candidates for such protection, and species listed as threatened, endangered, candidate, sensitive, or monitor by the state of Washington, and species protected under the Migratory Bird Treaty Act (MBTA).

- Evaluate and quantify the potential impacts of disturbance on priority habitats and protected plant and animal species identified in the survey.

Survey Methods:

Pedestrian and visual reconnaissance were performed at the following locations and dates, the percent cover of dominant vegetation was visually estimated:

- The staging areas at Gate 106 and at the 1200-foot road/Rattlesnake Mountain road intersection, and the former Nike missile base buildings were examined by J.L. Downs, S. Powell, and M. R. Sackschewsky on 29 April 2009.

- The 646 Building and the region where most of the debris sites are located were examined by J.L. Downs, A. Playter, M. R. Sackschewsky, J.M. Becker, and J.A. Stegen on 30 April 2009.

- The radio facilities and most abandoned structures on the ALE ridgeline, as well as Hodges Well, were examined by J.L. Downs and M. R. Sackschewsky, on 7 May 2009.

- The power lines along the ridgeline and to the 6652-T pump house, and cisterns along the Gate 111 (winterfat) road were examined by J.L. Downs, A. Playter, and M. R. Sackschewsky on 13 May 2009.

Priority habitats and species of concern are documented in: Washington Department of Fish and Wildlife (2008a, 2008b), and Washington State Department of Natural Resources (2009). Lists of animal and plant species considered Endangered, Threatened, Proposed, or Candidate by the U.S. Fish and Wildlife Service are maintained at 50 CFR 17.11 and 50 CFR 17.12; the list of birds protected under the MBTA is maintained at 50 CFR 10.13.

Survey Results:

Rattlesnake Mountain Sites

Ridgeline Sites

The immediate vicinity of most of the facilities at the ridgeline of Rattlesnake Mountain is relatively disturbed, with compacted gravel surfaces for vehicle access, and in a couple of cases, asphalt parking lots. However, the surrounding vegetation is dominated by species adapted to the harsh climatic conditions, including Sandberg's bluegrass (*Poa sandbergii*), rosy balsamroot (*Balsamorhiza rosea*), thyme-leaf buckwheat (*Eriogonum thymoides*), Gray's desertparsley (*Lomatium grayii*), wooly-pod milkvetch (*Astragalus purshii*), daggerpod (*Phoenicaulis chairanthoides*), Hood's phlox (*Phlox hoodii*), narrowleaf goldenweed (*Haplopaappus stenophyllus*), and low hawksbeard (*Crepis modocensis*). Less exposed areas with slightly deeper soils also have bluebunch wheatgrass (*Pseudoroegneria spicata*), wax currant (*Ribes cereum*), rock buckwheat (*Eriogonum sphaerocephalum*) and whiteleaf scorionweed (*Phacelia hastata*). No bird nests were noted on any of the towers or structures. A Townsend's ground squirrel (*Citellus townsendii*) was observed, as were cottontail rabbits (*Sylvilagus nutalli*). Although not observed during these site visits, white-tail jackrabbits (*Lepus townsendii*) and least chipmunk (*Tamias minimus*) have been commonly observed during previous surveys and are known to occur in the area.

Power Line to 6652-T

The power line between the proposed CCCF site on the ridgeline and the 6652-T well, as well as the two spur power lines that feed other communication antennae sites are through a very diverse native plant community dominated by bluebunch wheatgrass, Sandberg's bluegrass, with scattered shrubs including three-tip sage (*Artemisia tripartita*), purple sage (*Salvia dorrii*), squaw current (*Ribes cereum*), elderberry (*Sambucus caerulea*), mock orange (*Philadelphus lewisii*), and snowberry (*Symphorocarpus oreophyllus*); grasses such as Cusick's bluegrass (*Poa cusickii*); and forbs such as bluebells (*Mertensia oblongifolia*), shooting star (*Dodecatheon cusickii*), desertparsleys (*Lomatium macrocarpum, L. triternatum, L. dissectum, L. grayii*), wooly sunflower (*Eriophyllum lanatum*), Indian paintbrush (*Castilleja thompsonii*), and death camas (*Zigadenus venosus*). Nearly 60 plant species were identified along these power lines.

The well site is located within a seep area dominated by chokecherry (*Prunus virginiana*), and giant wildrye (*Elymus cinereus*). A raven's (*Covus corax*) nest (possibly inactive) was observed on the power pole adjacent to the pump house, chukars (*Alectoris chukar*) and robins (*Turdus migratorius*) were also observed.

Former Nike Missile Base Area

The immediate vicinity of the buildings and other facilities within the former Nike missile site is sparsely vegetated, primarily with weedy species. Less disturbed areas are dominated by Sandberg's bluegrass, cheatgrass (*Bromus tectorum*), and gray rabbitbrush (*Chrysothamnus nauseosus*). There is a large central portion of the compound that was planted to crested wheatgrass (*Agropyron cristatum*), but has also been colonized by a number of native species such as false mountain dandelion (*Microseris troximoides*),

velvet lupine (*Lupinus leucophyllus*), yarrow (*Achillea millefolium*), and both nine-leaf and bigseed desertparsley (*Lomatium triternatum* and *L. macrocarpum*),

Cliff swallow (*Hirundo pyrrhonota*), barn swallow (*H. rustica*), and Say's phoebe (*Sayornis saya*) nests were observed on the 6652-J and 6652-I buildings. Western kingbirds (*Tyrannus verticalis*), violet-green swallows (*Tachycineta thalassina*), white-crowned sparrows (*Zonotrichia leucophrys*) and western meadowlarks (*Sturnella neglecta*) were also observed within the former Nike missile site.

The vicinity of Hodges Well is dominated by cheatgrass, lupines, tumblemustard (*Sisymbrium altissimum*). Planted sagebrush and winterfat (*Cerotoides lanata*) are in the vicinity.

Upper Staging Area

The proposed staging area at the intersection of the 1200-foot road and the Rattlesnake Mountain road is dominated by lupines (*Lupinus sereus* and *L. leucophyllus*), Sandberg's bluegrass, Cuskick's sunflower (*Helianthus cusickii*), bottlebrush squirreltail (*Sitanion hystrix*), and needle-and-thread (*Stipa comata*), along with scattered shrubs including sagebrush (*Artemisia tridentata*) and green rabbitbrush (*Chrysothamnus viscidiflorus*).

Gate 106 Staging Area

The proposed staging area/entrance area at Gate 106 is relatively weedy and is currently dominated by cheatgrass and Sandberg's bluegrass, along with tumblemustard, fiddleneck (*Amsinckia lycopsoides*), prickly lettuce (*Lactuca serriola*), storksbill (*Erodium cicutarium*). There are a few scattered gray rabbitbush and some native grasses, such as Indian ricegrass (*Achnatherum hymenoides*) and bluebunch wheatgrass are present.

Debris Near 1200-Foot Road

Debris along the 1200-foot road consist of a variety of items including metal fence posts, large metal objects, barbed wire, communication cable, concrete foundations, abandoned natural gas wells, and cisterns. For the most part these items are in areas dominated by bluebunch wheatgrass and Sandberg's bluegrass, with an assortment of native species such as long-leaf phlox (*Phlox longifolia*), Lupines (*Lupinus* sp.), nineleaf desertparsley, bigseed desertparsley, low pussytoes (*Antennaria dimorpha*), and others. Many of these areas have very little non-native vegetation, and the communities are considered Washington Natural Heritage Program plant community element occurrences (DOE-RL 2001). Piper's daisy (*Erigeron piperianus*), a Washington State Sensitive plant species, was observed near a cistern site along the Gate 111 road and was very abundant around an old nesting platform laying adjacent to the power line road (Gate 112 Road).

Rattlesnake Springs/Building 646

The immediate vicinity of the 646 Building is compacted gravel with sparse, weedy vegetation. No bird nests were noted on the building. Beyond the compacted gravel, the site is surrounded by a community dominated by greasewood (*Sarcobatus vermiculatus*) and saltgrass (*Distichlis stricta*).

Gate 118 Debris field and other low elevation sites

This is an area between Gate 118 on Highway 240 and Rattlesnake Springs that was the site of numerous ecological experiments and sampling. Debris consists of many metal fence posts as well as irrigation piping, animal traps and trap covers, and several old refrigerators. The site has been burned several times, including in 2007. It is dominated by Sandberg's bluegrass, Cusick's sunflower, long-leaf phlox, Carey's balsamroot (*Balsamorhiza careyana*), and cheatgrass. A Washington State Watch list plant species, the crouching milkvetch (*Astragalus succumbens*) was common throughout the site. Sign of elk (*Cervus elaphus*), deer (*Odocoileus hemionus*), and coyotes (*Canis latrans*) were observed.

Considerations and Recommendations:

The ALE reserve is a Research Natural Area, a National Monument, a National Wildlife Refuge, and most of the plant communities are considered to be high quality element occurrences by the Washington Natural Heritage Program. Therefore, care should be taken during all of the proposed actions to minimize the habitat disturbance that could result from the proposed activities.

Facility Removal on Rattlesnake Mountain Ridgeline

- In general it is expected that removal of the communication towers and other facilities on the ridgeline can be conducted without significant damage to ecological resources of concern. No nests were observed on the towers or buildings, and the immediate vicinity of each facility has relatively little vegetation.

- However, care should be taken to minimize disturbance more distant from each facility. For instance, several of the towers have guy wires that are anchored subsurface. If possible, the anchors should be left in place to minimize surface disturbance. Likewise the buried electrical, and communication lines that are present around some of the facilities should be left in place to avoid further disturbance of the habitat.

- On the ridgeline of Rattlesnake Mountain, the environment is harsh and the native plant communities are extremely susceptible to disturbance. Thus, the rehabilitation efforts themselves may have undesirable adverse ecological impacts. Therefore, rehabilitation plans should be developed for each site on an individual basis, and should be designed to minimize the overall environmental impacts. Work should be planned to minimize surface disturbance. If gravel must be removed from the antennae sites, use of a guzzler may cause less damage than graders or front-loaders. In some cases, it may be preferable to spread crushed basalt over an abandoned road rather than try to grade adjacent berms to restore a smoother surface.

- Vehicles should stay on established roads and parking areas to the maximum extent practicable.

- If possible, the wooden power poles at the ridgeline, and extending to the 6652-T well should be cut off at ground surface rather than fully removed to minimize disturbance. Several of these poles below the top of the ridgeline may be left in place as perching or nesting sites.

- The site of the proposed new CCCF facilities is already highly disturbed, with compacted gravel surfaces. Workers and vehicles should stay on the existing gravel and asphalt surfaces to the extent practicable.

Facility Removal from the Former Nike Missile Base Area

- Demolition of the buildings and other facilities at the former Nike missile base area and at Hodges Well is not likely to adversely affect ecological resources. Planners should minimize the disturbance in the vicinity of the compound and once the proposed actions are completed, the site should be revegetated using locally derived native species.
- Additional review would be required prior to clean-up of the asphalt piles just north of the former Nike missile base. These piles are surrounded by planted sagebrush and previous restoration areas, therefore access to the asphalt piles would require careful consideration.

Building 646

- The abandoned lab and storage building at Rattlesnake Springs can be removed with little adverse ecological impacts if workers and equipment are kept to the compacted gravel and disturbed areas. Once the demolition is completed, the area should be revegetated using locally derived native species. Removal of the power line that feeds the building would require additional ecological review.

Staging Areas

- The staging area at Gate 106 is in relatively disturbed habitat, and no significant adverse effects are expected to occur at this site. Nevertheless, planners should try to minimize the site footprint to the degree practicable. Once the proposed actions are completed, the site should be replanted with locally derived native species.

- The upper staging area is within an area that was historically disturbed, either related to the past U.S. Army activities, or to agriculture or grazing and is not included within the mapped plant community element occurrences. However, the site has been recovering for a relatively long time, and is dominated by native species with a few weedy species and functions as an intact native community. Therefore, planners should make the footprint of the site no bigger than absolutely necessary. Once the proposed actions are completed the site should be revegetated using locally derived native species. This would be an excellent site to salvage seeds and/or plant material for use in the restoration of this and other sites disturbed during the proposed actions, planners should consider incorporating plant and/or seed salvage into development plans.

General Debris Removal

Debris removal across the lower elevations of ALE may proceed by following these recommendations:

- To the extent practicable, workers should collect items by hand when possible, returning collections to the nearest road for transport.
- In cases when the materials are either too heavy to move by hand, or there are significant quantities of material far from the nearest road, workers can transport it with ATVs, or in some

cases, fat-tired vehicles to minimize damage.

- Work requiring off-road vehicles to remove items located far from existing dirt roads should be conducted when vegetation is not actively growing and when birds are not nesting. Travel on frozen surfaces is usually relatively non-damaging, but off-road driving during muddy conditions could be especially damaging.

- Debris cleanup that would require travel of vehicles off of maintained roadways or the use of other heavy equipment and/or excavation would require site specific evaluation at the time the work is scheduled. Examples include, but are not limited to, the need to take vehicles off-road to recover significant quantities of debris far from an established roadway, such as the Gate 118 ecological research area, or excavation to remove or fill cisterns or gas well facilities.

General Considerations

- No plant or animal species protected under the ESA, candidates for such protection, or species listed by the Washington State government as threatened or endangered were observed in the vicinity of the proposed site.

- In general, work conducted between July 15 and March 15 is less likely to adversely impact nesting migratory birds. To the extent practicable, work should be scheduled in that window.

- If any nesting birds (if not a nest, a pair of birds of the same species or a single bird that would not leave the area when disturbed) are encountered, or bird defensive behaviors (flying at workers, refusal to leave area, strident vocalizations) are observed during project activities, please contact M.R. Sackschewsky at 371-7187 for further consultation.

- Ground-disturbing activities, such as those associated with the use of heavy equipment, present the potential for transport, spread and increase of noxious weedy species. Off-road travel should be avoided whenever possible, and wheels and undercarriages of all vehicles should be washed to minimize transport of weed seeds.

- Consider installing a vehicle wash station at the Gate 106 staging area to collect and prevent dissemination of weed seeds from the vehicles.

- Once the actions to move the ALE fence to match the legal boundaries are clearly defined, an additional site-specific review will be required. Moving the fences is not likely to have broad adverse effects, but could have local impacts to particular rare species or sensitive habitats.

- Site restoration plans should be developed on a site-by-site basis. Sites should be recontoured to blend with the surrounding landscape, but this should also be balanced with considerations of overall site disturbance, and recontouring may be minimized if it would increase the overall area of disturbance in an area that is difficult to revegetate.

- All plant material should be native to the site being revegetated, and should be based on locally derived parent material.

- Assuming compliance with the above recommendations, no adverse impacts to protected species, priority habitats, or other ecological resources of concern are expected to result from the proposed actions.

REFERENCES

DOE-RL. 2001. Hanford Site Biological Resources Management Plan. DOE/RL 96-32 Rev. 0. U.S. Department of Energy, Richland Operations Office, Richland, Washington.
Online at http://www.pnl.gov/ecomon/Docs/brmap/BRMAP.html.

Washington Department of Fish and Wildlife. 2008a. Species of Concern in Washington State. (Web page dated June 30, 2008, Accessed May 2009) Olympia, Washington.
Online at http://wdfw.wa.gov/wlm/diversty/soc/soc.htm.

Washington Department of Fish and Wildlife. 2008b. Priority Habitat and Species List. (Web page dated August 2008, accessed May 2009), Olympia Washington.
Online at http://wdfw.wa.gov/hab/phshabs.htm.

Washington State Department of Natural Resources. 2009. Washington Natural Heritage Program Plant Ranks. (Web page dated January 2009, accessed May 2009), Olympia, Washington.
Online at http://www1.dnr.wa.gov/nhp/refdesk/lists/plantrnk.html.

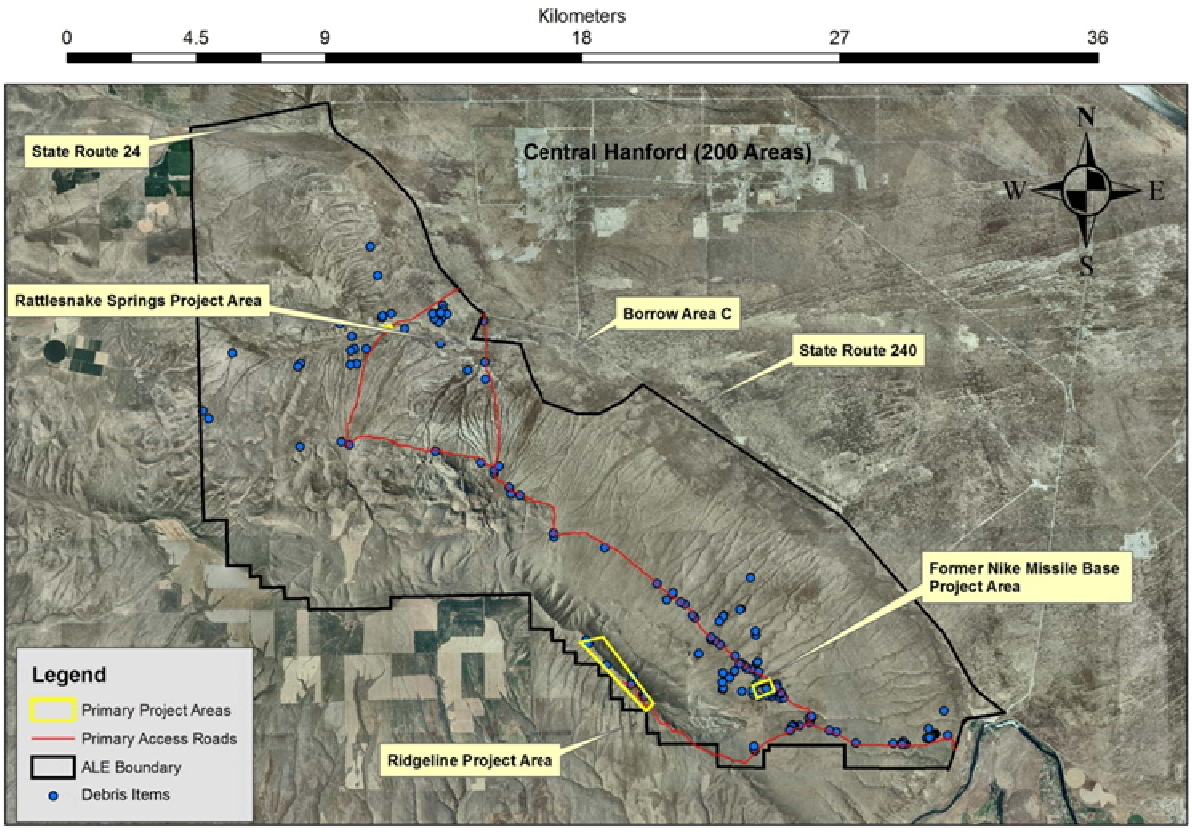

Figure 1. Three Primary Areas Targeted for Consolidation and/or Cleanup: Ridgeline Area, Former Nike Missile Base Area, and Rattlesnake Springs Area Overlaid on a 2006 Aerial Photograph

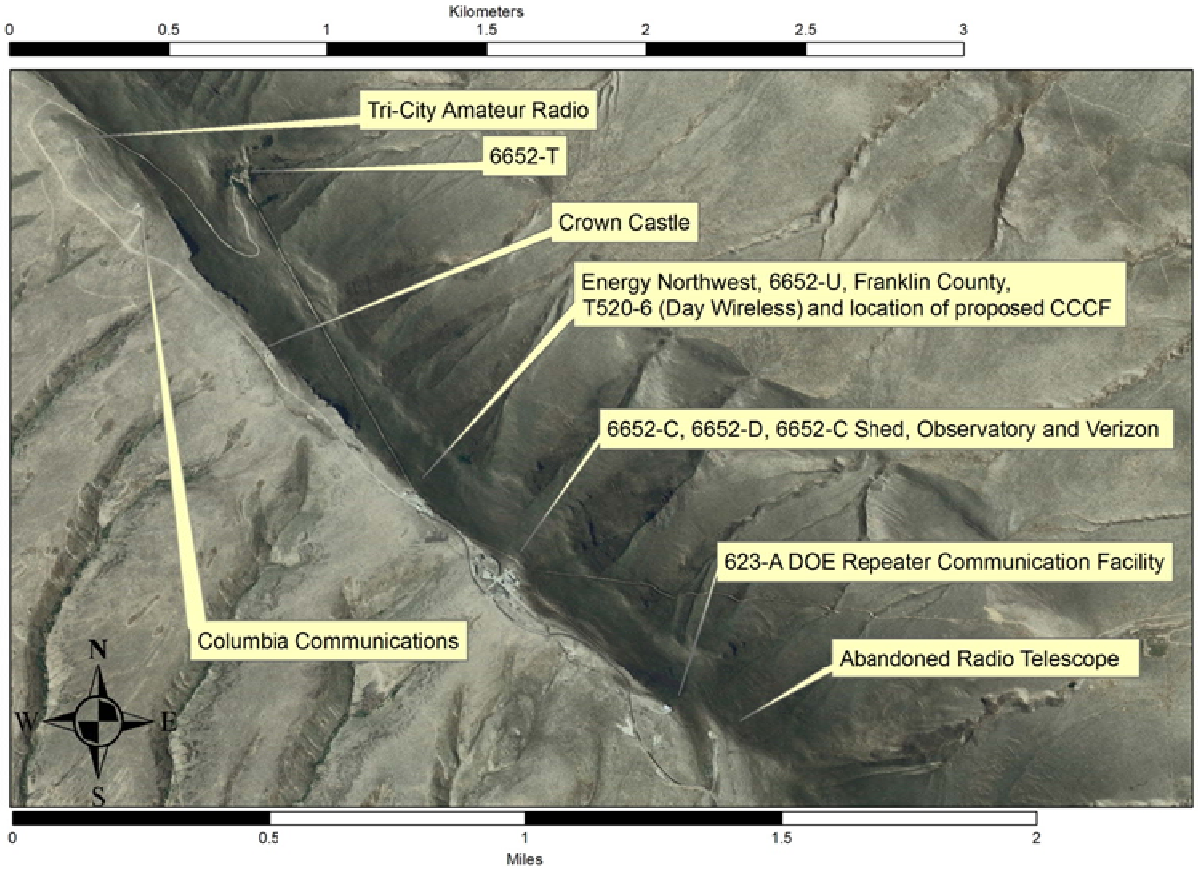

Figure 2. General Locations of the Ridgeline Facilities that Are Proposed for Demolition and the Proposed CCCF Overlaid on a 2006 Aerial Photograph.

Figure 3. Current facilities located at the former Nike missile base. USFWS buildings would not be removed.

Figure 4. The 646 Building at Rattlesnake Springs.

Appendix D

Comments on the Draft EA and DOE Responses

Appendix D: Comments on the Draft EA and DOE Responses

The *Draft Environmental Assessment for the Combined Community Communications Facility and Infrastructure Cleanup on the Fitzner/Eberhardt Arid Lands Ecology Reserve, Hanford Site, Richland, Washington* (ALE EA) was distributed for review and comment on May 28, 2009, and the formal comment period extended through June 12, 2009. The following section lists comments received by the U.S. Department of Energy (DOE) Richland Operations Office on the draft ALE EA and responses to those comments. Comments were received from the following:

- James C. Follansbee
- Pamela C. Follansbee
- L. A. Hauer
- Paul Boynton
- Riley Newman
- Eric Berg
- Ricco Bonicalzi
- Teara Farrow Ferman

James C. Follansbee, Trustee, Tri-City Amateur Radio Club, Pasco, Washington

Comments received: June 12, 2009

After reviewing the proposal to establish the Combined Community Communications Facility (CCCF) and demolish existing facilities on Rattlesnake Mountain ridge, I conclude that the damage to the environment would be greater if the project is undertaken than if no action were take at all.

I therefore support the 'No-Action Alternative' as outlined in section 5.11 of DOE/EA-1660.

Even the process of evaluating the proposal has done more damage to sites than has been done over many years of normal use. As example, look at the eleven people walking around 'Locale 7' in picture A.23. There are more people stomping on the moss than the six workers it took to erect the two towers in the first place! Please note the pristine ground cover at 'Locale 7' in pictures A.24, A.25, A.26, and A.27. The technical workers of the Tri-City Amateur Radio Club have always been extremely careful to not disturb natural cover at the site.

The ridge of Rattlesnake Mountain should be left as-is.

Thank you for the opportunity to submit comments on this Environmental Assessment.

Pamela C. Follansbee, Permanent Trustee, Tri-City Amateur Radio Club, Pasco, Washington

Comments received: June 12, 2009

Thank you for the opportunity to comment on the “Draft Environmental Assessment Combined Community Facility and Infrastructure Cleanup on the Fitzner/Eberhardt Arid Lands Ecology Reserve.”

I favor the "NO-ACTION ALTERNATIVE." It is most disturbing to contemplate the number of trucks, tractors, people, etc required to install the CCCF, to relocate the communications equipment to the CCCF, to dismantle and remove the current structures, and to rehabilitate Rattlesnake Ridge.

After studying "DOE/AE-1660" in depth, it appears that Section 3.3 "NO-ACTION ALTERNATIVE" will do the least damage to the ultra sensitive environment of Rattlesnake Ridge. Section 3.2 #2. "DOE could remove unneeded DOE structures at the base areas without implementing the communications facility and subsequent removal of other communications facilities on the ridgeline" would also leave Rattlesnake Ridge undisturbed. DOE/EA-1660 suggests that there is the potential to do more damage in the deconstruction of facilities than if the site is left alone.

The photographs depicting the current status of Rattlesnake Ridge and the projected appearance after the CCCF replaces the current communication facilities show that the current structures are barely visible. The current facilities are considerably smaller and more spread out than the CCCF.

DOE Response to comments from James C. Follansbee and Pamela C. Follansbee:
DOE is aware of the potential for damage to the sensitive environment on the ridgeline of Rattlesnake Mountain and other areas within ALE and will implement measures to minimize any potential damage to the environment during demolition and construction activities. The activities would occur within areas that have been previously disturbed, and those areas would be restored to a more natural state after the activities are completed, to the extent practicable.

Measures that could be implemented to minimize environmental damage during construction and demolition activities are discussed in Section 5.10 of the EA. For example, guyed towers on the ridgeline are detrimental to migratory birds. USFWS guidance recommends that new antennas be located within existing "antenna farms," self-supporting towers should be used rather than guyed towers, and to reduce the number of towers, providers should design new towers to accommodate multiple antennas for other users. The CCCF design incorporates all of these recommendations to minimize negative environmental impacts.

There are a number of facilities on the ridgeline that are not actively maintained. Over the past several years, the harsh environment at the ridgeline has caused numerous events such as a communications tower collapse in high winds, a roof blown off a building and sent sailing down the slope, and numerous electrical utility outages, including a high-wind event that snapped off the wooden utility poles at the base. These types of events have the potential to create safety hazards for individuals who might be in the area as well as damage to adjacent structures and to the environment. In addition, each time such an event occurs, it is necessary to mobilize heavy equipment to repair the damage. It has become increasingly expensive to continue to preserve the scattered aging utility and infrastructure on the ridgeline.

DOE's plans to clean up the Hanford Site include eventual removal of facilities that are not needed for ongoing operations, including those on ALE and the ridgeline. The proposed actions addressed in the EA would accelerate the removal of those facilities using ARRA funding.

Facility consolidation would result in a substantial improvement in appearance in the near field as well as important improvement in appearance from a distance. Consolidation of the communications facilities would also confine the impacts of ongoing activities to a much smaller area and allow the remaining parts of the ridgeline to be restored to a more natural state.

L. A. Hauer, West Richland, Washington

Comments received: June 7, 2009

1. By limiting the EA to proposed DOE activities, the EA avoids addressing all potential impacts to removing so-called "excess facilities" on Rattlesnake Ridge and within the ALE. My particular interest is the AASTA astronomical telescope, which is not addressed in the EA at all because "the owner" will be responsible for removal. This is am amazing bureaucratic sleight of hand: The impacts of removing the telescope include the expense of removing, relocating, and reinstalling equipment and infrastructire, as well as the potential for finding another suitable site. The impacts of leaving the telescope in place are not considered. The complete neglect of this important feature for the scientific community should not be

dismissed because "the owner" will deal with removal. Removal would not have been required without the DOE demand.

DOE Response: *DOE recognizes that removal of the telescope would have potential impacts on the ridgeline environment; however, removal of the telescope is not a federal activity within the definition of NEPA and is therefore not included in the scope of the EA. The owners of the telescope removed it in mid-June for relocation elsewhere.*

2. The description of conditions at the ridgeline are of a fragile environment. The proposal for demoliation using heavy equipment such as "backhoes, trackhoes, and front-end loaders" along with numerous heavy trucks to haul debris is inconsistent with the stated goal of preserving the sensitive area. How will de-construction activities be managed to minimize damage to the soil and environment without significant expense?
The activities proposed appear to be at variance with the methods proposed, and with the stated goals. Why not simply leave the buildings in place?

DOE Response: *DOE is aware of the potential for damage to the sensitive environment on the ridgeline of Rattlesnake Mountain and other areas within ALE, and would implement measures to minimize any potential damage to the environment during demolition and construction activities. Section 5.10 of the EA describes measures that could be implemented to protect the sensitive environments as required. The activities would occur within areas that have been previously disturbed, and to the extent practicable, those areas would be restored to a more natural state after the activities are completed.*

3. The several buildings now on the ridge line are proposed for demolition, but will be replaced by a new building that will be hauled up to the site. Please explain why either maintaining the present buildings or remodeling-refurbishing the present buildings would not be a suitable and less damaging alternative?

DOE Response: *There are a number of facilities on the ridgeline that are not actively maintained. Over the past several years, the harsh environment at the ridgeline has caused numerous events such as a communications tower collapse in high winds, a roof blown off a building and sent sailing down the slope, and numerous electrical utility outages, including a high-wind event that snapped off the wooden utility poles at the base. These types of events have the potential to create safety hazards for individuals who might be in the area, as well as damage to adjacent structures and to the environment. In addition, each time such an event occurs, it is necessary to mobilize heavy equipment to repair the damage. It has become increasingly expensive to continue to preserve the aging utility and communications infrastructure. The CCCF will likely be brought to the site in sections constructed offsite to minimize construction impacts on the ridgeline.*

4. The ridgeline area is identified as "an important high-elevation stopover point for migratory birds." (EA p. S-2) The ridgeline is subject to harsh weather conditions such as very high winds, the area has minimal vegetation to provide food or shelter, and there is no or minimal water source. Is there any evidence to support this assertion about the ridgeline?

DOE Response: *The designation of the ALE lands, including the ridgeline, as important areas for migratory birds was made by the Audubon Society and the State of Washington Department of Fish and Wildlife. Additional information on the importance of the ecosystems is available at the web sites for*

those organizations (http://wa.audubon.org/science_IBAWashington.html and http://wdfw.wa.gov/hab/phslist.htm). Because conditions on the ridgeline are harsh, the vegetation is very short-statured, but not necessarily "minimal." The plant cover is relatively continuous, and it provides food resources in the form of seeds and insects. It is a unique habitat that attracts some species rarely seen elsewhere on the Hanford Site. For example, the gray-crowned rosy-finch (an alpine and northern-tundra dwelling species) is seen along the Rattlesnake ridgeline during fall and spring migrations.

5. As the EA focuses only on DOE proposed demolition activities, it also avoids the subject of public access to the Rattlesnake Ridge or ALE. Wilderness areas throughout the nation provide a balance of public access with protection of natural features and wildlife. A hiking route utilizing the existing road--which will be maintained in its present primitive condition--would not further degrade conditions. It is unfortunate that no consideration of public access is part of the discussion.

DOE Response: *The Hanford Reach National Monument Comprehensive Conservation Plan and Environmental Impact Statement was prepared by the USFWS and considered a number of alternatives for future use of the Hanford Reach National Monument, including ALE. DOE participated in the preparation of that EIS as a cooperating agency. The alternative selected in the 2008 Record of Decision for that EIS includes provision for controlled public access to monument lands managed by the USFWS. That decision was made as part of a separate NEPA analysis and is not within the scope of actions considered in this EA.*

6. The evaluation of the "No-Action Alternative" (p. 45) is inadequate.
The alleged "net beneficial impacts" are minimal, despite the grand descriptions to suggest otherwise, and the potential health and safety risks of leaving the ridgeline alone appear to be far less than the proposed use of large-scale equipment and heavy trucks in the area that is described as fragile and sensitive.

6. The EA is an ingenuous exercise: by carefully limiting the question, the answer is assured. If Rattlesnake Ridge is the sensitive and fragile environment as described, then the impact of heavy equipment and numerous vehicle trips should be contra-indicated. The facts provided in the EA are not consistent with the conclusion.

Thank you for the opportunity to submit these comments.

DOE Response: *DOE acknowledges that short-term impacts to the environment might result from the proposed actions, similar to those that occurred when the facilities were installed. However, in the long-term, removing aging facilities and consolidating communication users at a single site on the ridgeline is expected to result in net beneficial impacts to the environment and reduce the areas that would be affected by ongoing operations in the future. In addition, it is likely that facility demolition in the near term would result in a lower health and safety risk to workers than might be the case if demolition occurred at a later date after the facilities have deteriorated further.*

Paul Boynton, Professor of Physics, Department of Physics, University of Washington, Seattle, Washington

Letter dated: June 11, 2009

I am responding to your invitation to comment on the Draft Environmental Assessment for the CCF and Infrastructure Cleanup on the Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE).

I write as the lead investigator of the University of Washington research team, in collaboration with Professor Riley Newman's UC Irvine team, on a series of gravitational physics experiments being conducted in building 6652L—the *Battelle Gravitation Physics Laboratory*—located on the ALE Reserve. This project has been sponsored by the National Science Foundation for the past decade and is locally facilitated by support from PNNL and the Boeing Company. Our project has been scheduled to continue until May, 2011.

The instrumentation we employ is extraordinarily sensitive to ground motion—so sensitive that our data must be acquired while no personnel are present in or near our building. The ALE Reserve site was selected through an extensive site survey process in the mid 90s that revealed it to exhibit extremely low ambient ground motion. Subsequent studies have shown it to be uniquely suited for the highly demanding requirements of this type of research. Any demolition activity within a mile or more of our site may pose a serious problem for our project. We sincerely request that demolition activity in the neighborhood of 6652L be deferred until after May, 2011. We request that:
1. Any demolition near 6652L be delayed as long as possible. In fact, we propose more critical Hanford facility demolitions along the Columbia River and in the Central Plateau be undertaken before any ALE facility demolition near 6652L begins.
2. Any demolition be concentrated in as short a time period as possible.
3. Our project be informed of scheduling decisions as early as possible with flexibility to preserve day to week long windows of non-demolition when critical measurements are being made.

Thank you for the opportunity to comment on this proposed cleanup project.

Riley Newman, Professor of Physics, School of Physical Sciences, Department of Physics and Astronomy, University of California - Irvine

Letter dated: June 10, 2009

I write in response to the invitation to comment on the Draft Environmental Assessment for the CCCF and Infrastructure Cleanup on the ALE.

I am the lead investigator of the UC Irvine team which is collaborating with Professor Paul Boynton's U. Wa. research team in a series of gravitational physics experiments in the 6652L former Nike missile bunker on the ALE reservation. This research is expected to continue until roughly May 1, 2011, at which time we are committed to having removed all equipment from 6652L.

Our instrumentation is extremely sensitive to vibration; demolition activity in the neighborhood of 6652L will be a serious problem for us. Ideally, demolition activity in the neighborhood of 6652L would be deferred until after May 1, 2011. If demolition activity in that neighborhood absolutely must be conducted before then, it would be best if:
1. demolition near 6652L could be conducted as late as possible in that time period, and
2. demolition was concentrated in as short a time period as possible.

Thank you for the opportunity to comment on this cleanup project.

Dr. Eric C. Berg, Professor of Physics, Newport Beach, California

Comments received: June 12, 2009

This letter is in response to the public comment period for the Draft Environmental Assessment CCCF and Infrastructure Cleanup on the Fitzner/Eberhardt ALE. I urge you to revise the Draft document and continue with the task at hand by scheduling the demolition within % mile of 6652L for after May 2011 or as close to that date as possible.

I have worked at 6652L for the past 8 years on ALE in the Gravitation Physics Laboratory (GPL) through the University of California Irvine. As described in the Draft document referenced above on page 22, this research is scheduled to continue through May 2011, which will conclude a roughly 15-year research program in which the NSF has invested millions of dollars.

The recent acceleration of the Hanford cleanup is an important task, and I am enthusiastically in support of it. Securing the world's largest, most hazardous, and most precarious nuclear waste ever is so much more significant than removing the old buildings at 6652L. Further, there are many ways that the proposed work around 6652L would be not only in conflict with but potentially harmful to the research task there.

Demolition of structures within M2 mile of 6652L would interrupt the research at GPL through vibrational noise as discussed on page 43 with regard to the LIGO research. It would impact the research through acoustic noise as discussed on page 42 with regard to Richland city residents. It could impede access to GPL depending on how the two staging areas discussed on page 39 are arranged. And it could generate a health hazard through dust generation in the local vicinity as discussed on page 42 with regard to persons far from the demolition. Further, the vibrational noise of demolition in such close vicinity could cause damage to the instrumentation in 6652LUGPL since that instrumentation is by design some of the world's most vibrationally-sensitive instrumentation. Again I urge you to schedule demolition of facilities witin 1/2 mile of 6652L on or after May 2011.
Sincerely,

Ricco Bonicalzi, Department of Physics, University of Washington, Seattle, Washington

Comments received: June 12, 2009

I would like to offer a comment on the Draft Assessment for the CCCF and Infrastructure Cleanup on the ALE.

I am a graduate student at the University of Washington whose thesis is based upon one of the experiments being conducted at the Battelle Gravitational Physics Laboratory in 6652L. I am acutely aware of how much work has gone into the preparation for the data we are currently in the process of acquiring. We are near the beginning of a data set that will significantly improve upon current measurements of the nature of gravity.

Demolition around 6652L as well as the human traffic involved would disrupt the data taking as the instrumentation is very sensitive to vibrations. The impact on the plan to reach our design goal by the end of our contract in May 2011 would be serious. I hope that such demolition can be avoided or at least minimized as much as possible in these last two years of our project when a quiet environment is so critical.

DOE Response to comments from Paul Boynton, Riley Newman, Eric Berg, and Ricco Bonicalzi: *DOE is aware that the instrumentation in 6652-L is sensitive to ground motion; however, time constraints involved with ARRA funding make it necessary to begin the proposed activities immediately and complete them within a relatively short period of time. Cleanup activities at other parts of the Hanford Site are also being accelerated.*

DOE will attempt to minimize impacts to your project to the extent practicable. To that end, DOE proposes to discuss the cleanup activities with you with a goal of minimizing impacts to your research and instrumentation. At a minimum, DOE will keep you informed of scheduling decisions as early as possible and will try to conduct the demolition activities at the former Nike missile area as quickly as possible to minimize impacts to the gravitational physics research.

Teara Farrow Ferman, Program Manager, Cultural Resources Protection Program, Confederated Tribes of the Umatilla Indian Reservation, Pendleton, Oregon

Comments received: June 22, 2009

Confederated Tribes
of the
Umatilla Indian Reservation
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Cultural Resources Protection Program
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June 17, 2009

Boyd Hathaway
U.S. Department of Energy
Richland Operations Office
P.O. Box 550, A2-15
Richland, WA 99352

COMMENTS ON THE DRAFT EA FOR THE CCCF AND INFRASTRUCTURE CLEANUP ON THE ALE

Dear Mr. Hathaway,

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Cultural Resources Protection Program (CRPP) has reviewed the *Draft Environmental Assessment for the Combined Community Communications Facility (CCCF) and Infrastructure Cleanup on the Fitzner/Eberhardt Arid Lands Ecology (ALE) Reserve, Hanford Site, Richland, Washington,* the corresponding Cultural Resources Review (CRR), and the Memorandum of Agreement (MOA) distributed electronically May 28, 2009. We did not receive the hard copy until June 2, 2009, and apologize for being a few days late in commenting: a 15-day review period is extremely short. Typically at least 30 days is allocated for comments on documents like this.

First, we want to commend DOE-RL for putting a huge effort into the clean-up of Laliik (Rattlesnake Mountain), proposing to remove the facilities and infrastructure no longer needed on the ridgeline and at the base. We hope that someday the Mountain will be completely free of man-made structures, but until then, we support the new CCCF that Energy Northwest and DOE are proposing to build on the ridgeline.

The CRPP agrees with DOE-RL's finding that even though reducing the footprint on ALE by removing most of the existing facilities, infrastructure, and miscellaneous debris and by restoring the area to its natural condition will result in a positive effect, there will also be an adverse effect on cultural resources created by the project on Laliik and on the former Nike Missile 6652 Building Complex.

DOE will be mitigating the adverse effects of the project activities by developing and implementing a MOA in consultation with tribal technical staff. We generally agree with the MOA, except for some outstanding issues that we address below.

The first issue is that the Tribes have been denied signatory status for this Agreement, just as it has in the past regarding projects proposed on Traditional Cultural Properties and sacred sites. RL has withheld this status for reasons we do not understand. We brought this to the attention of Mr. Doug Shoop May 4, 2009, at a technical consultation meeting. Mr. Shoop replied that if Tribes could provide examples of MOAs where Tribes were invited signatories, he would try again to move this forward. The CRPP provided several agreements but the current draft MOA does not reflect this change. Please correct this omission and include the tribes as a signatory rather than concurring party as was requested.

The second concern is that the CRPP feels that on-going activities of the CCCF for the extent of time that they will be on the Mountain will adversely effect the local environment. In terms of mitigation for these activities, the CRPP would recommend annual pedestrian surveys conducted on ALE. In the CTUIR Hanford Policy, we state that we would like to see a 100% cultural resources survey of the Hanford site and ALE would be a good start. The CRPP proposes that a certain amount of money be set aside by Energy Northwest each year for Tribes and PNNL to conduct NHPA Section 110 surveys of ALE. This would not only help fulfill our obligation to Hanford resources but also complete mitigation responsibilities for on-going activities of the CCCF.

The third concern is with the 1996 Programmatic Agreement (PA) between DOE and the Advisory Council of Historic Preservation and the Washington State Historic Preservation Office, *For The Maintenance, Deactivation, Alteration, and Demolition of the Built Environment on the Hanford Site, Washington*. That document expired without DOE completing the agreed to actions. It needs to be updated and rewritten so it can be used to address new situations. You will recall that the entire Hanford Construction Camp fiasco originated because the cleanup contractor misinterpreted the PA, which actually had expired anyway. This Treatment Plan produced as part of the PA calls for a comprehensive final report on the history of events and processes that qualify the Hanford Site for inclusion in the National Register of Historic Places. The second appendix to that report states that a Historic American Engineering records (HAER) will be written for the 105-B Reactor, the 221-T Plant, and the 313 Metal Fuels Fabrication Facility. We have found the B Reactor, Richland vicinity, Benton County, WA, listed in the Library of Congress but, T-Plant and the 313 Facility HAER documents are not listed. It does not appear that they were completed and submitted to the National Park Service (NPS) as required by the Treatment Plan.

If these HAER documents were completed and accepted by NPS then please provide the documentation. If they were not completed and accepted by the NPS, then the

mitigation has not been completed for the built environment at Hanford and therefore the NIKE buildings on ALE should not be considered mitigated.

In support of the CCCF project, the CTUIR CRPP recommends a statement be included in the MOA stating that the two missing HAER documents will be completed and sent into NPS within 6 months after signing of the CCCF MOA.

Finally, the CRPP does not recommend that the EA is signed until the MOA is signed. This recommendation is based on the history that DOE has with the 1100 Area Transfer of Land to the Port of Benton that occurred without a signed MOA. It is ten years later and the MOA still remains unsigned.

These are the CRPP comments and we look forward to further consultation with you on the decision regarding the need for an EIS.

If you have any questions, please contact Audie Huber, Intergovernmental Affairs Manager at (541) 276-3447 or Julie Longenecker, Hanford Coordinator in our Richland office at (509) 371-0643.

Respectfully,

Teara Farrow Ferman

Teara Farrow Ferman
Program Manager, CRPP

Cc:
Annabelle Rodriguez, DOE
Steve Weil, DOE
Doug Shoop, DOE
Kim Ballinger, DOE
Rob Whitlam, DAHP
Vera Sonneck, NPT
Russell Jim, YN
Rex Buck, Wanapum
Shawn Steinmetz, CTUIR-CRPP
Julie Longenecker, CTUIR-CRPP
Audie Huber, CTUIR-DNR
Stuart Harris, CTUIR-DOSE

DOE Response to comments from Teara Farrow Ferman:

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

JUL 20 2009

09-ISI-0092

Teara Farrow Ferman, Manager
Cultural Resource Protection Program
Confederated Tribes of the
Umatilla Indian Reservation
P.O. Box 638
Pendleton, Oregon 97801

Dear Ms. Farrow Ferman:

RESPONSE TO COMMENTS ON THE MEMORANDUM OF AGREEMENT, 600 AREA, HANFORD SITE

The U.S. Department of Energy, Richland Operations Office (RL) is in receipt of your letter dated June 17, 2009, which submitted comments on the Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE) Environmental Assessment (EA), and the Memorandum of Agreement (MOA) included in Appendix B. This letter is specifically responding to your comments concerning the MOA.

First we would like to thank Ms. Julie Longenecker of your staff for working collaboratively with RL on the review of the draft cultural resource review on May 5, 2009, and also the review of the MOA on May 14, 2009. We also thank you for obtaining sample agreements in regard to Tribes being signatory to the MOA and for your support of the Combined Community Communications Facility and Infrastructure Cleanup on ALE.

In regard to the request for signatory status on the MOA, RL reviewed several agreements for the subject project. RL's decision remains the same for the Tribes to be concurring parties on the MOA.

Thank you for the recommendation regarding Section 110 surveys of the Hanford Site and ALE. RL intends to comply with procedures for management and protection of cultural resources.

With regards to your concern on the Programmatic Agreement (PA) for the Maintenance, Deactivation, Alteration, and Demolition of the Built Environment, in coordination with the Washington State Department of Archaeology and Historic Preservation and the Advisory Council on Historic Preservation, RL plans to review the PA in the near future to determine what sections may need to be revised, if any. RL continues to rely on the work performed under the PA, and continues to perform mitigation.

Communication has taken place with the National Park Service staff and RL Cultural Resource Program staff on the draft Historic American Engineering Documents (HAER) for the 221-T Plant and the 313 Metal Fuels Fabrication Facility. Your office will be notified when the documents have been finalized. RL does not plan to revise the MOA because these additional documents are being finalized under the Treatment Plan prepared for the aforementioned PA.

Ms. Farrow Ferman -2-
09-ISI-0092

At this time the MOA is on the same schedule to be signed by RL as the Finding of No Significant Impact (FONSI) for the EA. Upon the signing of the MOA by the RL Manager, it will be transmitted to the Washington Department of Archaeology and Historic Preservation for their signature and to Tribes for concurrence. The Advisory Council on Historic Preservation has replied that they do not plan to be a signatory on the MOA.

As discussed in previous meetings with Ms. Longenecker, the ALE cleanup will be conducted with American Recovery and Reinvestment Act funds, which require that funds be spent within the next few years. Given the extreme climate and sensitive environment on ALE, work must begin during the summer of 2009 to take advantage of suitable working conditions.

Thank you for your comments and I look forward to working with you and your staff on this project. If you have questions, please contact me on (509) 376-7340.

Sincerely

H. Boyd Hathaway

H. Boyd Hathaway
Realty Officer

cc: S. Harris, CTUIR
R. Rhoades, PNNL
J. Longenecker, CTUIR
R. S. Weeks, PNNL
R. Whitlam, DAHP

Appendix E

Finding of No Significant Impact for the Combined Community Communications Facility and Infrastructure Cleanup on the Fitzner/Eberhardt Arid Lands Ecology Reserve, Hanford Site, Richland, Washington

FINDING OF NO SIGNIFICANT IMPACT FOR THE COMBINED COMMUNITY COMMUNICATIONS FACILITY AND INFRASTRUCTURE CLEANUP ON THE FITZNER/EBERHARDT ARID LANDS ECOLOGY RESERVE, HANFORD SITE, RICHLAND, WASHINGTON (DOE/EA-1660)

AGENCY: U.S. Department of Energy, Richland Operations Office

ACTION: Finding of No Significant Impact

SUMMARY: The U.S. Department of Energy (DOE) has prepared an Environmental Assessment (EA), DOE/EA-1660, to assess the environmental impacts associated with consolidating existing communications operations and removing excess facilities and infrastructure within the Fitzner/Eberhardt Arid Lands Ecology Reserve (ALE), located on the Hanford Site in Benton County, Richland, Washington. The proposed actions analyzed in the EA are within the scope of the forthcoming Draft Tank Closure and Waste Management (TC&WM) Environmental Impact Statement (EIS) and are referred to as "interim actions." DOE prepared this interim action EA before completing the TC&WM EIS process to take advantage of opportunities to accelerate remediation actions and reduce the physical footprint on ALE, thus improving the landscape and minimizing impacts to existing cultural and biological resources. Implementation of the proposed actions evaluated in this EA will not prejudice decisions to be made under the TC&WM EIS or limit DOE's choices from among the alternatives evaluated in the EIS.

Based on the analyses of potential environmental impacts in the final EA and considering the public comments received on the draft EA, DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment within the meaning of the "National Environmental Policy Act of 1969" (NEPA), 42 U.S.C. 4321, et seq. Therefore, the preparation of an EIS is not required.

PROPOSED ACTION: DOE proposes to remove most facilities on ALE, except those needed for ongoing operations by DOE and the U.S. Fish and Wildlife Service (USFWS) as well as communications equipment currently used by local governments and other organizations. Existing communications capabilities would be consolidated into a single facility on the ridgeline, consisting of an equipment building and two towers to support multiple antennas and radio repeaters. In addition, DOE would remove miscellaneous debris that is located across ALE from past activities, move an access gate to enhance security, and repair the ALE boundary fence as necessary.

The habitat at ALE has been protected since the 1940s, and since 2000, it has been included in the Hanford Reach National Monument, portions of which are managed by the USFWS. Four

major areas within ALE are the subject of proposed actions in the EA: 1) an area along the ridgeline of Rattlesnake Mountain, 2) the former Nike missile site at the northeastern base of the mountain, 3) the Rattlesnake Springs area near the northwestern base of the mountain, and 4) other areas within ALE between the former Nike missile site and the springs where various types of debris remain from previous uses.

Combined Community Communications Facility: DOE's proposed action would support continued communications operations on the Rattlesnake Mountain ridgeline by consolidating and co-locating services to reduce the number of facilities and overall footprint, lessening both the visual impact and the impact of people on the sensitive habitat on the ridgeline. The consolidated facility would consist of two towers and a maintenance and operations building. One existing 100-foot tower would be extended by 20 feet, and a new 180-foot tower would be constructed near the first tower. This facility would serve the needs of the existing communications tenants on the ridgeline, allowing the removal of six existing towers and associated support buildings from the ridgeline. The access road to the ridgeline would be maintained to continue to provide access for the communications tenants.

Facility Demolition: In addition to removing communications facilities from the ridgeline, DOE proposes to demolish most of the DOE buildings located at the former Nike missile site area, on the ridgeline, and at the Rattlesnake Springs area. The buildings to be removed total about 4580 m^2 (49,400 ft^2). Several still-serviceable structures would remain in place for use by the USFWS in management of the National Monument.

Cleanup of Debris: There are a number of abandoned miscellaneous items scattered across ALE. Examples include fence posts, coiled wire cable and barbed wire, conduit, rusted metal buckets and barrels, broken bricks, chunks of concrete, boards, and wooden posts. These items would be collected and disposed of in a manner that minimizes environmental impacts.

ALTERNATIVES: DOE considered several alternatives for the provision of communications capability, including the alternative of No Action as required by NEPA.

No-Action Alternative. The No-Action Alternative consists of not constructing a Combined Community Communications Facility. Instead, communications users would continue to use the seven towers and associated facilities currently located on the ridgeline and continue to maintain and operate the towers as necessary for emergency management and commercial communications requirements. The access road to the ridgeline would continue to be maintained to allow users to access and maintain the communications equipment.

The unneeded DOE facilities would remain in place with little ongoing maintenance. The boundary fence would continue to degrade in places and debris located across ALE would be left in place.

Other Alternatives. DOE considered whether the communications facilities could be moved to another promontory in the region. Although this alternative is not within the scope of DOE's authority, Energy Northwest prepared a study to evaluate the possibility of moving the communications towers currently located on the ridgeline to another location within Benton or Franklin Counties.

Based on this study, although some individual communications providers could potentially re-locate to other promontories, it was determined that no location exists in Benton or Franklin Counties that could provide the broad level of coverage for all users currently provided at the Rattlesnake Mountain ridgeline.

ENVIRONMENTAL IMPACTS: The EA presents an evaluation of environmental impacts, including impacts on land use, air quality, water quality, geological resources, ecological resources, floodplains and wetlands, cultural and historic resources, socioeconomics, environmental justice, resource commitments, transportation, waste management and pollution prevention, noise, and human health and safety. Cumulative impacts with other past, present, and reasonably foreseeable operations in the vicinity were also considered.

Environmental impacts associated with construction of the Combined Community Communications Facility are expected to be similar to those for any facility of comparable size. The facility would be compatible with existing land-use designations established by DOE. Resources required for construction consist of commonly available materials and fuels that are not unique or in short supply, and the labor required represents a small fraction of the local market. Consolidation of existing communications facilities to a smaller footprint is expected to have a net positive effect on visual resources in the near field.

The proposed demolition and cleanup activities would take place in areas associated with existing facilities and debris, which are largely sites that have been disturbed at some time in the past, although some have remained undisturbed for several decades. Activities in these areas, therefore, present the opportunity for disruption of ecological resources that have become established in the interim, or for discovery of cultural and historic sites that were previously unrecognized.

The proposed demolition and cleanup sites are not currently known to contain sensitive ecological resources or critical habitats that would be affected by the proposed activities. Restoration of previously disturbed areas would have a beneficial effect on ecological resources and habitats, and removal of unused facilities and debris is expected to have a net positive effect on visual resources in the near field.

Management of known cultural and historic resources, as well as any discovered during construction and cleanup activities, would be in accordance with regulatory requirements and agreements among DOE and other responsible agencies or parties, including the MOA in

Appendix B to the EA, which is being completed after considering comments and input received from members of the public and area tribes on this EA.

Health and safety risks to workers and members of the public from construction and cleanup activities are projected to be small, although the environment in the ridgeline area presents some unique hazards (such as adverse weather and road conditions) that are not normally present at other Hanford cleanup sites. The proposed activities might have short-term impacts on local traffic and noise levels, and temporary impacts on air quality could also occur. However, because of the remoteness of these activities from occupied areas, they would be unlikely to exceed regulatory standards for noise levels or for air concentrations of criteria pollutants and particulates. Effluents and wastes generated during demolition and cleanup would be minimized to the extent practicable and would be managed using existing facilities.

Operational impacts are expected to be minimal, consisting of occasional use of the consolidated communications facility by communications providers and access for road maintenance. The workforce would remain at about current levels, resulting in little, if any, incremental impact on community infrastructure, socioeconomic, or transportation resources. Because the impacts from facility operations are projected to be small in all cases and due to the remote location, there would be no opportunity for both high and disproportionate adverse impacts on minority or low-income populations, nor would noticeable cumulative impacts in combination with other ongoing operations in the region be expected.

Mitigation of Environmental Impacts. Mitigation of potential environmental impacts associated with construction of the combined community communications facility and cleanup activities would take place as required by existing regulations, agreements, and policies. Restoration of disturbed areas would return them to a more natural state, and cultural and historic resources would be managed in consultation with the State Department of Archaeology & Historic Preservation and Tribal Nations. To that end and pursuant to Section 106 of the National Historic Preservation Act (NHPA), DOE plans to finalize the Memorandum of Agreement (MOA) (included in Appendix B of the Final EA) with the Washington State Historic Preservation Officer and concurring parties, including the Confederated Tribes and Bands of the Yakama Nation, Confederated Tribes of the Umatilla Indian Reservation, the Nez Perce Tribe, and the Wanapum. The stipulations in the MOA are included to address the potential adverse effects from the proposed actions on historic and cultural properties, as discussed in the MOA as well as in the underlying cultural resources review (also included in Appendix B of the Final EA). Potential impacts to ecological resources (as discussed in the ecological resources review included in Appendix C of the Final EA) will also be appropriately mitigated and managed consistent with existing Hanford Site plans and procedures, including the Biological Resources Management Plan. Any potential health and safety risks encountered while implementing the proposed action would be managed in accordance with existing Hanford Site health and safety policies and procedures, with special measures taken as necessary to reduce the risks from working in the unique environment within ALE.

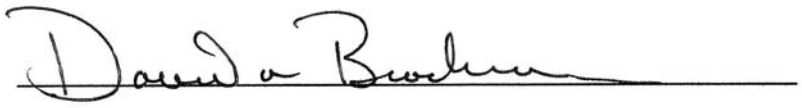
NEPA SIGNIFICANCE CRITERIA: Based on the analyses in the EA, as summarized in the previous section, the proposed action would not have a significant effect on the human environment within the meaning of NEPA. The term "significantly" and the significance criteria are defined by the Council on Environmental Quality Regulations for implementing NEPA at 40 Code of Federal Regulations (CFR) Part 1508.27, as listed below.

1) Beneficial and adverse impacts [40 CFR Section 1508.27(b)(l)]: The analysis indicates that there will be no significant impacts from implementing the proposed action; restoration of previously disturbed areas would have a beneficial effect on ecological resources and habitats; and removal of unused facilities and debris is expected to have a net positive effect on visual resources in the near field (Section 5.0).
2) Public health and safety [40 CFR Section 1508.27(b)(2)]: The analysis indicates emissions of radiological and hazardous contaminates would be small and would not be expected to significantly affect public health (Section 5.5). Removal and disposal of potential low levels of radioactive waste from the areas considered in this EA are unlikely to result in any measureable radiation exposure to workers or members of the public.
3) Unique characteristics of the geographical area [40 CFR Section 1508.27(b)(3)]: Implementing the proposed action is intended to improve the unique characteristics of the areas. While short-term impacts to sensitive ecological resources may occur, the proposed action would ultimately reduce the footprint of affected areas, which could be viewed as having an overall net beneficial effect.
4) Degree to which effects on the quality of the human environment are likely to become highly controversial [40 CFR Section 1508.27(b)(4)]: The analysis in the EA indicates that implementing the proposed action will not result in significant effects on the quality of the human environment. The extent of public comments received on the draft EA indicate that while the selected action is of some concern, it is not highly controversial.
5) Uncertain or unknown risks on the human environment [40 CFR Section 1508.27(b)(5)]: There are no uncertain risks associated with implementing the proposed action.
6) Precedent for future actions [40 CFR Section 1508.27(b)(6)]: The proposed action does not set a precedent for future actions.
7) Cumulatively significant impacts [40 CFR Section 1508.27(b)(7)]: The analysis in the EA has not identified any significant cumulative impacts associated with implementing the proposed action (Section 5.9).
8) Effect on cultural or historical resources [40 CFR Section 1508.27(b)(8)]: The portion of Rattlesnake Mountain under DOE jurisdiction and control has been determined to be a National Register-eligible Traditional Cultural Property and contains historic properties as defined under the NHPA. The consolidation of communication facilities and removal of unneeded buildings and infrastructure from ALE would reduce the footprint of affected areas, which could be viewed as having a net beneficial effect on the overall spiritual qualities and visual and natural setting.

9) Effect on threatened or endangered species or critical habitat [40 CFR Section 1508.27 (b)(9)1]: The proposed action would not have an effect on threatened or endangered species or critical habitat (Section 5.3). While short-term impacts to ecological resources may occur, the selected action would reduce the footprint of affected areas, which could be viewed as having a net overall beneficial effect.
10) Violation of Federal, State, or Local law [40 CFR Section 1508.27 (b)(10)]: The selected actions would not violate any Federal, state, or local laws (Section 6.0).

DETERMINATION: Based on the analyses of potential environmental impacts in the final EA and considering the public comments received on the draft EA, DOE concludes that the proposed action to reduce the impacts of people and infrastructure on ALE does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of NEPA. Therefore, an EIS for the proposed action is not required. With this determination, DOE can proceed with construction of the combined community communications facility, demolition of unneeded structures, and cleanup of abandoned debris at ALE.

Issued in Richland, Washington, this 20th **day of** July **, 2009.**



David A. Brockman

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AVAILABILITY OF EA AND FURTHER INFORMATION:

The **EA (DOE/EA- 1660)** is available at the **DOE** Public Reading Room, Consolidated Information Center at Washington State University-Tri-Cities, and may be accessed electronically at: http://www.hanford.gov/rl/?page=86&parent=52.

Requests for single copies of the EA or other related information may be referred to:

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Further information regarding the DOE NEPA process is available from:

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