SIGURD TO RED BUTTE No. 2
345kV TRANSMISSION LINE PROJECT

PRELIMINARY PLAN OF DEVELOPMENT

Submitted to:

United States Department of the Interior
Bureau of Land Management

United States Department of Agriculture
Forest Service

Submitted by:

PacifiCorp
(dba Rocky Mountain Power)

Revised
February 2010

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Appendices that may be included in the final Plan of Development:

Emergency Preparedness and Response Plan Guidelines
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Right-of-Way Preparation, Rehabilitation, and Restoration Plan
Blasting Plan Methodology
Hazardous Materials Management Plan
Biological Protection Plan
Other Special Resource Considerations and Mitigation Measures
Paleontological Resources Literature Review and Treatment Plan
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LIST OF ACRONYMS

AC	Alternating current
ACSR	Aluminum core steel reinforced
BLM	Bureau of Land Management
CIC	Construction, inspection, and compliance contractor
kcmil	Thousand circular mil
kV	Kilovolt(s)
MW	Megawatt(s)
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
OPGW	Optical ground wire
POD	Plan of Development
ROW	Right-of-way
U.S.	United States
USFWS	U.S. Fish and Wildlife Service
WECC	Western Electricity Coordinating Council

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1.0 INTRODUCTION

PacifiCorp (dba Rocky Mountain Power) is submitting this preliminary Plan of Development (POD) to the Bureau of Land Management (BLM) and U.S. Forest Service (Forest Service), along with a Standard Form 299 federal application for permanent facility ROWs for the construction, operation, and maintenance of a proposed single-circuit 345 kilovolt (kV) transmission line that would extend between the Sigurd Substation, located approximately 6 miles northeast of the City of Richfield in Sevier County, Utah, to the Red Butte Substation, located west of State Route 18 and the town of Central in Washington County, Utah (Figure 1-1). This project is referred to as the Sigurd to Red Butte No. 2 – 345kV Transmission Line Project (Project).

The Project has an in-service date of June 1, 2014. To the maximum extent feasible, the new transmission line will be located in association with federally designated utility corridors and/or parallel to existing transmission facilities and other linear facilities. The proposed permanent ROW being requested will be up to 150 feet wide, maintaining a separation from other existing extra-high voltage transmission lines as required (separation distance from existing transmission lines is dependent upon location and voltage of existing lines, among other factors). The final length of the proposed transmission line route will be determined through the National Environmental Policy Act (NEPA) process but is expected to be approximately 160 miles. Alternative routes that are being considered at this time are illustrated in Figure 1-1. Final specifications for the proposed transmission line and substation facilities will be determined upon further engineering and design studies.

A lease-term of 50 years will be requested to construct, operate, and maintain the transmission line and structures. Specific acreages associated with permanently and temporarily disturbed areas, including access roads, work areas, etc., will be determined through future engineering and environmental studies. Once constructed, the Project will be in operation year-round, 24 hours a day transporting electrical power to southwestern Utah. Maintenance activities will be scheduled and coordinated with other facilities to avoid service interruptions to customers served by the transmission line.

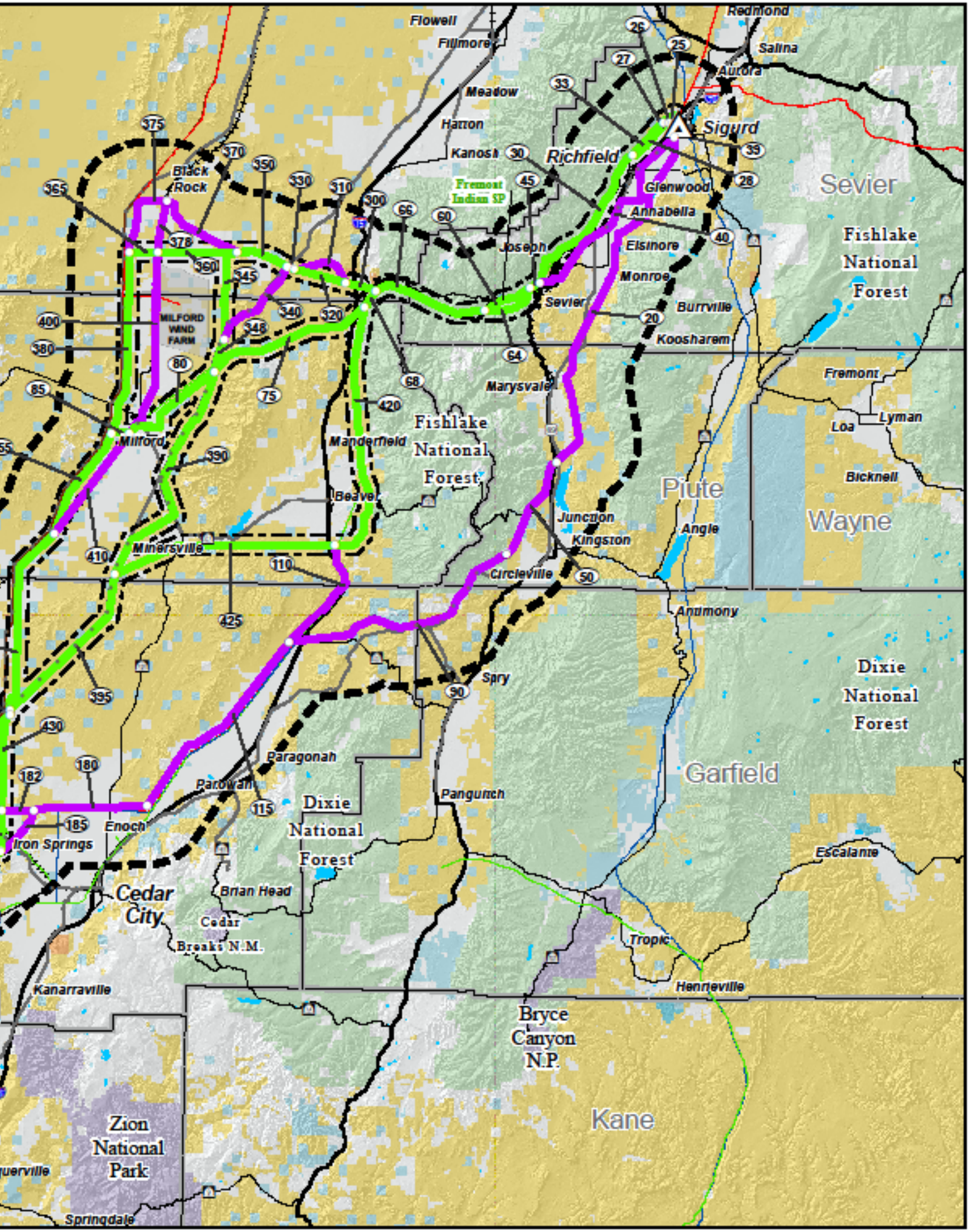
The duration of construction activities is dependent partially on the timing of project authorization, but in general, the entire construction period could last as much as 30 months, of which up to 16 months is anticipated for heavy construction activities associated with the proposed transmission line and substation interconnections. Construction would consist of the following new or expanded facilities:

- approximately 160 miles of single-circuit 345kV overhead transmission line from the Sigurd Substation to the Red Butte Substation (length dependent upon alternative selected)
- new substation equipment at the existing Sigurd and Red Butte substations within the existing substations
- construction and operation of new or improved roads to each structure along the 345kV transmission line
- temporary work areas associated with construction activities

Detailed environmental studies, engineering refinement studies, and field review/surveys are required for the proposed and alternative transmission line routes to be evaluated during the NEPA process. PacifiCorp has developed this preliminary POD to reflect initial engineering, design, and environmental mitigation and protection measures associated with the Project. In the future, this document will be organized and updated to contain the final characterization of the Project (e.g., construction, operation, and maintenance specifications, and disturbance calculations) and the approved mitigation measures and stipulations developed during permitting studies.

The preliminary POD includes the following sections:

- Section 1 – Introduction
- Section 2 – Purpose and Need
- Section 3 – Project Description
- Section 4 – Operation and Maintenance
- Section 5 – Mitigation of Environmental Concern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Circleville
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Milford
Manderfield
Beaver
Minersville
Spry
Dixie National Forest
Garfield
Paragonah
Parowan
Panguitch
Enoch
Iron Springs
Cedar City
Brian Head
Cedar Breaks N.M.
Escalante
Tropic
Henrieville
Kanarraville
Bryce Canyon N.P.
Kane
Zion National Park
Springdale

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2.0 PURPOSE AND NEED

PacifiCorp needs to increase the bi-directional transfer capability of its southwest Utah transmission system from 300 megawatts (MW) to 600 MW by 2014. The purpose and need for the Project is summarized below.

2.1 NEED AS A REGULATED UTILITY

As a regulated utility, PacifiCorp has a responsibility to provide its customers with safe, reliable, and adequate transmission capacity to meet short-term and long-term load growth via connection to generation resources and through access to energy markets. The purpose of the proposed Project is to develop a transmission facility that enables PacifiCorp to meet the forecasted electrical demands of customers by 2014.

2.2 NEED TO IMPROVE CAPACITY

The full rated capacity of the southwest Utah electrical system, including the existing 345kV transmission line (Sigurd to Red Butte No. 1), is expected to be exceeded by 2014. At that time, load growth in southwestern Utah will surpass the capability of the existing transmission system and new facilities must be constructed to provide reliable capacity for load service. PacifiCorp proposes to augment the existing transmission system's capacity to meet the projected load demand of southwest Utah. In addition, under its Open Access Transmission Tariff, PacifiCorp has transmission service contract obligations for firm transmission service into and out of southwest Utah. PacifiCorp needs additional transfer capacity between Sigurd and Red Butte to meet its contracted transmission obligations by 2014. PacifiCorp proposes to meet this need by increasing the rated capacity of the southwest Utah system to accommodate the need for regional power transfers as well as local load (i.e., electrical demand within PacifiCorp's service territory).

2.3 NEED TO PROVIDE RELIABLE TRANSMISSION

Transmission systems in the United States must be planned, operated, and maintained under North American Electrical Reliability Corporation (NERC) reliability standards. PacifiCorp is governed by the Western Electricity Coordinating Council (WECC), a regional council of NERC, the standards of which may be more stringent than those required by NERC. In compliance with these standards, transmission systems must be built with sufficient levels of redundancy to enable the transmission system to reliably operate in the event of loss or outage of the system elements (i.e., transmission line segment or substation element). In planning new transmission lines, NERC/WECC transmission planning criteria require consideration of existing lines, the load they serve, interconnection with the wider grid, and the remaining capacity of the rest of the grid to operate reliably if co-located lines fail at the same time resulting in multiple line outage. Therefore, to ensure PacifiCorp's ability to reliably serve present and future loads, a new transmission line needs to be designed such that it meets NERC/WECC's planning and reliability criteria in such a manner that it will receive an adequate capacity-rating to meet the needs of PacifiCorp's customers.

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3.0 PROJECT DESCRIPTION

3.1 RIGHT-OF-WAY

The proposed transmission line would consist of a single-circuit 345kV transmission line from the existing Sigurd Substation to the existing Red Butte Substation. The line would be approximately 160 miles long and would require a ROW width of approximately 150 feet. Permanent facilities would be located in the ROW to the extent possible. Other facilities outside the ROW may include access roads, regeneration sites, and temporary work areas. The transmission line would operate year-round and on a daily basis, 24 hours a day.

New permanent and temporary land rights would be required for the Project, such as the transmission line ROW, access roads, and temporary work sites, and would be obtained by PacifiCorp.

The ROW would cross several administrative jurisdictions, including the BLM, the Forest Service, and state lands, as well as private lands.

The Project may require crossing of other electrical transmission lines, U.S. and state highways, and other utilities. Applications for permits, licenses, or ROWs for these crossings would be submitted to the appropriate entities for approval prior to initiating construction. In these areas, safety precautions would be taken to ensure that there are no conflicts with continued use of these existing facilities.

3.2 TRANSMISSION STRUCTURES

3.2.1 Transmission Line Support Structures

The transmission line circuit would typically be supported by single-circuit steel H-frame structures at tangent locations. Structures located at points where the line terminates or changes direction abruptly (deadends) would typically be lattice steel towers. Both the H-frame tangent structures and lattice tower deadends would typically be 80 to 140 feet in height above ground (Figure 3-1). Spacing between structures would typically be between 800 and 1,200 feet, or five to seven structures per mile. In some situations, taller structures or longer spans may be required.

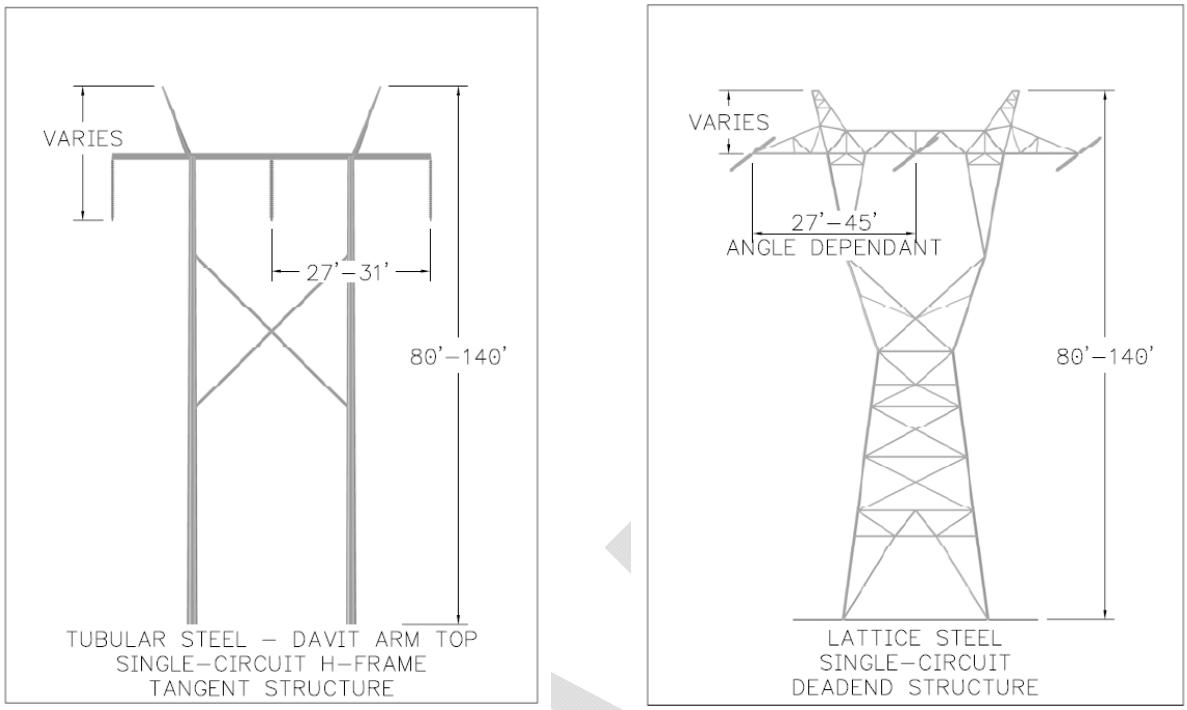

Figure 3-1 Typical Single-circuit 345kV Structure Types

In some cases, alternative structure types would be used to mitigate specific route segment design needs. These other potential alternative structures, which would be used only when conditions warrant, are shown in Figure 3-2. The design of the structures may vary depending on engineering requirements and/or mitigation prescribed. The exact height of each structure would be governed by topography and safety requirements for conductor clearance.

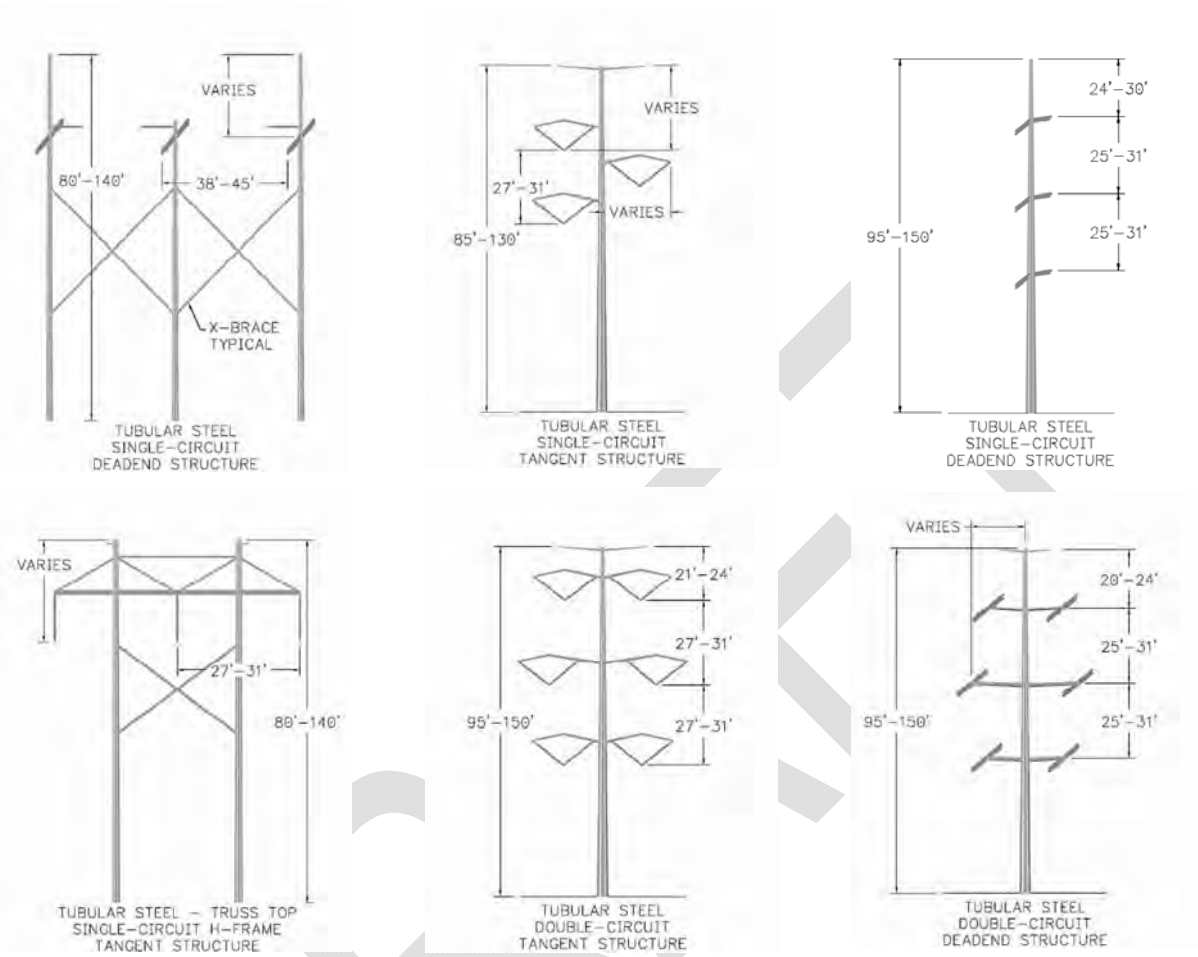

Figure 3-2 Alternative 345kV Structure Types

The design, construction, operation, and maintenance of the Project will meet or exceed the requirements of the National Electrical Safety Code (NESC), U.S. Department of Labor, Occupational Safety and Health Standards, and PacifiCorp's requirements for safety and protection of landowners and their property. Typical design characteristics of the transmission

TABLE 3-1
TYPICAL DESIGN CHARACTERISTICS OF THE 345KV TRANSMISSION LINE

Feature	Description
Line length (approximate miles)	150 to 160
Types of structures	Tangent, steel H-frame structures Angle/deadend, steel lattice structures
Structure height (feet)	80 to 140
Span length (feet)	Typically 800 to1,200
Structures per mile	5 to 7
Right-of-way width (feet)	150
Land Temporarily Disturbed	
Structure work area	150 x 200 feet per structure
Wire-pulling sites	150 x 750 feet per 2 to 4 miles

TABLE 3-1 TYPICAL DESIGN CHARACTERISTICS OF THE 345KV TRANSMISSION LINE	
Feature	**Description**
Wire-tensioning sites	150 x 750 feet per 2 to 4 miles
Wire-splicing sites	100 x 100 feet per 2 miles
Construction yards	Approximately one 12- to 20-acre site every 40 to 50 miles on private land; locations to be determined
Concrete batch plant	One 15-acre site, location to be determined
Land Permanently Required	
Structure base	See Table 1 & Table 2
Communication regenerator station	8 x 12 feet building footprint within 100 x 100 feet fenced area
Access Roads	
New roads required	New roads would be a minimum of 14 feet wide (travel surface); maximum 27 feet wide, depending on slope (total distance to be determined)
New spur roads required	Spur roads would be a minimum of 14 feet wide (travel surface); maximum 27 feet wide, depending on slope (total distance to be determined)
Improve existing roads	Improved roads would have a minimum travel surface of 14 feet wide (total distance to be determined)
Electrical Properties	
Nominal voltage	345kV AC line-to-line
Capacity	600 MW per circuit
Circuit configuration	Single-circuit with three phases per structure, two subconductors per phase
Conductor	954 kcmil ACSR 54/7 Cardinal
Minimum ground clearance of conductor	30 feet minimum per PacifiCorp standard practice
Notes: AC = alternating current MW = megawatts kcmil = thousand circular mil ACSR = aluminum conductor steel reinforced	

3.2.2 Foundations

Depending on soil and loads, the foundations would be installed either on drilled pier foundations or direct embedment. Each structure location would be evaluated individually during final engineering to determine the exact foundation dimensions. Foundation parameters for the typical structure types are shown in Table 3-2 and foundation parameters for the alternative structure types are shown in Table 3-3.

TABLE 3-2 FOUNDATIONS FOR TYPICAL STRUCTURE TYPES				
Structure Type	**Number of Foundations**	**Foundation Diameter (ft)**	**Foundation Depth (ft)**	**Total Area In Foundation Footprint**
Davit Arm Top Single-circuit H-Frame	2	4 to 5	15 to 25	5’ x 32’ with 5’ diameter foundations
Lattice Single-circuit	4	4 to 5	15 to 25	45’ x 45’ with 5’ diameter

TABLE 3-2 FOUNDATIONS FOR TYPICAL STRUCTURE TYPES				
Structure Type	**Number of Foundations**	**Foundation Diameter (ft)**	**Foundation Depth (ft)**	**Total Area In Foundation Footprint**
Deadend				foundations

TABLE 3-3 FOUNDATIONS FOR ALTERNATIVE STRUCTURE TYPES				
Structure Type	**Number of Foundations**	**Foundation Diameter (ft)**	**Foundation Depth (ft)**	**Total Area In Foundation Footprint**
Three Pole Single-circuit Deadend	3	6 to 8	15 to 30	8' x 98' with 8' diameter foundations & 45' pole spacing
Single Pole Single-circuit Tangent	1	6 to 7	15 to 25	6' to 7' diameter circle
Single Pole Single-circuit Deadend	1	7 to 12	25 to 50	7' to 12' diameter circle
Truss Top Single-circuit H-Frame	2	4 to 5	15 to 22	5' x 32' with 5' diameter foundations
Single Pole Double-circuit Tangent	1	6 to 10	25 to 50	6' to 10' diameter circle
Single Pole Double-circuit Deadend	1	7 to 12	25 to 50	7' to 12' diameter circle

3.2.3 Conductors

The 345kV single-circuit structures would consist of three phases with a double-conductor bundle (i.e., two subconductors) per phase installed in a vertical configuration with 18-inch spacing between subconductors. Each conductor would consist of outer aluminum strands with a stranded steel reinforced core (i.e., ACSR).

Minimum conductor height aboveground for the 345kV line would be based on NESC requirements and PacifiCorp's own standards. Based on Avian Power Line Interaction Committee recommendations (Avian Power Line Interaction Committee, 2006), adequate spacing between conductors would be implemented. In addition, shield wires would be located at the top of every structure along with an overhead optical ground wire (OPGW), which would be used for line operation communications.

3.2.4 Insulators and Associated Hardware

The assemblies of insulators are designed to maintain electrical clearances between the conductors and the structure. Single-circuit H-frame (tangent) and angle 345kV structures would have three I-shaped string insulators suspended from the structure (refer to Figure 3-1). Other structures would have either V-shaped or I-shaped insulators. Table 3-1 describes the typical design characteristics of the proposed 345kV transmission line.

3.2.5 Overhead Ground Wire

The overhead ground wire would shield the 345kV transmission line from direct lightning strikes. Two overhead ground wires, (one of which would be an OPGW, as described in Section 3.2.3) measuring 0.4 to 0.5 inches in diameter, would be installed on the top of the structures. Current from lightning strikes would be transferred through the ground wires and structures into the ground.

3.2.6 Grounding

Ground rods would be installed next to the structure foundations and would be bonded to the structure. Lattice towers (single-circuit angle or dead-end structures) would typically have four grounds installed per structure, and H-frame and steel-pole structures would typically have two grounds installed per structure. After the ground rods have been installed, the grounding would be tested to determine the resistance to ground. If the measurements indicate a high resistance, counterpoise may need to be installed, which typically consists of trenching in-ground wire to a depth of 12 inches in non-cultivated land and 19 inches in cultivated land with a ground rod driven at the end. The counterpoise may be contained within the limits of the ROW and may be altered or doubled back and forth to meet the requirements of the Project.

3.2.7 Optical Ground Wire

Reliable and secure communications for system control and monitoring of the transmission line is very important to maintain the operational integrity of the Project and of the overall interconnected system. Primary communications for relaying and control would be provided via OPGW, which would be installed on the transmission lines. Each transmission structure would have two lightning protection shield wires installed on the peaks of each of the structures. One of the shield wires would be composed of extra high strength steel wire with a diameter of 0.495 inch and a weight of 0.517 pound per foot. The second shield wire would be an OPGW constructed of aluminum and steel that carries 48 glass fibers in its core. On the 345kV line, the OPGW's would have a diameter of 0.465 inches and a weight of 0.290 pounds per foot. The glass fibers inside the OPGW shield wires would facilitate data transfer between the Company's facilities along the fiber path. The data transferred are required for system control and monitoring. A second communications path would be provided via the PacifiCorp's existing microwave system or utilizing a power line carrier. No new microwave sites are anticipated for the Project. Updated microwave equipment may be installed at existing sites and at the substations.

3.3 ACCESS ROADS

Construction of the transmission line would require vehicle, truck, and crane access to each new structure site for construction crews, materials, and equipment. Similarly, construction of other Project facilities (e.g., staging areas and substation sites) would require vehicle access. Five types of access may be used for the Project:

1) paved roads

2) dirt roads that would not require improvements
3) dirt roads that may require improvements
4) new access roads
5) overland access (drive and crush).

To the extent possible, existing roads and two-track trails would be used in their present condition without improvements. In areas where improvements are required or are deemed to be in the best interest of the Project for future use, they would be graded to provide a smooth travel surface. Access on the ROW, other than in specific areas, would require a road, graded to a minimum travel surface width of 14 feet and a maximum of 27 feet wide (depending on slope). In some cases, new roads that must be graded for access along steep slopes (side-hill roads) may exceed this width, depending on the amount of displaced soil. These roads typically go directly from structure to structure, except on hillsides, ridgebacks, rock outcrop areas, wash crossings, or in treed areas, where the road would follow suitable topography from structure to structure, which may be outside the ROW. In these locations, the road would be built in areas that generally cause the least amount of overall disturbance.

3.4 SUBSTATIONS

New substation equipment would be needed at the terminus points to interconnect the transmission line with the existing Sigurd and Red Butte substations.

At the existing Sigurd Substation, new 345kV circuit breakers, a shunt reactor, a shunt capacitor, high voltage switches, bus supports, and other equipment would be installed along with all associated site preparation, fencing, foundations, steel substation structures, bus work, protection and control, and metering. The existing Three Peaks (Red Butte) 345kV Line would be moved one position to the east, and the existing line position would be used for the termination of the new Sigurd 345kV Line. The existing substation fence boundary would be expanded approximately 2 to 3 acres to the south to support the installation of a new 345kV line reactor and a new 345kV steel substation structure. The exact dimensions of the expanded area would be determined during the final engineering design phase of the Project. The existing access road would be used to reach the site.

At the existing Red Butte Substation, new 345kV circuit breakers, high voltage switches, bus supports, a shunt reactor with a series capacitor, shunt capacitors, control house, and other equipment would be installed along with all associated site preparation, foundations, steel substation structures, bus work, protection and control, and metering. The existing access road would be used to reach the site. Table 3-4 includes a description of the typical design characteristics of a 345/138 kV substation expansion.

TABLE 3-4 TYPICAL DESIGN CHARACTERISTICS OF A 345/138KV SUBSTATION EXPANSION	
Site size (approximate)	10 to 20 Acres
Equipment	Shunt Reactors, Series Reactors, Series Capacitors, Station Switches, Voltage and Current sensing devices, Power Transformers, Power Circuit Breakers.
Access road ▪ Width ▪ Road surface ▪ Grading	Existing access roads would be used where possible
Fire protection facilities	Existing fire protection faculties would be expanded to include new equipment
Substation grounding	According to applicable codes
Land temporarily disturbed	A 20-foot-wide buffer zone along the perimeter of the substation expansion area estimated to be less than one acre
Voltage	345/138kV and below
Source: Rocky Mountain Power 2008	

3.5 PRECONSTRUCTION SURVEY ACTIVITIES

Prior to construction, the ROW and temporary and permanent access roads for construction and maintenance will be surveyed to locate the centerlines accurately, after which pedestrian surveys for cultural and biological resources will be conducted.

3.5.1 Geotechnical Investigation

The purpose of the geotechnical investigation is to collect information regarding subsurface stability, which would be used in the final design of each transmission tower structure and foundation. The geotechnical investigation would consist of the drilling and sampling of soils to a typical depth of 40-50 feet below the existing ground surface. The boreholes would have a diameter of approximately 8 inches and would be backfilled with auger cuttings and on-site soils. Temporary access road construction and blading would be required. Surface disturbance would be limited to the actual tracks left by the drill rig and support vehicles within the work areas and temporary access routes. Reclamation of disturbed areas will occur and will consist of, but not be limited to, returning disturbed areas back to rounded contours, reseeding, installing cross drains for erosion control, placing water bars in the road, and filling ditches. All areas on BLM and Forest Service lands that are disturbed by geotechnical testing activities will be drill seeded with a seed mixture appropriate for those areas.

A separate Application for Transportation and Utility Systems and Facilities on Federal Land (Standard Form 299) was submitted by Rocky Mountain Power to the BLM in September 2009 to conduct the geotechnical investigations for the Project. The BLM will review and process the application in accordance with all applicable federal laws and regulations. An Environmental Assessment will be prepared for the proposed geotechnical investigation.

3.5.2 Engineering Surveys

After a preferred route is selected through the NEPA process, on-ground investigations will be completed to accurately locate the centerline of the ROW and temporary and permanent access roads for construction and maintenance. The exact centerlines will be determined to implement design criteria and satisfy the mitigation measures during the NEPA process. Before construction surveying begins, required permits to survey on public and state lands or right-of-entry for privately owned land will be obtained. Construction survey work will consist of transmission line and access road centerline locations and ROW boundaries where necessary. Structure locations will be flagged and staked, and the proposed centerlines will be flagged and staked where needed.

3.5.3 Cultural Resource Surveys

Permitted contractors will survey the areas of potential effect for the selected route and all identified access roads for which any ground-disturbing activities will be conducted. Any cultural property that will be directly or indirectly impacted will be subject to evaluation and determination through National Historic Preservation Act Section 106 consultation. Project engineers will work with Project archaeologists to avoid or minimize impacts on any identified cultural resources, as possible.

3.5.4 Biological Surveys

- Potential species that will require special consideration will be determined during the NEPA compliance process in consultation with the BLM, Forest Service, U.S. Fish and Wildlife Service (USFWS), and Utah Division of Wildlife Resources. Specific mitigation measures for biological resource areas will be developed as part of the NEPA process. As needed, surveys and/or Endangered Species Act Section 7 consultation will be performed.

- Jurisdictional waters of the U.S. will be delineated within the ROW and areas of potential construction disturbance (storage yards, access roads, etc). Mitigation to reduce or avoid impacts to jurisdictional waters and wetlands will be implemented where feasible. Coordination with the U.S. Army Corps of Engineers will occur to ensure the project is in compliance with Section 404 of the Clean Water Act.

3.6 PROJECT CONSTRUCTION

This section describes the construction of the Project. Topics include an overview of the construction sequence, the construction workforce, environmental safety training, deviations during construction, and project compliance.

3.6.1 Construction Sequence and Workforce

3.6.1.1 Construction Sequence

Construction of the transmission line will include the following sequence of activities:

- Surveying the transmission centerline, other project features, and work areas
- Upgrading or construction of temporary and permanent access roads
- Clearing and grading for the ROW, structure sites, staging areas,
- and batch plants
- Excavating and installing foundations
- Assembling and erecting structures with temporary and permanent pad sites
- Stringing conductors and ground wires
- Installing counterpoise (structure grounds) where needed
- Performing cleanup and reclamation of affected areas

These activities are described in more detail below. In addition, information is provided describing construction facilities and other construction components for:

- Construction storage yards and concrete batch plants
- Equipment staging areas
- Equipment refueling areas
- Helicopter use and refueling (if necessary)

Also, the final POD will include detailed information related to the construction of the project, including:

- Transportation management
- Blasting
- Flagging, fencing, and signage
- Erosion/dust control and air quality
- Fire protection
- Hazardous materials management
- Emergency preparedness and response

3.6.1.2 Construction Workforce

An estimated number of workers and types of equipment required to construct the proposed transmission line is shown in Table 3-5. The Project would consist of several phases of construction at various locations. Regular field meetings will be held with the construction, inspection, and compliance contractor (CIC) and biological monitors to review the process and its implementation.

TABLE 3-5 ESTIMATED PERSONNEL AND EQUIPMENT FOR EACH OF TWO CONSTRUCTION SECTIONS			
Activity	**People**	**Quantity of Equipment**	**Equipment Type**
Survey	6	3	pickup trucks
Support Equipment	8 to 16	3	4 x 4 pickup
		2	1-ton mechanic service truck
		2	equipment fuel truck
		1	5-ton truck tractor
		2	40-ton lowboy rig
		2	45-ton cherry picker
		2	10-ton fork lift
		2	4,000-gallon water truck
Road Maintenance, Building and Restoration Equipment	12 to 24	2	4 x 4 pickup
		1	D8 crawler tractor
		2	4,000-gallon 6 x 6 water truck
		2	self propelled water wagon
		2	road grader
		2	backhoe
Guard Pole Equipment	5 to 10	2	4 x 4 pickup
		1	flatbed boom truck
		2	auger truck
Foundation installation	30 to 48	4	4 x 4 pickup
		2	crewcab pickup
		4	air compressor
		2	25-ton flatbed boom truck
		4-8	15-ton flatbed boom truck
		4-8	rock drill
		3	excavators
		3	auger truck
		2	10 cubic yard dump truck
		2	1.5 cubic yard front end loader
		2	backhoe
		4-8	concrete mixing trucks
		2	18-ton crane
		2	30-ton crane
Yard and Material Hauling Equipment	10	2	4 x 4 pickup
		3	10-ton fork lift
		2	8-ton fork lift
		2	4-ton fork lift
		1	22-ton crane
		1	6 x 4 truck tractor
		2	15-ton flatbed boom truck

TABLE 3-5 ESTIMATED PERSONNEL AND EQUIPMENT FOR EACH OF TWO CONSTRUCTION SECTIONS			
Activity	**People**	**Quantity of Equipment**	**Equipment Type**
Structure Assembly and Erection	40 to 60	2	4 x 4 pickup
		2	crewcab pickup
		2	100-ton hydraulic crane
		1	70-ton hydraulic crane
		2	D8 crawler tractor
		2	air compressor
		2	4 x 4 flatbed truck
Wire Stringing and Ground Cleanup Equipment	20 to 48	2	cranes (120 ton)
		2	cranes (19-ton)
		2	cranes (30-ton)
		2	6 x 6 truck tractor
		2	trucks (2 ton)
		2	trucks (5 ton)
		1	auger truck
		2	backhoe
		2	high reach boom truck
		1	15-ton flatbed boom truck
		4	pickup trucks
		2	4 x 4 pickup
		2	crewcab pickup
Wire installation	25	6	wire reel trailers
		2	diesel tractors
		3	3-drum pulling machines
		1	single drum puller (large)
		3	double bull-wheel tension machine (heavy)
		2	sagging equipment (D-8 Cat, tracked)
		1	helicopter and fly ropes
		4	carry all
		2	static wire reel trailer
		1	air compressor
OPGW installation	4 to 8	1	OPGW splicing trailer
		1	OPGW bucket truck
Notes: Maximum total personnel required considering all tasks = 255 (actual personnel at any one time would be less) Depending on schedule requirements, multiple crews may be required. Source: Pike Engineers (Doug Proctor), 2009			

3.6.1.3 Environmental and Safety Training

Prior to gaining access to the ROW, all construction and maintenance workers will be required to participate in an environmental education program. This program will be developed by PacifiCorp prior to the start of construction and will be submitted to the BLM and/or Forest Service Authorized Officer(s) for review and approval prior to implementation. At a minimum, the

program will include the following topics: biological, cultural, paleontological, and other environmental requirements and protection measures. After completion of construction, PacifiCorp will provide environmental education to all maintenance and operation personnel who will be accessing the ROW.

After participating in the training program, each trained worker will receive a card and hardhat sticker indicating they are cleared for access to the ROW. The construction contractor(s) will provide the CIC with an updated list of those workers who have received the training. The construction contractor(s) will be responsible for ensuring that all construction personnel have received the required training. A non-compliance violation will be issued if a worker is found working on the ROW without the required training.

In addition, the construction contractor(s) will be responsible for providing safety training, as required. Specific health and safety information will be included in the final POD, including a description of the safety requirements specifically associated with construction activities (construction of access roads, blasting, fire protection, etc.) All construction, operation, and maintenance activities will be required to comply with Occupational Safety and Health Administration regulations. The CIC will be notified by the construction contractor(s) of any accidents that occur on public land during construction of the Project. Notification procedures for emergencies will be described in the final POD in the Emergency Preparedness and Response Plan Guidelines.

3.7 PROJECT COMPLIANCE

PacifiCorp will contact the BLM and Forest Service Authorized Officer(s) or designee(s) prior to commencing construction and/or any ground-disturbing activities. A pre-construction conference will be scheduled with BLM, Forest Service, other cooperating agencies (as appropriate), and PacifiCorp prior to commencing construction and/or ground-disturbing activities on the ROW. PacifiCorp personnel and contractors' representatives involved with construction and/or any ground-disturbing activities associated with this ROW will attend this conference to review the stipulations of the grant, including the POD, Restoration Plan, and other documents, as determined by BLM and/or Forest Service.

PacifiCorp will not initiate any construction or other ground-disturbing activities on the public land portion of the ROW until after issuance of the federal Notice to Proceed (Form 2800-15) issued by the Authorized Officer(s) or designee(s).

All activities associated with the construction, operation, maintenance, and decommissioning of the ROW will be conducted within the authorized limits of the ROW. PacifiCorp will construct, operate, and maintain the facilities, improvements, and structures within this ROW in strict conformity with the approved POD and made part of the grant. In some instances, roads and angle string set-ups will be outside of the ROW. However, these locations will be identified and established during detailed design and authorized in the approved POD. Any relocation, additional construction, or use that is not in accordance with the approved POD will not be initiated without the prior written approval of the Authorized Officer(s) or designee(s). A copy of the complete ROW grant, including all stipulations and approved POD will be made available on

the ROW area during construction. Noncompliance with the above will be grounds for an immediate temporary suspension of activities.

3.8 DEVIATIONS DURING CONSTRUCTION

Changes or deviations are likely to be needed for the approved Project to accommodate or mitigate on-site circumstances. To avoid delays in the construction schedule, a process would be developed in the final POD for the review and approval of proposed changes that may be required after construction has commenced.

3.9 CONSTRUCTION PLAN AND PROGRAM

The activities associated with the construction of the major and ancillary facilities of the Project are described in the sequence in which they will occur. These activities include the following:

- Surveying the transmission centerline, other project features, and work areas
- Upgrading or construction of temporary and permanent access roads
- Clearing and grading for the ROW, structure sites, staging areas, and batch plants
- Excavating and installing foundations
- Assembling and erecting structures with temporary and permanent pad sites
- Stringing conductors and ground wires
- Installing counterpoise (structure grounds) where needed
- Performing cleanup and reclamation of affected areas

3.9.1 Surveying the Right-of-way Centerline, Other Project Features, and Work Areas

Ground survey and staking would be performed to locate structure centers, reference points, ROW boundaries (if necessary), access roads (e.g., new access roads, spur roads to structure sites, and overland access), and temporary work areas. If deemed necessary, environmental monitoring activities would be in place during this phase. Specific flagging and staking procedures would be described in detail in the final POD. Flagging would be maintained until final cleanup and/or reclamation is completed, after which the flags would be removed. Some of these activities could begin as much as two years or more before the start of construction.

3.9.2 Upgrading or Construction of Temporary and Permanent Access Roads

Roads enable access to the ROW and tower sites for both construction and long-term maintenance of the transmission line. Access roads must be sufficient to bear the weight and endure heavy construction vehicle use. Existing paved and unpaved highways and roads would be used, where possible, for the transportation of materials and equipment from the storage yards to the areas where they would be needed along the transmission line ROW.

The appropriate agencies and private landowners would be consulted before road construction begins. All roads would be upgraded or constructed in accordance with PacifiCorp's

transmission construction standards (TA 500, TA 501, TA 503, and TA 504). These standards would be compared to the appropriate land-management agency's standards, if any, prior to construction. Specific plans for the construction, rehabilitation, and/or maintenance of roads would be documented in the POD during the engineering-design phase of the Project. These plans would incorporate the relevant criteria of the affected agencies and landowners or land users.

Where the proposed transmission line would parallel existing transmission lines or other linear utilities, the access roads along the existing utilities would be used, where possible, to minimize the amount of new road construction. However, these roads could require upgrading before they could be used for construction. Where existing roads could be used, only spur roads to tower sites may be needed. The number of new spur roads would be held to a minimum, consistent with their intended use (e.g., structure construction or conductor stringing and tensioning). All roads existing prior to construction of the Project would be left in a condition equal to or better than their condition prior to construction.

In some temporary work areas, only temporary roads may be needed. Typically, these temporary roads would be graded to a travel-surface width of approximately 14 feet, with a 1-foot ditch on either side (for a total of 16 feet) depending on site-specific conditions. Turnout areas and curves would require a wider surface. Normally, a ditch drainage system would not be constructed for temporary roads.

Permanent access roads would be constructed, where needed, for construction or long-term maintenance, or where landowners or land-managing agencies require. Permanent roads would be graded to a travel-surface width of approximately 14 feet, except where turnout areas and curves or specifications of the land-managing agency require a wider surface. The roads would usually follow the natural grade; the maximum slope would be 15 percent.

New bladed roads and improved access roads would be built to the minimum travel surface width of 14 feet. For areas that do not require new access roads on the ROW, overland access may be used. Due to rough terrain conditions, new roads that must be graded for access along steep slopes (side-hill roads) could exceed a 14-foot width, with the total disturbed width varying depending on the amount of displaced soil. In addition, roads may be routed around specific areas due to topography or to avoid sensitive resources. As-built drawings showing these and other necessary deviations would be submitted to the BLM and Forest Service on completion of construction of the Project. Where required, new roads would be built and would not typically include an improved ditch drainage system.

In some temporary work areas, only temporary roads may be needed. Typically, these temporary roads would be graded to a travel-surface width of approximately 14 feet, depending on site-specific conditions. Turnout areas and curves would require a wider surface. Typically, ditches on either side of the road would serve as drainage for temporary roads and a ditch drainage system would not be constructed.

Erosion control and sedimentation measures such as water bars, culverts, sediment basins, or perimeter control would be installed as required to minimize erosion during and subsequent to construction of the Project. These features would be constructed in accordance with PacifiCorp standards (TA 503 and TA 504). To the maximum extent possible, drainages would be crossed

at grade. Where such crossings are not feasible, culverts may be constructed (some of which may be temporary).

Appropriate dust control measures would be implemented at the necessary locations along the route. Methods to minimize dust and erosion control associated with existing and new access would also be provided in the final POD.

Helicopters may be used for construction (structure placement) in limited areas where there are environmental constraints, where access is difficult due to terrain, or where it is economically practical. However, permanent access roads to each structure location would be required.

In certain areas, it could be necessary to block roads after construction to restrict future access for general and undesired use. At the appropriate time, the BLM or Forest Service, in coordination with PacifiCorp and other potential users of the utility corridor, would determine which of the newly constructed access roads would be closed, restored, or retained for operation and maintenance activity. New access roads required for operation and maintenance of the Project and/or other planned facilities would be closed using PacifiCorp's Transmission Standard TA 521.

For the environmental impact statement studies, the amount of ground disturbance from upgrading or constructing access will be estimated. Three levels of ground disturbance are defined and summarized in Table 3-6. Existing roads suitable for access and the general condition of each will be mapped. This information will be combined with slope data to provide an estimate of the potential ground disturbance that could result from upgrading existing roads or constructing new roads.

TABLE 3-6
GROUND DISTURBANCE/ACCESS LEVELS

Level 1	**Existing Paved and Unpaved Roads** Roads generally in good condition, but may need to be improved selectively. An average of 0.3 to 0.5 miles of spur road would be required for each mile of transmission line. Spur roads would disturb about 0.7 acres per mile of transmission line.
Level 2	**Construct New Road in Level to Sloping Terrain (0 to 10 percent grade)** Approximately 1.0 to 1.5 miles of new road would be required for each mile of transmission line. Road construction would disturb approximately 2.1 acres per mile of transmission line.
Level 3	**Construct New Road in Steep Terrain (over 10 percent grade)** Approximately 1.5 to 2.5 miles of new road would be required for each mile of transmission line. Road construction would disturb approximately 3.9 acres per mile of transmission line.

3.9.3 Clearing and Grading Activities for the Right-of-Way, Structure Sites, Staging Areas, and Batch Plants

Clearing of natural vegetation would be required for construction purposes (access, spur roads, and structure sites), clearances for electrical safety, long-term maintenance, and reliability of the transmission line. In or adjacent to the ROW, mature vegetation would be removed under or near the conductors to provide adequate electrical clearance as required by NESC and the U.S.

Department of Energy. Clearing activities would be in compliance with PacifiCorp Vegetation Management Specification Manual and the Standard FAC-003-1 Transmission Vegetation Management Program.

At each structure site in rough and steep terrain, work areas required would vary depending on the site conditions. Work areas may be larger, and permanent structure sites may require additional clearing and grading to accommodate crane pads used by construction and maintenance crews. Extensive grading along steep slopes would be required to accommodate some tower sites.

At each structure site, work areas are required to facilitate the safe operation of equipment and construction operations. In typical work areas in flat terrain, an area 150 feet by 200 feet of temporary disturbance would be required for equipment and construction tasks. In that work area, the permanent disturbance associated with the structure footings would be up to 40 feet by 40 feet. The work area would be cleared of vegetation only to the extent necessary. Access in the work area would be overland travel with minimal grading required in the work site. After line construction, all temporary work areas would be restored.

Construction of the Project would begin with the establishment of staging areas, which are required for storing materials, construction equipment, and vehicles. Additionally, concrete batch plants, if necessary, would be sited at staging areas, as would some of the required fly yards for helicopter operations, if any. Staging areas would be located near each end of the transmission line ROW, would be approximately every 40 to 50 miles along the route, and would occupy approximately 12 to 20 acres each.

The staging areas would serve as field offices, reporting locations for workers, parking space for vehicles and equipment, sites for material storage, and stations for equipment maintenance. Facilities would be fenced and their gates locked. Security guards would be stationed where needed. Staging area locations would be finalized following discussion with the land-managing agency or negotiations with landowners. In some areas, the staging area may need to be scraped by a bulldozer and a temporary layer of rock laid to provide an all-weather surface. Unless otherwise directed by the landowner, the rock would be removed from the staging area on completion of construction, and the area would be restored.

In locating staging areas, the preference is for relatively level areas with easy existing access to minimize site grading and new road construction. The staging areas would be located on private land to the extent possible and in previously disturbed sites or in areas of minimal vegetative cover, where possible.

Detailed maps would be developed to show proposed locations of staging areas once they are identified during the design phase.

3.9.4 Excavating and Installing Foundations

Vertical excavations for foundations will be made with power drilling equipment. Where soils permit, a vehicle-mounted power auger or backhoe will be used. In rocky areas, the foundation holes will be excavated by drilling or blasting methods, or installing special rock anchors.

Foundation holes left open or unguarded will be covered to protect the public and wildlife. If practical, fencing may be used. All safeguards associated with using explosives (e.g., blasting mats) will be employed. Blasting activities will be coordinated with the appropriate agencies, particularly for purposes of safety and protection of sensitive areas and biological resources. In extremely sandy areas, water or a gelling agent approved by the Authorized Officer(s) will be used to stabilize the soil before excavation.

Direct embedded H-frame tangent structures would be predominantly used. Poles would be directly embedded into excavated holes at a depth based on results of geotechnical studies. If soils are determined unsuitable for direct embedment, a drilled pier may be required.

In areas where steel-lattice structures will be used, cast-in-place footings will be installed by placing reinforcing steel and a structure stub into the foundation hole, positioning the stub, and encasing it in concrete. Spoil material (excavated subsoil) will be used for fill where suitable and the remainder will be spread at the structure site or along graded access roads or in locations previously agreed upon by PacifiCorp and the Authorized Officer(s). In areas where H-frame structures are being used, increased volumes of spoils (based on foundation size and depth) may require spreading of spoils beyond the general disturbance area in order to maintain grades and runoff, and to facilitate restoration. In these areas, the topsoil will be salvaged and set aside to be placed over the subsoil material during restoration. These locations will be mitigated on a case-by-case basis and tracked by the CIC. The foundation excavation and installation will require access to the site by power augers or drills, cranes, material trucks, and ready-mix concrete trucks.

Drilled pier foundations would be used for tubular steel structures.

Foundation holes left open or unguarded would be covered to protect the public and wildlife. If practical, fencing may be used. Soil removed from foundation holes would be stockpiled on the work area. These piles would be used to backfill holes, and the topmost layer would be distributed over the work area.

3.9.5 Assembling and Erecting Structures with Temporary and Permanent Pad Sites

3.9.5.1 Conventional Method of Assembly and Erection

H-frame tangent-structure and single-pole material would be hauled to the structure location and assembled onsite. Typically, the entire structure would be framed on the ground and erected as one unit using a crane.

Lattice-frame structure material would be preassembled in a convenient size and weight in the staging areas. These subsection assemblies and associated hardware would be shipped to each tower site by truck. The subsections would be assembled at the site and hoisted into place by a large crane and then fastened together to form a complete tower.

If drilled pier foundations are necessary, H-frame and single-pole structures would be fastened to foundations using the appropriate sized anchor bolts.

H-frame steel poles, crossarms, insulator assemblies and other associated hardware will be trucked to each structure location. Typically, structures will be fully assembled on site and set as one unit using rubber-tired cranes. Alternately, depending on weight of structures, structures may require setting in sub-assemblies.

Lattice deadends will be pre-assembled into subsections at material storage yards and then trucked to the structure location and assembled using a rubber-tired crane. Alternately, bundles of steel members and associated hardware (and oftentimes insulators, hardware and stringing sheaves) may be transported to each structure site by truck. Wood blocking is hauled to each location and laid out; then steel bundles are opened and laid out for assembly by sections and assembled into subsections of convenient size and weight. The assembled subsections are then hoisted into place by means of a large crane and fastened together to form a complete structure. A follow-up crew then tightens all the bolts in the required joints.

3.9.5.2 Helicopter Method of Assembly and Erection (optional)

For the optional helicopter method of erection, H-frame steel poles, crossarms, and associated hardware and lattice bundles of steel members and associated hardware for up to 15 to 20 structures (and oftentimes insulators, hardware, and stringing sheaves) are shipped to a centralized area by truck. Wood blocking is hauled to the area and laid out; then the steel bundles are opened and laid out for assembly and assembled into subsections of convenient size and weight according to the helicopter's lifting capabilities. Steel members are then assembled into complete structures. For steel-lattice structures, the leg extensions are typically hauled to the individual structure locations and assembled and erected in place by crews with smaller cranes. After a planned amount of structures are completely assembled, the helicopter is mobilized to the Project and within a few days will set all the planned structures within a given section. A follow-up crew then tightens all the bolts in the required joints. See Section 3.9.10.4 (below) for additional details on the use and refueling of helicopters during construction.

3.9.6 Stringing Conductors, Ground Wires, and Optical Ground Wire

Insulators, hardware, and stringing sheaves would be delivered to each tower site for installation. The towers would then be rigged with insulator strings and stringing sheaves at each ground wire and conductor position. Guard structures would be erected over highways, railroads, power lines, structures, and other obstacles for public protection during wire installation. Guard structures consist of H-frame wood poles and nets placed on either side of an obstacle. These structures prevent ground wires, conductors, or equipment from falling on an obstacle.

Equipment for erecting guard structures would include augers, line trucks, pole trailers, and small cranes. Guard structures may not be required for small roads or may be accommodated by line trucks. On such occasions, other safety measures such as barriers, flagmen, or other traffic control would be used.

Sites for tensioning and pulling equipment typically measure approximately 150 feet by 750 feet every 2 to 4 miles. However, when construction occurs in steep and rough terrain, these sites

may require larger, less symmetrical pulling and tensioning areas. Likewise, sites for tensioning and pulling equipment on either side of a large angle structure may be off the ROW. A temporary use permit would be obtained for these sites, as needed.

A pilot line would be pulled (strung) from tower to tower by helicopter or 4-wheel drive vehicle and threaded through the stringing sheaves at each structure. A larger diameter, stronger line would then be attached to the pilot line and strung. This is called the pulling line and is used in turn to pull in the conductor, OPGW, or ground wire. This process is repeated until the ground wire and conductor are pulled through all sheaves. The ground wire and conductor would be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end.

Ground wires, OPGW, and conductors will be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end of a conductor segment. Sites for tensioning equipment and pulling equipment will be approximately 2 to 3 miles apart (will be identified in the final POD). The tensioning and pulling sites will be an area approximately 150 feet by 750 feet depending on the structure's purpose (e.g., mid-span or deadend). Tensioners, pullers, line trucks, wire trailers, dozers, pickups, and tractors needed for stringing and anchoring the ground wire or conductor will be located at these sites. The tensioner, in concert with the puller, will maintain tension on the ground wire or conductor while they are fastened to the structures.

Tension will be maintained on all insulator assemblies to assure positive contact between insulators, thereby avoiding sparking. Caution also will be exercised during construction to avoid scratching or nicking the conductor surface, which may provide points for corona to occur.

3.9.7 Installing Counterpoise (Tower Grounds) Where Needed

Part of standard construction practices prior to conductor installation will involve measuring the resistance of the ground to electrical current near the structures. If the measurements indicate a high resistance, counterpoise will be installed, which will consist of trenching in-ground wire to a depth of 12 inches in non-cultivated land and 18 inches in cultivated land, with a ground rod driven at the end. The counterpoise will be contained within the limits of the ROWs and may be altered or doubled back and forth to meet the requirements of the Project. Typical equipment used for installing ground rods includes line trucks, backhoes, trenchers, etc.

A grounding system would be installed at the base of each transmission structure that would consist of copper ground rods embedded into the ground in immediate proximity to the structure foundation and connected to the structure by a buried copper cable. When the resistance to ground for each transmission structure would be greater than 25 ohms with the use of ground rods, counterpoise would be installed to lower the resistance to 25 ohms or less. Counterpoise consists of a bare copper-clad or galvanized-steel cable buried a minimum of 12 inches deep and extending away from the structures (from one or more legs of structure) for approximately 200 feet in the ROW.

3.9.8 Substation Construction

New substation equipment would be needed at the terminus points to interconnect the transmission line with the existing Sigurd and Red Butte substations. At the Sigurd Substation, the fence boundary would be expanded approximately 2 to 3 acres to the south to support the installation of a new 345kV line reactor and new 345kV steel substation structures. The exact dimensions of the expanded areas would be determined during the final engineering design phase of the Project.

The preparation of these sites would require the following:

- Cut-and-fill grading
- Placement and compaction of structural fill to serve as a foundation for equipment
- Grading to maintain drainage patterns
- Oil spill containment facilities
- Gravel-surfaced yard
- Gravel-base roads a minimum of 20 feet wide based on site-specific conditions
- Fencing
- Subsurface grounding grids
- Cable trenches

3.9.9 Cleanup and Reclamation of Affected Areas

Construction sites, material storage yards, and access roads would be kept orderly. Refuse and trash would be removed from the sites and disposed of at an approved landfill. In remote areas, trash and refuse would be removed to a construction staging area until proper disposal can be arranged. No open burning of construction trash would occur without appropriate approval.

The ROW would be reclaimed, as described in this document. All practical means would be employed to restore the land to its original contour and natural drainage patterns. Revegetation activities along the ROW would conform to the land management agency's or PacifiCorp's vegetation management standards. Reclamation seed mixture would conform to land-management agency requirements and approval.

3.9.10 Additional Construction Components

The following are additional components for the construction of the Project that will be used in conjunction with the general construction activities discussed previously.

3.9.10.1 Construction Storage Yards and Concrete Batch Plants

Previously disturbed public land and/or private property will be used to the maximum extent practicable for construction staging, material storage, batch plants, and personnel reporting. It is estimated that there will be six to seven of these areas for the Project. These areas will be long-term material storage yards for the Project, ranging in size from 10 to 20 acres each, and will

be used throughout the duration of construction of the Project for receiving, storing, and transferring required materials.

Concrete for use in the structure foundations will be dispensed from portable concrete batch plants located at approximately 25-mile intervals along the ROW. It is estimated that there will be six to seven portable batch plant locations required for the Project, located in the staging areas. Equipment typically required at a batch plant site includes generators, concrete trucks, front-end loaders, Bobcat loaders, dump trucks, transport trucks and trailers, water tanks, concrete storage tanks, scales, and job-site trailers. Rubber-tired trucks and flatbed trailers will be used to assist in relocating the portable plant along the ROW. Commercial ready-mix concrete may be used when access to structure construction sites is economically feasible.

The construction yards and batch plants also may serve as field offices, reporting locations for workers, parking areas for vehicles and equipment, and locations for equipment maintenance. All required permits and approvals needed for additional construction storage yards and batch plants not previously identified will be obtained by the construction contractor(s).

3.9.10.2 Equipment Staging

Equipment staging will be located at pulling and tensioning sites or work areas previously described. These areas will be used to temporarily lay out equipment to be used for work on specific Project activities at nearby locations.

3.9.10.3 Equipment Refueling

The contractor will implement standard refueling procedures for heavy equipment that is left on the ROWs for long periods of time, such as cranes, blades, dozers, drill rigs, etc. This equipment will be refueled in place. As a rule, no personal or light-duty vehicles will be allowed to refuel on the ROW. Procedures and precautions similar to those used for helicopter refueling (discussed below) will be used.

3.9.10.4 Helicopter Use and Refueling

A helicopter may be used for construction activities (e.g., moving personnel and equipment, structure erection, conductor stringing). Helicopters will set down in areas previously identified to receive temporary disturbance. Travelers will be dropped on pulling and tensioning sites or other work areas previously described. Refueling would occur at these locations or at airports or other approved locations. During refueling, spill-protection measures will be in place. All Federal Aviation Administration regulations will be followed. Notification will be made to coordinate the air space with other possible helicopters or aircraft in the area (i.e., seeding operations, fire support).

4.0 OPERATION AND MAINTENANCE

This section provides information describing ongoing and long-term activities that will occur along the ROW. This information includes a discussion on permitted uses, ROW safety requirements, inspection and maintenance, long-term access, signage, and contingency planning.

4.1 COMPATIBLE USES

After construction, compatible uses in the ROW on public land will be considered and approved by PacifiCorp and the BLM or Forest Service. Examples of compatible uses within the ROW include grazing, vehicle and pedestrian access, recreational use, and pre-existing compatible uses. Examples of prohibited uses include buildings or closed structures frequented by humans, such as residences, and any use that requires changes in surface elevation that affect electrical clearances of existing or planned facilities. Compatible uses within easements on private land crossed by the transmission line will be similar to those on the public land and subject to the discretion of PacifiCorp.

4.2 RIGHT-OF-WAY SAFETY REQUIREMENTS

The design, operation, and maintenance of the Project will meet or exceed applicable criteria and requirements outlined by the Federal Energy Regulatory Commission, WECC, NESC, and U.S. Department of Labor Occupational Safety and Health Standards for the safety and protection of landowners, their property, and the general public. The transmission line will be protected with power circuit breakers and line relay protection equipment. If a conductor failure occurs, power will be removed automatically from the line. Lightning protection will be provided by overhead ground wires on the top of the line. Where vegetation presents a potential hazard, trees will be trimmed or cut to prevent accidental grounding contact with conductors.

4.3 BUILDING AND FENCE GROUNDING

AC transmission lines have the potential to induce currents on adjacent metallic structures, such as transmission lines, railroads, pipelines, fences, or structures, that are parallel to, cross, or are adjacent to the transmission line. Induced currents on these facilities occur to some degree during steady-state operating conditions and during a fault condition on the transmission line. For example, during a direct lighting strike to the conductor on the line, the insulators may flash over, causing a fault condition on the line, and current would flow down the structure through the grounding system (i.e., ground rod or counterpoise) and into the ground. The magnitude of the effects of the AC-induced currents on adjacent facilities is highly dependent on the magnitude of the current flows in the transmission line, the proximity of the adjacent facility to the line, and the distance (length) for which the two facilities parallel one another in proximity.

The methods and equipment needed to mitigate these conditions would be determined through electrical studies of the specific situation. As standard practice, and as part of the design of the Project, electrical equipment and fencing at the substation would be grounded. All fences, metal

gates, pipelines, metal buildings, etc., adjacent to the ROW that cross or are in the transmission line ROW would be grounded. If applicable, grounding of metallic objects outside of the ROW may also occur, depending on the distance from the transmission line, as determined through the electrical studies. These actions take care of the majority of induced current effects on metallic facilities adjacent to the line by shunting the induced currents to ground through ground rods, ground mats, and other grounding systems, thus reducing the step-and-touch electric shock potential that a person may experience when touching a metallic object near the line.

In the case of a longer parallel facility, such as a pipeline parallel to the Project over many miles, additional electrical studies would be undertaken to 1) identify any additional mitigation measures (more than the standard grounding practices) that would need to be implemented to prevent damaging currents from flowing onto the parallel facility and 2) prevent electrical shock to a person that may come in contact with the parallel facility. Some of the typical mitigation measures that could be considered for implementation, depending on the degree of mitigation needed can include the following (National Association of Corrosion Engineers International, 2003):

- **Fault Shields**—shallow grounding conductors connected to the affected structure adjacent to overhead electrical transmission towers, poles, substations, etc. They are intended to provide localized protection to the structure and pipeline coating during a fault event from a nearby electric transmission power system.

- **Lumped Grounding**—localized conductor or conductors connected to the affected structure at strategic locations (e.g., at discontinuities). They are intended to protect the structure from both steady state and fault AC conditions.

- **Gradient Control Wires**—a continuous and long grounding conductor or conductors installed horizontally and parallel to a structure (e.g., pipeline section) at strategic lengths and connected at regular intervals. These are intended to provide protection to the structure and pipeline coating during steady-state and fault AC conditions from nearby electric transmission power systems.

- **Gradient Control Mats**—typically used for aboveground components of a pipeline system. These are buried ground mats bonded to the structure and are used to reduce electrical step-and-touch voltages in areas where people may come in contact with a structure subject to hazardous potentials.

Permanent mats bonded to the structure may be used at valves, metallic vents, cathodic protection test stations, and other aboveground metallic and non-metallic appurtenances where electrical contact with the affected structure is possible. In these cases, there is no “standard” solution that would solve these issues every time. Instead, each case must be studied to determine a series of parameters, including 1) the magnitude of the induced currents and the most appropriate mitigation given the ground resistivity, distance paralleled, steady-state and fault currents, and fault clearing times expected on the transmission line and 2) distance between the line and the pipeline. If the electrical studies indicate a need to install cathodic protection devices on a parallel pipeline facility, a distribution supply line interconnection may be needed to provide power to the cathodic protection equipment.

During final design of the transmission line segments, appropriate electrical studies would be conducted to identify 1) the issues associated with paralleling other facilities and 2) the types of equipment that would need to be installed, if any, to mitigate the effects of the induced currents.

4.4 INSPECTIONS AND MAINTENANCE

PacifiCorp would conduct three inspections each year, two of which would be done by overflight. Overflight line maintenance by helicopter is critical during the spring and fall of each year, based on weather conditions, helicopter availability, and statutory requirements of the states served by PacifiCorp. The spring and fall overflight maintenance activities are conducted to identify conditions that 1) pose an immediate hazard to the public or employees or that 2) risk immediate loss of supply or damage to the electrical system to get those conditions resolved prior to peak demand in the summer and winter months.

PacifiCorp employees receive training in accordance with Bird Management and Avian Protection Plans and adhere to these plans for all maintenance activities. Avian monitors routinely identify nest locations and check these structures for activity. Overflight maintenance activities are conducted at a distance and speed that does not result in disturbance to avian species or their nests.

Monitoring and maintenance would be done from all approved or existing access roads. Maps would be provided to maintenance crews for subsequent entry into closed access roads. When access into the tower/pole locations needs improvement, a dozer blade would be used. Any closed access roads would be secured at the conclusion of maintenance activities.

The implementation of routine operation and maintenance activities on power lines would minimize the need for most emergency repairs. However, when emergency maintenance activities are necessary to repair natural hazard, fire, or man-caused damages to a line, PacifiCorp would respond as quickly as possible to restore power.

In the event of an emergency, crews will be dispatched quickly to repair or replace any damaged equipment. Every attempt will be made to contact the agency or landowners along the ROW. In the event notification cannot be made, crews will conduct emergency repair operations. Repair of the line will have priority under emergency conditions, and reasonable efforts will be made to protect plants, wildlife, and other resources. Restoration and reclamation procedures, following completion of repair work, will be similar to those prescribed during construction. The final POD will provide a more detailed description of the guidelines and regulations that must be followed.

Damage repair may require the same types of equipment used during construction, including power augers for hole boring, backhoes for excavation, and/or concrete trucks and cranes for structure erection. Other required equipment may include power tensioners, pullers, wire trailers, crawler tractors, and trucks and pickups for hauling materials, tools, and men. Under certain conditions, a helicopter could be used to haul in material and erect structures or string conductor in those areas where access and/or terrain conditions preclude the use of conventional methods. Site and access road disturbances, such as ruts created during damage operations, will be restored to satisfactory condition using rehabilitation procedures.

Maintenance crews will trim trees and vegetation, where needed, to prevent accidental grounding contact with conductors. In most areas, accepted standard utility practices such as repeated tree and brush removal, will be followed to maintain the ROW. Trees will be removed in accordance with PacifiCorp's standards. PacifiCorp will comply with agency requirements regarding management of noxious weeds within the ROW, along access roads, and at temporary use areas (e.g., cleaning equipment to prevent spread of noxious weeds). Chemical treatment within or adjacent to the ROW generally will be limited to areas with noxious weeds, and only if absolutely necessary and in accordance with the Noxious Weed Management Plan (to be included in the final POD).

If, during transmission line maintenance and monitoring, it is determined that new or reconstruction activities should be implemented, PacifiCorp will notify the Authorized Officer(s), property owners, and/or other regulatory agencies, and obtain proper approvals, as necessary.

Dust control, during ground-disturbing maintenance of the transmission line, will be managed the same as during construction. Dust-control measures will be provided in the final POD.

The substation yards and all equipment will be patrolled and monitored by maintenance personnel on a routine basis. If a large volume of a contaminant were to leak from a piece of electrical equipment, an alarm or a failure will occur. The operations center will be notified of the problem, and a trained maintenance crew will be dispatched to the substation immediately to begin repairs and cleanup.

4.5 RADIO OR TELEVISION INTERFERENCE

PacifiCorp will respond to complaints of radio or television interference generated by the transmission line by investigating the complaints and implementing appropriate mitigation measures, if needed. The transmission line will be patrolled on a regular basis so that damaged insulators or other components, which could cause interference, are repaired or replaced.

4.6 LONG-TERM ACCESS TO AND ALONG THE RIGHT-OF-WAY

Authorized access roads will be used only for maintenance purposes after completion of construction. Where long-term access is required for maintenance of the line, PacifiCorp will maintain the approved access roads in a safe, useable condition, as directed by the Authorized Officer(s). A regular maintenance program may include, but is not limited, to blading, ditching, culvert installation, and surfacing.

If snow removal is needed, equipment used will be equipped with shoes to keep the blade 2 inches off the road surface in order to avoid damage. Where the ground is uneven at drainage crossings, special precautions will be taken in order to ensure equipment blades do not destroy vegetation.

4.7 SIGNAGE AND MARKERS

At this time, no specific locations have been identified for aerial line markers; however, bird flight diverters will be placed on the shield wire/OPGW, if required, and will be specified in the final POD. Warning signs will be placed on structures and at substations to mark high-voltage danger areas, per industry standards.

4.8 ONGOING STUDIES

During the operation and maintenance phase of the projects, PacifiCorp will conduct ongoing studies to monitor selected environmental factors related to biological resources, if needed, and public health and safety. Potential operation-and-maintenance-phase mitigation measures are presented in Section 5 – Mitigation of Environmental Concerns, and will be included in the final POD, as appropriate.

4.9 CONTINGENCY PLANNING

A representative will be selected by PacifiCorp to provide routine and emergency planning for situations such as power outages, equipment upgrades, and fire control. The designated representative will have the authority to receive and carry out instructions from the BLM or Forest Service Authorized Officer(s).

4.10 EMERGENCY PROCEDURES

Emergency response procedures will be implemented for the following potential or similar events:

- Downed transmission lines, structures, or equipment failure
- Fires
- Sudden loss of power
- Natural disasters
- Serious personal injury

4.11 DECOMMISSIONING AND RECLAMATION

Should the ROW and facilities no longer be needed, a decommissioning and reclamation plan will be developed by the ROW grant holder. One year prior to decommissioning of the ROW, the holder shall contact the BLM or Forest Service Authorized Officer(s) to arrange a joint inspection of the ROW. This inspection will be held in order to agree to an acceptable decommissioning and rehabilitation plan. The Authorized Officer(s) must approve the plan in writing prior to commencement of any decommissioning activities.

Reclamation and decommissioning procedures will attempt to reclaim the landscape as near to original conditions as possible. The decommissioning and reclamation plan will be reviewed and approved by the Authorized Officer(s) and will include the following information:

- What facilities and access routes are to be removed, reclaimed, and/or rehabilitated
- How facilities and access routes will be removed and the disturbed areas reclaimed
- The time of year the facilities and access routes will be removed
- Stabilization and reclamation techniques to be used during restoration

5.0 MITIGATION OF ENVIRONMENTAL CONCERNS

This section provides an overview of potential preliminary Project mitigation measures associated with the construction, operation, and maintenance of the Project.

Two types of mitigation measures will be developed during the NEPA process and will be included as conditions in the decision document approving the Project. These include standard mitigation/best management practices and selectively committed mitigation measures, as described below.

Standard mitigation measures are those that apply to the Project as a whole. These measures typically address specific environmental policies and regulatory requirements. Where warranted, on a case-by-case basis, mitigation beyond these generic measures will be recommended to reduce potential impacts, often in specific impact locations. These are called selective mitigation measures and they will be developed as part of the environmental studies for the Project. Table 5-1 provides a preliminary list of example standard mitigation measures identified to reduce impacts on environmental resources. These measures generally have been categorized as they apply to three specific phases of the projects, including (1) engineering and design, (2) construction, and (3) operation and maintenance of facilities. These and other measures will be reviewed, revised, and developed further, as appropriate, to reduce impacts associated with specific resource concerns (e.g., cultural, biological, visual resources), and will be included in the final POD.

The construction contractor(s) will adhere to the measures identified during the engineering/design phase, as well as those measures to address construction and reclamation activities. The CIC will be responsible for the oversight of the implementation of these measures to ensure that PacifiCorp and the construction contractor(s) meet the 'intent' of the mitigation measures (identified below).

TABLE 5-1
PRELIMINARY STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES

	Mitigation Measure	Mitigation Application Phase		
		Engineering, Design, and Location	Construction	Operation and Maintenance
1	All construction vehicle movement outside the ROW normally will be restricted to predesignated access, contractor-acquired access, or public roads.		●	●
2	The spatial limits of construction activities would be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents indicating survey or construction limits would be applied to rocks, vegetation, structures, fences, etc.		●	
3	In construction areas where recontouring is not required, vegetation will be left in place wherever possible, and original contour would be maintained to avoid excessive root damage	●	●	

TABLE 5-1 PRELIMINARY STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES				
		Mitigation Application Phase		
	Mitigation Measure	Engineering, Design, and Location	Construction	Operation and Maintenance
	and allow for resprouting. Vegetation that is not consistent with line safety and operation will be removed.			
4	In construction areas (e.g., marshalling yards, tower sites, spur roads from existing access roads) where ground disturbance is significant or where recontouring is required, surface restoration will occur as required by the landowner or land management agency. The method of reclamation will normally consist of, but is not limited to, returning disturbed areas back to their natural contour, reseeding, installing cross drains for erosion control, placing water bars in the road, and filling ditches. All areas on BLM lands that are disturbed as a part of the construction and/or maintenance of the proposed power line will be drill seeded where practicable with a seed mixture appropriate for those areas unless an alternative method (e.g., broadcast seeding) is required due to slope or terrain. The BLM will prescribe a seed mixture that fits each range site. Drill seeding will be done in September or October to maximize the chance of success. The BLM may recommend broadcast seeding as an alternative method in some cases. In these cases, seed will be applied at 1.5 to 2 times the rate when broadcasted and the seed will be covered by a method such as harrowing or raking.		●	
5	Watering facilities (tanks, natural springs and/or developed springs, water lines, wells, etc.) would be repaired or replaced if they are damaged or destroyed by construction activities to their pre-disturbed condition as required by the landowner or land-management agency.		●	
6	Towers and/or conductors would be marked with high-visibility devices where required by governmental agencies (FAA). Tower heights would be less than 200 feet to avoid the need for aircraft obstruction lighting.	●	●	●
7	On agricultural land, the ROW would be aligned, insofar as is practicable, to reduce the impact to farm operations and agricultural production.	●		

TABLE 5-1 PRELIMINARY STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES				
		Mitigation Application Phase		
	Mitigation Measure	Engineering, Design, and Location	Construction	Operation and Maintenance
8	Prior to construction, the Construction Contractor will instruct all personnel on the protection of cultural, ecological, and other natural resources including: (a) federal and state laws regarding antiquities and plants and wildlife, including collection and removal; (b) the importance of these resources; and (c) the purpose and necessity of protecting them.		●	
9	In consultation with appropriate land-management agencies and state historic preservation officers and in accordance with the Programmatic Agreement, specific mitigation measures for cultural resources would be developed and implemented to mitigate any identified adverse impacts. These may include Project modifications to avoid adverse impacts, monitoring of construction activities, and data recovery studies.	●	●	
10	Special status species or other species of particular concern would be considered in accordance with management policies set forth by appropriate land-management agencies (e.g., BLM, Forest Service, etc). This would entail conducting surveys for plant and wildlife species of concern along the proposed transmission line route and associated facilities (e.g., access and spur roads, staging areas, etc.) as agreed upon by the land-management agencies. In cases where such species are identified, appropriate action would be taken to avoid adverse impacts on the species and its habitat and may include altering the placement of roads or towers, where practicable, and monitoring activities.	●	●	
11	The Proponent would respond to complaints of line-generated radio or television interference by investigating the complaints and implementing appropriate mitigation measures where possible. The transmission lines would be patrolled by air or inspected on the ground on a periodic basis, in compliance with company standards, so that damaged insulators or other line materials that could cause interference are repaired or replaced.			●
12	The Proponent would continue to monitor studies performed to determine the effects of EMF.		●	●

TABLE 5-1 PRELIMINARY STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES				
		Mitigation Application Phase		
	Mitigation Measure	Engineering, Design, and Location	Construction	Operation and Maintenance
13	The proposed hardware and conductor would limit the audible noise, radio interference, and television interference due to corona. Tension would be maintained on all insulator assemblies to assure positive contact between insulators, thereby avoiding sparking. Caution shall be exercised during construction to avoid scratching or nicking the conductor surface which may provide points for corona to occur.	●	●	
14	The Proponent would apply necessary mitigation where possible to eliminate problems of induced currents and voltages onto conductive objects sharing the same ROW to meet the appropriate NESC codes.		●	●
15	All requirements of those entities having jurisdiction over air quality matters would be adhered to. Any necessary dust control plans would be developed, and permits for construction activities would be obtained. Open burning of construction trash would not be allowed, unless permitted by appropriate authorities.		●	
16	Fences, gates, and walls would be replaced, repaired, or restored to their original condition as required by the landowner or the land-management agency in the event that they are removed, damaged, or destroyed by construction activities. Fences would be braced before cutting. Temporary gates or enclosures would be installed only with the permission of the landowner or the land-management agency and would be removed/restored following construction. Cattle guards would be installed where new permanent access roads cut through fences on BLM-administered lands.		●	●
17	During construction of the transmission lines, the ROW would be free of non-biodegradable debris. Slash would be left in place or disposed of in accordance with requirements of the land-management agency or landowner.		●	●
18	Hazardous material shall not be drained onto the ground or into streams or drainage areas. Totally enclosed containment would be provided for all trash. All construction waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials would be		●	●

TABLE 5-1
PRELIMINARY STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES

	Mitigation Measure	Mitigation Application Phase		
		Engineering, Design, and Location	Construction	Operation and Maintenance
	removed to a disposal facility authorized to accept such materials.			
19	Dull galvanized steel and non-specular conductors would be used to reduce visual impacts.		●	
20	Vehicle refueling and servicing activities would be performed in the ROW or in designated construction zones located more than 300 feet from wetlands and streams. Spill preventative and containment measures or practices would be incorporated as needed.		●	●
21	In cultivated agricultural areas, soil compacted by construction activities would be decompacted. Construction activities would occur in so far as practicable to minimize impacts on agricultural operations.		●	
22	Pacificorp designs and constructs all new or rebuilt transmission facilities to its raptor-safe design standards, including *Suggested Practices for Avian Protection on Power Lines; The State of the Art in 2006* (APLIC 2006); PacifiCorp's Bird Management Program Guidelines, updated June 2006; and PacifiCorp's substation guidelines. New substations or modified portions of the existing substations must incorporate animal protections in accordance with PacifiCorp standards.	●		
23	To eliminate the spread of noxious/invasive weeds throughout the BLM field office area, a Noxious Weed Management Plan will be developed and incorporated into the final POD, which will be approved by the BLM prior to the issuance of a ROW grant		●	●
24	A Fire Protection Plan would be developed and incorporated into the POD, which would be approved by the BLM prior to the issuance of a ROW grant. The holder or its contractors would notify the BLM of any fires and comply with all rules and regulations administered by the BLM concerning the use, prevention, and suppression of fires on federal lands, including any fire prevention orders that may be in effect at the time of the permitted activity. The holder or its contractors may be held liable for the cost of fire suppression, stabilization, and rehabilitation. In the event of a fire, personal		●	●

TABLE 5-1 PRELIMINARY STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES			
	Mitigation Application Phase		
Mitigation Measure	Engineering, Design, and Location	Construction	Operation and Maintenance
safety would be the first priority of the holder or its contractors. The holder or its contractors would: ▪ Operate all internal and external combustion engines on federally managed lands per 36 CFR 261.52(j), which requires all such engines to be equipped with a qualified spark arrester that is maintained and not modified. ▪ Carry shovels, water, and fire extinguishers that are rated at a minimum as ABC – 10 pound on all equipment and vehicles. If a fire spreads beyond the suppression capability of workers with these tools, all would cease fire suppression action and leave the area immediately via pre-identified escape routes. ▪ Initiate fire suppression actions in the work area to prevent fire spread to or on federally administered lands. If fire ignitions cannot be prevented or contained immediately, or it may be foreseeable that a fire would exceed the immediate capability of workers, the operation must be modified or discontinued. No risk of ignition or re-ignition would exist before leaving the operation area. ▪ Prior to any operation involving potential sources of fire ignition from vehicles, equipment, or other means, weather forecasts and potential fire danger would be reviewed. Prevention measures to be taken each workday would be included in the specific job briefing. Consideration would be given to additional mitigation measures or temporary discontinuance of the operation during periods of extreme wind and dryness. ▪ Operate all vehicles on designated roads or park in areas free of vegetation. Vehicles, including the undercarriages, would be thoroughly washed prior to entering the site. ▪ Operate welding, grinding, or cutting activities in areas cleared of vegetation			

TABLE 5-1 PRELIMINARY STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES				
	Mitigation Measure	Mitigation Application Phase		
		Engineering, Design, and Location	Construction	Operation and Maintenance
	within range of the sparks for that particular action. A spotter is required to watch for ignitions.			
25	Where work would occur on Superfund sites listed in the NPL, Rocky Mountain Power must seek approval from the Environmental Protection Agency. Work on contaminated sites must avoid remedial structures (e.g., capped areas, treatment, or monitoring wells, etc.) and workers must use adequate worker protection measures for working in contaminated areas.	●	●	
26	Destroying trees should be avoided as much as possible.	●	●	●
27	In newly disturbed temporary work areas, the soil would be salvaged and would be distributed and contoured evenly over the surface of the disturbed area after construction completion. The soil surface would be left rough to help reduce potential wind erosion		●	
28	Grading would be minimized by driving overland within work areas whenever possible.		●	
29	Avoid activities during the migratory bird bredding season, typically between April 15 – July 15; however, dates may vary depending upon the species and current environmental conditions. *Responsibilities of Federal Agencies to Protect Migratory Birds.* (Migratory Bird Executive Order (E.O. 13186), January 10, 2001)	●	●	●
30	When breeding, bird surveys are required, focus on BLM Sensitive Species, and the 2002 USFWS BCC/PIF list. Available for downloading at the web address below. http://www.fws.gov/migratorybirds/reports/BCC2002.pdf; (Migratory Bird Executive Order (E.O. 13186), January 10, 2001)	●	●	●
31	Follow USFWS guidelines for raptor protection during the breeding season. Available for downloading at the web address below. http://www.fs.fed.us/r4/rifc/pahvant/Comment_Letter_US_Fish_&_Wildlife.pdf; (Migratory Bird Executive Order (E.O. 13186), January 10, 2001)	●	●	●
32	Overhead static wires will be marked with highly visible devices (i.e., marker balls or other marking devices) where required by			●

TABLE 5-1 PRELIMINARY STANDARD MITIGATION MEASURES/BEST MANAGEMENT PRACTICES				
		Mitigation Application Phase		
	Mitigation Measure	Engineering, Design, and Location	Construction	Operation and Maintenance
	governmental agencies with jurisdiction.			
33	In designated areas, sensitive plants and/or habitat would be flagged and structure would be placed to allow spanning of these features, where feasible, within the limits of standard structure design.	●	●	
34	The transmission line will be regularly patrolled and properly maintained in compliance with applicable safety codes.			●

SECTION 6.0 – REFERENCES

Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Avian Protection on Power Lines: State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Sacramento, CA.

National Assembly of Corrosion Engineers (NACE) International. 2003. Mitigation of Alternating Current and Lightning Effects on Metallic Structures and Corrosion Control Systems.

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