

**REDACTED**

Rocky Mountain Power

Docket No. 17-035-40

Witness: Rick A. Vail

BEFORE THE PUBLIC SERVICE COMMISSION  
OF THE STATE OF UTAH

ROCKY MOUNTAIN POWER

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**REDACTED**

Direct Testimony of Rick A. Vail

June 2017

1 **Q. Please state your name, business address, and present position with PacifiCorp.**

2 A. My name is Rick A. Vail. My business address is 825 NE Multnomah, Suite 1600,  
3 Portland, Oregon 97232. My present position is Vice President of Transmission. I am  
4 responsible for transmission system planning, customer generator interconnection  
5 requests and transmission service requests, regional transmission initiatives, asset  
6 management, capital budgeting for transmission, and administration of the Company's  
7 Open Access Transmission Tariff ("OATT"). I am testifying on behalf of Rocky  
8 Mountain Power ("Company").

9 **QUALIFICATIONS**

10 **Q. Please describe your educational background and professional experience.**

11 A. I have a Bachelor of Science Degree with Honors in Electrical Engineering with a focus  
12 in electric power systems from Portland State University. I have been employed at the  
13 Company since 2001, and have had a range of management responsibility within the  
14 asset management group, including capital planning, maintenance policy, maintenance  
15 planning, and investment planning. I served as director of asset management from 2007  
16 to 2012. I became Vice President of Transmission in December 2012.

17 **PURPOSE AND SUMMARY OF TESTIMONY**

18 **Q. What is the purpose of your testimony?**

19 A. My testimony supports the Company's Application, which includes a request for an  
20 order under Utah Code Ann. § 54-17-302 approving the Company's "significant energy  
21 resource decision" to construct or procure four new Wyoming wind resources  
22 (collectively, the "Wind Projects") with a total capacity of 860 megawatts ("MW").  
23 The Application also includes a request for an order under Utah Code Ann. § 54-17-

24 402 approving the Company’s “resource decision” to construct a 140-mile, 500 kilovolt  
25 (“kV”) transmission line and related transmission facilities. Specifically, my testimony  
26 describes the purpose for and customer benefits resulting from the construction of the  
27 following proposed facilities, which I refer to collectively as the “Transmission  
28 Projects”:

29 “Aeolus-to-Bridger/Anticline Line”

- 30 • A 140-mile, 500 kilovolt (“kV”) transmission line (“Aeolus-to-Anticline line”),  
31 which includes construction of the new Aeolus (500/230 kV) and Anticline  
32 (500/345 kV) substations;
- 33 • A five-mile, 345 kV transmission line that will extend from the proposed  
34 Anticline substation to the Jim Bridger substation, along with associated  
35 interconnection facilities at the Jim Bridger substation to accommodate the  
36 interconnection of the 345 kV line from the proposed Anticline substation;
- 37 • A voltage control device at the existing Latham substation;

38 “230kV Network Upgrades”

- 39 • A new 16-mile 230 kV transmission line parallel to an existing 230 kV line from  
40 Shirley Basin substation to the proposed Aeolus substation, including  
41 modifications to the Shirley Basin substation to accommodate the new line;
- 42 • The reconstruction of four miles of an existing 230 kV transmission line  
43 between the proposed Aeolus substation and the Freezeout substation, including  
44 modifications of the Freezeout substation to accommodate the new line; and
- 45 • The reconstruction of 14 miles of an existing 230 kV transmission line between  
46 the Freezeout substation and the Standpipe substation, including modifications

47 to the Freezeout and Standpipe substations to accommodate the transmission  
48 lines.

49 The reconstructed sections are proposed to be in a parallel alignment to the  
50 existing 230 kV transmission lines. The 230 kV Network Upgrades are needed to  
51 support interconnection of the Wind Projects, which are described in the testimony of  
52 Company witness Mr. Chad A. Teply.

53 My testimony and exhibits provide the information required by Utah Code Ann.  
54 § 54-17-302 and Utah Admin. Code 746-440-1(1) related to the Transmission Projects.

55 **Q. Please summarize your testimony.**

56 A. The Transmission Projects support the Company's short- and long-term energy  
57 demands and will strengthen the overall reliability of the existing transmission system.  
58 While the Aeolus-to-Bridger/Anticline Line has long been recognized as an integral  
59 component of the Company's long-term transmission planning, its construction and  
60 that of the other components of the Transmission Projects has not been economic until  
61 now. Renewal of the federal wind production tax credit ("PTC") has created a time-  
62 limited opportunity for the Company to acquire significant cost-effective, zero-fuel-  
63 cost wind resources, generating PTCs from the Wind Projects enabling customers to  
64 receive substantial benefits as quantified by Mr. Rick T. Link.

65 To achieve the full customer benefits of the PTCs, however, the Company  
66 must develop the Wind Projects with the Transmission Projects and bring them into  
67 service by December 31, 2020. The Wind Projects are not economic without the  
68 Transmission Projects, which are needed to relieve existing congestion and to  
69 interconnect new PTC-eligible wind facilities in high-wind areas of Wyoming. The

70 Transmission Projects are not economic without incremental cost-effective wind  
71 facilities producing zero-fuel-cost energy and PTCs.

72 Congestion on the current transmission system in eastern Wyoming limits the  
73 ability to deliver energy from eastern Wyoming to the Jim Bridger energy hub. The  
74 Aeolus-to-Bridger/Anticline Line will relieve this congestion and increase the  
75 transmission capacity across Wyoming by 750 MW. The Transmission Projects will  
76 allow the Company to interconnect up to approximately 1,270 MW of wind resources,  
77 including the 860 MW of Wind Projects that are the subject of this Application, and  
78 create substantial benefits for Utah customers and customers throughout the  
79 Company's service area. Construction of the Transmission Projects will also enable the  
80 Company to more efficiently utilize existing generation resources in Wyoming to serve  
81 loads in Utah, Wyoming, Idaho, and the Pacific Northwest. The Transmission Projects  
82 also better position the Company to interconnect future resources in southeastern  
83 Wyoming and provide greater flexibility in managing existing resources.

84 In addition to increasing the transmission capacity out of southeastern  
85 Wyoming, the Transmission Projects will also provide critical voltage support to the  
86 Wyoming transmission network and enhance the overall reliability of the transmission  
87 system by adding incremental new transmission capacity westbound between the  
88 Company's existing thermal and renewable facilities, the proposed Wind Projects in  
89 eastern Wyoming, and other sources of energy in northern Utah. Additional  
90 transmission paths will mitigate the impact of outages on the existing system. The  
91 Transmission Projects will also enhance the Company's ability to comply with

92 mandated North American Electric Reliability Corporation (“NERC”) and Western  
93 Electricity Coordinating Council (“WECC”) reliability and performance standards.

94 The Aeolus-to-Bridger/Anticline Line is also an important component of the  
95 Company’s Energy Gateway Transmission Expansion Project (“Energy Gateway”) and  
96 has long been recognized as a key transmission segment in the region’s long-term  
97 transmission planning. By acting on this time-limited opportunity to develop the  
98 Transmission Projects and the associated Wind Projects, the Company can provide  
99 substantial customer benefits.

#### 100 **GENERAL DESCRIPTION OF THE TRANSMISSION PROJECTS**

101 **Q. Please describe the Aeolus-to-Anticline line.**

102 A. The proposed Aeolus-to-Anticline line is a single-circuit 500 kV line that will begin at  
103 the proposed Aeolus substation, which will be located approximately 11 miles  
104 northwest of Medicine Bow, Wyoming. From the Aeolus substation, the transmission  
105 line will run west across the Medicine Bow River past the Hanna Draw. The line will  
106 then continue southwesterly to Walcott Junction and then west across the Platte River  
107 and south of Sinclair and Rawlins, where it will then largely follow an existing 230 kV  
108 transmission line to the proposed Anticline substation.

109 From the proposed Anticline substation, the Company will construct a 345 kV  
110 transmission line that will extend north for approximately five miles and terminate into  
111 an expansion of the existing Jim Bridger generating plant substation.

112 The Aeolus-to-Anticline line will be located in Wyoming’s Sweetwater and  
113 Carbon counties and will primarily cross open rangeland. Approximately 49 percent of

114 the land crossed is federally owned, seven percent state owned, and nearly 44 percent  
115 privately owned.

116 Attached as Exhibit RMP\_\_\_\_(RAV-1) is a map showing the proposed route for  
117 the Aeolus-to-Anticline line, along with the other facilities included in the Transmission  
118 Projects.

119 **Q. What types of towers and conductors will be used to construct the Aeolus-to-**  
120 **Anticline line?**

121 A. The Aeolus-to-Anticline line segment will be constructed using approximately  
122 522 lattice steel towers with heights about 115 to 160 feet. The steel towers will have a  
123 “flat” configuration with each phase being parallel to each other in a horizontal  
124 arrangement. Attached to my testimony as Exhibit RMP\_\_\_\_(RAV-2) is a sample  
125 drawing of proposed 500 kV tower designs.

126 The conductor for the Aeolus-to-Anticline line will be triple bundled  
127 1272 kcmil 45/7 Aluminum Conductor Steel Reinforced (“ACSR”) “Bittern” per  
128 phase. Each conductor in the phase bundle will have a diameter of 1.345 inches, with  
129 three phases, comprised of three conductors each, for a total of nine conductors in the  
130 circuit.

131 The 345 kV Anticline-to-Jim Bridger line segment will use 25 to 30 of either of  
132 the following types of structures: (1) tubular steel H-frames; or (2) poles with heights  
133 from about 110 to 150 feet. Attached to my testimony as Exhibit RMP\_\_\_\_(RAV-3) is a  
134 sample drawing of proposed 345 kV tower designs. The conductor for this segment will  
135 also be triple bundled 1272 kcmil 45/7 ACSR Bittern per phase. The steel poles will  
136 have two arms on one side, with one arm on the other side to carry one phase per arm.

137 In addition, each of the transmission line segments will also carry two overhead  
138 ground wires. One of the wires will be galvanized steel while the other will be Optical  
139 Ground Wire (“OPGW”) to facilitate communications. Each wire will have a diameter  
140 of approximately 0.5 inches.

141 **Q. Please describe the proposed new Aeolus substation.**

142 A. The new Aeolus 500/230 kV substation will be located approximately 11 miles  
143 northwest of Medicine Bow, Wyoming, and will be sited on a Company-owned parcel  
144 of land (Township 24 North, Range 80 West, Section 35) and occupy approximately  
145 100 acres. The substation will include security fencing and an improved access road  
146 from U.S. Highway 30. The substation will be constructed using conventional air  
147 insulated bus and equipment and connect to existing Shirley Basin and Freezeout  
148 substations via the connection of an existing 230 kV transmission line into the new  
149 Aeolus site (discussed in more detail below). Attached to my testimony as Exhibit  
150 RMP\_\_\_(RAV-4) are the preliminary Aeolus substation one-line diagram and general  
151 arrangement drawings.

152 Construction of the Aeolus substation will require the following:

- 153 • Construction of a 230 kV yard, including all work to support the  
154 installation of 230 kV breaker bays for termination of the existing  
155 Freezeout-to-Shirley Basin 230 kV transmission line and to support the  
156 low side of the 500/230 kV transformer;
- 157 • Installation of a 230 kV shunt reactor;
- 158 • Completion of all site development, civil work, bus work, protection  
159 and controls, security and communications, and construction of a  
160 control building;
- 161 • Construction of a 500 kV yard including all work to support the  
162 termination of one 500 kV transmission line to Anticline substation,  
163 including two 500 kV breaker bays to support termination of the 500 kV  
164 line and connection to the high side of a 500/230 kV transformer;

- 165 • Installation of three single phase 500/230 kV transformer units with one  
166 additional spare unit;
- 167 • Installation of one 500 kV shunt capacitor, three single phase line  
168 reactors and one 500 kV neutral reactor;
- 169 • Construction of a replacement access bridge over the Medicine Bow  
170 River and associated upgrades to an existing unpaved county road from  
171 U.S. Highway 30 to the substation location. The bridge will be  
172 constructed to Wyoming Department of Transportation HS-20  
173 (“Highway Semi-trailer”) specifications. Upon completion, the bridge  
174 will become the property and responsibility of Carbon County;
- 175 • Completion of all site development, civil work, bus work, protection  
176 and controls, security, communications, and construction of a control  
177 building including site emergency power; and
- 178 • Implementation of a new generation tripping remedial action scheme,  
179 which would trip generation in the Foote Creek/Aeolus area in the event  
180 the Aeolus-to-Jim Bridger lines (or transformers) trip during high  
181 transfers on the Aeolus West transmission path. Initial technical studies  
182 indicate tripping up to approximately 660 MW of generation at the  
183 following wind farms during high-transfer conditions:
  - 184 • Foote Creek: 108 MW
  - 185 • Carbon County 1 (Q706): 250 MW
  - 186 • High Plains/McFadden Ridge 1: 245 MW
  - 187 • Seven Mile I and II: 53 MW.
- 188 • Specific remedial action scheme arming levels for lower flow  
189 conditions will need to be determined via follow-on technical studies.

190 In addition, the Aeolus substation will be designed to facilitate future expansion of  
191 the site for additional resources.

192 **Q. Please describe the proposed new Anticline substation.**

193 A. The new Anticline 500/345 kV substation will be located approximately three miles  
194 northeast of Point of Rocks, Wyoming and will be sited on a Company-owned parcel  
195 of land (T20N, R100W, Sec. 13) and occupy approximately 140 acres. The new  
196 substation will include security fencing and an improved access road and will be

197 constructed using conventional air insulated bus and equipment. The Anticline  
198 substation will connect to the existing Jim Bridger generating plant substation via a  
199 new 345 kV transmission line (discussed above) and can be expanded to accommodate  
200 future 500 kV transmission lines. Attached to my testimony as Exhibit RMP\_\_\_\_(RAV-  
201 5) are the preliminary Anticline substation one-line diagram and general arrangement  
202 drawings.

203 Construction of the Anticline substation will require the following:

- 204 • Construction of the new 500 kV substation yard including all work to  
205 support the termination of one 500 kV transmission line to the Aeolus  
206 substation;
- 207 • Construction of two 500 kV breaker bays to support termination of the  
208 500 kV line and connection to the high side of a 500/345 kV  
209 transformer;
- 210 • Installation of three single phase 500/345 kV transformer units with one  
211 additional spare unit;
- 212 • Installation of one 500 kV shunt capacitor, three single phase line  
213 reactors and one 500 kV neutral reactor;
- 214 • Construction of a 345 kV yard which includes a ring bus and 345 kV  
215 breakers to facilitate 345 kV line termination to Jim Bridger and future  
216 installation of phase shifting transformers; and
- 217 • Completion of all site development, civil work, bus work, protection  
218 and controls, security and communications, and construction of a  
219 control building including site emergency power.

220 **Q. Please describe the modifications to the Jim Bridger generating plant substation**  
221 **that will be necessary to interconnect the new Anticline substation to the Jim**  
222 **Bridger generating plant substation.**

223 A. The new Anticline substation will interconnect to the Jim Bridger substation via a new,  
224 five-mile, 345 kV transmission line (discussed above). The Jim Bridger substation is  
225 located west of, and immediately adjacent to, the Jim Bridger power plant. To

226 accommodate the interconnection of the Anticline substation, the Jim Bridger  
227 substation will be expanded to include an additional transmission line termination bay.  
228 Attached to my testimony as Confidential Exhibit RMP\_\_\_\_(RAV-6) are the preliminary  
229 Jim Bridger substation one-line diagram and general arrangement drawings related to  
230 the construction at the Jim Bridger substation, which will include the following:

- 231 • Expanding the existing 345 kV substation yard to add one new 345 kV  
232 line termination bay to the existing yard;
- 233 • Relocating the existing shunt capacitor to facilitate connection of a new  
234 line termination bay to the existing 345 kV bus;
- 235 • Completion of all site development, civil work, bus work, protection  
236 and controls, security and communications;
- 237 • Modification to the Jim Bridger remedial action scheme will be needed  
238 due to the re-dispatch of Jim Bridger generation necessary to  
239 accommodate new wind generation in eastern Wyoming, while  
240 maintaining the 2,400 MW rating on the Bridger West transmission  
241 path; and
- 242 • Modification of existing protection and control systems within the  
243 existing 345 kV yard to enable safe operation of the expanded facility.

244 In addition, the existing Latham substation, located approximately four miles  
245 south of Interstate Exit 187, adjacent to Wyoming Highway 789, will be expanded to  
246 include a voltage control device. The type and design of the device will be defined  
247 pending completion of future technical studies. The Company plans to install the device  
248 within the constraints of the currently leased property boundaries. Attached to my  
249 testimony as Confidential Exhibit RMP\_\_\_\_(RAV-7) are the existing Latham substation  
250 one-line diagram and general arrangement drawings. The substations will be modified  
251 once final design details of the voltage control device are determined.

252 **Q. Please describe the 230 kV transmission line from the Shirley Basin substation to**  
253 **the Standpipe substation.**

254 A. The proposed 230 kV transmission line projects will begin at the Company's existing  
255 Shirley Basin substation, located approximately 1.5 miles east of the south junction of  
256 state highways 77 and 487. A new 230 kV line will parallel an existing 230 kV  
257 transmission line running southwesterly along the western side of the Freezeout  
258 Mountains and will connect into the Aeolus substation. South of Aeolus substation to  
259 Standpipe substation, via the Freezeout substation, the 230 kV project is a  
260 reconstruction of the existing 230 kV line. The line continues south out of the Aeolus  
261 substation across the Medicine Bow River and connects into the Company's existing  
262 Freezeout substation located between the Pine and South Pine Draws. The 230 kV line  
263 then continues in a southwesterly direction to the Company's existing Standpipe  
264 substation, which is located approximately two-and-one-half miles southeast of Hanna,  
265 Wyoming.

266 All of the 230 kV segments are located in Carbon County and the new line will  
267 cross areas of mountainous terrain reaching elevations of approximately 7,500 feet.  
268 Attached to my testimony as Confidential Exhibit RMP\_\_\_\_(RAV-8) are the existing  
269 Shirley Basin, Freezeout and Standpipe substations one-line diagrams and general  
270 arrangement drawings. These substations may be modified to accommodate the 230 kV  
271 transmission line project. Final drawings will be provided when they become available.

272 **Q. What types of towers and conductors will be used for the 230 kV transmission**  
273 **line?**

274 A. The single circuit 230 kV transmission line will be rebuilt using either wood or steel

275 H-frame structures with heights ranging from 90 to 120 feet. Attached to my testimony  
276 as Exhibit RMP\_\_\_(RAV-9) is a sample drawing of proposed 230 kV tower designs.  
277 The conductor for the section north of the Aeolus substation to the Shirley Basin  
278 substation will be double bundle 1575 kcmil ACSR/TW “Potomac” per phase. The  
279 conductor for the section south of the Aeolus substation will be a double bundle 1272  
280 kcmil 45/7 ACSR “Bittern” per phase.

281 **Q. Please describe the estimated total cost of the Transmission Projects.**

282 A. The Aeolus-to-Bridger/Anticline Line is estimated to cost [REDACTED], as  
283 summarized in Confidential Table 1 below:

284 **Confidential Table 1**

[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]

285 The entire cost of the Aeolus-to-Bridger/Anticline Line will be paid by the  
286 Company without contribution from any third-party customer projects.

287 The 230 kV Network Upgrades are estimated to cost [REDACTED] as  
288 summarized in Confidential Table 2 below:

289

Confidential Table 2

[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]

290 The Company expects that the costs of the 230 kV Network Upgrades will be  
291 re-assessed and assigned to the wind resource facilities selected via the Company’s  
292 2017R request for proposals (“2017R RFP”) process under their respective  
293 interconnection agreements. The 230 kV Network Upgrades and are necessary to  
294 support the interconnection of up to 1,270 MW of new or repowered wind generation  
295 in eastern Wyoming.

296 **Q. When does the Company expect to complete the construction of the Transmission**  
297 **Projects?**

298 A. The Transmission Projects are being developed together with the Wind Projects, which  
299 will generate zero-fuel-cost energy and PTCs that make the codependent projects  
300 economic. To obtain the full benefits of the PTCs, the Transmission Projects and the  
301 Wind Projects must be in service no later than December 31, 2020.

302 **Q. Why must the Company receive an approval now for a project that is not**  
303 **scheduled for completion until December 2020?**

304 A. The Company does not currently have all of the necessary rights-of-way to construct  
305 the Transmission Projects. To achieve an in-service date before the end of 2020, the  
306 Company must complete acquiring the necessary rights-of-way by March 31, 2019.

307 The Company must obtain Commission approvals under the schedule it has proposed

308 in the Application to meet this schedule. A delay in approval jeopardizes the December  
309 31, 2020 deadline and risks the loss of PTC benefits—which will mean that neither the  
310 Transmission Projects nor the Wind Projects will move forward. A project critical-path  
311 schedule is attached to my testimony as Exhibit RMP\_\_\_\_(RAV-10).

### 312 **BENEFITS OF THE TRANSMISSION PROJECTS**

313 **Q. How will the Transmission Projects benefit customers and improve system**  
314 **performance?**

315 A. The Transmission Projects will: (1) relieve congestion and increase transmission  
316 capacity across Wyoming, allowing interconnection of new generation resources and  
317 greater flexibility in managing existing resources; (2) provide critical voltage support  
318 to the transmission system; (3) improve system reliability; and (4) reduce energy and  
319 capacity losses. Because the cost of the Transmission Projects are substantially offset  
320 by the generation of zero-fuel-cost energy and PTCs from the Wind Projects, customers  
321 receive substantial benefits as quantified by Mr. Link.

322 **Q. How will the Transmission Projects increase transmission capacity in**  
323 **southeastern Wyoming?**

324 A. Currently, the Company's transmission system in southeastern Wyoming is operating  
325 at capacity, which limits transfer of existing resources from eastern Wyoming. Also,  
326 due to limited fault current in the southeastern portion of the transmission system,  
327 which indicates a weak grid, interconnection of additional resources in this prime wind  
328 region is precluded to maintain grid stability. The Transmission Projects will not only  
329 increase the transfer capability from east to west by 750 MW, but will also improve the

330 fault current providing “stiffness” to the grid. This will allow additional wind facilities  
331 in and around the proposed Aeolus substation, which is not possible today.

332 When the Transmission Projects are complete, the Company estimates that it  
333 can interconnect up to approximately 1,270 MW of additional wind facilities east of  
334 the Bridger/Anticline substation. The assumed level of new wind resources is higher  
335 than the assumed incremental transfer capability of the transmission facilities because  
336 wind resources do not generate at their full capability in all hours of the year. At times  
337 when wind resources in southeastern Wyoming are operating near full output, other  
338 resources in the area can be re-dispatched to accommodate PTC-producing wind  
339 generation. Installing more variable resources in an area relative to total transmission  
340 capacity allows for more efficient use of the transmission system and the ability to use  
341 the most cost-effective resources to meet customer demand.

342 The increased capacity also provides improved access to existing generation  
343 resources, and increased opportunities to move incremental energy from Wyoming to  
344 offset higher-priced generation in the PacifiCorp system or other energy imbalance  
345 market participants’ systems as noted by Mr. Link.

346 **Q. Is the increased capacity from the Transmission Projects consistent with the**  
347 **Company’s obligation to provide transmission service under its OATT?**

348 A. Yes. The Company’s OATT, approved by the Federal Energy Regulatory Commission  
349 (“FERC”), details the Company’s requirements and obligations to provide transmission  
350 service. Section 28.2 defines the Company’s responsibilities, which include the  
351 requirement to “plan, construct, operate and maintain the system in accordance with  
352 good utility practice.” Section 28.3 states the requirement for the Company to provide

353 “firm service over the system so that designated resources can be delivered to  
354 designated loads.” The Company is required to provide adequate and non-  
355 discriminatory service to all network customers. Although the Transmission Projects  
356 are not specifically mandated by the Company’s obligations under its OATT, the  
357 Transmission Projects will allow the Company to more efficiently meet current and  
358 forecasted customer energy demand by relieving the existing transmission congestion  
359 in southeastern Wyoming.

360 **Q. Will the up-front transmission costs of the Transmission Projects be recovered in**  
361 **PacifiCorp’s transmission rates?**

362 A. Yes, the Transmission Projects are considered network transmission assets under  
363 PacifiCorp’s OATT and provide a number of benefits to the transmission grid, as  
364 discussed earlier in my testimony. Because the Transmission Projects are integrated  
365 into PacifiCorp’s transmission network and provide benefits to that network, such as  
366 congestion relief, increased transmission capacity and improved system reliability,  
367 among others, FERC precedent for ratemaking supports rolling the costs of these assets  
368 into PacifiCorp’s transmission rates.

369 **Q. How will the costs of the Transmission Projects flow into PacifiCorp’s**  
370 **transmission rates, and who will pay these rates?**

371 A. All transmission rates charged to wholesale transmission customers must be approved  
372 by FERC. PacifiCorp’s transmission rate structure is a FERC-approved formula that  
373 has been in place since 2012. A formula rate is a method of calculating a rate, but is not  
374 the rate itself; the actual transmission rate that is charged to wholesale transmission  
375 customers is produced annually by updating FERC-approved inputs to the formula rate.

376 Formula rates rely on annual updates using inputs from the detailed, publicly available,  
377 and audited FERC Form No. 1, along with other Company data. The annual update  
378 process includes transmission capital additions such as the Transmission Projects.

379 PacifiCorp's merchant function is the largest transmission customer of  
380 PacifiCorp's transmission system, but there are third-party transmission customers as  
381 well. While all transmission customers pay OATT transmission rates, third-party  
382 transmission customers generate revenue credits that offset the cost of PacifiCorp's  
383 transmission revenue requirement in retail rates, as discussed in Mr. Link's testimony.

384 **Q. What are the benefits resulting from the critical voltage support that will be**  
385 **provided by the Transmission Projects?**

386 A. Under certain operating conditions, voltage control issues have limited the ability to  
387 add additional resources, particularly wind facilities, in southeastern Wyoming. The  
388 Transmission Projects will solve the voltage control issues and allow up to 1270 MW  
389 of additional wind generation to be interconnected into the transmission system.

390 **Q. How will the Transmission Projects improve system reliability?**

391 A. The transmission grid can be affected in its entirety by what happens on an individual  
392 transmission line or path. For example, the transmission system between eastern and  
393 central Wyoming is comprised of several individual transmission lines or line  
394 segments. Attached to my testimony as Exhibit RMP\_\_\_\_(RAV-11) is a diagram of the  
395 existing Wyoming transmission system. A single outage on any of the individual lines  
396 or line segments due to storm, fire, or other interference can and does cause significant  
397 reductions in transmission capacity and can negatively impact the Company's ability  
398 to serve customers. Line outages require the Company to significantly curtail

399 generation resources to stabilize system voltages and require less efficient re-dispatch  
400 of system resources to meet network load requirements.

401 In the event of a line outage, the redundancy provided by the Transmission  
402 Projects will allow the Company to continue to meet native load service obligations  
403 and continue to meet other contractual obligations to third parties. Strengthening this  
404 path and increasing system redundancy with the new Transmission Projects will benefit  
405 all customers by reducing the risk of outages and inefficient dispatch resulting from  
406 those outages.

407 In addition, the Transmission Projects will improve the Company's ability to  
408 perform required maintenance without significant operational impacts to the system,  
409 and will reduce impacts to customers during planned and forced system outages.  
410 Transmission line and substation maintenance windows are currently limited because  
411 the system is highly utilized. By relieving congestion and providing additional  
412 transmission paths, the Transmission Projects will allow greater flexibility for the  
413 Company.

414 **Q. Can you provide an example where the Transmission Projects will mitigate the**  
415 **impact of an outage on the 230 kV transmission system?**

416 A. Yes. The following are examples of potential outages that will be mitigated by the  
417 Transmission Projects:

- 418 • For an outage of the Latham-to-Point of Rocks 230 kV line, the Project  
419 eliminates the overload on the Dave Johnston to Amasa 230 kV line;
- 420 • For an outage of the Mustang-to-Spence 230 kV line, the Project  
421 eliminates the overload on 230 kV lines west of Platte;
- 422 • For an outage of the Riverton-to-Wyopo 230 kV line, the Project  
423 eliminates overloads on 230 kV lines west of Platte;

424 • For an outage of the Dave Johnston-to-Amasa 230 kV line, the Project  
425 eliminates the overload on the 230 kV lines west of Platte; and

426 • For an outage of the Platte-to-Standpipe 230 kV line, the Project  
427 eliminates the need to trip approximately 130 MW of generation at  
428 Foote Creek.

429 **Q. Will the Transmission Projects also enhance the Company’s ability to meet the**  
430 **reliability standards applicable to its transmission system?**

431 A. Yes. Although the Company currently meets or exceeds the applicable reliability  
432 standards and criteria, the addition of the Transmission Projects will allow the  
433 Company to more efficiently meet or exceed those standards and criteria.

434 **Q. Please describe the applicable reliability standards.**

435 A. The Company plans, designs, and operates its transmission system to meet or exceed  
436 NERC Standards for Bulk Electric Systems (“BES”) and WECC Regional standards  
437 and criteria. The NERC standards are set forth in 18 CFR Part 40 (Mandatory  
438 Reliability Standards for Bulk-Power Systems). The WECC standards and criteria are  
439 deemed necessary for the Western Interconnection to meet or exceed NERC standards.  
440 The Company must currently comply with more than 100 approved NERC standards.  
441 These standards dictate the minimum levels of transmission system reliability,  
442 redundancy, and performance required for transmission facilities.

443 The most relevant standard here is NERC’s Transmission Planning  
444 Performance Requirements set forth in NERC TPL-001-4, which establishes  
445 transmission system planning performance requirements intended to ensure that the  
446 BES will operate reliably over a broad spectrum of system conditions and following a  
447 wide range of probable contingencies.

448 **Q. How do NERC's and WECC's standards and criteria influence the need for the**  
449 **Transmission Projects?**

450 A. The mandatory standards, particularly, NERC's TPL-001-4 standard, require the  
451 Company to have a forward-looking transmission plan to reliably serve current and  
452 anticipated customer demands under all expected operating conditions, including  
453 normal system operations (all system elements in service) and during system  
454 contingencies (where elements of the transmission system are out of service), both  
455 planned or otherwise.

456 The Company performs annual reliability assessments to determine whether its  
457 transmission system complies with minimum mandatory system performance  
458 standards, which require that during loss of any single transmission system element  
459 ("N-1 single contingencies") that firm service is maintained, no system overloads exist,  
460 and there is no loss of customer demand.

461 The Aeolus-to-Anticline line is sub-segment D.2 of Gateway West, which, as  
462 part of Energy Gateway, has been included in the Company's annual TPL-001-4  
463 assessment as part of its short- and long-term plans to dependably meet NERC and  
464 WECC reliability requirements. The Transmission Projects' new transmission  
465 segments are particularly effective in increasing system reliability under the various  
466 multiple contingency categories of the TPL-001-4 standard.

467 **Q. Can you explain the TPL-001-4 standard?**

468 A. Yes. The NERC Standard TPL-001-4 requires the Company to plan for a scenario with  
469 outages of multiple transmission elements. The Company must plan how it will adjust  
470 the transmission system after the first outage and then respond to the second outage

471 (this type of scenario is referred to as an N-1-1 condition). The Aeolus-to-Anticline line  
472 will significantly help under these types of N-1-1 conditions. For example, without the  
473 Aeolus-to-Anticline line, the N-1-1 outage of Riverton to Wyopo 230 kV line followed  
474 with an outage of Spence to Mustang 230 kV line would require curtailment of the TOT  
475 4A path by approximately 500 MW. But with the addition of the Aeolus-to-Anticline  
476 line, this curtailment would not be required. The study was performed with TOT 4A  
477 flows at 1,030 MW in the original case. The addition of the Aeolus-to-Anticline line  
478 prevents thermal overload on the 230 kV transmission system west of Platte.

479 **Q. What are the WECC path rating studies?**

480 A. The WECC path rating studies follow a three-phase process established by the Planning  
481 Coordination Committee (“PCC”) that utilizes peer review study groups, made up of  
482 the project sponsor and other interested WECC members, to establish a path rating for  
483 a given transmission path or set of transmission paths, which may exhibit simultaneous  
484 interactions with each other. Path rating studies utilize a transmission model of the  
485 Western Interconnection and will take multiple months to evaluate the performance of  
486 the new transmission facilities and to demonstrate that the proposed transmission  
487 project will have no negative impacts on previously established transmission path  
488 ratings. The path ratings that are established following this process represent the  
489 “Maximum Path Transfer Capability” of a transmission path.

490 Once projects complete the second phase of the path rating studies, they are  
491 granted an “Accepted” rating and placed in Phase 3 (construction phase) status. After  
492 the Accepted status is granted, other projects currently going through the WECC path

493 rating process must recognize the project in their studies and cannot negatively impact  
494 the path rating for the project.

495 **Q. Has the Aeolus-to-Anticline line been included in WECC path rating studies?**

496 A. Yes. The Aeolus-to-Anticline line has undergone WECC's Three Phase Ratings  
497 Process, and has been approved by WECC for Phase 3 Construction Phase status as  
498 part of the overall Energy Gateway project. The Aeolus West transmission path and  
499 three other Gateway West transmission paths (TOT 4A, Bridger/Anticline West, and  
500 Path C) have completed the Three Phase Rating Process and were granted Phase 3  
501 status on January 5, 2011. This WECC approval is necessary because it allows the  
502 Company to interconnect the Aeolus-to-Anticline line to the wider transmission system  
503 in the area and to reliably operate the project at its approved ratings. This line will  
504 strengthen the Company's transmission capacity and flexibility, especially when  
505 complemented with other Energy Gateway projects, specifically Anticline-to-Populus,  
506 Aeolus-to-Clover and Oquirrh-to-Terminal. The Aeolus-to-Anticline line is regarded as  
507 a necessary interconnection point to support the long-term transmission expansion  
508 planning established in the WECC Region plans and in the most recent Northern Tier  
509 Transmission Group sub-regional plan. The construction of this project, as an integral  
510 component of the larger Energy Gateway project, provides options to access additional  
511 resources.

512 **Q What are the impacts to the system and the Company if the Transmission Projects  
513 are not completed?**

514 A. If the projects are not completed, the existing congestion will remain and the  
515 Company's ability to deliver resources to load will remain constrained. Because the

516 Company currently meets all applicable system reliability and performance criteria, the  
517 Transmission Projects are not strictly required to satisfy those standards. Rather, the  
518 Transmission Projects have long been identified as an important addition to Wyoming's  
519 transmission system, and the zero-fuel-cost energy and PTCs generated by the  
520 incremental wind resources provide a time-limited opportunity to build the projects  
521 now with only a moderate rate impact.

522 **Q. How will the Transmission Projects reduce energy and capacity losses?**

523 A. Reduced energy and capacity losses on the transmission system have the potential to  
524 provide significant cost savings over time. Generally, the addition of a new  
525 transmission path in parallel with existing lines, like the Transmission Projects, will  
526 reduce the energy and capacity losses by reducing the impedance of the transmission  
527 system. Reduced line losses mean more efficient delivery of energy and capacity at  
528 reduced costs.

529 **Q. Did the Company consider alternatives to the Transmission Projects?**

530 A. Yes. While long-term alternatives to constructing a new transmission line are limited,  
531 the Company did consider other approaches, but none were as cost-effective. As  
532 described more fully in the testimony of Mr. Link, the Transmission Projects and Wind  
533 Projects were included in the Company's 2017 Integrated Resource Plan, where they  
534 were analyzed in comparison to alternatives. The resource portfolios that included the  
535 Transmission Projects and Wind Projects were consistently least cost, least risk.

536 **Q. Has the Company considered any other alternatives to the Transmission Projects?**

537 A. The Company also considered the ability to obtain additional transmission capacity by  
538 upgrading the existing transmission system or implementing alternative transmission

539 technologies. Since 2013, the Company has completed several important projects to  
540 enhance the transmission system in southeast Wyoming, including the dynamic line  
541 rating of the Miners (Standpipe)-Platte 230 kV line (2013), Southern Wyoming Voltage  
542 Control Scheme, which coordinated wind generation reactive output to stabilize local  
543 area voltages (2015), and construction of the Standpipe substation and (60 MVAR)  
544 synchronous condenser for voltage control (2016). These projects allowed the  
545 Company to delay the Transmission Projects until 2020, but are not a long-term  
546 substitute for the Transmission Projects.

547 **REQUIREMENTS OF UTAH ADMIN. CODE R746-440-1(1)**

548 **Q. Please summarize how the Company's Application meets the requirements for a**  
549 **Voluntary Resource Decision.**

550 A. Utah Admin. Code R746-440-1(1) describes what must be included in an application a  
551 Voluntary Resource Decision. I have incorporated exhibits to my testimony that  
552 provide information for the Transmission Projects pertaining to R746-440-1(1).

553 **Q. Have you provided the description of the Transmission Projects required by Utah**  
554 **Admin. Code R746-440-1(1)(a)?**

555 A. Yes. In addition to the description included in the introductory sections of my  
556 testimony, Exhibits RMP\_\_(RAV-2), RMP\_\_(RAV-3), RMP\_\_(RAV-4),  
557 RMP\_\_(RAV-5), RMP\_\_(RAV-9) and Confidential Exhibits RMP\_\_(RAV-6),  
558 RMP\_\_(RAV-7) and RMP\_\_(RAV-8) provide engineering specifications, drawings,  
559 and other pertinent technical information for the Transmission Projects.

560 **Q. Have you provided a map of the Transmission Projects as a part of your project**  
561 **description?**

562 A. Yes. The Transmission Projects will be sited entirely in Wyoming, Carbon and  
563 Sweetwater counties and the terrain is primarily open rangeland. The map attached as  
564 Exhibit RMP\_\_\_(RAV-1) describes the proposed route for the transmission lines and  
565 the proposed locations for the associated substations. Cadastral surveying (which is a  
566 field survey that establishes or re-establishes legal property boundaries) for all  
567 transmission lines and associated access roads is in progress, so metes and bounds  
568 descriptions are not available at this time. The Company will provide the results of the  
569 surveys once they are complete. The attached Confidential Exhibit RMP\_\_\_(RAV-12)  
570 provides the Transmission Projects' sections on federal lands and the Transmission  
571 Projects' sections on private and state lands.

572 **Q. Have you also prepared a geological report of the proposed sites of the**  
573 **Transmission Projects?**

574 A. Yes. As part of the federal permitting process for the Energy Gateway project, the  
575 Company conducted a two-year geotechnical exploration and geologic hazards  
576 assessment. For the Aeolus-to-Anticline Line, the geotechnical exploration program  
577 consisted of advancing 44 borings, collection of soil samples for laboratory testing, lab  
578 testing and determination of soil properties, and reporting for use in the foundation  
579 design. The Company intends to advance an additional 44 borings to further inform the  
580 foundation design. During the same period, the Company conducted surficial geology  
581 and geologic hazard reconnaissance. Recommendations regarding noted geologic  
582 hazards were published in reports for all segments of the Aeolus-to-Anticline Line. The

583 geological reports are included in Exhibit RMP\_\_\_\_(RAV-13). The work is also  
584 generally applicable to the balance of the Transmission Projects and will be validated  
585 as such.

586 The geotechnical engineering studies concluded that all tower sites were  
587 suitable for drilled pier foundations as planned, as long as the recommended values for  
588 soil engineering properties are used in the design and consideration is given to potential  
589 excavation difficulties during construction.

590 A geotechnical study consistent in scope and technical approach to that  
591 described above and as contained within Exhibit RMP\_\_\_\_(RAV-13) will be performed  
592 for the 230 kV Network Upgrades.

593 Shallow groundwater is not likely to pose a significant constraint on the  
594 Transmission Projects, but could complicate foundation drilling and construction.  
595 Areas where annual or seasonal groundwater depths are less than 10 feet below the  
596 ground surface are considered high-risk. Geologic hazard reconnaissance confirms  
597 high ground water in only few isolated locations.

598 Operating mineral deposits are provided in Exhibit RMP\_\_\_\_(RAV-14) and a  
599 topographical map showing the substation locations and right-of-way overlay is  
600 included in Exhibit RMP\_\_\_\_(RAV-15).

601 **Q. Please describe where the Company has addressed the Company's compliance**  
602 **with applicable Commission laws and rules, as required by R746-440-1(1)(b).**

603 A. The Company's Application addresses how this filing complies with applicable  
604 Commission laws and rules.

605 **Q. Does your testimony address the purposes and reasons for the resource decision,**  
606 **as required by R746-440-1(1)(c)?**

607 A. Yes, that is the primary purpose of my testimony.

608 **Q. As required by R746-440-1(1)(d), please provide the projected costs of the**  
609 **Transmission Projects.**

610 A. The estimated total cost for the Transmission Projects is [REDACTED]. The  
611 individual cost components of this estimate are set forth in Confidential Tables 1-2  
612 above.

613 **Q. Under R746-440-1(1)(d), (f), (i), (j) and (k), can you provide additional**  
614 **background on the Transmission Projects, including a description of project**  
615 **schedules, milestones, and construction timelines, engineering studies, and the**  
616 **general status of the Company's siting and permitting activities?**

617 A. Yes. Starting with the schedule of the Transmission Projects, to meet the December  
618 2020 deadline, the Company expects to execute contracts for the upgrades to access  
619 roads and the bridge to the Aeolus substation site by September 2017 and construction  
620 on those components is expected to begin in May 2018 for completion by November  
621 2018.

622 The Company expects to provide a limited notice-to-proceed for the Aeolus-to-  
623 Anticline line and 230 kV Network Upgrades by the end of 2018, so that the Company  
624 can acquire the necessary rights-of-way by March 31, 2019. The final notice-to-proceed  
625 for the Transmission Projects is expected to be issued by April 1, 2019, so that  
626 construction can begin.

627                   The Company expects the Transmission Projects to become commercially  
628 operational by October 31, 2020.

629                   A project critical path schedule is attached to my testimony as Exhibit  
630 RMP\_\_\_(RAV-10).

631 **Q.    Has the Company entered into a binding contract for design and construction of**  
632 **the Transmission Projects?**

633 A.    No. The Company has engaged the services of an owner’s engineer to provide  
634 engineering and design services for the Transmission Projects scope of work. The final  
635 designs will be performed by the engineer, procurement and construction (“EPC”)  
636 contractor(s) selected via competitive market solicitation.

637 **Q.    Are there additional technical studies that are necessary before the Transmission**  
638 **Projects are completed?**

639 A.    Yes. While many technical studies have been completed to date, a number of technical  
640 studies will need to be performed to assure that the completed projects will meet all  
641 national standards for engineering, reliability and system operations, specifically:

- 642                   • Substation and Line Design Studies;
- 643                   • Static VAr Compensator Design Studies;
- 644                   • Jim Bridger – Subsynchronous Resonance (“SSR”) Analysis Studies  
645                   and SSR Mitigation Analysis;
- 646                   • Dynamic Voltage Control Analysis;
- 647                   • Remedial Action Scheme (Bridger/Aeolus) Studies;
- 648                   • FAC-013-2 Assessment of Transfer Capability for the Near-Term  
649                   Transmission Planning Horizon Studies; and
- 650                   • System Operating Limit Studies.

651                    These technical studies will be completed in phases as required to support the  
652 design during the engineering phase of the Transmission Projects. All studies will be  
653 completed by late 2018. Near-term planning and operational studies will be completed  
654 in the middle of 2020, in preparation for the Transmission Projects being placed in-  
655 service by October 31, 2020.

656 **Q.    Please describe how the Company plans to address environmental issue associated**  
657 **with the Transmission Projects.**

658 A.    The Company has conducted a thorough assessment of the impacts of the Transmission  
659 Projects on the surrounding environment and resources. Much of this assessment  
660 occurred as part of the permitting process required by National Environmental Policy  
661 Act (“NEPA”) because portions of the Transmission Projects will be sited on federal  
662 land. For the 230 kV line section between Aeolus and Standpipe substations, the route  
663 was analyzed for impacts as an alternative under the Gateway South project. The  
664 Company and Bureau of Land Management (“BLM”) are currently evaluating any  
665 requirements necessary to complete the impacts assessment.

666                    In addition to requirements developed via the NEPA process, the Company will  
667 also ensure compliance with the Company Avian Protection Plan and other Company  
668 Standards.

669 **Q.    Please describe the NEPA process.**

670 A.    In December 2008, the Company filed a right-of-way permit application with the BLM  
671 and the U.S. Forest Service, which triggered the need for BLM to prepare an  
672 Environmental Impact Statement (“EIS”) in accordance with the requirements of  
673 NEPA. The draft EIS was released for public comment on July 29, 2011, and the Final

674 EIS was published on April 26, 2013. The Record of Decision was released on  
675 November 14, 2013.

676 The BLM used the following criteria to select the authorized route:

- 677 • Allow for reasonable construction costs associated with the preferred  
678 route;
- 679 • Route on public land where practical;
- 680 • Avoid cultural and natural resource areas;
- 681 • Avoid sensitive species habitat, including bald eagle nests and big game  
682 winter range;
- 683 • Follow existing corridors or linear structures;
- 684 • Avoid Visual Resource Management Class II areas;
- 685 • Avoid designated areas such as National Monuments, Wilderness Study  
686 Areas, National Landscape Conservation System areas and State and  
687 local parks; and
- 688 • Avoid BLM-identified preliminary priority sage-grouse habitat and  
689 Wyoming core habitat areas.

690 The assessment that supported BLM's EIS analyzed the impact of construction,  
691 ongoing operation and maintenance, and decommissioning and reclamation of the  
692 Aeolus-to-Bridger/Anticline Line. The assessment considered the cumulative effects of  
693 the proposed Transmission Projects, together with past, present, and reasonably  
694 foreseeable future actions, and addressed the following:

- 695 • Cultural resources, such as prehistoric or historic archaeological sites,  
696 districts, buildings, historic trails, roads, and landscapes;
- 697 • Vegetation communities, including the potential impact of invasive  
698 plant species due to the construction process;
- 699 • Wetlands and riparian areas;
- 700 • Wildlife and fish, including big game, small mammals, reptiles,  
701 amphibians, migratory birds and raptors;

- 702 • Special status species, including those listed under the federal  
703 Endangered Species Act (“ESA”), those proposed for federal listing as  
704 well as candidates under the ESA, BLM, or Forest Service Sensitive  
705 species, Forest Service Management Indicator Species, and State  
706 Heritage Program plant species of concern;
- 707 • Soils, include clearing, grubbing, and grading along the rights-of-way  
708 and at additional temporary workspaces; trenching; backfilling;  
709 excavating; and construction of permanent structures, such as  
710 transmission line structures, access and service roads, co-generation  
711 sites, and substations;
- 712 • Paleontological resources;
- 713 • Water resources;
- 714 • Agricultural resources;
- 715 • Air quality; and
- 716 • Noise.

717 Based on that analysis, the BLM and cooperating agencies concluded that for  
718 many resources, the effects of the Transmission Projects, coupled with the effects of  
719 other known projects, will not be substantial. To the extent that resources may be  
720 impacted, the Company has proposed reasonable mitigation efforts to minimize the  
721 impact.

722 **Q. What impact assessment studies have been performed?**

723 A. The studies related to the impact assessment are included in BLM’s Record and  
724 Decision. The studies are voluminous and can be found at following websites:

- 725 • The Final EIS:
- 726 [https://eplanning.blm.gov/epl-front-](https://eplanning.blm.gov/epl-front-office/eplanning/docset_view.do?projectId=65164&currentPageId=92763&documentId=78833)  
727 [office/eplanning/docset\\_view.do?projectId=65164&currentPageId=92763&do-](https://eplanning.blm.gov/epl-front-office/eplanning/docset_view.do?projectId=65164&currentPageId=92763&documentId=78833)  
728 [cumentId=78833](https://eplanning.blm.gov/epl-front-office/eplanning/docset_view.do?projectId=65164&currentPageId=92763&documentId=78833)
- 729 • The Final EIS Appendices:

730 [https://eplanning.blm.gov/epl-front-](https://eplanning.blm.gov/epl-front-office/eplanning/docset_view.do?projectId=65164&currentPageId=92763&documentId=78834)  
731 [office/eplanning/docset\\_view.do?projectId=65164&currentPageId=92763&do-](https://eplanning.blm.gov/epl-front-office/eplanning/docset_view.do?projectId=65164&currentPageId=92763&documentId=78834)  
732 [cumentId=78834](https://eplanning.blm.gov/epl-front-office/eplanning/docset_view.do?projectId=65164&currentPageId=92763&documentId=78834)

733 The mitigation plans are also included in the above links and identified in the  
734 attached Exhibit RMP\_\_\_\_(RAV-16).

735 **Q. Please describe the Company’s plan of development related to the Transmission**  
736 **Projects.**

737 A. Once the Transmission Projects are in service, they will not directly produce any  
738 emissions into the environment. The Company is preparing the plan of development,  
739 which will govern the construction phase of the Aeolus-to-Bridger/Anticline Line and  
740 must be approved by BLM. This plan will include specific requirements to ensure full  
741 compliance with all applicable regulations and requirements of the right-of-way permit  
742 granted by BLM for siting the Aeolus-to-Bridger/Anticline Line on federal lands. The  
743 plan of development will also include best practices for all aspects of environmental  
744 protection. The Company anticipates that, at a minimum, the plan of development for  
745 the construction phase will account for fugitive dust control, storm water pollution  
746 prevention, spill containment and counter measures, plant/wildlife restrictions, and  
747 ground disturbance reclamation. The Company anticipates that the protection measures  
748 it will use for the Transmission Projects as shown in Exhibit RMP\_\_\_\_(RAV-17) will be  
749 similar to those implemented on the Company’s Mona-to-Oquirrh and Sigurd-to-Red  
750 Butte transmission projects, adjusted to meet the specifics of this project as necessary.

751 Once the Transmission Projects are in service, the Company will install three  
752 primary devices to protect air, water, chemical, biological, and thermal qualities:

- 753 • Construction of retention basins at the substation sites to control storm  
754 water runoff, to manage erosion control and waterflows across adjacent  
755 properties as well as at the substation sites;

- 756 • Storm water control along the transmission line access routes will be  
757 managed using ditches at the verge of new access roads along with water  
758 control and diversion techniques, such as the use of water bars; and
- 759 • At the substation sites, an oil containment plan will be incorporated into  
760 the final design such that, in the event of a leak, the contents of any oil-  
761 filled equipment would be contained within the substation site and not  
762 leach into the underlying soils.

763 **Q. Please describe the effectiveness of the three protective devices you describe above**  
764 **and the operational conditions for which the Company designed and tested the**  
765 **devices.**

766 A. The devices all represent proven technology employed at numerous substations and  
767 other facilities across the United States. Water-retention designs will comply with all  
768 relevant codes as well as the Clean Water Act requirements, where applicable. The  
769 Company has successfully employed all of these techniques on recent transmission  
770 projects including Populus-to-Terminal, Mona-to-Oquirrh, and Sigurd-to-Red Butte  
771 transmission projects.

772 **Q. Please describe any potential safety hazards related to the Transmission Projects.**

773 A. The Company requires a high standard of safety performance and planning by all of its  
774 employees and contractors. During the construction phase, the primary safety hazards  
775 will vary somewhat by stage of the project, but will generally relate to:

- 776 • Heavy equipment operations;
- 777 • Open excavations;
- 778 • Slips, trips and falls;
- 779 • Crane operations;
- 780 • Working at height;
- 781 • Working around energized facilities; and
- 782 • Climatic conditions.

783                   The Company will require all personnel working on the Transmission Projects  
784 to perform safety training specific to the Transmission Projects. The safety plan will  
785 require appropriate safety markings, barriers and other restriction devices to prevent  
786 worker or public access to potentially unsafe conditions.

787                   During operations, the main safety hazard will be the energized facilities. Tower  
788 structures are designed to provide electrical clearances to the ground and structures and  
789 prevent climbing without specialist equipment, so that the public cannot reach the  
790 conductor.

791                   All substation energized facilities are constructed so that the high-voltage  
792 equipment is placed with sufficient clearances from the site security fence to prevent  
793 accidental contact with the energized equipment. All substations will include security  
794 fencing, controlled access devices, security monitoring to limit and manage personnel  
795 gaining access to the site.

796 **Q.   Please describe the status of satisfying local, state, tribal, or federal governmental**  
797 **agency requirements.**

798 **A.**   The Company has obtained a federal right-of-way permit from the BLM, which covers  
799 approximately half of the 140 mile-length of the Aeolus-to-Anticline line. The right-  
800 of-way grant was authorized concurrently with the release of the Record of Decision,  
801 discussed above. The BLM's decision provides the authorizations, with stipulations,  
802 necessary for the Company to begin construction on federally administered lands.

803                   Stipulations in the right-of-way grant require additional environmental surveys  
804 to be completed to clear construction areas before receiving the notice to proceed to  
805 construct on public land. The Company is currently conducting surveys for cultural,

806 paleontological, biological and potential wetland resources that will need to be  
807 protected and, if adversely impacted, mitigated. The BLM and the U.S. Corp of  
808 Engineers will issue final notices to proceed after receipt and approval of survey  
809 reports, pre-construction notifications, and payment of any required mitigation funds  
810 determined.

811 In addition, the right-of-way grant includes the requirement to comply with  
812 several additional federal agency required permits and approvals, which the Company  
813 is currently in the process of completing, including Section 106 Consultation under the  
814 National Historic Preservation Act, Section 404 Clean Water Act Permit, and Resource  
815 Protection Plans required by the BLM.

816 The Company is in the process of securing all relevant federal, state, and local  
817 permits for the 230 kV section between the Aeolus substation and the Standpipe  
818 substation. The Company anticipates that this section will be subject to the same or  
819 similar conditions included in the Record of Decision, released November 12, 2013.

820 **Q. What is the current status of the necessary permits from local government**  
821 **entities?**

822 A. The Company has or will receive the required consents, franchises, and permits from  
823 all the local governmental entities having jurisdiction over the proposed route for the  
824 Transmission Projects. These will include an application to the Wyoming Department  
825 of Environmental Quality and the Wyoming Industrial Siting Council for the issuance  
826 of a permit. The Company will also obtain a conditional use permit from Carbon  
827 County and a construction permit from Sweetwater County.

828 In addition to the conditional use permit, the Company is in the process of  
829 obtaining the required consents and permits from the State of Wyoming, subject to  
830 completion of the final design of the transmission line alignment. Additionally, the  
831 Company will obtain any permits and approvals required from state agencies for actual  
832 construction and operation of the Transmission Projects in the ordinary course of  
833 development. These required consents and permits may include, but may not be limited  
834 to, stream alteration permits from the Wyoming Game and Fish Department, highway  
835 encroachment permits from the Wyoming Department of Transportation, storm water  
836 permits from the Wyoming Department of Environmental Quality Water Quality  
837 Division, rights-of-way grants from the Wyoming State Trust Lands Administration,  
838 and approvals from the State Historic Preservation Office of Wyoming.

839 Based on the current routing plan, these are the only permits, franchises, and  
840 consents required for the Transmission Projects. Should a routing change resulting from  
841 the environmental approval process require any additional local consents, franchises,  
842 or permits, the Company will immediately seek such approval and provide notice to  
843 the Commission.

844 Exhibit RMP\_\_\_\_(RAV-18) provides additional details on the required permits.

845 **Q. Please describe the sage grouse habitat in the vicinity of the Transmission Projects.**

846 A. As part of the NEPA process, the Company's assessment specifically addressed the  
847 potential impact of the Aeolus-to-Bridger/Anticline Line on sage grouse habitat. The  
848 studies related to sage grouse are included in the Final EIS issued by BLM. In addition,  
849 the mitigation plan associated with sage grouse is described in Exhibit RMP\_\_\_\_(RAV-  
850 16).



874 grant the Company's Application for approval of its "voluntary resource decision" for  
875 the Transmission Projects.

876 **Q. Does this conclude your direct testimony?**

877 A. Yes.