PACIFICORP
A MIDAMERICAN ENERGY HOLDINGS COMPANY

April 8, 2015

United States Department of Interior
Bureau of Land Management, Wyoming State Office
5353 Yellowstone Road
P.O. Box 1828
Cheyenne, Wyoming 82003
Attention: Ms. Tamara Gertsch

RE: PacifiCorp/Rocky Mountain Power
Energy Gateway South 500kV Transmission Project
Revised Standard Form 299 Right-of-Way Application

Dear Ms. Gertsch:

PacifiCorp/Rocky Mountain Power is submitting for your consideration and action a revised Standard Form 299 (SF299) application for PacifiCorp/Rocky Mountain Power's proposed Energy Gateway South 500 kilovolt (kV) Transmission Project (Project), which amends the original application filed by PacifiCorp on November 30, 2007.

This revision is submitted to clarify PacifiCorp/Rocky Mountain Power's proposed alternative route corridors currently being considered for detailed analysis, and to update the Project description. More specifically, the primary changes from the January 2013 SF299 application revision reflected in this revision include:

- Proponent's preferred route has been updated to relocate a small portion of the route outside the Raven Ridge ACEC
- Updated description of Project structures and facilities, such as the proposed use of guyed structures
- Updated physical specifications

Please do not hesitate to contact me if you have any questions. I may be contacted by telephone at (801) 220-2518 or (801) 842-5783 or by electronic mail at Todd.Jensen@PacifiCorp.com.

Yours sincerely,

Todd Jensen
Director, Main Grid Transmission and Delivery

ENERGY GATEWAY SOUTH TRANSMISSION PROJECT

Revised Standard Form 299 Right-of-Way Application
Attachment A

Revised from
January 2013
Submittal

Submitted to:

Bureau of Land Management
Wyoming State Office
5353 Yellowstone Road
Cheyenne, Wyoming 82003

Submitted by:

PacifiCorp/Rocky Mountain Power

April 2015

This attachment presents information requested in Standard Form (SF) 299.

7) Project description (*describe in detail*): (a) type of system or facility (*e.g., canal, pipeline, road*); (b) related structures and facilities; (c) physical specifications (*length, width, grading, etc.*); (d) term of years needed; (e) time of year of use or operation; (f) volume or amount of product to be transported; (g) duration and timing of construction; and (h) temporary work areas needed for construction.

The Energy Gateway South Project is one part of PacifiCorp/Rocky Mountain Power's overall transmission expansion program, called the Energy Gateway Program, which will add more than 1,900 miles of new transmission lines connecting PacifiCorp/Rocky Mountain Power's customers to new and existing generation resources and provide stronger ties to established energy markets. The Energy Gateway Program is composed of several large-scale projects that will address customers' increasing electric energy use, improve system reliability, and connect new renewable resources and other generation resources to customers throughout PacifiCorp's six-state service area and the western United States.

As proposed, the Energy Gateway South project (Project) would be comprised of a high-voltage alternating current (AC) transmission line that would run between existing, planned, and proposed substations. A proposed single-circuit 500-kilovolt (kV) transmission line approximately 400 miles in length would begin at the planned Aeolus Substation near Medicine Bow, Wyoming, connect to two proposed series compensation substations, and terminate at the Clover Substation near Mona, Utah. The Clover Substation was previously known as the Mona Annex Substation. Several alternative routes between these two termini have been proposed to date. A map of the Project study area, which includes the proposed alternative routes, is presented as Figure 1 – Alternative Routes Map. The Proponent preferred route consists of the following links: W15, W21, W35, W36, W30, W32, W101, W125, W108, W116, W113, W302, W411, C31, C61, C71, C91, C92, C171, C173, C174, C175, C186, C188, U242, U280, U285, U300, U400, U401, U404, U413, U418, U408, U411, U417, U445, U504, U508, U514, U516, U560, U530, U533, U539, U460, U621, U625, U638, U639, U650.

The Project would connect two planned substations and two proposed series compensation substations including:

- Planned Aeolus Substation—this substation is planned to be constructed under the Gateway West project and will need to be in service prior to the in service date for this Project.
- Existing Clover Substation—this substation interconnects to the existing Mona Substation and existing 345kV transmission system in Utah. The Clover Substation was constructed as part of the Mona to Oquirrh Transmission Line Project.
- Proposed Series Compensation Substations 1 and 2—two series compensation substations are proposed at approximately the one-third and two-third points of the line between the Aeolus and Clover Substations to improve the transport capacity and efficiency of the transmission line.

Modifications at the Mona substation will be required, however, it is anticipated that no expansion outside of the Mona substation fence line will be required. The Mona to Huntington 345kV transmission line would also be rerouted from the Mona Substation to the Clover Substation. This would include construction of two new single circuit 345kV line segments into

the Clover Substation. A new transmission line corridor would be required on the North and East sides of the Clover Substation.

The proponent's project description has been revised to incorporate new information and is being submitted to the BLM concurrently as Appendix B to this revised SF 299.

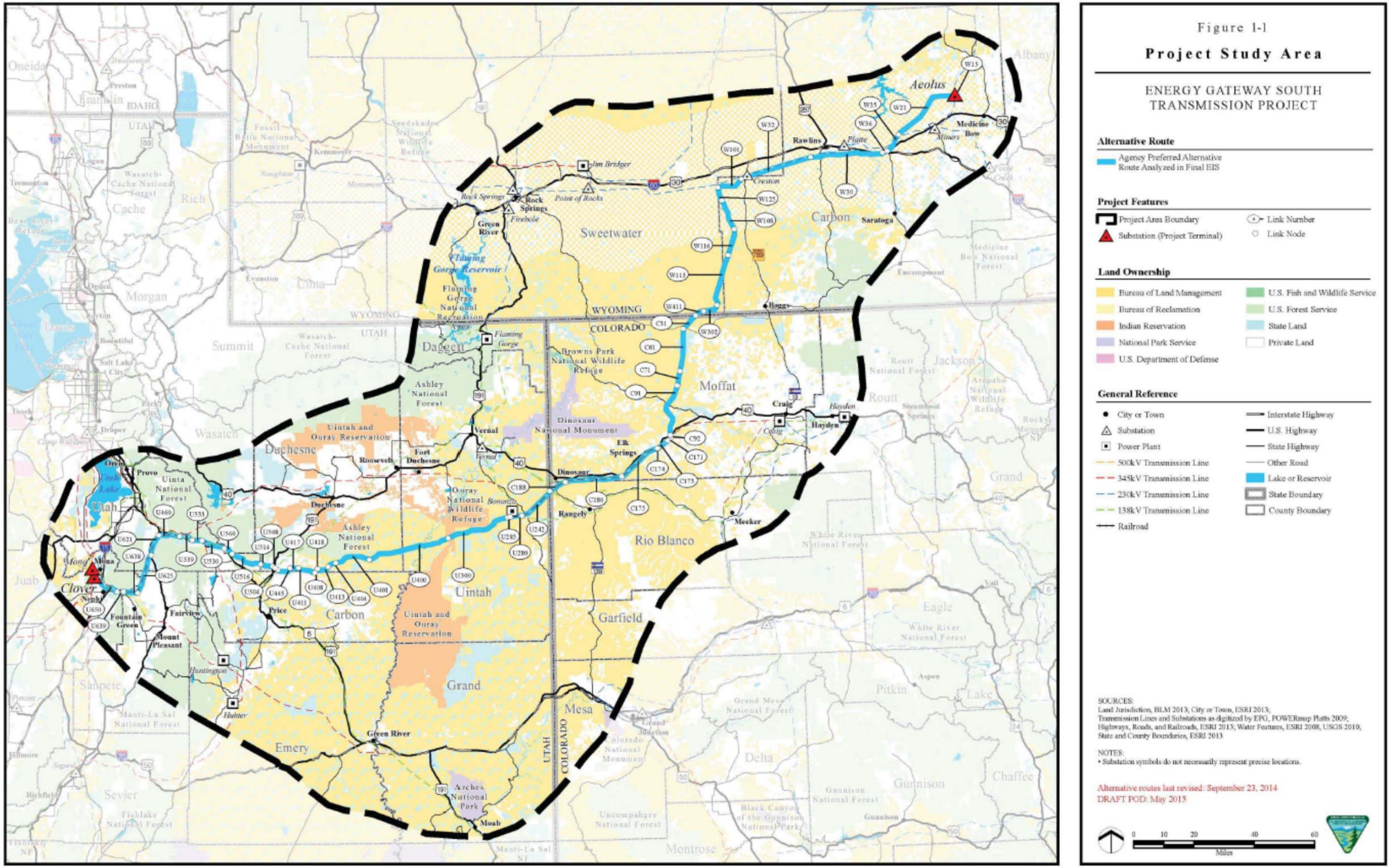

Figure 1 – Alternative Routes Map

(a) Type of system or facility

An extra high-voltage transmission line system, including proposed Series Compensation Stations 1 and 2, are being proposed as 500kV AC facilities. The rebuilding of three 345kV lines between the existing Clover and Mona Substations is being proposed.

(b) Related structures and facilities

The proposed transmission line circuits typically would be supported by the following types of 500/345kV structures: 500kV self-supporting single circuit lattice steel (Figures 2 and 3), single circuit guyed lattice steel (Figures 4 and 5), self-supporting single circuit steel 500kV and 345kV H-frame (Figures 6 and 7), and 345kV single circuit steel mono-pole and/or double circuit steel mono-pole structures (Figures 8 and 9). A more detailed description of transmission line segments, substations, and ancillary facilities is included in Attachment B – Project Description.

In general, single-circuit guyed lattice steel structures would be used in Wyoming, Colorado, and portions of Utah as tangent towers (in locations that have a line angle equal to or less than 1 degree) in flat to rolling terrain. In areas where terrain is rougher and in locations that have a line angle equal to or less than 1 degree, tangent towers would be self-supporting lattice steel structures. Self-supporting lattice steel towers would be used in all areas of the project where angles in the line would be greater than 1 degree.

The 345kV single-circuit lines between the Clover and Mona Substations would use steel H-frame (Figure 7), steel mono-pole single circuit (Figure 8), and/or steel mono-pole double circuit (Figure 9) 345kV structures, depending on final design requirements. Detail is included in Attachment B – Project Description.

PacifiCorp/Rocky Mountain Power proposes to acquire a permanent 250-foot-wide right-of-way for the construction and operation of the Project. The 345kV transmission line rebuild would require a permanent 150-foot-wide right-of way. The determination of the right-of-way width is primarily based on two main criteria: (1) sufficient horizontal conductor clearance must be maintained to the right-of-way edge under all conditions and (2) sufficient room must be provided within the right-of-way to perform transmission line maintenance.

The proposed Series Compensation Substations 1 and 2 would be located at separate points between the planned Aeolus Substation and the planned Clover Substation. Circuit breakers and related switching equipment, bus supports and other equipment would be installed for the 500kV transmission line(s) structures. Additional equipment, including 500kV series capacitors and 500kV transformers and shunt reactor banks, and emergency generators along with all associated site preparation, fencing, foundations, protection, control, communications equipment, and metering would be installed. Locations for the series compensation stations have not yet been identified but generally would be located equidistant between the planned Aeolus Substation and the Clover Substation. Permanent access roads to all substations would be required and in general, substation access roads would be approximately 20 feet in width with minimum 110-foot turning radius, depending on the slope conditions. Final design for the 500kV transmission system, including

proposed series compensation substations, would not be determined until further transmission planning and engineering studies have been completed.

Major facility/equipment additions to Clover Substation (inside the fence) include, but are not limited to, 500kV and 345kV related equipment, i.e. circuit breaker(s), shunt capacitor(s), shunt reactor(s), along with all associated site preparation, fencing, foundations, steel substation towers, bus work, protection and control, and metering.

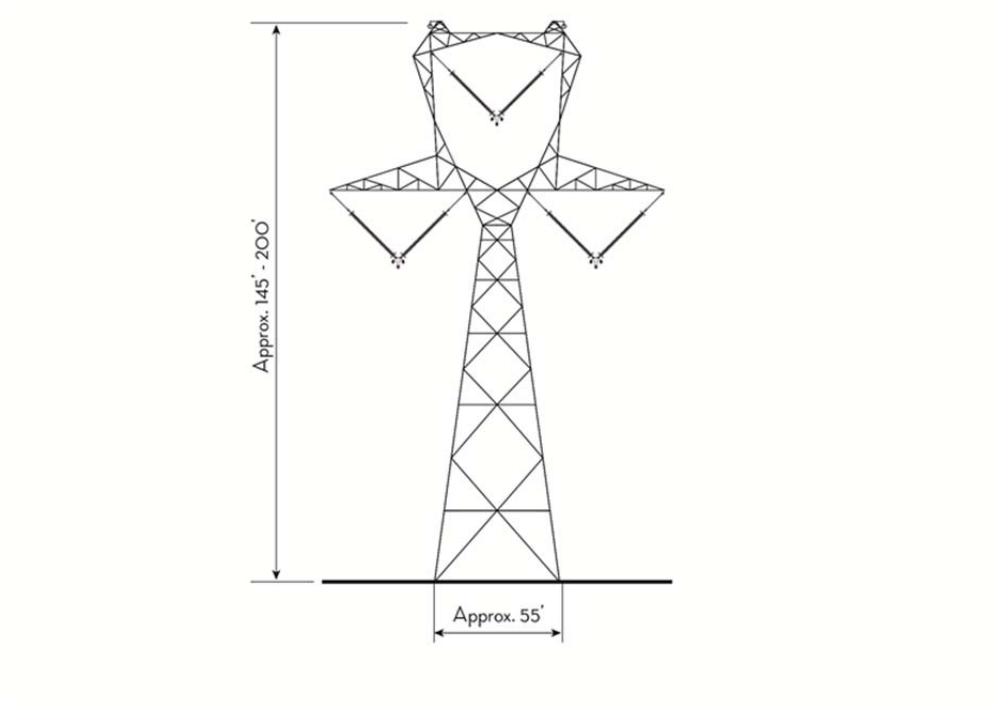

Figure 2 – Proposed Single-circuit 500-kilovolt Lattice Steel Structure (Delta Configuration)

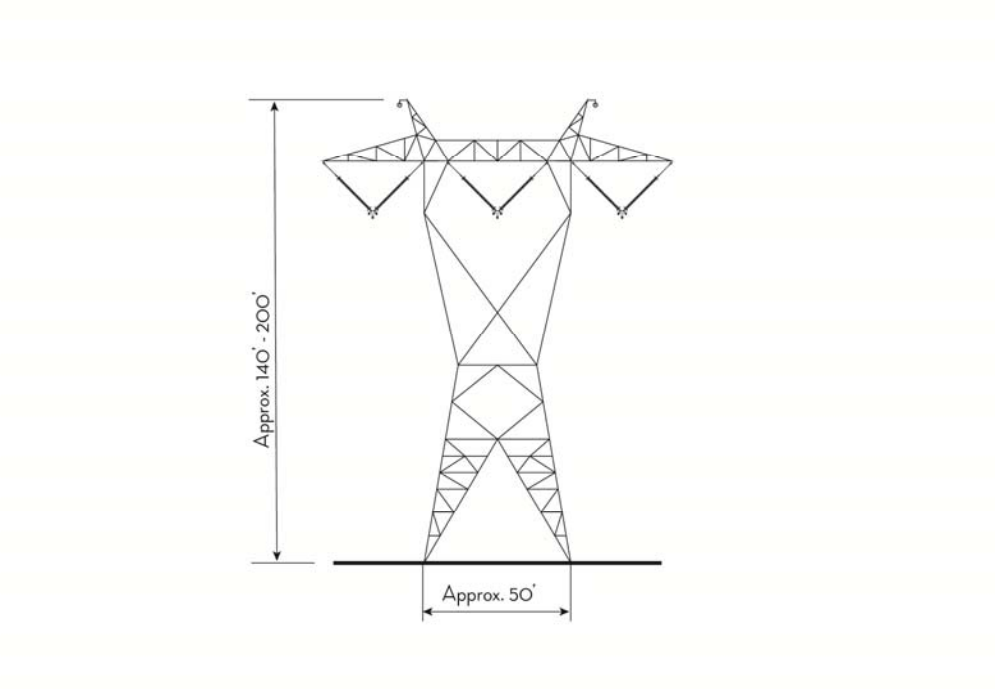

Figure 3 – Proposed Single-circuit 500-kilovolt Lattice Steel Structure (Horizontal Configuration)

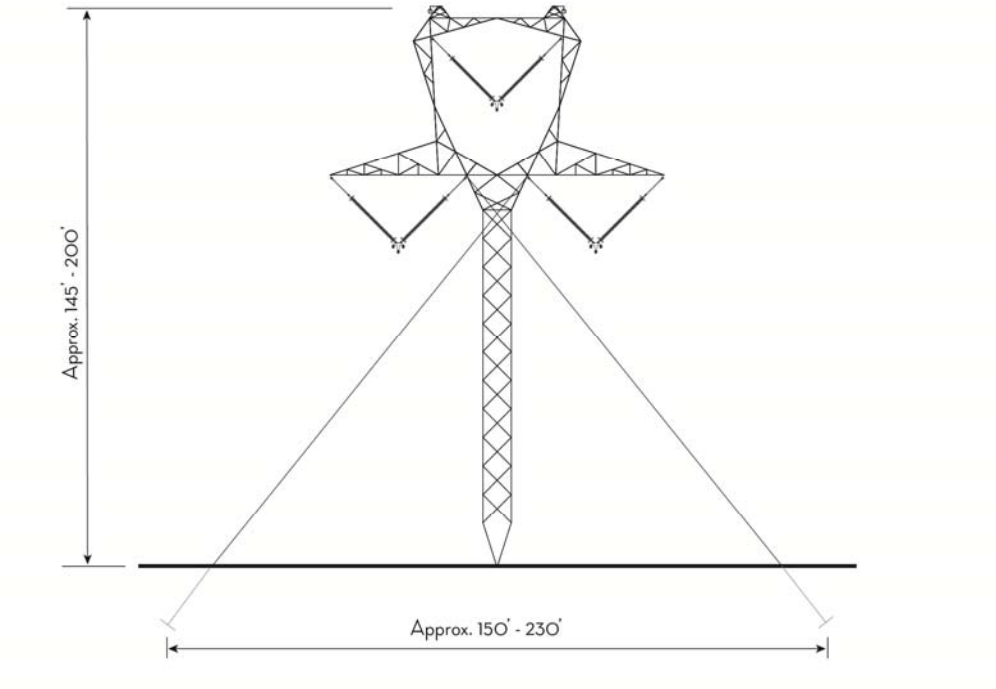

Figure 4 – Proposed Guyed Delta Lattice Steel

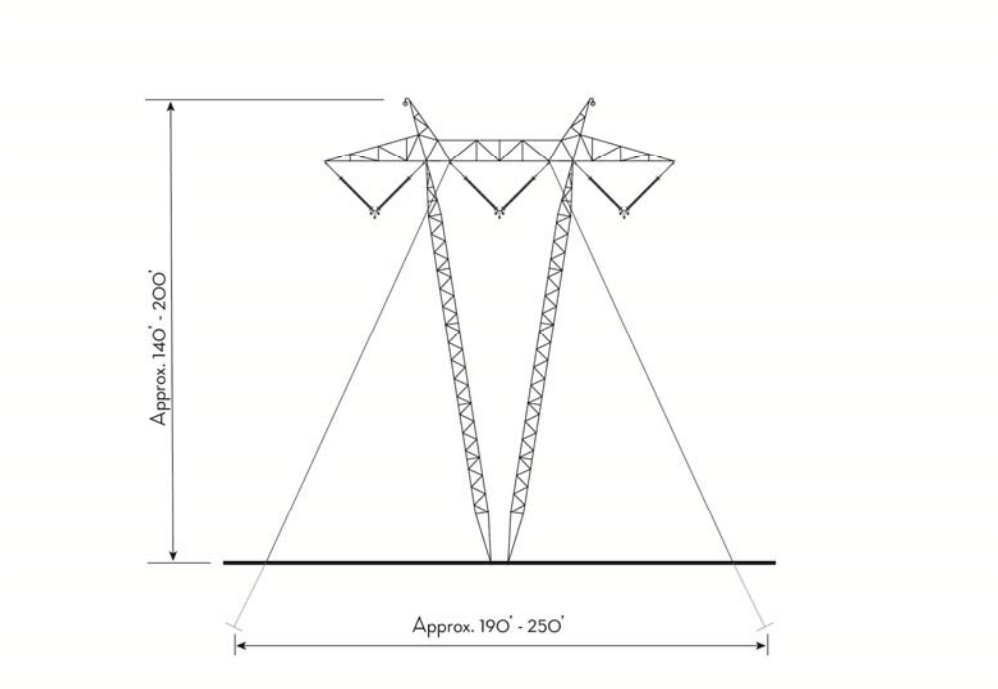

Figure 5 – Proposed Guyed V Lattice Steel

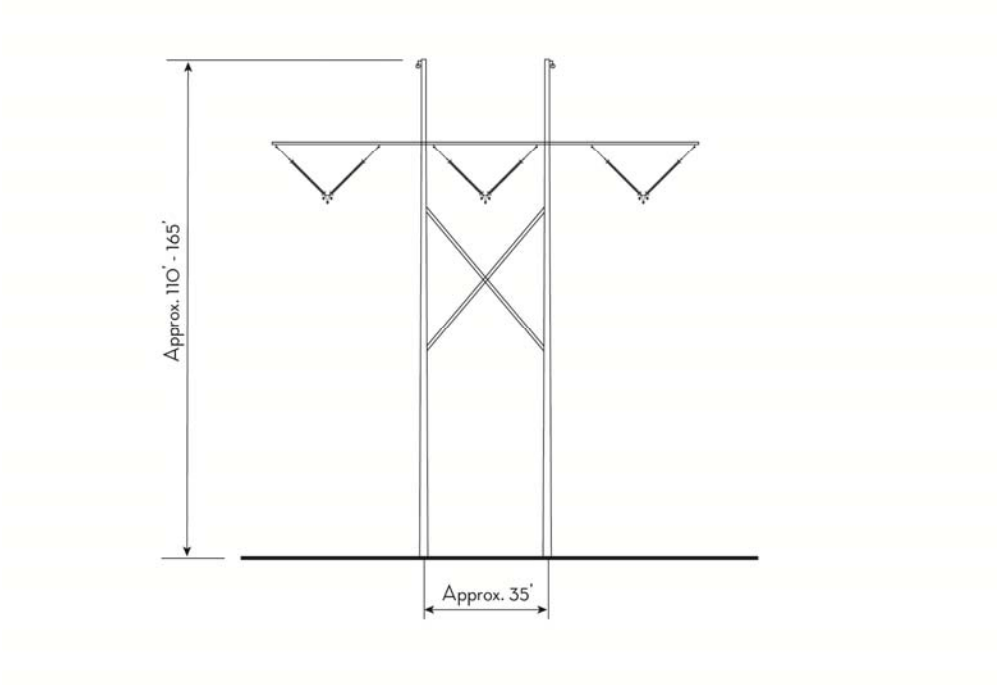

Figure 6 – Proposed Tangent Single-circuit 500-kilovolt H-frame Structure

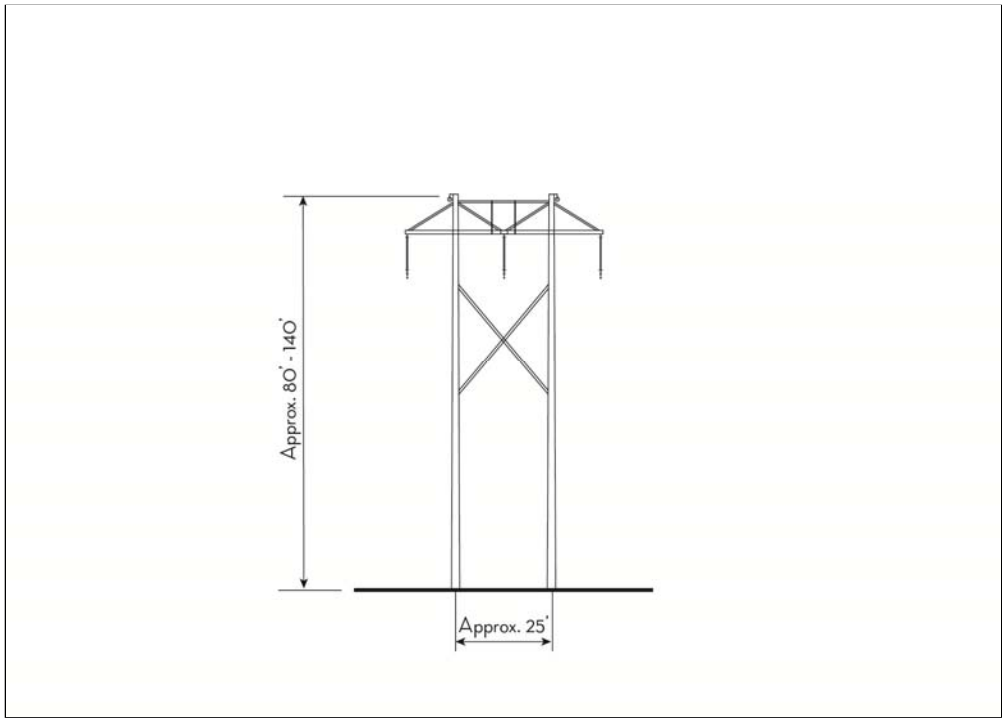

Figure 7 – Proposed Tangent Single-Circuit 345 kV H-Frame Structure

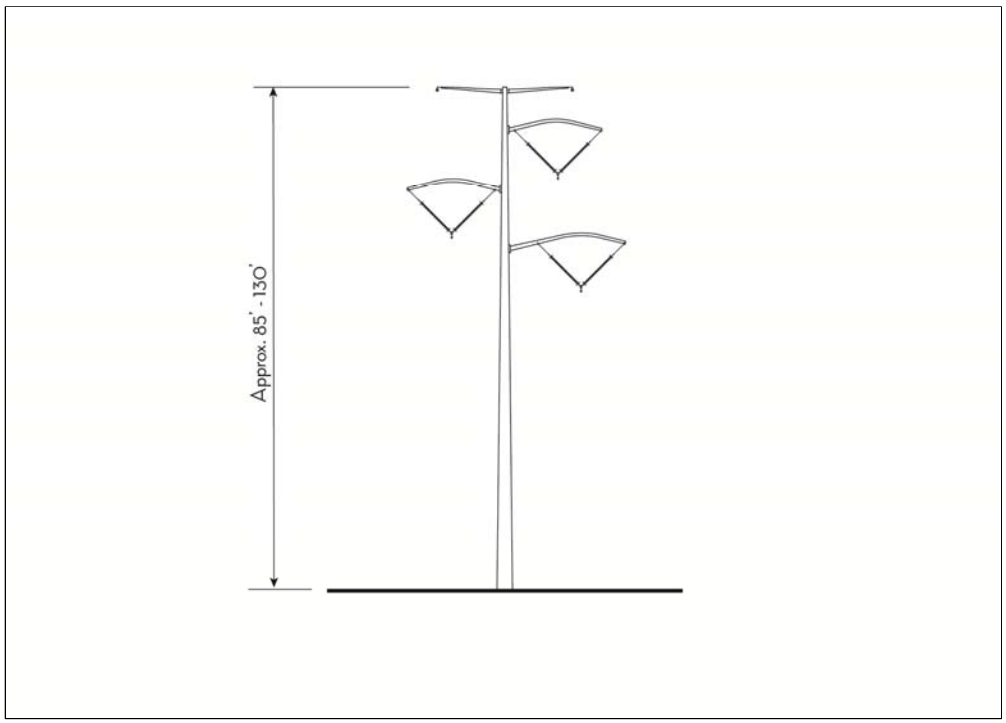

Figure 8 – Proposed Single-Circuit 345kV Mono-Pole Tangent Structure (for angles 0°–5°)

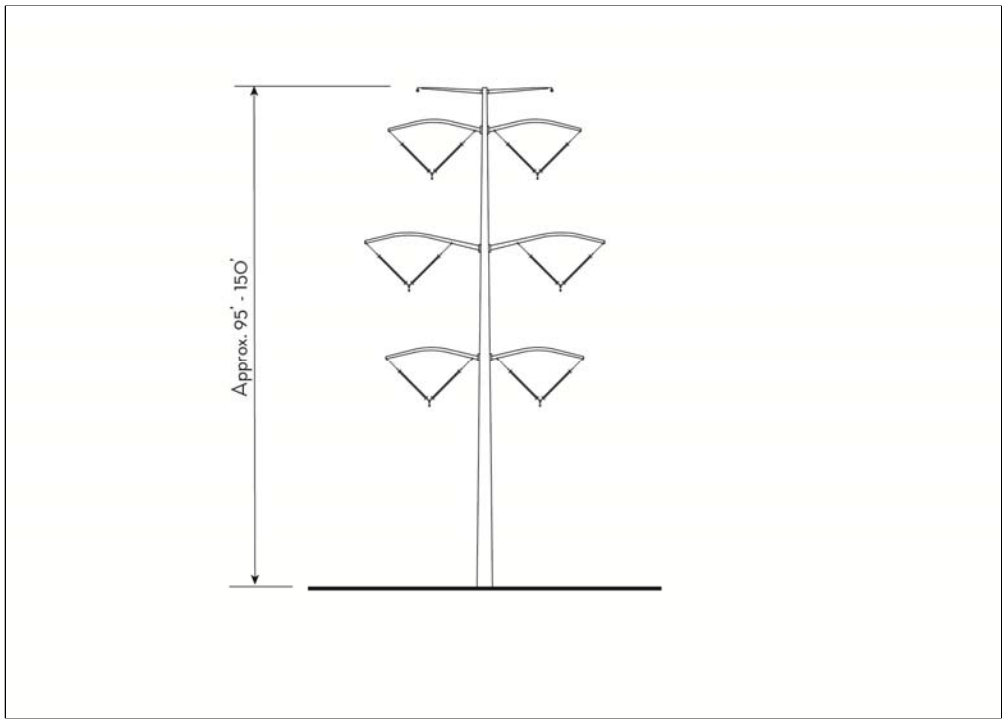

Figure 9 – Proposed Double-Circuit 345kV Mono-Pole Tangent Structure (for angles 0°–5°)

(c) Physical Specifications

The transmission system length would be approximately 400 miles (depending on the alternative route selected) with a right-of-way width of 250 feet. The transmission system is required to meet reliability standards established by the North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC). As an essential service provider, PacifiCorp/Rocky Mountain Power's obligation remains to provide safe, reliable, reasonably priced electricity to meet the current and future needs of our customers. Based on best engineering practices, maintaining adequate physical separation from other existing extra high voltage transmission lines remains a priority for the Company to meet reliability standards.

The rebuild of the transmission lines between Mona and Clover substations would be approximately 3 miles long on existing right-of-way. The length of the Mona to Huntington rebuild is still to be determined.

A more detailed project description, including physical specifications of the transmission line segments, substations, and ancillary facilities is included in Attachment B – Project Description. Final design for the proposed transmission line and substation facilities will be determined upon further transmission planning and engineering studies.

(d) Term of years needed

The requested term of right-of-way grant for the Project is 50 years.

(e) Time of year or use of operation

The transmission line(s) would operate year-round and on a daily basis, 24 hours a day. Maintenance activities would be scheduled and coordinated with other facilities to avoid service interruptions to customers served by the line(s).

(f) Volume or amount of product to be transported

The proposed transmission line would have a Planned Rating of approximately 1,500 megawatts (MW) of power. WECC'S Three Phase Rating Process and Procedures will determine the final Approved Ratings. The amount of energy transferred on the transmission line at any given time may vary depending upon the needs of customers, system configurations, and the demands of the larger interconnected electrical system.

(g) Duration and timing of construction

A minimum of 3 years is anticipated to construct the proposed substations and transmission line with construction projected to begin in July 2017.

(h) Temporary work areas needed for construction

Temporary work areas would be determined during preliminary design and compliance with the National Environmental Policy Act (NEPA), through the development of an Environmental Impact Statement (EIS). Approximately one 30-acre construction yard would be required every 20 miles (locations to be determined and located on private property to the maximum extent possible). Approximately one 15-acre fly yard will be required every 5 miles (locations to be determined and located on private property to the maximum extent possible). A work area of approximately 250 feet by 250 feet (1.43 acres per structure), depending on slope, would be needed at each tower site. Line tensioning sites would require approximately a 250' width x 600' length approximately every 9000 feet (3.4 acres). More information on the typical dimensions for and associated with the transmission line components is included in Attachment B – Project Description.

8) Attach a map covering area and show location of project proposal.

The location of the Project, including the proposed alternative routes being considered for detailed analysis, is presented in Figure 1 – Alternative Routes Map.

9) State or local government approval:

Applications for all required state and local permits would be submitted during, or after, the Bureau of Land Management (BLM) and U.S. Forest Service's (USFS) review and approval process, as appropriate.

10) Nonreturnable application fee:

An application fee was filed with the original Project right of-way application submittal in May 2007 (under the name Jim Bridger to Crystal Project).

12) Give statement of your technical and financial capability to construct, operate, maintain, and terminate system for which authorization is being requested.

PacifiCorp/Rocky Mountain Power has successfully constructed, operated, and maintained similar electrical facilities throughout the states of Wyoming and Utah (and its six-state service territory) for 100 years. PacifiCorp/Rocky Mountain Power has the technical and financial capability to construct, operate, and maintain the proposed Project.

13a) Describe other reasonable alternative routes and modes considered.

Regional corridor feasibility studies were completed from Wyoming to southern Nevada to assist in developing transmission corridors. Results of the studies identified corridor options that would minimize potential environmental impacts. The preliminary corridors for study were typically up to 4 miles wide and were included in the Preliminary SF 299 application submitted to the BLM in 2007. Subsequent to the 2007 analysis, additional review and screening of the alternatives has been performed with further consideration for the following criteria:

- Presence of designated or proposed utility corridors
- Presence of other existing linear facilities
- Sensitive resource areas and land use constraints (at a macro level)
- Substation interconnection requirements
- System planning criteria including separation requirements from existing and planned bulk electric facilities
- Construction, minimized line length, operation, and maintenance of facilities

PacifiCorp/Rocky Mountain Power's interdisciplinary team used the following process to further identify alternative routes:

- Utilize federally-designated utility corridors as feasible, but minimize the use of utility corridors that contain existing extra-high voltage transmission lines
- Parallel linear facilities, such as pipelines, low voltage transmission lines, etc.
- Minimize segments and/or line mileage that conflicts with the NERC and/or WECC planning criteria, and would result in reduced reliability or capacity.

After reviewing comments on the Draft Environmental Impact Statement, alternative route links have been added, adjusted, or eliminated to address identified resource and land use conflicts. The Bureau of Land Management revised alternative route links based on their consistency with management objectives and whether they would have substantially greater or similar effects compared to other alternatives being carried forward in the analysis. Figure 1 – Alternative Routes Map Pacificorp/Rocky Mountain Power's proposed alternative route. As part of this proposed route, PacifiCorp/Rocky Mountain Power proposes to relocate a small portion of the existing Bears Ears to Bonanza line outside the Raven Ridge ACEC in a manner as to also accommodate the GWS alignment outside the ACEC. Engineering details regarding the relocation will be completed upon approval of a final route in the Record of Decision and right-of-way grant.

Further detailed environmental studies, engineering studies, and field review/surveys will be required for the proposed alternative transmission line routes, substations, and series compensation substations as part of the NEPA process.

13b) Why were these alternatives not selected?

The PacifiCorp/Rocky Mountain Power interdisciplinary team eliminated some preliminary routes due to incompatibility with the Company's regulatory obligations and industry transmission planning standards. Alternative routes that have been eliminated from consideration at this time include routes that:

- do not meet the purpose and need for the Project;
- do not meet system reliability or planning criteria for the Project; or
- are not practical to construct or financially infeasible.

Based on preliminary comments from federal and state agencies, some alternative routes were also eliminated based on non-compliance with land management plans and known sensitive resources.

The Bureau of Land Management further refined the alternatives upon receiving feedback from comments on the Draft Environmental Impact Statement and collecting environmental resource data.

Alternative routes and substation sites that meet the Project's purpose and need will be considered during the NEPA process.

13c) Give explanation as to why it is necessary to cross federal lands.

In order to interconnect the transmission line with all necessary terminal points (substations), the crossing of federally managed land primarily administered by the BLM and USFS would be required. Generally, the study area is identified as open range and undeveloped; however, incorporated cities and other populated areas are dispersed throughout. Generally, alternatives identified outside of urban areas would cross federally managed land.

14) List authorizations and pending applications filed for similar projects which may provide information to the authorizing agency (*Specify number, date, code, or name*).

Four right-of-way applications have been filed with the BLM for EHV transmission lines within the Project study area:

(1) Mona to Oquirrh 500/345kV Transmission Corridor Project, filed January 2007 with the BLM Salt Lake and Fillmore field offices by PacifiCorp/Rocky Mountain Power;
(2) Wyoming-West Transmission Corridor Project (Wyoming-West), filed in March 2007 by National Grid and the Wyoming Infrastructure Authority (WIA)—at this time National Grid and WIA are not moving forward with Wyoming West;
(3) Dave Johnston to Hemingway 500kV Transmission Project (Gateway West), filed in May 2007 by PacifiCorp/Rocky Mountain Power and Idaho Power Company; and
(4) TransWest Express 500kV Transmission Project (TransWest Express), filed in November 2007 by National Grid, revised by National Grid in February 2008, and then reassigned to TransWest Express LLC in September 2008.

In August 2007, Arizona Public Service (APS), PacifiCorp/Rocky Mountain Power, WIA, and National Grid entered into an agreement to collaborate on the development of the TransWest Express and Energy Gateway South projects. Since this time, APS, WIA, and National Grid have withdrawn from the agreement, and the right-of-way application and related BLM project file for the TransWest Express Project has been assigned to TransWest Express LLC. More recently, PacifiCorp/Rocky Mountain Power and TransWest Express LLC cooperated as requested by BLM to locate the transmission lines in shared corridors.

15) Provide statement of need for project, including the economic feasibility and items such as: (a) cost of proposal (*construction, operation, and maintenance*); (b) estimated cost of next best alternative; and (c) expected public benefits.

The energy needs of PacifiCorp/Rocky Mountain Power's customers have significantly increased the electrical demands placed on the supply system over the past 25 years. As a result, the current transmission system that has provided consumers with access to low cost generating resources and ensures the delivery of reliable service is now fully utilized. Looking to the future, prudent action by PacifiCorp/Rocky Mountain Power requires that electric infrastructure be planned and constructed.

The Project will help ensure customers now and in the future have adequate sources of safe and reliable electricity including new sources of renewable energy provided by wind generation located in Wyoming. PacifiCorp/Rocky Mountain Power provides an essential public service and is obligated to provide safe, reliable, efficient and adequate service thereby meeting the growing electrical demands of its customers.

This Project will fulfill the following key responsibilities of PacifiCorp/Rocky Mountain Power in meeting those obligations:

- Transmission capacity – provide incremental levels of increased transmission capacity for use by PacifiCorp's network customer's longer term and additionally provide opportunities for third-party transmission users to acquire access and to maintain PacifiCorp/Rocky Mountain Power's ability to continue to meet existing contract commitments for transmission service.
- Meeting customer demand – support the increasing electrical needs demanded by retail customers in the region, and meeting those demands both now and for the long term. Electric customers' demands for more electricity continue to grow along with their expectations for increased reliability.
- Reliability – provides increased reliability by adding to the region's existing transmission infrastructure, which is now capacity constrained and is operationally limited. The Project will substantially improve PacifiCorp/Rocky Mountain Power's ability to provide reliable electrical service to its customers through access to energy resources.
- Access energy resources—the Project is expected to provide necessary options to transport electricity generated from new and existing facilities anticipated to be built in Wyoming, which has substantial energy resources to serve PacifiCorp/Rocky Mountain Power's growing load centers. These energy resources include new renewable generation sources like wind, in addition to conventional thermal resources.

(a) Cost of proposal (construction, operation, maintenance):

The approximate cost of the transmission line project is anticipated to be $1.5 billion.

(b) Estimated cost of next best alternative

This right-of-way application identifies several transmission line alternative routes. As the Project progresses through the EIS process, detailed studies would be completed and alternative routes would be evaluated in detail.

(c) Expected public benefits

The transmission line(s) would increase reliability and maintain economic viability of electricity to consumers throughout the western states. Other public benefits may include increased employment in rural areas, as part of transmission line(s) construction and operation, and an increased tax base.

16) Describe probable effects on the population in the area, including the social and economic aspects, and the rural lifestyles.

The Project may provide the impacted population with job opportunities (e.g., construction, operation, maintenance) and increased tax revenues based on the value of the Project's assets. All aspects of the Project's impact on the rural lifestyle would be examined in detail in the EIS. On a regional scale, the Western Interconnection would benefit from an additional improvement to the electrical system's capacity to provide safe, adequate, reliable, and efficient energy.

17) Describe likely environmental effects that the proposed project would have on: (a) air quality; (b) visual impact; (c) surface and ground water quality and quantity; (d) the control or structural change on any stream or other body of water; (e) existing noise levels; and (f) the surface of the land, including vegetation, permafrost, soil, and soil stability.

Mitigation measures would be developed, where necessary, to minimize potential environmental impacts to natural and human resources.

(a) Air quality

Construction of the Project would have relatively short-term and localized effects on air quality in the Project area, from fugitive dust and emissions from equipment exhaust.

(b) Visual impacts

Effects on visual resources would result from the visibility of Project facilities (e.g., transmission structures, conductors, and substation), vegetation clearing, and ground-disturbing construction activities. Viewers potentially affected by the Project include residences, recreationists, and travelers along roads. Mitigation measures would be implemented to reduce visual impacts where practicable.

(c) Surface and ground water quality and quantity

Effects to water resources are anticipated to be minimal. Minimal changes to drainage patterns are expected. Potential effects to surface water would be short-term during construction.

(d) Control or structural change on any stream or other body of water

The Project would not create any control or structural change of any perennial stream or other permanent body of water. Efforts would be made to place the transmission structures outside perennial streams and all other water bodies.

(e) Existing noise levels

Noise levels resulting from the Project would be almost entirely due to construction-related activities, which would result in a temporary increase in noise levels during daytime hours. Measures would be implemented to mitigate potential noise effects to receivers during construction activities. The Project would comply with all local noise ordinances during construction, maintenance, and operation.

(f) The surface of land including vegetation, permafrost, soil, and soil stability

For operational safety reasons, any tall-growing species vegetation in the Project's right-of-way would be removed. Impacts to vegetation would be temporary at each transmission line structure, except for the actual location of the transmission structure where vegetation would be removed. There may be impacts to vegetation from construction and maintenance access, depending on final construction design. Vegetation within existing rights-of-way, but outside of the Project's construction area, would not be impacted.

Potential impacts to soil stabilization from the Project would be minimal and would be mitigated.

18) Describe the probable effects that the proposed project would have on (a) populations of fish, plant life, wildlife, and marine life, including threatened and endangered species; and (b) marine mammals, including hunting, capturing, collecting, or killing these animals.

The Project is not anticipated to have an adverse impact on the populations of fish, marine life, marine mammals, including hunting, capturing, collecting, or killing these animals. Potential effects to populations of plant life, wildlife, including threatened and endangered species, would be evaluated in the NEPA compliance process. Mitigation measures would be developed where necessary to minimize potential environmental impacts.

19) State whether any hazardous material, as defined in this paragraph, would be used, produced, transported, or stored on or within the right-of-way or any of the right-of-way facilities, or used in the construction, operation, maintenance, or termination of the right-of-way or any of its facilities.

No hazardous material would be produced, transplanted, or stored on, or within the Project right-of-way. Petroleum products, such as gasoline, diesel fuel, and lubricants, would be present on-site during construction. These products would be used to fuel and lubricate vehicles and equipment but would be contained within fuel trucks or in approved containers. Vehicle-fueling and maintenance activities would not occur in any environmentally sensitive areas. When not in use, such materials would be stored properly to prevent drainage or accidents during Project construction.

Construction, operation, and maintenance activities would comply with applicable federal, state, and local regulations regarding the use of hazardous materials. Hazardous materials would not be drained onto the ground or into streams. 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 removed and transported to a disposal facility authorized to accept such materials. Spills are not expected, but should they occur, would likely be minimal and would be immediately addressed. All potentially hazardous materials would be addressed in the EIS and the final Plan of Development.

Mitigation measures would be developed where necessary to minimize potential environmental impacts.

20) Name all the Department(s)/Agency(ies) where this application is being filed.

The Project primarily crosses federal lands managed by the BLM and the USFS. This right-of-way application has been filed with the BLM Wyoming State Office.

ENERGY GATEWAY SOUTH TRANSMISSION PROJECT

Revised Standard Form 299 Right-of-Way Application
Attachment B – Project Description

Revised from January 2013 Submittal

Submitted to:

Bureau of Land Management
Wyoming State Office
5353 Yellowstone Road
Cheyenne, Wyoming 82003

Submitted by:

PacifiCorp/Rocky Mountain Power

April 2015

Per request of the Bureau of Land Management (BLM), PacifiCorp/Rocky Mountain Power is providing a more detailed description of the Energy Gateway South Project (Project).

1.0 PROJECT DESCRIPTION

1.1 Substation and Ancillary Facilities Descriptions

Table 1-1 describes the anticipated components of each substation and the ancillary facilities.

TABLE 1-1
SUBSTATION AND ANCILLARY FACILITIES DESCRIPTIONS

Substation	Description
Aeolus Substation	▪ *Planned* substation to be constructed as part of proposed Energy Gateway West Project ▪ Planned access road is gravel and would not need extension ▪ 500kV circuit breakers and related switching equipment ▪ Bus and support structures ▪ 500kV line termination structures approximately 125 to 135 feet in height ▪ 500kV shunt reactor bank(s) ▪ 500kV shunt capacitor bank(s) ▪ Potential and current transformers ▪ Control, protection, and communications equipment
Series Compensation Substation #1	▪ *Proposed* Substation ▪ Access road required ▪ Perimeter security fence ▪ 500 kV circuit breakers and related switching equipment ▪ 500kV line termination structures approximately 125 to 135 feet in height ▪ Bus and support structures ▪ 500kV shunt reactor banks ▪ 500kV series capacitors ▪ Emergency generator ▪ Potential transformers ▪ Control, protection, and communications equipment ▪ Control building
Series Compensation Substation #2	▪ *Proposed* Substation ▪ Access road required ▪ Perimeter security fence ▪ 500kV circuit breakers and related switching equipment ▪ 500kV line termination structures approximately 125 to 135 feet in height ▪ Bus and support structures ▪ 500kV shunt reactor banks ▪ 500kV series capacitors ▪ Emergency generator ▪ Potential transformers ▪ Control, protection, and communications equipment ▪ Control building
Clover Substation	▪ *Existing* substation constructed as part of the Mona to Oquirrh Project ▪ Gravel access road ▪ Perimeter security fence ▪ 500kV and 345kV circuit breakers and related switching equipment

TABLE 1-1 SUBSTATION AND ANCILLARY FACILITIES DESCRIPTIONS	
Substation	**Description**
	▪ Bus and support structures ▪ 500kV/345kV transformer bank ▪ 500kV shunt reactor bank ▪ 500kV series capacitors ▪ Emergency generator ▪ Potential and current transformers ▪ Control, protection, and communications equipment ▪ Control building
Ancillary Facilities	
Communications and Control Facilities	▪ Regenerator sites are required to amplify the system control and monitoring signals carried over the fiber optic cable attached to the transmission towers ▪ A total of 10 regenerator sites will be needed ▪ Regenerator sites will be located either within a substation or at another location along the route remote from a substation ▪ Regenerator sites remote from a substation are 100 X 100 feet with a 75 X 75-foot fenced area ▪ Typical building dimensions within the fenced area are 12 feet wide X 32 feet long X 9 feet tall ▪ The fiber OPGW cable supported on the transmission structures would be routed in and out of the regenerator site building from the nearest transmission structure either underground or overhead along two independent diverse paths ▪ Electronic equipment, required to support the fiber optic cable installation would be located inside the building ▪ At sites not within a substation, an LP fueled emergency generator would be installed to provide backup power during an outage of the local electric distribution system supply ▪ Maximum regenerator site spacing is 55 miles or less depending on access and proximity to local electric distribution lines ▪ The primary siting criteria for a regenerator site located outside of a substation would be: adjacent to the transmission line right-of-way, proximity to existing low voltage electric distribution lines to provide power to the facility, and the ability to easily access the site by vehicle
Other	▪ Distribution line extensions are required to provide operational power and station service power at: o Regenerator Sites – for standalone regeneration stations o Series Compensation Substation #1 o Series Compensation Substation #2 ▪ Typically provided from an existing distribution line located in proximity to the site ▪ Not required for Aeolus and Clover Substations since these are currently planned and/or will exist at the time of Project construction

1.2 Transmission Line Descriptions

Table 1-2 describes the anticipated typical characteristics of the transmission line.

TABLE 1-2
TRANSMISSION LINE DESCRIPTIONS

Transmission Line	Description
500 kV Transmission Line Facilities	▪ Three-phase 500kV construction for all tower designs, conductor spacing, and clearances ▪ Nominal Voltage: 500kV AC line-to-line ▪ Capacity: 1,500 MW per circuit ▪ Conductors: bundled 1,272 kcmil 45/7 ACSR/TWD “”Bittern”, with three subconductors per phase o Non-specular finish o Subconductor triple bundle configuration: triangular o Estimated subconductor diameter: 1.345 inches ▪ One OPGW - wire diameter: 0.637 inches, containing 48 fibers ▪ One EHS steel overhead ground wire - estimated shield wire diameter: approximately 0.495 inches ▪ Typical minimum design conductor ground clearance: 35 feet ▪ Proposed structure types: o Self-supporting lattice steel, single-circuit structures (delta configuration); dulled galvanized steel finish; o Self-supporting lattice steel, single-circuit structures (horizontal configuration), dulled galvanized steel finish; o Self-supporting tubular steel, single-circuit tangent H-frame structures (horizontal configuration) self-weathering or dulled galvanized finish; o Guyed “V” lattice steel, single-circuit structures(horizontal configuration), dulled galvanized steel finish o Guyed lattice steel, single-circuit structures (delta-configuration); dulled galvanized steel finish. ▪ Typical structure heights varies between 100 and 200 feet ▪ Approximate distance between structures: 1,000 to 1,800 feet (average span length of 1,500 feet) ▪ Right-of-way width: 250 feet ▪ The exact quantity, structure type and height, distance between (span lengths), and specific locations (spotting) of the structures would depend on the final detailed design of the transmission line, which is influenced by the terrain, land use, and economics. Alignment refinements may also slightly increase or decrease the quantity, location, and height of structures ▪ Regeneration stations located at maximum spacing of 55 miles common to all segments (see ancillary facilities description in Table 1-1) ▪ Two series capacitor substations would be located at the 1/3rd and 2/3rd points along the line ▪ Line length: approximately 400 miles
345 kV Transmission Line Facilities	▪ Three-phase 345kV construction for all tower designs, conductor spacing, and clearances ▪ Nominal Voltage: 345kV AC line-to-line

TABLE 1-2 TRANSMISSION LINE DESCRIPTIONS	
Transmission Line	**Description**
	▪ Capacity: 700 MW per circuit ▪ Conductors for Mona to Clover lines: bundled 1,272 kcmil 45/7 ACSR "Bittern", with three subconductors per phase o Non-specular finish o Subconductor bundle configuration: vertical o Estimated subconductor diameter: 1.345 inches ▪ Conductors for Mona to Huntington line: bundled 954 kcmil 54/7 ACSR "Cardinal", with two subconductors per phase o Non-specular finish o Subconductor double bundle configuration o Estimated subconductor diameter: 1.196 inches ▪ One OPGW - wire diameter: 0.637 inches, containing 48 fibers ▪ One EHS steel overhead ground wire - estimated shield wire diameter: approximately 0.495 inches ▪ Typical minimum design conductor ground clearance: 30 feet ▪ Proposed structure types: o steel H-frame single- circuit structures; self-weathering steel or dulled galvanized steel finish o steel mono-pole single circuit o steel mono-pole double circuit ▪ Typical structure heights varies between 80 and 140 feet ▪ Approximate distance between structures: 800 to 1,200 feet ▪ Right-of-way width: 150 feet ▪ The exact quantity, structure type and height, distance between and placement of the structures would depend on the final detailed design of the transmission line, which is influenced by the terrain, land use, and economics. Alignment options may also slightly increase or decrease the quantity, location, and height of structures

1.2 Transmission Line Descriptions

Table 1-3 describes the anticipated typical dimensions for transmission line components.

TABLE 1-3 TYPICAL DIMENSIONS FOR 500kV and 345kV TRANSMISSION LINE COMPONENTS	
500kV Transmission Lines	
Land Temporarily Disturbed	
Structure Work Area	250 x 250 feet per structure Disturbance associated with construction at structures will be minimized to the extent practicable by incorporating grading design, using the maximum variability of structure leg extensions during construction planning.
Wire-pulling and Tensioning Sites	250 x 400 feet, two every 3 to 5 miles
Splicing sites	100 by 100 feet every 9,000 feet

Multi-purpose Construction Yards	Approximately one 30-acre site every 20 miles, location to be determined[1]
Helicopter Fly Yards	Approximately one 15-acre site every 5 miles where helicopter construction is used, locations to be determined
Land Permanently Required	
Area occupied by the structure	0.08 acre
Right-of-way width	250 feet
Access Roads(improve existing, spur, and new)	Improvements to existing, spur, and new roads will typically have a 14-foot-wide travel surface (in steeper terrain the travel surface width could be a maximum of 22 feet for radius of curves) including disturbance for grading and drainage features (total distance to be determined). Ground disturbance associated with access road construction could typically range from approximately 2.8 to 17 acres of disturbance per mile, depending on site conditions and topography.
Other	
Typical Structure Heights	Between 100 and 200 feet
Approximate distance between Structures	1,000 to 1,800 (average span of 1,500 feet)
Communication regeneration station	100 by 100 feet with 75- by 75-foot fenced areas and a 12- by 32-foot building; one station approximately every 55 miles
345kV Transmission Lines	
Land Temporarily Disturbed	
Structure Work Area	150 x 200 feet per structure
Wire-pulling and Tensioning Sites	150 by 400 feet; one site located at the end of each segment
Splicing site	100 by 100 feet; one site for segments 4a and 4b
Multi-purpose Construction Yard	One 10-acre site, location to be determined
Helicopter Fly Yard	15-acre site located near Clover Substation (location to be determined)[2]
Land Permanently Required	
Area occupied by structure	5 by 40 feet per structure (H-frame)
Right-of-way width	150 feet
Access Roads(improve existing, spur, and new)	Improvements to existing, spur, and new roads will typically have a 14-foot-wide travel surface (in steeper terrain the travel surface width could be a maximum of 22 feet for radius of curves) including disturbance for grading and drainage features (total distance to be determined). Ground disturbance associated with access road construction could typically range from approximately 2.8 to 17 acres of disturbance per mile, depending on site conditions and topography.
New Spur Roads Required	Approximately 0.625 mile of new spur roads per

	mile of transmission line where new spur roads are needed.
Improve Existing Roads	Existing roads will be improved to 14 feet wide or smoothed to width of berm.
Other	
Typical Structure Heights	Between 80 and 140 feet
Approximate distance between Structures	800 to 1,200 feet

Notes:
The exact quantity, structure type and height, distance between and placement of the structures would depend on the final detailed design of the transmission line, which is influenced by the terrain, land use, and economics. Alignment options may also slightly increase or decrease the quantity, location, and height of structures

[1] Multi-purpose construction yards include concrete batch plants, which would occur approximately every 60 miles except in areas where the Project could be serviced by existing concrete batch plants. Helicopter landing and refueling also would occur in the multi-purpose construction yards

[2] Helicopter fly yards, which are used to transport materials to structure work areas during construction, also may include space dedicated for refueling helicopters.