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March 21, 2023

VIA ELECTRONIC FILING

Attention: Filing Center
Public Utility Commission of Oregon
201 High Street SE, Suite 100
P.O. Box 1088
Salem, Oregon 97308-1088

Re: Docket UM 2032 – Investigation into the Treatment of Network Upgrade Costs for Qualifying Facilities

Attention Filing Center:

Attached for filing in the above-captioned docket is the Joint Utilities' Motion for Rehearing and/or Clarification.

Please contact this office with any questions.

Sincerely,

Alisha Till
Paralegal

Attachment

BEFORE THE PUBLIC UTILITY COMMISSION OF OREGON

UM 2032

In the Matter of PUBLIC UTILITY COMMISSION OF OREGON, Staff Investigation Into Treatment of Network Upgrade Costs for QFs.	**JOINT UTILITIES' MOTION FOR REHEARING AND/OR CLARIFICATION**

I. INTRODUCTION

Pursuant to ORS 756.561 and OAR 860-001-0720, PacifiCorp d/b/a Pacific Power (PacifiCorp or Company), Portland General Electric Company (PGE), and Idaho Power Company (Idaho Power) (together, the Joint Utilities) ask the Public Utility Commission of Oregon (Commission) to reconsider and/or clarify discrete elements of Order No. 23-005. The Joint Utilities believe the order represents an important step forward in addressing the complex issues raised by the interconnection of Qualifying Facilities (QFs). The order protects and implements critical state regulatory policies while, at the same time, moving the state's PURPA policies forward by setting the stage for additional information gathering on transmission planning and potential new optionality for QFs contracting with public utilities. Order No. 23-005 navigates a complex set of intertwined federal and state responsibilities by which a public utility is bound and attempts to strike a balance that provides QFs with viable legal options while holding customers harmless from the risks created by those options. In so doing, the order provides important guidance for future implementation of QF interconnection while protecting customers from potentially exorbitant QF-driven Network Upgrade costs.

The Joint Utilities nevertheless seek rehearing or clarification of elements of the order addressing a QF's ability to elect Energy Resource Interconnection Service (ERIS) and the parameters of the terms and conditions of a contract reflecting this election.

First, Order No. 23-005 holds that a QF may elect to interconnect with ERIS so long as it signs a non-standard PPA with the purchasing utility that assigns the unique costs and risks associated with that election to the QF. The Joint Utilities ask the Commission to reconsider its decision to allow a QF to interconnect with ERIS. Order No. 23-005 accurately observes that a Commission policy allowing a QF to interconnect with ERIS could result in "significant legal and economic risks to ratepayers."[1] Pushing these significant legal and economic risks onto a QF contract is impractical, inconsistent with PURPA and the Federal Energy Regulatory Commission's (FERC) decision in *Pioneer Wind Park I, L.L.C.*, ("*Pioneer Wind*"),[2] and likely to increase litigation and disputes.

Second, in the event the Commission declines to reverse its decision on ERIS, the Joint Utilities seek clarification (or in the alternative, rehearing) of a few specific issues to ensure they understand how to implement the Commission's order. In general, the Joint Utilities believe they are capable of implementing Order No. 23-005, but because QFs will be seeking to negotiate new and unusual non-standard contacts with utilities, any ambiguity in the order may lead to unnecessary disputes.

- The Commission should clarify that any QF choosing to interconnect with ERIS in an area where there is no existing capacity will be delivered on non-firm transmission service, and the delivering utility will not be required, as part of the QF non-standard contracting process, to specify when or how often that non-firm

[1] Order No. 23-005 at 2 (Jan. 20, 2023).
[2] *Pioneer Wind,* 145 FERC ¶ 61,215 (2017).

transmission service will be available. Order No. 23-005 states that a QF should voluntarily commit to curtailment "at a level that the utility agrees obviates the need for the Network Upgrades identified in a [Network Resource Interconnection Service] NRIS report[.]"[3] As the Joint Utilities will explain, interconnection service does not convey transmission service, and no part of an ERIS or an NRIS study addresses how often non-firm transmission may or may not be available on the transmission system—nor are the Joint Utilities aware of any interconnection study that could make such an assessment. If the Commission does, in fact, intend for utilities to offer a QF assurances about the availability of non-firm transmission service during the term of a QF contract, the Joint Utilities request rehearing on the ground that it is not feasible to comply with the order.

- The Commission should clarify that a purchasing utility negotiating a non-standard contract with a QF need not agree to contract terms that would violate FERC statutes, orders, rules, regulations, or tariffs other than FERC's order in *Pioneer Wind*. The Commission's directive for utilities to experiment with use of the federal transmission system could lead to misunderstandings with QFs on this issue. If the Commission disagrees with the Joint Utilities' interpretation, the Joint Utilities respectfully seek rehearing on the ground that Order No. 23-005 exceeds the Commission's statutory authority.
- The Commission should clarify that its favorable reference to Puget Sound Energy's (PSE) tariff for QF curtailment[4] is not an endorsement of similar tariffs

[3] Order No. 23-005 at 34 (emphasis added).
[4] *See In re Puget Sound Energy's Proposed New Schedule 153 Tariff*, Docket No. UE-210818, Puget Sound Energy's Initial Filing (Oct. 29, 2021).

in Oregon. The PSE tariff provides little financial or operational benefit to QFs, yet its design increases the likelihood of system reliability events and/or shifts the cost of reliability and safety upgrades triggered by the QF to the next generator seeking service and/or to utility customers.[5] In the event the Commission does intend for Oregon utilities to file such a tariff, the Joint Utilities ask the Commission to reconsider that decision or, in the alternative, clarify that utilities will not be held legally or financially responsible for any cost-shifting or reliability issues that occur as a direct result of implementing such a tariff.

II. LEGAL STANDARD

Reconsideration or clarification of a Commission order is appropriate where there is either (1) an error of law or fact in the order that was essential to the decision, or (2) good cause for further examination of an issue essential to the decision.[6] The Commission's order must be "supported by substantial evidence in the record."[7] Substantial evidence exists "when the record, viewed as a whole, would permit a reasonable person to make that finding."[8]

III. BACKGROUND

One of the two key issues under investigation in this docket is whether QFs should be required to interconnect with NRIS (as they have long been required to do), or whether they should be permitted to interconnect with ERIS.

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[5] Joint Utilities' Posthearing Brief at 46 (Aug. 5, 2022).
[6] OAR 860-001-0720; *see, e.g., In re PacifiCorp dba Pac. Power Application for an Order Approving Queue Reform Proposal*, Docket UM 2108, Order No. 20-465 (Dec. 4, 2020) (modifying the Commission's previous order based on a showing of good cause to "allow interconnection customers more time after receiving a cluster study to post a security deposit for the estimated cost of identified Network Upgrades," despite the fact that no party had shown legal error).
[7] ORS 183.482(8); *see also Calpine Energy Sols. LLC v. Pub. Util. Comm'n of Or.*, 298 Or App 143, 156 (2019) (overturning the Commission's order for lack of substantial evidence).
[8] ORS 183.482(8).

ERIS is a basic interconnection service that studies the facilities needed to safely and reliably physically interconnect a generating resource to the utility's transmission system.[9] ERIS studies identify only the facilities that must be constructed to ensure the generator can be safely interconnected and eligible to deliver its power on the transmission system on an "as-available" basis, meaning the capacity that already exists on the system.[10] If no such capacity already exists, then the ERIS generator will be eligible to be delivered on non-firm transmission service. NRIS, by contrast, is intended to ensure that an interconnecting generator is eligible to deliver its output to load using firm transmission.[11] A NRIS study first identifies the same facilities identified in an ERIS study necessary for basic interconnection, then identifies any additional Network Upgrades (i.e. facilities) that must be constructed to ensure that a generator's power can be reliably delivered to load.[12] NRIS Network Upgrades have been referred to as "deliverability-driven" Network Upgrades. A generator interconnected with NRIS is eligible to deliver power to load on firm transmission. Customers with firm transmission service can reserve that firm transmission service under a long-term transmission service agreement,[13] and are curtailed *only after* non-firm transmission service customers are curtailed.[14]

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[9] *See Standardization of Generator Interconnection Agreements and Procedures*, 104 FERC ¶ 61,103 (2003), Appendix C at 4 (Order No. 2003) (*pro forma* LGIP) ("Energy Resource Interconnection Service").

[10] Order No. 2003, Appendix C at 4 (*pro forma* LGIP) ("Energy Resource Interconnection Service"). *See* Joint Utilities/100, Vail-Bremer-Foster-Larson-Ellsworth/28. ERIS studies turn a blind eye to whether potential deliverability issues exist in the area of the generator's chosen interconnection site.

[11] *See, e.g.*, Order No. 2003 at P 768, P 784 ("[T]he study for Network Resource Interconnection Service identifies the Network Upgrades that are needed to allow the Generating Facility to contribute to meeting the overall capacity needs of the Control Area or planning region whereas the study for Energy Resource Interconnection Service does not.").

[12] More specifically, NRIS identifies Network Upgrades beyond those identified in an ERIS study that are needed to ensure the generation in the area where the generator proposes to interconnect can be reliably delivered to the load on the transmission provider's system during peak load conditions. *See, e.g.,* Order No. 2003, Appendix C at 16 (*pro forma* LGIP) (3.2.2.2); Order No. 2003 at P 768, P 784 ("[T]he study for Network Resource Interconnection Service identifies the Network Upgrades that are needed to allow the Generating Facility to contribute to meeting the overall capacity needs of the Control Area or planning region whereas the study for Energy Resource Interconnection Service does not.").

[13] Network resource and point-to-point transmission services are both firm transmission services.

[14] Joint Utilities/100, Vail-Bremer-Foster-Larson-Ellsworth/17, 28.

The Joint Utilities have argued that the purpose of a utility signing a PURPA contract is to acquire power to serve customer load; therefore, a QF should be interconnected with NRIS and designated as a network resource or otherwise made eligible for delivery using firm transmission service under the OATT process so the QF power can be used reliably for that purpose. The Joint Utilities argued that if a QF obtains ERIS, and therefore does not pay for the costs of NRIS Network Upgrades, the cost of building the Network Upgrades needed to secure a reservation of firm transmission to deliver the QF's power to load will be shifted to the utility and its customers.[15] QFs, for their part, have argued that NRIS Network Upgrades are prohibitively expensive and prevent the development of QF projects.

Order No. 23-005 attempts to thread the needle on a solution to these competing positions by (1) allowing a QF to elect to interconnect with ERIS, rather than NRIS; (2) requiring the purchasing utility to decline to build the deliverability Network Upgrades needed to secure a reservation of firm transmission capacity to deliver the QF's power to load (thereby reducing Network Upgrade costs, but requiring the utility to rely on non-firm transmission for delivery of the QF power); and (3) requiring the QF and utility to negotiate a non-standard contract that reflects the terms and conditions of the arrangement, including the fact that the utility will take the QF power only when non-firm transmission service is available. This effectively means that the QF power, if scheduled at all, would be subject to an increased risk of curtailment for operational reasons outside the utility's control, rather than economic considerations.

Order No. 23-005 acknowledges that allowing a QF to interconnect with ERIS "creates significant legal and economic risks,"[16] but concludes that a QF should be able to interconnect with ERIS under an individually negotiated non-standard contract that takes these risks into

[15] *See, e.g.,* Joint Utilities/100, Vail-Bremer-Foster-Larson-Ellsworth/30-31.
[16] Order No. 23-005 at 33.

account. The Joint Utilities have argued—and still maintain—that such an arrangement is inappropriate for any long-term contract for power intended to serve load, as well as inconsistent with FERC's prohibition, articulated in *Pioneer Wind,* against delivering QF power on non-firm transmission.[17]

A. The Commission Should Reverse Its Decision to Allow a QF to Interconnect with ERIS.

The Joint Utilities ask the Commission to reverse its decision to allow a QF to interconnect with ERIS. Order No. 23-005 accurately observes that a Commission policy allowing a QF to interconnect with ERIS could result in "significant legal and economic risks to ratepayers." Simply shifting these legal and economic risks to a non-standard QF contract is unlikely to eliminate those risks entirely, while increasing the likelihood of QF disputes.

Allowing a QF to interconnect with ERIS is problematic for several reasons. As the Joint Utilities have noted, if a QF elects ERIS, but the NRIS Network Upgrades needed to secure firm transmission service required to deliver the QF power to load are not constructed, the purchasing utility will need to rely on non-firm transmission service to move the QF power, and the utility will be burdened with a long-term contract for a resource for which it may not have any transmission capacity at any given moment. The avoided cost of the power will be impacted, as will its value to customers. Moreover, because the utility will need to rely on non-firm transmission service for the QF's power, the arrangement will conflict with FERC's conclusion in *Pioneer Wind* that PURPA requires a utility to deliver QF power on <u>firm</u> transmission.[18]

The Commission correctly notes that Section 301(b) of FERC's PURPA regulations allow parties to agree to terms and conditions that are inconsistent with PURPA, but simply alluding to

[17] The Commission noted that the prohibitions against curtailment in *Pioneer Wind* raised "some level of legal risk." Order No. 23-005 at 34.
[18] *Pioneer Wind,* 145 FERC ¶ 61,215.

that regulation does not solve the *Pioneer Wind* issue. *Pioneer Wind* arose where PacifiCorp's transmission system lacked sufficient transmission capacity for PacifiCorp's merchant function to secure firm transmission service to deliver the QF power to load. PacifiCorp attempted to negotiate a contract with the QF that reflected the costs and risks associated with the lack of deliverability—as the Commission directs the parties to do in Order No. 23-005. PacifiCorp proposed to deliver the QF on non-firm transmission service (i.e., the type of transmission service subject to curtailment first) as one possible solution to the issue, among others.[19] Before the parties had concluded their negotiations, and before the Wyoming Public Service Commission (PSC) had any opportunity to address any dispute, the QF filed a complaint at FERC. In its complaint, the QF argued that PacifiCorp was required to take all of the QF's power at full avoided cost under a legally enforceable obligation without curtailment despite the lack of firm transmission capacity needed to deliver the power to load.

In response, PacifiCorp argued that any decision by FERC was wildly premature. The parties were permitted to negotiate alternative solutions under Section 301(b) of FERC's PURPA regulations; the discussions of potential alternatives—including alternatives to curtailment—were ongoing; and the Wyoming PSC had not been given the opportunity weigh in on any disputes the parties might have about how best to address the deliverability issue in the context of the QF contract. As PacifiCorp explained,

[19] *See Pioneer Wind*, Docket No. EL14-1-000, Motion to Intervene and Answer of PacifiCorp in Opposition at 11-12 (Oct. 23, 2013) ("Given the set of contingencies and operational constraints facing the parties, the draft PPA was an attempt to negotiate contract provisions consistent with PURPA that take these issues into account. The draft QF PPA was not a final offer, but an offer made as part of the Section 292.301(b) negotiation process, and one that Pioneer could accept or reject. Most recently, on October 9, 2013, PacifiCorp provided Pioneer a revised draft PPA with modified curtailment provisions. PacifiCorp indicated to Pioneer well before the filing of the Petition that it would be providing a revised PPA [reflecting an alternative pricing option in lieu of a curtailment provision], yet Pioneer saw fit to file the Petition [at FERC] regardless. Contrary to Pioneer's assertions, PacifiCorp never required that the curtailment provisions to which Pioneer objects in its Petition be included in any contract. The priority curtailment provisions in the draft PPA were part of ongoing negotiations with PacifiCorp, and represented one set of potential contract options based on certain assumptions about the future construction of Segment D.").

First . . . [t]he priority curtailment provisions included in the draft qualifying facility ("QF") power purchase agreement ("PPA") with which Pioneer takes issue were offered as an option that would allow Pioneer to receive higher avoided-cost pricing. They are not a requirement for any PPA and PacifiCorp has *never* "refus[ed] to execute [a] PURPA PPA with Pioneer Wind unless Pioneer Wind agrees to allow the Pioneer Wind Project to be curtailed ahead of other generators." Indeed, PacifiCorp remains willing to continue to discuss PPA options with Pioneer.

Second, the Petition should be dismissed because it is premature. Before Pioneer filed its Petition, PacifiCorp told Pioneer clearly that it was willing to offer a revised PPA that addresses its concerns. PacifiCorp and Pioneer continue to engage in the negotiations contemplated by the Commission's [PURPA 301(b)] regulations and those of the State of Wyoming. The issues in dispute are still in flux and the underlying facts have changed even since Pioneer filed its Petition – not only on minor issues, but on issues critical to the Petition. The Commission has repeatedly declined to address requests for relief that are brought to the Commission prematurely, and it should decline to address this one as well.

Third, the State of Wyoming has established specific procedures for negotiating PPAs and for resolving PURPA-related disputes. Should the parties ultimately fail to reach agreement on the terms of a PPA, the State of Wyoming should resolve the issue first, as the dispute involves issues that the Commission has delegated to the states in the first instance. Importantly, Pioneer has not yet invoked the dispute resolution provisions of PacifiCorp's Schedule 38 on file with the Wyoming Public Service Commission ("Wyoming PSC"), and attached hereto as Exhibit 2, whose provisions control PacifiCorp's purchases from Pioneer. Insofar as PURPA implementation is delegated to the States, Pioneer should utilize that process before coming to this Commission.

Fourth, the Commission should exercise its discretion to dismiss the Petition as a matter of sound policy. Granting Pioneer's Petition (or even entertaining the substantive arguments in it) would encourage parties to file for preemptive declaratory relief at the Commission before the negotiation process is complete or otherwise reached a true impasse, adversely affecting the negotiation process contemplated by Commission policy and regulations. Requiring parties to complete the negotiation process encourages the most efficient use of resources. Parties should complete those discussions before racing to this

> Commission for a mid-stream declaration on the ultimate terms of a state-law PURPA contract.[20]

FERC ignored PacifiCorp's ripeness and Section 301(b) arguments and sent the issue back to the Wyoming PSC with instructions to address the problem with QF deliverability—and thus the terms and conditions of the QF contract—*in a manner that did not involve curtailment, because delivering a QF on non-firm transmission service "is in direct violation of the Commission's PURPA policies*."[21]

Thus, while a combination of ERIS plus curtailment may seem like an appropriate pathway under Section 301(b) of FERC's PURPA regulations, it is a pathway that FERC has rejected under at least one set of facts in the context of Section 301(b). As a practical matter, NRIS is the only type of interconnection service that accurately reflects QF demands on the utility system and ensures that QF power can be reliably used to serve load.[22] Allowing a QF to interconnect with ERIS, while forcing a utility to rely on non-firm transmission service to take the power, undermines PURPA's intent, overly complicates QF contracting, and is likely to lead to disputes about both the value of the QF power and the allocation of risks associated with a long-term contract for power that a utility cannot rely upon to serve customers.

B. In the Event the Commission Retains Its Decision to Allow QFs to Elect ERIS, the Commission Should Clarify or Reconsider Its Statement that a Utility Must Offer Curtailment "at a Level that the Utility Agrees Obviates the Need for the Network Upgrades[.]"

In Order No. 23-005, the Commission made the following statement about assessing the risks associated with permitting a QF to interconnect with ERIS, rather than NRIS:

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[20] *See Pioneer Wind*, Docket No. EL14-1-000, Motion to Intervene and Answer of PacifiCorp in Opposition at 1-3; *id.* at 11 ("The draft QF PPA was not a final offer, but an offer made as part of the *Section 292.301(b)* negotiation process, and one that Pioneer could accept or reject.") (emphasis added).
[21] *Pioneer Wind,* 145 FERC at PP 38, 41 (acknowledging the Wyoming PSC's authority to address the deliverability issue, but ordering the Wyoming PSC to address it through cost, rather than curtailment).
[22] *See* Joint Utilities' Prehearing Brief at 31 (June 3, 2022).

> To facilitate further assessment about how on-system QF interconnection with ERIS would work and what efficiencies may be gained, but with lower risks, we adopt NewSun's suggestion to allow any on-system QF to choose to be studied for both ERIS and NRIS, at the QF's expense. We direct the utilities to develop and make appropriate filings that facilitate a QF's ability to pay for both ERIS and NRIS analyses. We further direct the utilities to engage in negotiation of a non-standard contract with any QF that chooses to interconnect with a host utility using ERIS, so long as the QF voluntarily commits to allow curtailment at a level that obviates the need for the Network Upgrades otherwise identified in a NRIS report.

Order No. 23-005 at 2 (emphasis added). During the course of this proceeding, the Joint Utilities have discussed the challenges associated with identifying and allocating the costs associated with PURPA's must-take arrangement when a QF interconnects with ERIS. The above quotation seems to suggest that the information contained in ERIS and/or NRIS studies can provide a QF with information about the risk of "curtailment" should the QF elect ERIS. It also suggests that if a QF obtains both ERIS and NRIS studies, this dual set of studies will provide the QF and utility with more information about interconnection than the parties are able to access today. Neither of these statements is accurate.

Interconnection studies do not, and cannot, analyze how often non-firm transmission capacity will be available on a transmission system at any given time. Thus, allowing a QF to obtain information from both ERIS and NRIS studies (which the Joint Utilities are willing and able to do)[23] will give the QF no information about when or how often non-firm transmission will be available.

[23] The Joint Utilities already provide the information contained in both ERIS and NRIS studies to QFs today. As the Joint Utilities' transmission witnesses explained, an NRIS study starts with an ERIS study, then adds a deliverability analysis to that study. Joint Utilities/100. The information for both types of studies is contained in an NRIS study, and the elements of both studies can be broken out transparently in an NRIS study report.

Interconnection studies are designed to identify facilities (including Network Upgrades) that must be constructed before an interconnection request can be granted. As the Joint Utilities' transmission witnesses explained, when a generator seeks to interconnect with a utility's transmission or distribution system, the transmission provider must evaluate the interconnecting generator's impact on the transmission system to determine what physical facilities and upgrades, including Network Upgrades, are necessary to permit the generator to safely and reliably interconnect with the larger grid and to allow the generator to operate as intended.[24] An interconnecting generator might require the reconductoring of an existing line or the installation of a new line, breakers, switches, or even substations before an interconnection request can be granted.[25] This is the only type of information provided by an interconnection study: the identification of facilities that must be constructed before a request can safely be granted. (As an example, a PacifiCorp cluster study report is attached to this motion as Attachment A.)[26]

Interconnection studies provide no information about the availability of non-firm transmission on the system at any given time, nor can they be scoped to do so. Non-firm transmission service is commonly referred to as "as-available" service, which in the context of transmission service means that it will be available for use by non-firm transmission customers only if there is excess transfer capability on the transmission system after all firm transmission customers have been served.[27] A transmission provider cannot know how firm transmission customers will exercise their rights at any given time, and thus cannot know when excess

[24] Joint Utilities/100, Vail-Bremer-Foster-Larson-Ellsworth/15.
[25] Joint Utilities/100, Vail-Bremer-Foster-Larson-Ellsworth/15.
[26] The study illustrates the scope and parameters of an interconnection study; provides a description of each interconnection request in the cluster; identifies both the ERIS and NRIS facilities needed to grant the interconnection requests; and provides individual cost estimates for each generator for any ERIS and NRIS facilities needed to grant its interconnection request, among other things.
[27] *See, e.g.,* FERC *pro forma* OATT definition 1.28 and Section 14.7, Curtailment or Interruption of Service, available at: https://www.ferc.gov/media/pro-forma-oatt-effective-march-14-2022.

transmission capacity will be available for non-firm transmission customers. For example, firm transmission customers might choose to exercise all of their firm rights to use a transmission line one day but choose not to use all of those rights the next day. QF power would not flow on the first day, but it might on the second. Because interconnection studies cannot, and do not attempt to, ascertain precisely how firm transmission customers will exercise their first-priority rights at any given time, they cannot know what transmission capacity will remain after those rights are exercised.

Moreover, even if non-firm transmission capacity tends to be widely available on a specific, unconstrained transmission line today, which might allow one to speculate (and only speculate) that a QF would rarely be curtailed in that area today, that availability could change in the future for any number of reasons, including the addition of new firm transmission reservations, changes to transmission facilities, new regulatory requirements, or any other factor affecting system operations.[28] The availability of non-firm transmission service at any given time cannot be guaranteed; it certainly cannot be assured over the term of a QF contract.[29] This lack of certainty about transmission availability is a reality for non-firm transmission customers, who enjoy lower costs in exchange for (1) lower service priority, (2) a lack of guaranteed transmission capacity, and (3) an agreement to take the transmission system as they find it.[30]

Because a QF's agreement to be curtailed must be voluntary under Section 301(b) of FERC's PURPA regulations (assuming it is permissible at all),[31] the parameters of an agreement

[28] Firm transmission service can be reserved for the full output of a resource under a long-term agreement, and rights to that firm service can be protected over time; customers taking non-firm transmission service, by contrast, take the transmission system as it comes.
[29] Joint Utilities/400, Vail-Bremer-Foster-Larson-Ellsworth/213.
[30] *See, e.g.,* FERC *pro forma* OATT definition 1.28 and Section 14.7, Curtailment or Interruption of Service. FERC assumes utilities will serve load using firm transmission service. System reliability requires generation to match load on the system at all times, a delicate balance a utility cannot accomplish if the generation it has acquired on a long-term basis to serve load is trapped behind constraints.
[31] 18 C.F.R. § 292.301(b).

to curtail must be clear. The Joint Utilities ask the Commission to clarify that Order No. 23-005 does *not* require utilities negotiating a non-standard contract with a QF to use ERIS and NRIS studies to specify when or how often the QF may be curtailed over the life of a contract. This lack of certainty about transmission availability will not prevent the Joint Utilities from offering a QF a solution that involves non-firm transmission if that is what the Commission directs despite the legal risks presented by *Pioneer*; it simply means that the QF, by virtue of its election to be interconnected with ERIS, will need to bear the risk of transmission unavailability. To the extent Order No. 23-005 does, in fact, intend for utilities to provide a QF with some sort of assurances about the availability of non-firm transmission service over the term of the contract, the Joint Utilities request rehearing on the grounds that compliance is not feasible.

C. Clarifying Some Basic Parameters of a Non-Standard Contract that Includes Curtailment Will Help Avoid Disputes.

1. The terms and conditions of a non-standard PPA with curtailment must allow a utility to comply with FERC statutes, orders, rules, regulations, and tariffs, with the exception of FERC's Pioneer Wind order.

The Joint Utilities ask the Commission to clarify that a purchasing utility negotiating a non-standard contract with a QF need not agree to contract terms that would violate FERC statutes, orders, rules, regulations, or tariffs.

The Commission's decision to require utilities to deliver QF power on non-firm transmission, despite FERC's prohibition of this arrangement in *Pioneer Wind,*[32] is presumably informed in part by the fact that PURPA is implemented through a dual system of federal and state oversight that gives state regulatory authorities primary implementation authority over the terms

[32] *See Pioneer Wind,* 145 FERC at P 38 ("[I]n addition to the fact that the proposed curtailment provision is broader than the purchasing utility's right to curtail purchases in system emergencies under section 292.307(b) of the Commission's PURPA regulations, and unduly discriminatory, the proposed curtailment provision, in effect, treats Pioneer Wind *as if it were a non-firm transmission customer*, which is in direct violation of the Commission's PURPA policies.") (emphasis added).

and conditions of QF contracts and decisions about avoided cost.[33] The order, however, clearly contravenes FERC's statements that QF power cannot be delivered on non-firm transmission and that QFs can be curtailed *only* in the case of system emergencies.[34] Because Order No. 23-005 not only direct utilities to implement QF contracting practices that appear to be inconsistent with a FERC order, but also encourages parties to "experiment" with "creative" uses of the federal transmission system, the Joint Utilities are concerned that the order may spur a number of QF requests for creative arrangements, some of which could be problematic under federal law.

The Joint Utilities would not typically ask the Commission to clarify that its orders allow a utility to comply with federal law, but the Commission's directive for utilities to experiment with use of the federal transmission system could lead to misunderstandings on this issue. The Joint Utilities assume that Order No. 23-005 asks the parties to seek workable solutions that allow a utility to comply with its federal obligations.[35] If the Commission disagrees with the Joint Utilities' interpretation, the Joint Utilities respectfully seek rehearing on the ground that Order No. 23-005 exceeds the Commission's statutory authority by intruding into areas of federal authority over which FERC has exclusive jurisdiction.

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[33] State regulatory authorities are required to implement PURPA pursuant to the rules and regulations promulgated by FERC. *See* 16 U.S.C. § 824a-3(f). "A state has broad authority to implement PURPA with respect to the approval of purchase contracts between utilities and QFs." *N. Am. Nat. Res., Inc. v. Mich. Pub. Serv. Comm'n,* 73 F Supp 2d 804, 807 (D Mich 1999) (*citing Crossroads Cogeneration Corp. v. Orange & Rockland Utils., Inc*., 159 F3d 129, 135 (3d Cir 1998).

[34] *See Pioneer Wind* 145 FERC at P 37 ("The proposed section 4.4(b) curtailment provision would unlawfully permit the purchasing utility to curtail purchases from the QF in broader circumstances than those permitted by the Commission's PURPA regulations which authorize curtailments in system emergencies.").

[35] If a state orders a utility to violate a FERC order interpreting PURPA, the potential consequence is an enforcement order against the state. If a utility violates its non-PURPA federal regulatory requirements under the Federal Power Act, the potential consequences include investigation of the utility by FERC's Office of Enforcement, the imposition of significant civil penalties, and other unintended consequences (such as reliability failures). *See, e.g., Enforcement of Statutes, Orders, Rules, and Regulations*, 132 FERC P 61,216 (2010) (Revised Policy Statement on Penalty Guidelines); *Enforcement of Statutes, Orders, Rules, and Regulations*, 130 FERC P 61,220 (2010) (Initial Policy Statement on Penalty Guidelines) (describing how penalties will be assessed for violations of FERC tariffs, reliability standards, and other violations of FERC statutes, orders, rules, regulations, or tariffs.). These are not risks that are reasonably assignable to a QF through a contract.

2. The Commission should clarify that its favorable reference to Puget Sound Energy's tariff for QF curtailment[36] is not an endorsement of similar tariffs in Oregon.

In Order No. 23-005, the Commission cites favorably to the Washington Utilities and Transportation Commission's (WUTC) efforts to experiment with QF curtailment, presumably referring to the "Optional QF Interconnection Service" tariff filed by PSE in 2021.[37] The tariff allows a QF to be curtailed in some limited circumstances as an alternative to paying for the full cost of the Network Upgrades it triggers. In FERC parlance, the transmission service available to the QF under the tariff is equivalent to non-firm transmission. The Joint Utilities seek clarification that Oregon utilities are not required to implement a similar tariff. The Joint Utilities understand Order No. 23-005 to require utilities to negotiate contractual solutions that allow for QF curtailment, rather than implementing a tariff that mirrors PSE's.

As the Joint Utilities have noted, it is unclear what the PSE tariff would accomplish as a practical matter other than decreasing reliability and shifting costs to other customers.[38] PSE explained in its filing that a QF must be "Fully Deliverable" to qualify for the tariff, a term that effectively means the QF must be interconnected with (and pay for) NRIS.[39] Some limited cost savings to QFs appear to be achieved by requiring the transmission provider ignore certain NERC reliability and safety issues identified in the QF's interconnection studies, then curtailing the QF

[36] *See* Docket No. UE-210818, Puget Sound Energy's Initial Filing.
[37] *See* Interconnection Customer Coalition/301, Lowe/1-17 (PSE's Schedule 153 QF Transmission Interconnection Service Tariff and additional explanatory materials, and WUTC Staff Memorandum for Dec. 23, 2021 Open Meeting).
[38] Joint Utilities' Posthearing Brief at 45-46.
[39] *See* Docket No. UE-210818, Puget Sound Energy's Initial Filing, Attachment "A" at 4 (Puget Sound Energy Schedule 153) ("Fully Deliverable shall mean the Qualifying Facility meets all interconnection requirements, including the construction of any and all (i) necessary interconnection facilities to meet interconnection standards and (ii) system upgrades, if necessary, to deliver output from the Qualifying Facility to Company's retail customers, and Company has available transmission capacity, including the construction of any and all necessary facilities to guaranty transfer capacity, necessary to deliver the Net Output to any point on Company's Transmission System."); s*ee also* Docket No. UE-210818, Puget Sound Energy's Initial Filing, Schedule 153, Section 5.B ("An Interconnection Customer who is interested in this Schedule 153 service is required to follow the Company's Qualifying Facility Transmission Interconnection Procedures (Attachment "B" of this Schedule) and to reimburse the Company's costs associated with the evaluation and establishment of Interconnection Customer's Schedule 153 service request.").

when reliability issues arise.[40] But in general, the tariff seems designed to drive down reliability while still requiring QFs to bear the costs of the most expensive types of Network Upgrades.[41]

The Joint Utilities have noted their discomfort with dispensing with reliability elements of a study simply to make it cheaper for a QF to interconnect.[42] Doing so would either increase the likelihood of reliability events on the system or shift the costs of QF-driven reliability and safety upgrades to the next generator seeking service (or perhaps to the transmission provider if the issue shows up first in NERC reliability studies).[43] Therefore, the Joint Utilities seek clarification that the Commission does not intend to require utilities to implement a similar tariff. In the event the Commission does so intend, the Joint Utilities ask the Commission to reconsider that decision or, in the alternative, to clarify that utilities will not be held legally or financially responsible for any cost-shifting or reliability issues that occur as a direct result of implementing such a tariff.

IV. CONCLUSION

The Joint Utilities respectfully request rehearing, or in the alternative, clarification, consistent with this motion.

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[40] *See* Docket No. UE-210818, Puget Sound Energy's Filing Letter at 2 (Oct. 29, 2021) (noting that study obligations under the proposed tariff are different from FERC's NRIS study obligations because the proposed new QF-specific study process eliminates the transmission provider's requirement to identify Network Upgrades needed "to ensure adequate redundancy in interconnection facilities and capacities in case of an N-1-1 outage.") In other words, the QF-specific tariff relieves the transmission provider of the obligation to ensure its facilities comply with NERC Standard TPL-001-1 (Transmission System Planning Performance Requirements) as part of the interconnection process, despite the fact that FERC requires transmission providers to comply with NERC reliability standards.

[41] The tariff allows QF curtailment in emergency situations, which FERC already allows and as FERC noted in *Pioneer Wind*. Section 292.101(b)(4) of FERC's PURPA regulations defines "system emergency" as "a condition on a utility's system which is likely to result in imminent significant disruption of service to customers or is imminently likely to endanger life or property" and allows QFs to be curtailed as necessary to ensure reliability. 18 C.F.R. § 292.101(b)(4). It is unclear from the tariff how PSE intends to curtail QFs under the tariff, but PacifiCorp assumes that because the addition of the QF may create or exacerbate reliability issues, the tariff gives PSE the right to curtail the QF before other customers.

[42] Joint Utilities' Posthearing Brief at 46.

[43] Joint Utilities' Posthearing Brief at 46.

Respectfully submitted this 21st day of March 2023, on behalf of the Joint Utilities.

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ATTACHMENT A

to

Joint Utilities' Motion for Rehearing and/or Clarification

PACIFICORP

Generation Interconnection

Cluster 2 Study Report

Cluster Area 18

November 14, 2022

TABLE OF CONTENTS

1.0 SCOPE OF THE STUDY

Cluster Area 18 (CA18) is generally described as the central Oregon area and includes the following Interconnection Requests: C2-06, C2-07, C2-08, C2-09, C2-114, C2-117, C2-135, C2-147, C2-158, C2-159, C2-177, C2-178, C2-197, C2-198, C2-199 and C2-200. Interconnection Requests within CA18 have proposed a total of 2,023.9 megawatts of new generation.

Consistent with Attachment W, Section 3.4.2 and Section 51.4 of PacifiCorp's ("Transmission Provider") Open Access Transmission Tariff ("OATT"), this interconnection Transition Cluster Study ("Cluster Study") evaluated the impact of the proposed interconnections on the reliability of the Transmission System. The Cluster Study considered the Base Case as well as all generating facilities (and with respect to (iii) below, any identified Network Upgrades associated with such higher queued interconnection) that, on the date the Cluster Request Window closes:

(i) are existing and directly interconnected to the Transmission System;
(ii) are existing and interconnected to Affected Systems and may have an impact on the Interconnection Request;
(iii) have a pending higher queued or higher clustered interconnection request to interconnect to the transmission system; and
(iv) have executed an LGIA or requested that an unexecuted LGIA be filed with FERC.

The Cluster Study consisted of power flow, stability, and short circuit analyses.

This Cluster Study report provides the following information:

- identification of any circuit breaker short circuit capability limits exceeded as a result of the interconnection;
- identification of any thermal overload or voltage limit violations resulting from the interconnection;
- identification of any instability or inadequately damped response to system disturbances resulting from the interconnection and
- description and non-binding, good faith estimated cost of facilities required to interconnect the Generating Facilities to the Transmission System and to address the identified short circuit, instability, and power flow issues.

2.0 STUDY ASSUMPTIONS

- All active higher priority transmission service and/or generator interconnection requests that were considered in this study are listed in Appendix 2. If any of these requests are withdrawn, the Transmission Provider reserves the right to restudy this request, and the results and conclusions could significantly change.
- For study purposes there are two separate queues:
    - Transmission Service Queue: to the extent practical, all network upgrades that are required to accommodate active transmission service requests were modeled in this study.
    - Generation Interconnection Queue: Interconnection Facilities and network upgrades associated with higher queued or higher clustered interconnection requests were modeled in this study.

- The Interconnection Customers' request for energy or network resource interconnection service in and of itself does not request or convey transmission service. Only a Network Customer may make a request to designate a generating resource as a Network Resource. Because the queue of higher priority transmission service requests may be different when a Network Customer requests network resource designation for this Generating Facility, the available capacity or transmission modifications, if any, necessary to provide Network Integration Transmission Service may be significantly different. Therefore, Interconnection Customers should regard the results of this study as informational rather than final.
- Under normal conditions, the Transmission Provider does not dispatch or otherwise directly control or regulate the output of generating facilities. Therefore, the need for transmission modifications, if any, that may be required to provide Network Resource Interconnection Service will be evaluated on the basis of 100 percent deliverability (i.e., this study did not model displacement of other resources in the same area).
- This study assumed the Projects will be integrated into the Transmission Provider's system at agreed upon and/or proposed Points of Interconnection ("POI" or "POIs").
- If Interconnection Customers proceed through the interconnection process, they will be required to construct and own any facilities required between the Point of Change of Ownership and the Project unless specifically identified by the Transmission Provider.
- The locations of any new POI substations required to be constructed for Interconnection Requests proposing to tap an existing transmission line will be assumed to be feasible at the location requested by Interconnection Customers. If no specific location was requested by an Interconnection Customer, the Transmission Provider will assume a location nearest to the Interconnection Customer's generating facility location. However, as the Transmission Provider is ultimately responsible for obtaining the property for any new POI substation, if the Transmission Provider is unable to obtain the necessary property at the assumed location in this study report, the exact location of the substation will have to be modified. Interconnection Customer's will be responsible for constructing its Interconnection Facilities to reach the location of the POI substation.
- Line reconductor or fiber underbuild required on existing poles were assumed to follow the most direct path on the Transmission Provider's system. If during detailed design the path must be modified it may result in additional cost and timing delays for the Interconnection Customer's Project.
- Generator tripping may be required for certain outages.
- All facilities will meet or exceed the minimum Western Electricity Coordinating Council ("WECC"), North American Electric Reliability Corporation ("NERC"), and the Transmission Provider's performance and design standards.
- Power flow analysis requires WECC base cases to reliably balance under peak load conditions the aggregate of generation in the local area, with the Generating Facility at full output, to the aggregate of the load in the Transmission Provider's Transmission System. As the ("PACE") balancing authority area ("BAA") has more existing and proposed generation than load, it is necessary to assume some portion of other resources are displaced by this Project's output in order to assess the impact of interconnecting this Project's generation to transmission system operations. For the purposes of this study, generation in the Transmission Provider's X areas were assumed to be displaced.
- All applicable system improvements associated with higher priority generation

interconnection requests, transmission service requests, load requests and/or planned Transmission Provider projects will be assumed to be in-service which includes the following:
    - Transmission Provider Planned Projects:
        - The Transmission Provider planned Houston Lake-Ponderosa #2 115 kV transmission line (Q4 2023)
    - Upgrades Assigned to Higher Priority Requests
        - Addition of a third 230-115 kV transformer at Ponderosa (TCA8)
- This report is based on information available at the time of the study. It is the Interconnection Customer's responsibility to check the Transmission Provider's web site regularly for Transmission System updates at https://www.oasis.oati.com/ppw

3.0 GENERATING FACILITY REQUIREMENTS

The following requirements are applicable to all Interconnection Requests. The Transmission Provider will identify any site-specific generating facility requirements in addition to the following in this report and in facilities studies. Certain Interconnection Requests requesting service at a voltage level traditionally defined as distribution may be subject to the transmission interconnection request requirements listed below should the Transmission Provider make that determination.

3.1 Transmission Voltage Interconnection Requests

All interconnecting synchronous and non-synchronous generators are required to design their Generating Facilities with reactive power capabilities necessary to operate within the full power factor range of 0.95 leading to 0.95 lagging. This power factor range shall be dynamic and can be met using a combination of the inherent dynamic reactive power capability of the generator or inverter, dynamic reactive power devices and static reactive power devices to make up for losses.

For synchronous generators, the power factor requirement is to be measured at the POI. For non-synchronous generators, the power factor requirement is to be measured at the high-side of the generator substation.

The Generating Facility must provide dynamic reactive power to the system in support of both voltage scheduling and contingency events that require transient voltage support, and must be able to provide reactive capability over the full range of real power output.

If the Generating Facility is not capable of providing positive reactive support (i.e., supplying reactive power to the system) immediately following the removal of a fault or other transient low voltage perturbations, the facility must be required to add dynamic voltage support equipment. These additional dynamic reactive devices shall have correct protection settings such that the devices will remain on line and active during and immediately following a fault event.

Generators shall be equipped with automatic voltage-control equipment and normally operated with the voltage regulation control mode enabled unless written authorization (or directive) from the Transmission Provider is given to operate in another control mode (e.g. constant power factor control). The control mode of generating units shall be accurately represented in operating studies.

The generators shall be capable of operating continuously at their maximum power output at its rated field current within +/- 5% of its rated terminal voltage.

All generators are required to ensure the primary frequency capability of their Facility by installing, maintaining, and operating a functioning governor or equivalent controls as indicated in FERC Order 842.

As required by NERC standard VAR-001-4.2, the Transmission Provider will provide a voltage schedule for the POI. In general, Generating Facilities should be operated so as to maintain the voltage at the POI, typically between 1.00 per unit to 1.04 per unit, or other designated point as deemed appropriated by Transmission Provider. The Transmission Provider may also specify a voltage and/or reactive power bandwidth as needed to coordinate with upstream voltage control devices such as on-load tap changers. At the Transmission Provider's discretion, these values might be adjusted depending on operating conditions.

Generating Facilities capable of operating with a voltage droop are required to do so. Voltage droop control enables proportionate reactive power sharing among Generation Facilities. Studies will be required to coordinate voltage droop settings if there are other facilities in the area. It will be the Interconnection Customer's responsibility to ensure that a voltage coordination study is performed, in coordination with Transmission Provider, and implemented with appropriate coordination settings prior to unit testing.

For areas with multiple generating facilities additional studies may be required to determine whether or not critical interactions, including but not limited to control systems, exist. These studies, to be coordinated with Transmission Provider, will be the responsibility of the Interconnection Customer. If the need for a master controller is identified, the cost and all related installation requirements will be the responsibility of the Interconnection Customer. Participation by the Generation Facility in subsequent interaction/coordination studies will be required pre- and post-commercial operation in order ensure system reliability.

Interconnection Requests that are 75 MVA or larger may be required to facilitate collection and validation of accurate modeling data to meet NERC modeling standards. The Transmission Provider, in its roles as the Planning Coordinator, requires Phasor Measurement Units (PMUs) at all new Generating Facilities with an individual or aggregate nameplate capacity of 75 MVA or greater. In addition to owning and maintaining the PMU, the Generating Facility will be responsible for collecting, storing (for a minimum of 90 days) and retrieving data as requested by the Planning Coordinator. Data must be stored for a minimum of 90 days. Data must be collected and be able to stream to Planning Coordinator for each of the Generating Facility's step-up transformers measured on the low side of the GSU at a sample rate of at least 60 samples per second and synchronized within +/- 2 milliseconds of the Coordinated Universal Time (UTC). Initially, the following data must be collected:

- Three phase voltage and voltage angle (analog)
- Three phase current (analog)

Data requirements are subject to change as deemed necessary to comply with local and federal regulations.

All generators must meet the Federal Energy Regulatory Commission (FERC), North American Electric Reliability Corporation (NERC) and WECC low voltage ride-through requirements as specified in the interconnection agreement. Inverters must be designed to stay connected to the grid in the case of severe faults and may not momentarily cease output within the no-trip area of the voltage curves. Figure 1 illustrates the voltage ride-through capability as per NERC PRC-024. Importantly, inverters should be designed such that a trip outside of the curves is a "may-trip" area (if needed to protect equipment) not a "must-trip" area. Inverters that momentarily cease active power output for these voltage excursions should be configured to restore output to pre-disturbance levels in no greater than five seconds, provided the inverter is capable of these changes. Generators must provide test results to the Transmission Provider verifying that the inverters for this Project have been programmed to meet all PRC-024 requirements rather than manufacturer IEEE distribution standards.

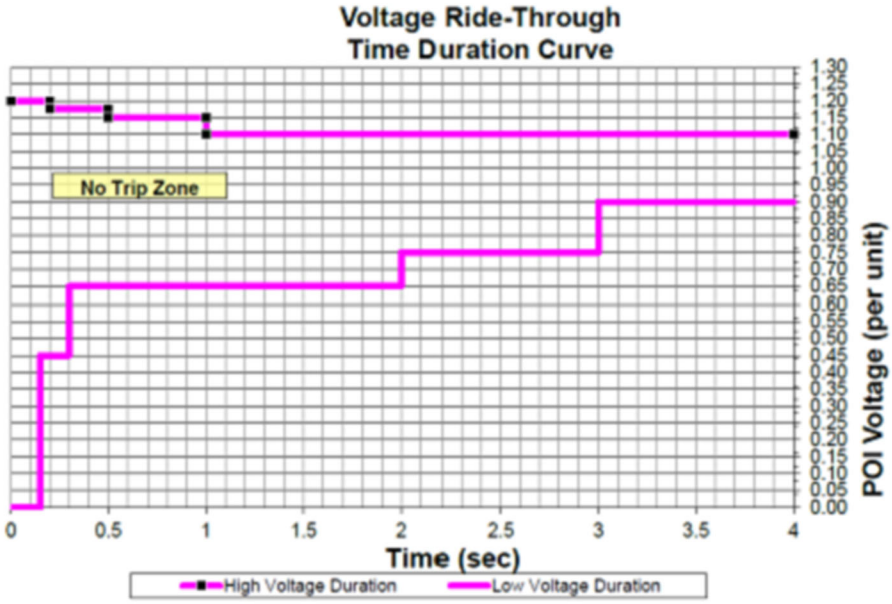

Figure 1 – Voltage Ride-Through Curve

As the Transmission Provider cannot submit a user written model to WECC for inclusion in base cases, a standard model from the WECC Approved Dynamic Model Library is required 180 days prior to trial operation. The list of approved generator models is continually updated and is available on the http://www.WECC.biz website.

Interconnection Customer with an Interconnection Request for a Generating Facility that is both 75 MVA or larger as well as being interconnected at a voltage higher than 100 kV shall register with NERC as the Generator Owner ("GO") and Generator Operator ("GOP") for the Large Generating Facility and provide the Transmission Provider documentation demonstrating registration in order to be approved for Commercial Operation. This registration must be maintained throughout the lifetime of the Interconnection Agreement.

Interconnection Customers are responsible for the protection of transmission lines between the Generating Facility and the POI substation. For Interconnection Requests that are smaller than 75 MVA or are interconnected at a voltage less than 100 kV which have a tie line that is longer than

1,000 feet the Interconnection Customer shall construct and own a tie-line substation to be located at the change of ownership (separate fenced facility adjacent to the Transmission Provider's POI substation). The tie line substation shall include an Interconnection Customer owned protective device and associated transmission line relaying/communications. The ground grids of the Transmission Provider's POI substation and the Interconnection Customer's tie-line substation will be connected to support the use of a bus differential protection scheme which will protect the overhead bus connection between the two facilities.

3.2 Distribution Voltage Interconnection Requests

The Generating Facility and interconnection equipment owned by the Interconnection Customers are required to operate under constant power factor mode with a unity power factor setting unless specifically requested otherwise by the Transmission Provider. The Generating Facilities are expressly forbidden from actively participating in voltage regulation of the Transmission Provider's system without written request or authorization from the Transmission Provider. The Generating Facilities shall have sufficient reactive capacity to enable the delivery of 100 percent of the plant output to the applicable POI at unity power factor measured at 1.0 per unit voltage under steady state conditions.

Generators capable of operating under voltage control with voltage droop are required to do so. Studies will be required to coordinate the voltage droop setting with other facilities in the area. In general, the Generating Facility and Interconnection Equipment should be operated so as to maintain the voltage at the POI between 1.01 pu to 1.04 pu. At the Public Utility's discretion, these values might be adjusted depending on the operating conditions. Within this voltage range, the Generating Facility should operate so as to minimize the reactive interchange between the Generating Facility and the Public Utility's system (delivery of power at the POI at approximately unity power factor). The voltage control settings of the Generating Facility must be coordinated with the Public Utility prior to energization (or interconnection). The reactive compensation must be designed such that the discreet switching of the reactive device (if required by the Interconnection Customer) does not cause step voltage changes greater than +/-3% on the Public Utility's system.

All generators must meet applicable WECC low voltage ride-through requirements as specified in the interconnection agreement.

As per NERC standard VAR-001-1, the Public Utility is required to specify voltage or reactive power schedule at the POI. Under normal conditions, the Public Utility's system should not supply reactive power to the Generating Facility.

4.0 Cluster Area Definitions

The Transmission Provider performed the Cluster Study based on geographically and/or electrically relevant areas on the Transmission Provider's Transmission System known as Cluster Areas. The Transmission Provider has determined that the Interconnection Requests discussed in Section 5.0 are located in a geographically and/or electrically relevant area on Transmission Provider's Transmission System, and thus, were assigned Cluster Area 18 in the Cluster Study process.

5.0 CLUSTER AREA 18

Cluster Area 18 is generally described as the central Oregon area. This Cluster Area consists of the following Interconnection Requests.

5.1 Description of Interconnection Request – C2-06

The Interconnection Customer has proposed to interconnect 80 megawatts ("MW") of new hybrid solar and battery storage generation to PacifiCorp's ("Transmission Provider") Prineville-Redmond 115 kV transmission line. The new POI substation is assumed to be constructed at approximately latitude 44.2773, longitude -121.1389 located in Deschutes County, Oregon. The Interconnection Request is proposed to consist of sixty-four (64) Ingeteam Ingecon Sun 1600TL B615 solar inverters for a total output of 80 MW at the POI. The Interconnection Request also consists of Tesla megapack battery storage inverters. The requested commercial operation date is May 30, 2026. Figure 2 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for Network Resource Interconnection Service ("NRIS").

The Transmission Provider has assigned the Project Cluster Number "C2-06"

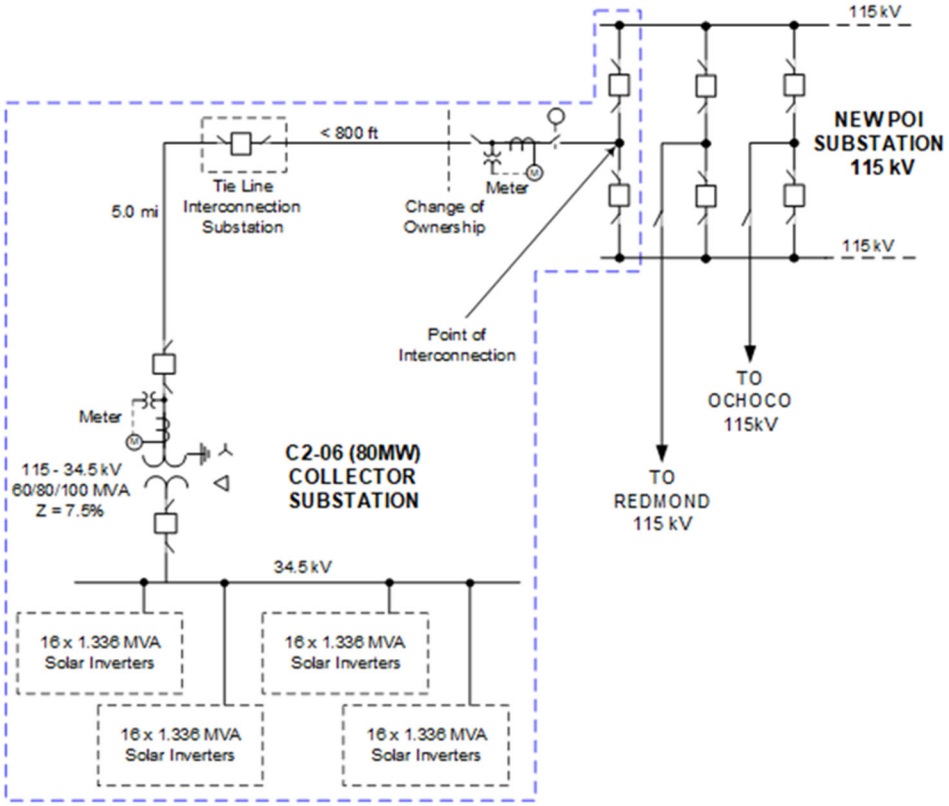

Figure 2: Simplified System One Line Diagram C2-06

5.2 Description of Interconnection Request – C2-07

The Interconnection Customer has proposed to interconnect 80 megawatts ("MW") of new hybrid solar and battery storage generation to PacifiCorp's ("Transmission Provider") Baldwin Road-Ponderosa #1 115 kV transmission line located in Crook County, Oregon. The Interconnection Request is proposed to consist of sixty-four (64) Ingeteam Ingecon Sun 1600TL B615 solar inverters for a total output of 80 MW at the POI. The Interconnection Request also consists of Tesla megapack battery storage inverters. The requested commercial operation date is May 30, 2026. Figure 3 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for Network Resource Interconnection Service ("NRIS").

The Transmission Provider has assigned the Project Cluster Number "C2-07"

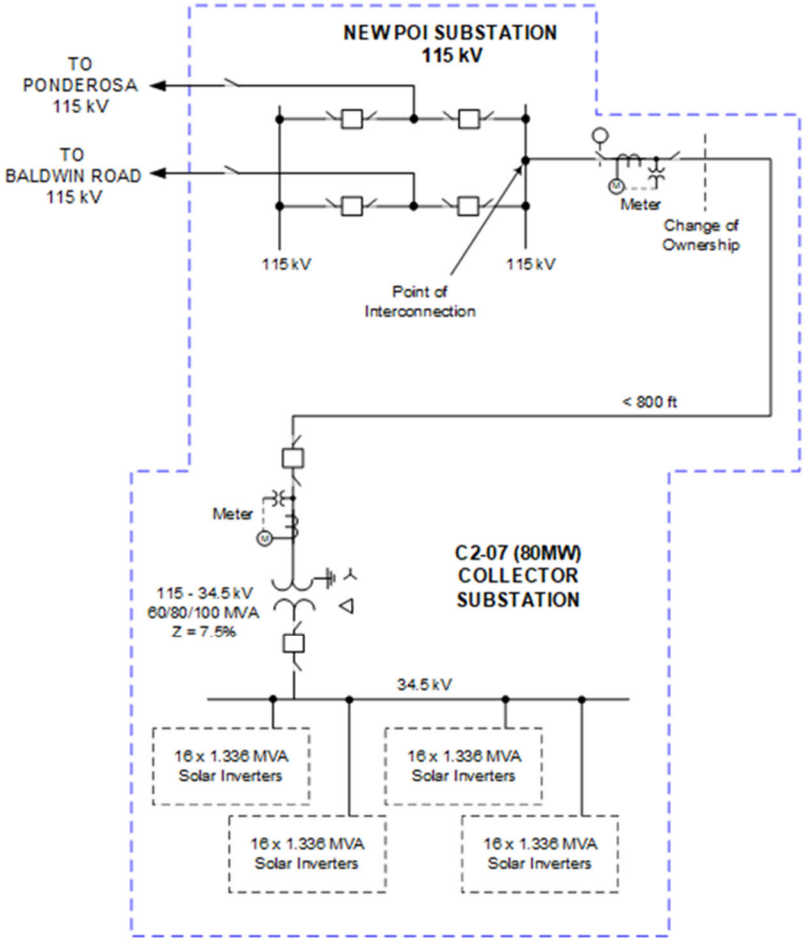

Figure 3: Simplified System One Line Diagram C2-07

5.3 Description of Interconnection Request – C2-08

The Interconnection Customer has proposed to interconnect 80 megawatts ("MW") of new hybrid solar and battery storage generation to PacifiCorp's ("Transmission Provider") Prineville-Redmond 115 kV transmission line. The new POI substation is assumed to be constructed at approximately latitude 44.2773, longitude -121.1389 located in Deschutes County, Oregon. The Interconnection Request is proposed to consist of sixty-four (64) Ingeteam Ingecon Sun 1600TL B615 solar inverters for a total output of 80 MW at the POI. The Interconnection Request also consists of Tesla megapack battery storage inverters. The requested commercial operation date is May 30, 2026. Figure 4 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for Network Resource Interconnection Service ("NRIS").

The Transmission Provider has assigned the Project Cluster Number "C2-08"

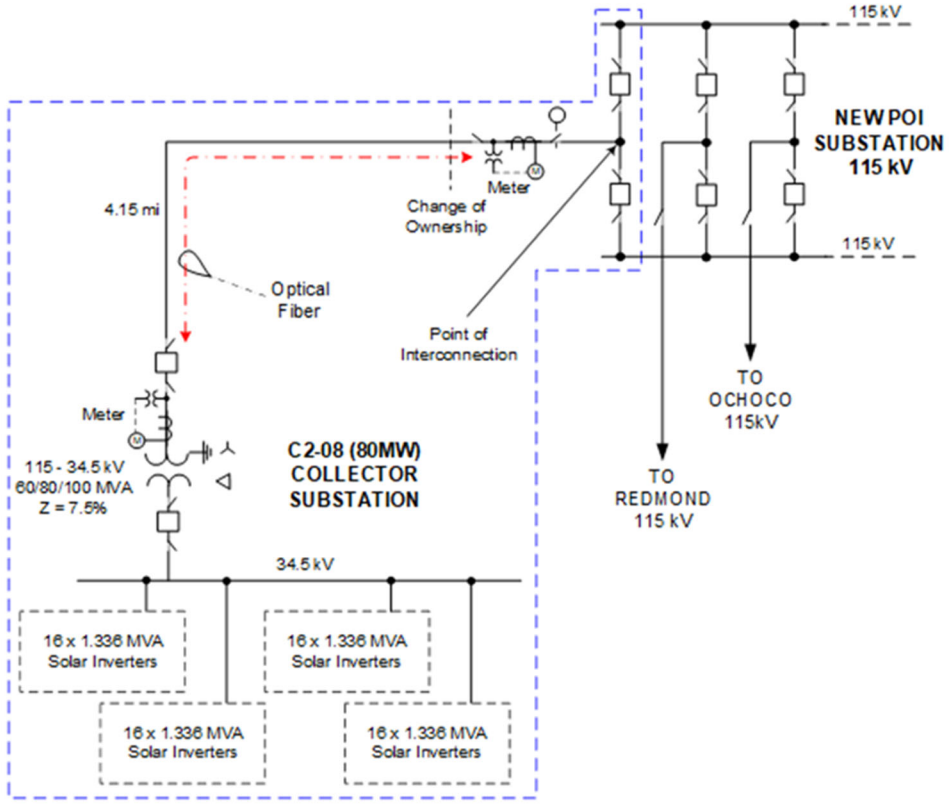

Figure 4: Simplified System One Line Diagram C2-08

5.4 Description of Interconnection Request – C2-09

The Interconnection Customer has proposed to interconnect 80 megawatts ("MW") of new hybrid solar and battery storage generation to PacifiCorp's ("Transmission Provider") Ponderosa 115 kV substation located in Crook County, Oregon. The Interconnection Request is proposed to consist of sixty-four (64) Ingeteam Ingecon Sun 1600TL B615 solar inverters for a total output of 80 MW at the POI. The Interconnection Request also consists of Tesla megapack battery storage inverters. The requested commercial operation date is May 30, 2026. Figure 5 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for Network Resource Interconnection Service ("NRIS").

The Transmission Provider has assigned the Project Cluster Number "C2-09"

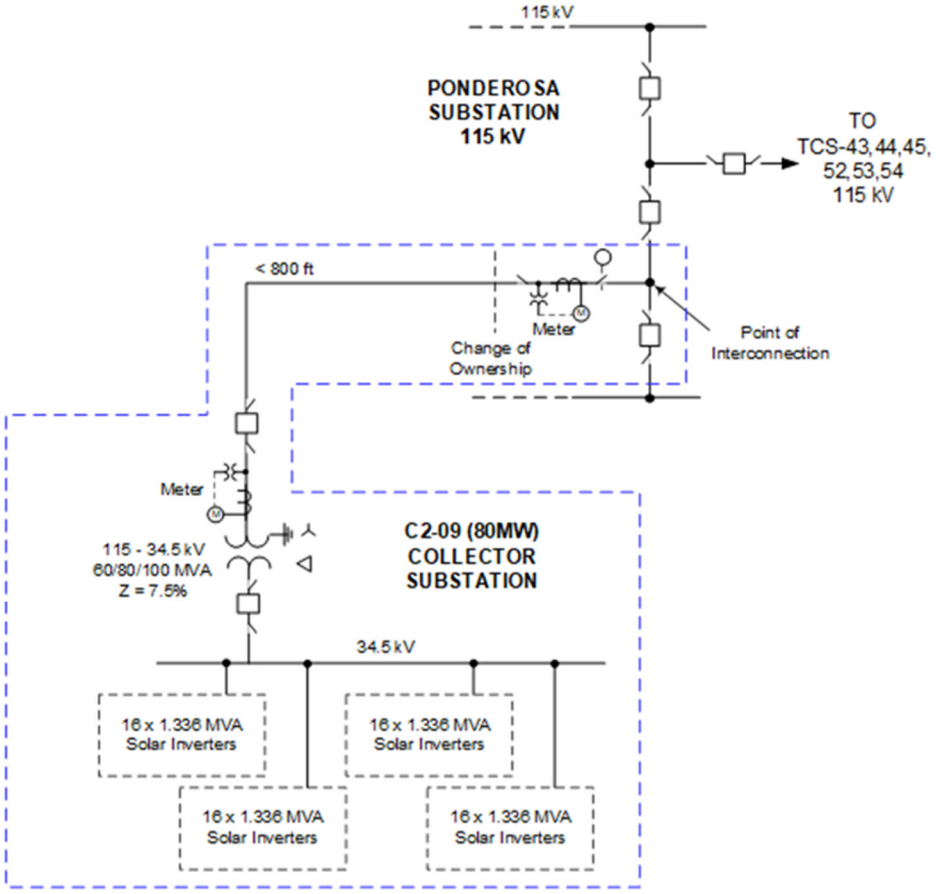

Figure 5: Simplified System One Line Diagram C2-09

5.5 Description of Interconnection Request – C2-114

The Interconnection Customer has proposed to interconnect 199 megawatts ("MW") of new hybrid solar and battery storage generation to PacifiCorp's ("Transmission Provider") Corral 230 kV substation located in Crook County, Oregon. The Interconnection Request is proposed to consist of two hundred seventy-five (275) TMEIC PUV-L0840 solar inverters for a total output of 199 MW at the POI. The Interconnection Request also consists of twenty-four (24) SunGrow SC5000UD-MV-US battery storage inverters. The requested commercial operation date is December 1, 2026. Figure 6 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for both Network Resource Interconnection Service ("NRIS") and Energy Resource Interconnection Service ("ERIS").

The Transmission Provider has assigned the Project Cluster Number "C2-114"

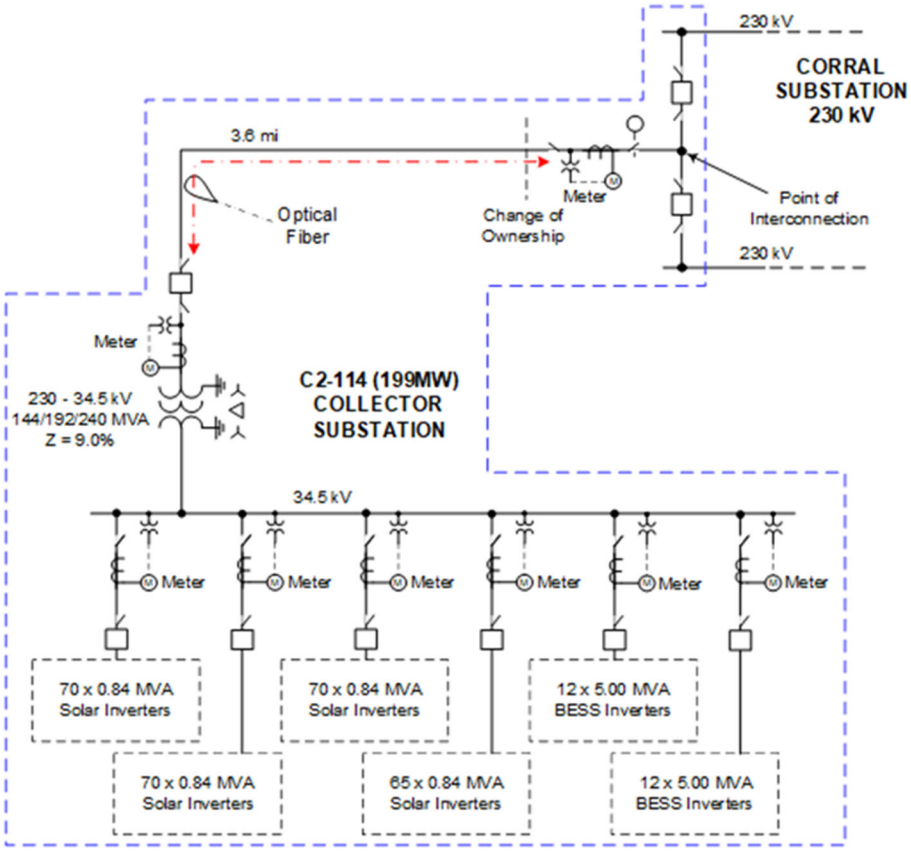

Figure 6: Simplified System One Line Diagram C2-114

5.6 Description of Interconnection Request – C2-117

The Interconnection Customer has proposed to interconnect 199 megawatts ("MW") of new hybrid solar and battery storage generation to PacifiCorp's ("Transmission Provider") Corral 230 kV substation located in Crook County, Oregon. The Interconnection Request is proposed to consist of two hundred seventy-five (275) TMEIC PUV-L0840 solar inverters for a total output of 199 MW at the POI. The Interconnection Request also consists of twenty-four (24) SunGrow SC5000UD-MV-US battery storage inverters. The requested commercial operation date is December 1, 2026. Figure 7 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for both Network Resource Interconnection Service ("NRIS") and Energy Resource Interconnection Service ("ERIS").

The Transmission Provider has assigned the Project Cluster Number "C2-117"

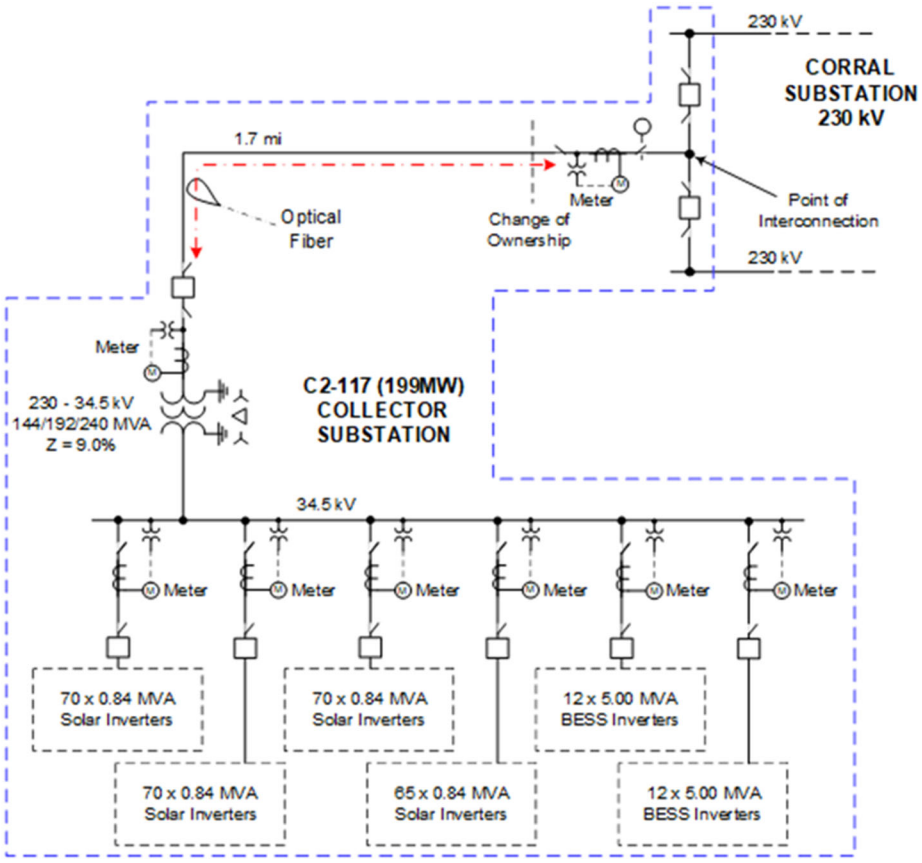

Figure 7: Simplified System One Line Diagram C2-117

5.7 Description of Interconnection Request – C2-135

The Interconnection Customer has proposed to interconnect 150 megawatts ("MW") of new hybrid solar and battery storage generation to PacifiCorp's ("Transmission Provider") Corral 230 kV substation located in Crook County, Oregon. The Interconnection Request is proposed to consist of forty-three (43) GPTech PCS3MWD3-V690 solar inverters for a total output of 150 MW at the POI. The Interconnection Request also consists of twenty-two (22) GPTech PCS3MWD3-V690 battery storage inverters. The requested commercial operation date is December 1, 2026. Figure 8 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for both Network Resource Interconnection Service ("NRIS") and Energy Resource Interconnection Service ("ERIS").

The Transmission Provider has assigned the Project Cluster Number "C2-135"

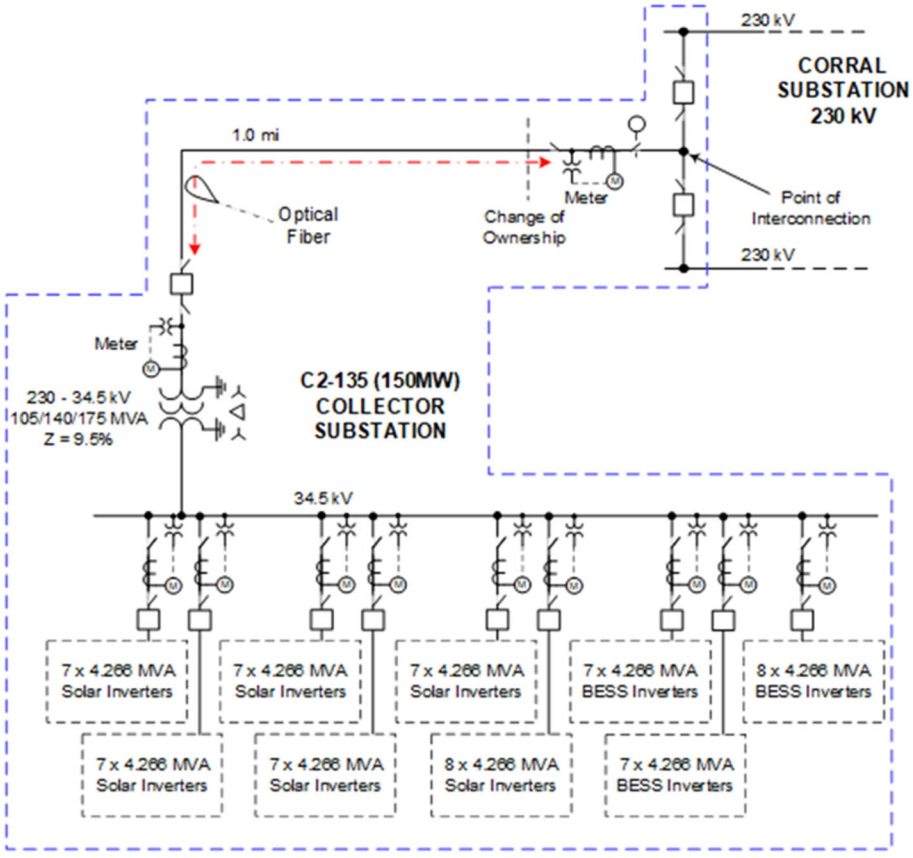

Figure 8: Simplified System One Line Diagram C2-135

5.8 Description of Interconnection Request – C2-147

The Interconnection Customer has proposed to interconnect 199 megawatts ("MW") of new hybrid solar and battery storage generation to PacifiCorp's ("Transmission Provider") Corral 230 kV substation located in Crook County, Oregon. The Interconnection Request is proposed to consist of fifty-eight (58) TMEIC Ninja 4200PV-PCS solar inverters for a total output of 199 MW at the POI. The Interconnection Request also consists of fifty-eight (58) TMEIC Ninja 4200 ESS-PCS battery storage inverters. The requested commercial operation date is May 31, 2025. Figure 9 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for both Network Resource Interconnection Service ("NRIS") and Energy Resource Interconnection Service ("ERIS").

The Transmission Provider has assigned the Project Cluster Number "C2-147"

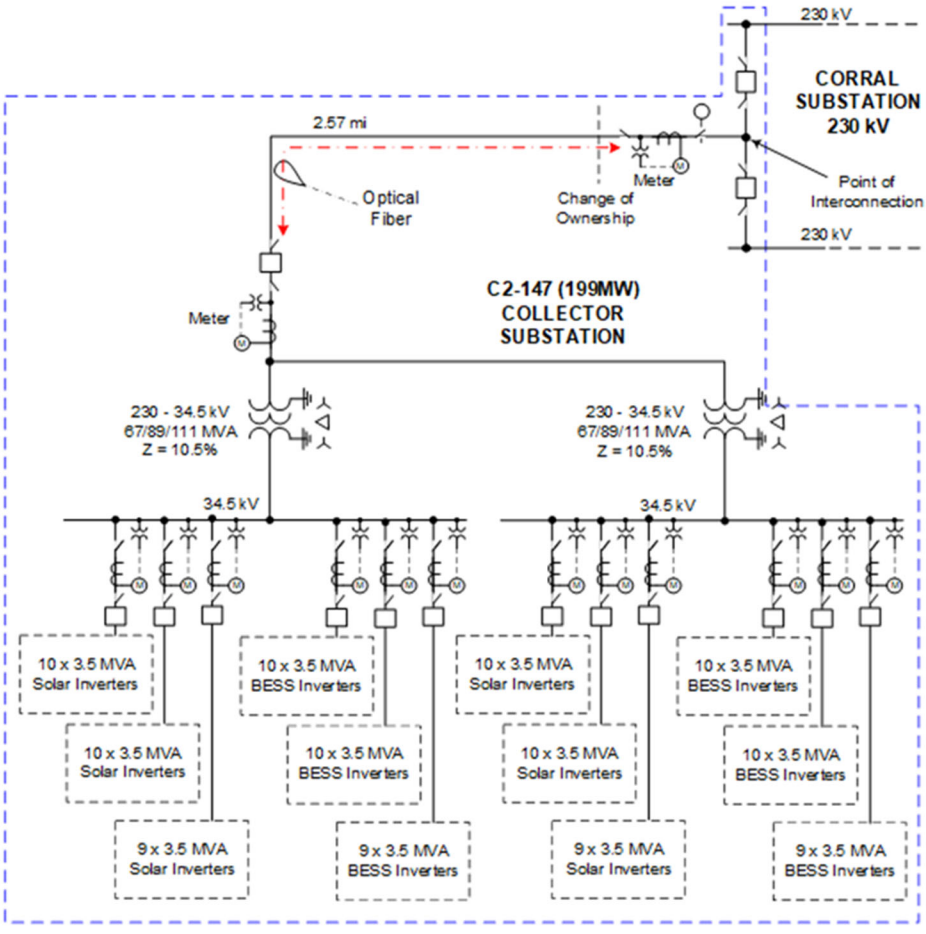

Figure 9: Simplified System One Line Diagram C2-147

5.9 Description of Interconnection Request – C2-158

The Interconnection Customer has proposed to interconnect 199 megawatts ("MW") of new hybrid solar and battery storage generation to PacifiCorp's ("Transmission Provider") Corral 230 kV substation located in Crook County, Oregon. The Interconnection Request is proposed to consist of sixty (60) SunGrow SG3600UD-MV solar inverters for a total output of 199 MW at the POI. The Interconnection Request also consists of two hundred eight (208) Tesla Megapack 1.2 MVA battery storage inverters. The requested commercial operation date is December 31, 2026. Figure 10 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for both Network Resource Interconnection Service ("NRIS") and Energy Resource Interconnection Service ("ERIS").

The Transmission Provider has assigned the Project Cluster Number "C2-158"

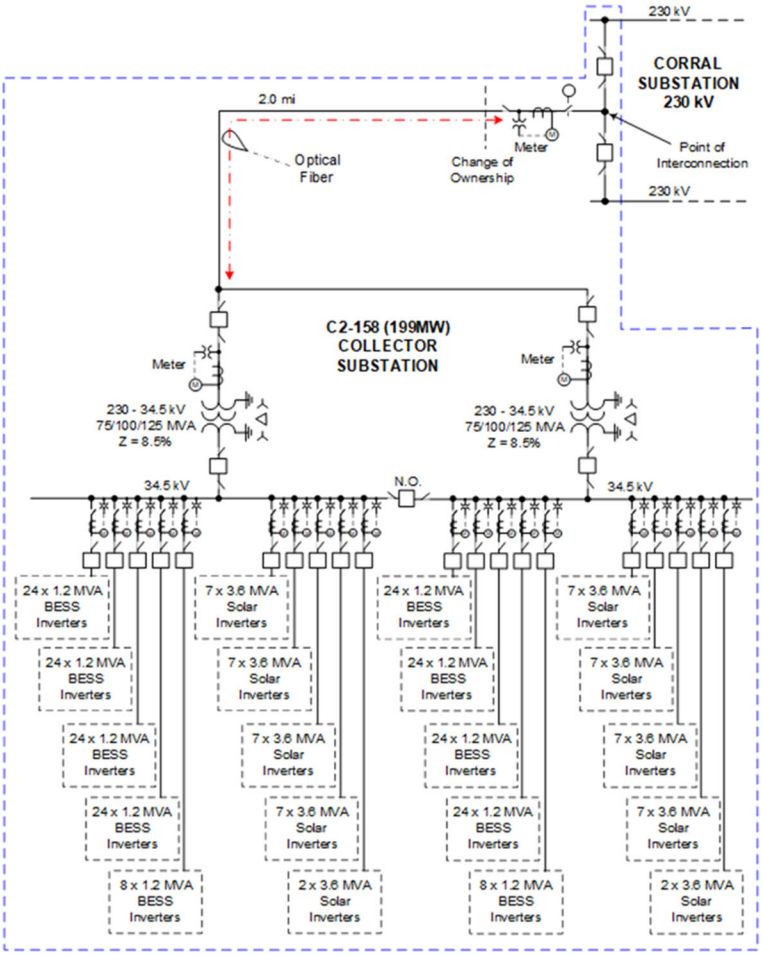

Figure 10: Simplified System One Line Diagram C2-158

5.10 Description of Interconnection Request – C2-159

The Interconnection Customer has proposed to interconnect 199 megawatts ("MW") of new battery storage generation to PacifiCorp's ("Transmission Provider") Corral 230 kV substation located in Crook County, Oregon. The Interconnection Request is proposed to consist of two hundred eight (208) Tesla Megapack 1.2 MVA battery storage inverters for a total output of 199 MW at the POI. The requested commercial operation date is December 31, 2027. Figure 11 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for both Network Resource Interconnection Service ("NRIS") and Energy Resource Interconnection Service ("ERIS").

The Transmission Provider has assigned the Project Cluster Number "C2-159"

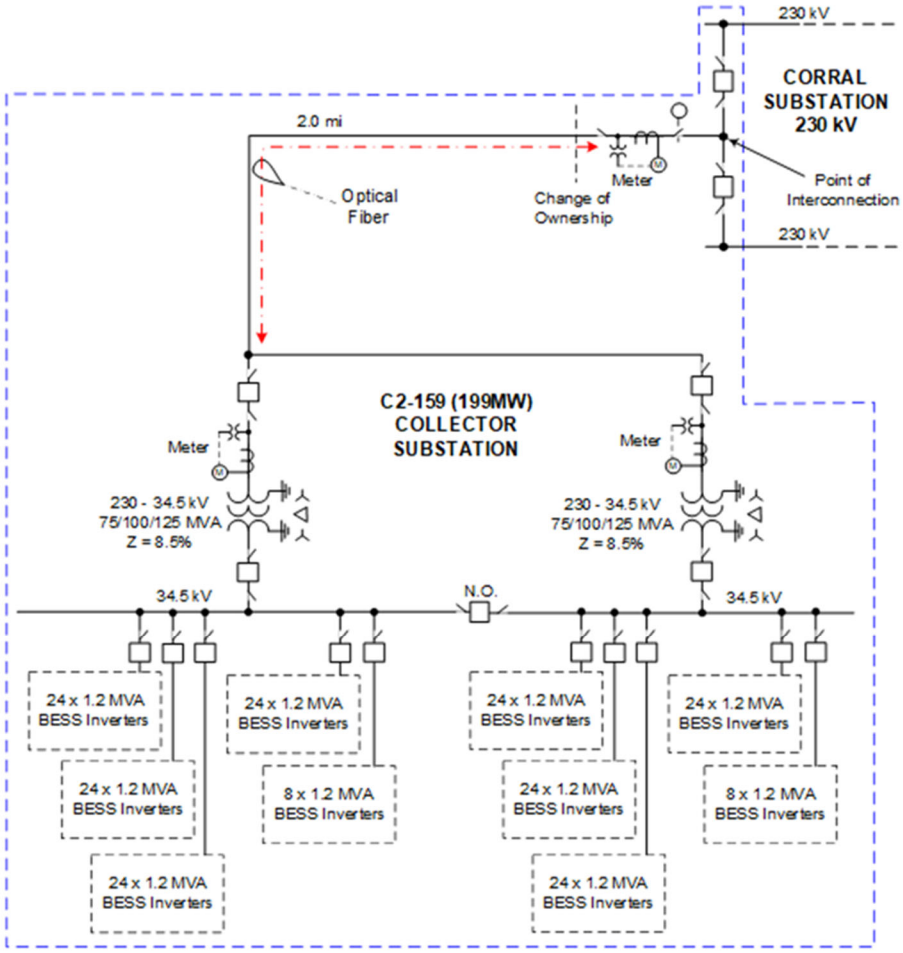

Figure 11: Simplified System One Line Diagram C2-159

5.11 Description of Interconnection Request – C2-177

The Interconnection Customer has proposed to interconnect 199 megawatts ("MW") of new battery storage generation to PacifiCorp's ("Transmission Provider") Corral 230 kV substation located in Crook County, Oregon. The Interconnection Request is proposed to consist of two hundred eight (208) Tesla Megapack 1.2 MVA battery storage inverters for a total output of 199 MW at the POI. The requested commercial operation date is April 30, 2029. Figure 12 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for both Network Resource Interconnection Service ("NRIS") and Energy Resource Interconnection Service ("ERIS").

The Transmission Provider has assigned the Project Cluster Number "C2-177"

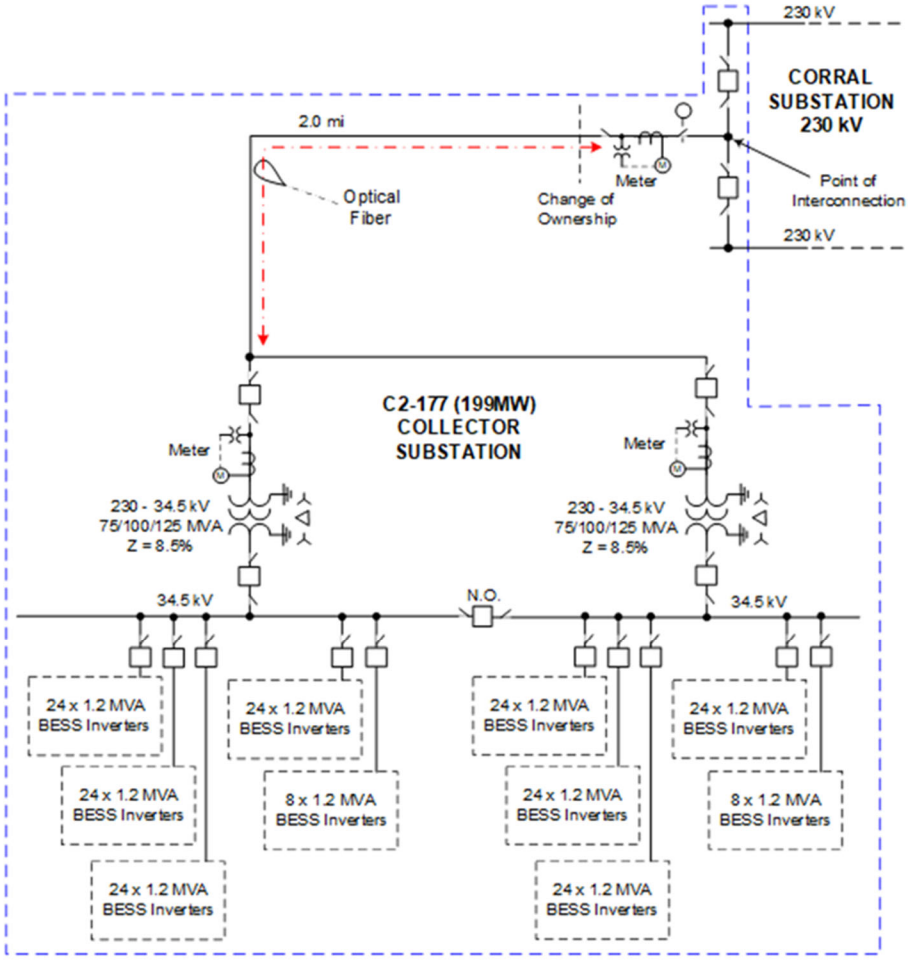

Figure 12: Simplified System One Line Diagram C2-177

5.12 Description of Interconnection Request – C2-178

The Interconnection Customer has proposed to interconnect 199 megawatts ("MW") of new battery storage generation to PacifiCorp's ("Transmission Provider") Corral 230 kV substation located in Crook County, Oregon. The Interconnection Request is proposed to consist of two hundred eight (208) Tesla Megapack 1.2 MVA battery storage inverters for a total output of 199 MW at the POI. The requested commercial operation date is April 30, 2029. Figure 13 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for both Network Resource Interconnection Service ("NRIS") and Energy Resource Interconnection Service ("ERIS").

The Transmission Provider has assigned the Project Cluster Number "C2-178"

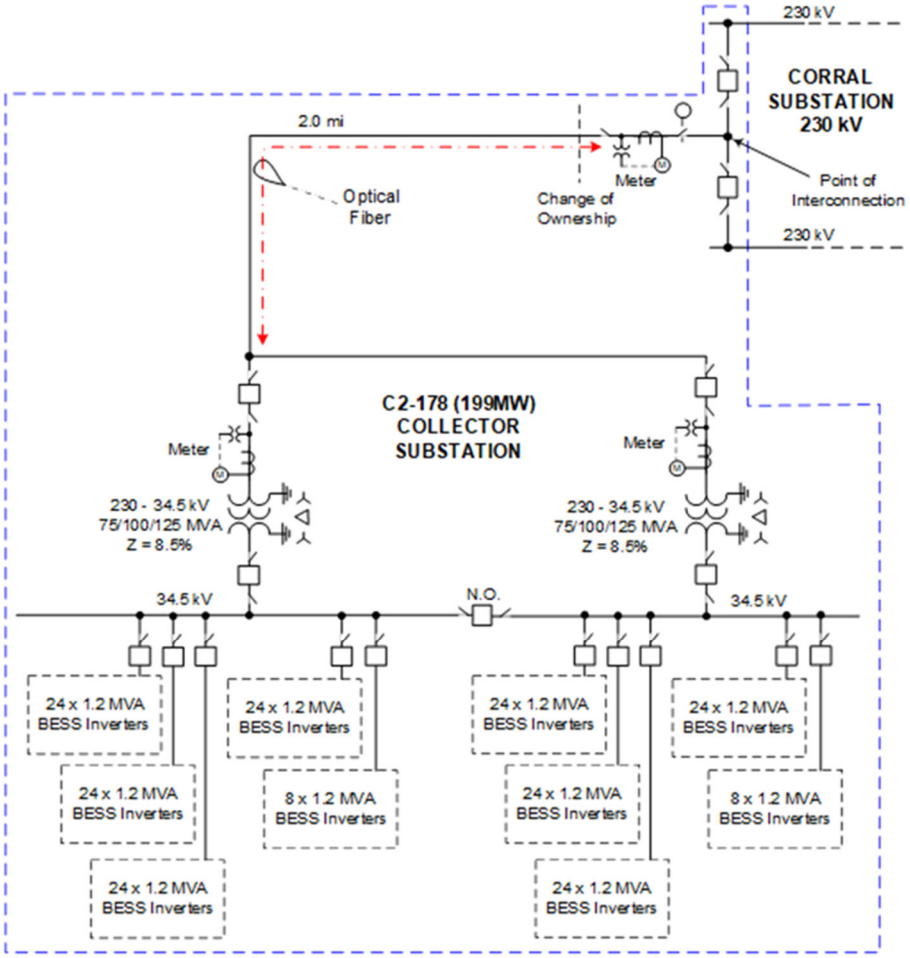

Figure 13: Simplified System One Line Diagram C2-178

5.13 Description of Interconnection Request – C2-197

The Interconnection Customer has proposed to interconnect 40 megawatts ("MW") of new hybrid solar and battery storage generation to PacifiCorp's ("Transmission Provider") Prineville-Redmond 115 kV transmission line. The new POI substation is assumed to be constructed at approximately latitude 44.2773, longitude -121.1389 located in Deschutes County, Oregon. The Interconnection Request is proposed to consist of twelve (12) SunGrow 3600UD solar inverters for a total output of 40 MW at the POI. The Interconnection Request also consists of forty (40) Tesla Megapack II battery storage inverters. The requested commercial operation date is March 31, 2027. Figure 14 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for Network Resource Interconnection Service ("NRIS").

The Transmission Provider has assigned the Project Cluster Number "C2-197"

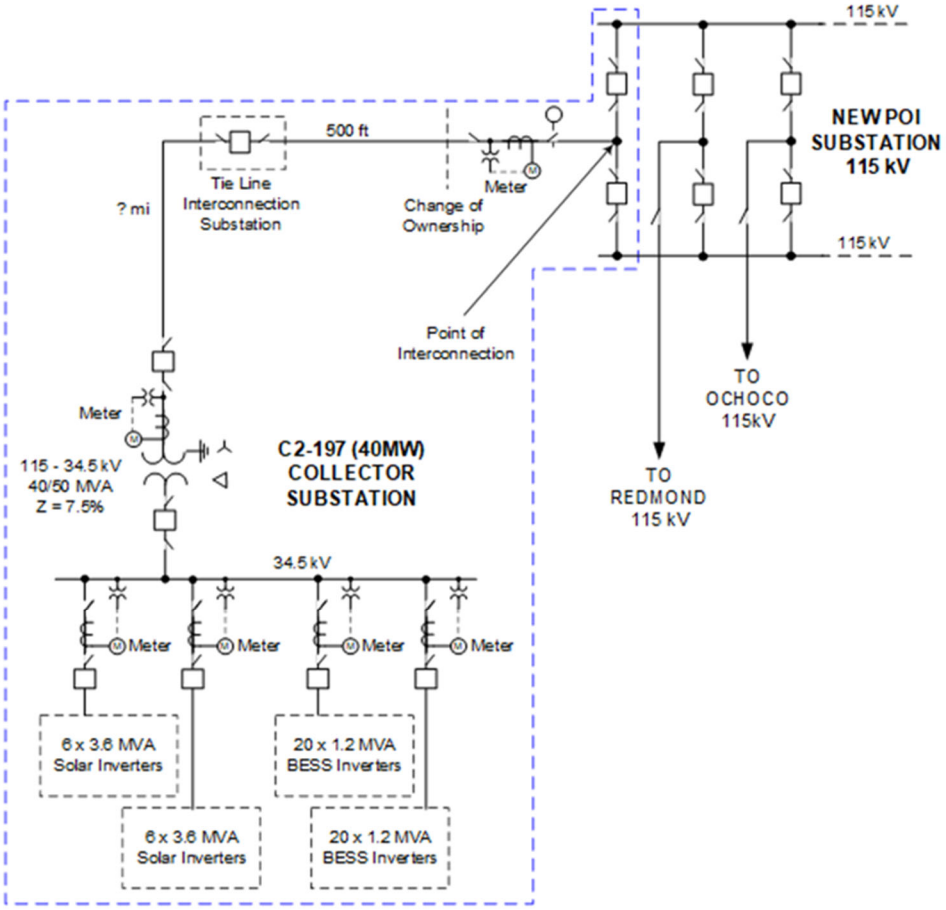

Figure 14: Simplified System One Line Diagram C2-197

5.14 Description of Interconnection Request – C2-198

The Interconnection Customer has proposed to interconnect 40 megawatts ("MW") of new hybrid solar and battery storage generation to PacifiCorp's ("Transmission Provider") Prineville-Redmond 115 kV transmission line. The new POI substation is assumed to be constructed at approximately latitude 44.2773, longitude -121.1389 located in Deschutes County, Oregon. The Interconnection Request is proposed to consist of twelve (12) SunGrow 3600UD solar inverters for a total output of 40 MW at the POI. The Interconnection Request also consists of forty (40) Tesla Megapack II battery storage inverters. The requested commercial operation date is March 31, 2027. Figure 15 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for Network Resource Interconnection Service ("NRIS").

The Transmission Provider has assigned the Project Cluster Number "C2-198"

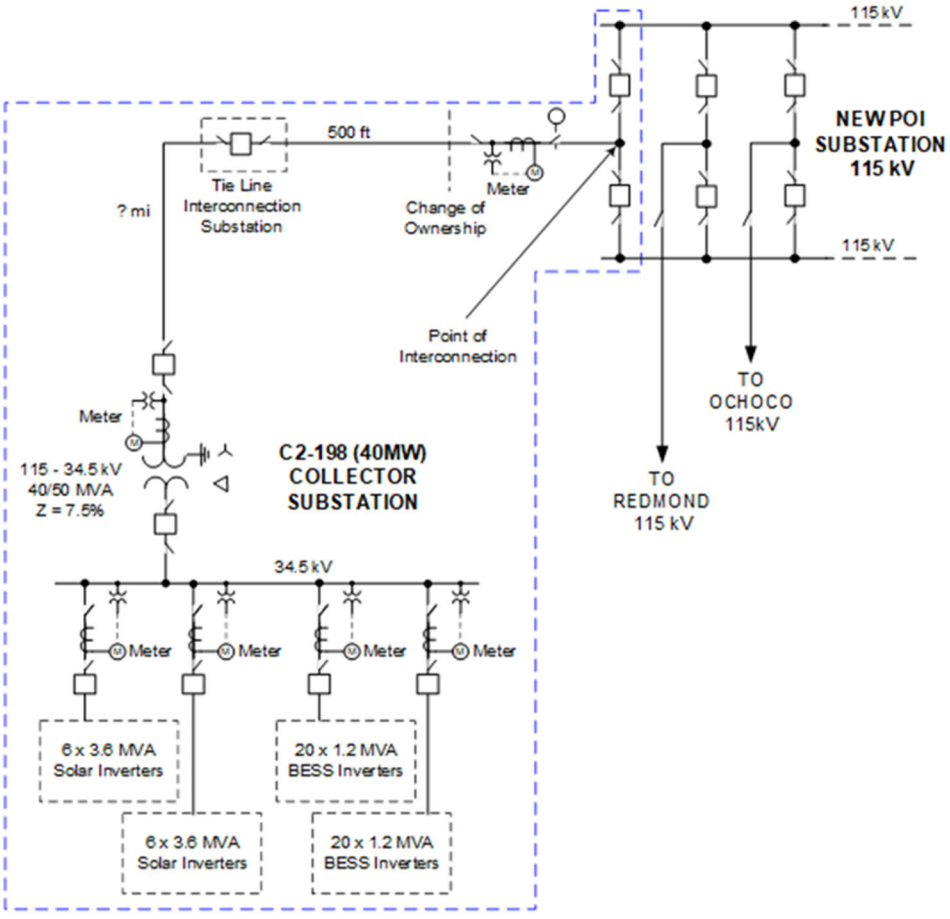

Figure 15: Simplified System One Line Diagram C2-198

5.15 Description of Interconnection Request – C2-199

The Interconnection Customer has proposed to interconnect 40 megawatts ("MW") of new battery storage generation to PacifiCorp's ("Transmission Provider") Prineville-Redmond 115 kV transmission line. The new POI substation is assumed to be constructed at approximately latitude 44.2773, longitude -121.1389 located in Deschutes County, Oregon. The Interconnection Request is proposed to consist of twelve (12) Tesla Megapack II battery storage inverters for a total output of 40 MW at the POI. The requested commercial operation date is March 31, 2027. Figure 16 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for both Network Resource Interconnection Service ("NRIS") and Energy Resource Interconnection Service ("ERIS").

The Transmission Provider has assigned the Project Cluster Number "C2-199"

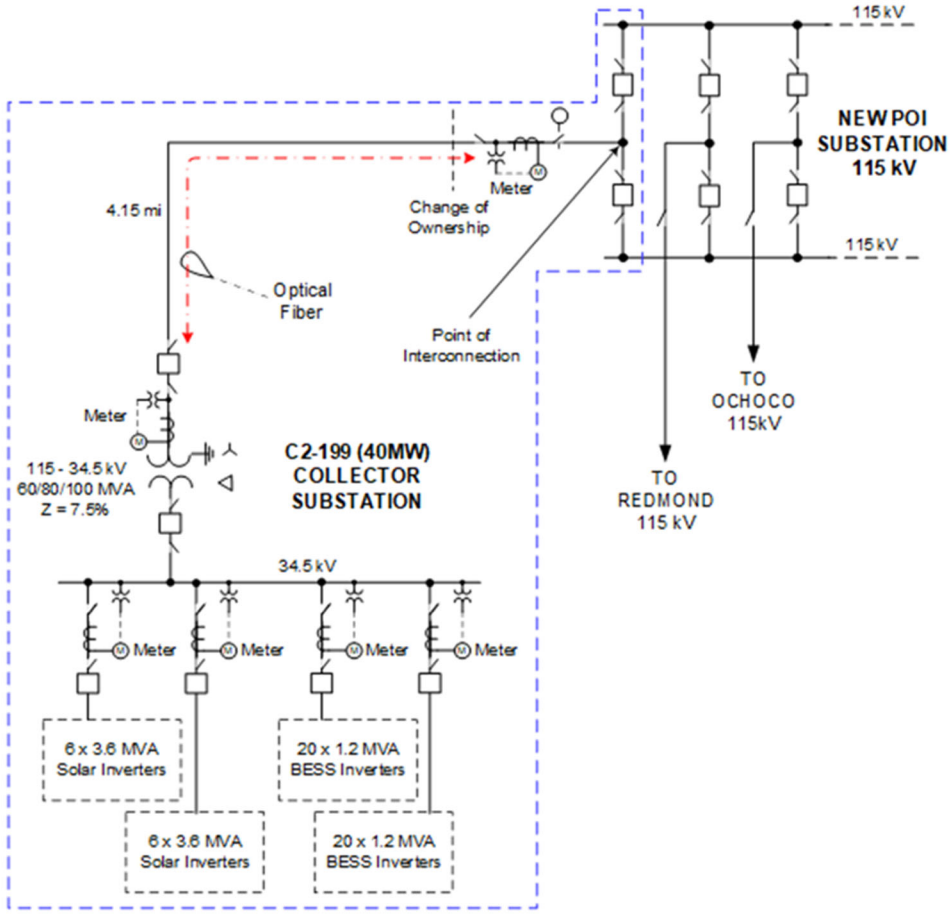

Figure 16: Simplified System One Line Diagram C2-199

5.16 Description of Interconnection Request – C2-200

The Interconnection Customer has proposed to interconnect 40 megawatts ("MW") of new battery storage generation to PacifiCorp's ("Transmission Provider") Prineville-Redmond 115 kV transmission line. The new POI substation is assumed to be constructed at approximately latitude 44.2773, longitude -121.1389 located in Deschutes County, Oregon. The Interconnection Request is proposed to consist of twelve (12) Tesla Megapack II battery storage inverters for a total output of 40 MW at the POI. The requested commercial operation date is March 31, 2027. Figure 16 below, is a one-line diagram that illustrates the interconnection of the proposed Generating Facility to the Transmission Provider's system.

Interconnection Customer will NOT operate this generator as a Qualified Facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

The Interconnection Request will be studied for both Network Resource Interconnection Service ("NRIS") and Energy Resource Interconnection Service ("ERIS").

The Transmission Provider has assigned the Project Cluster Number "C2-200"

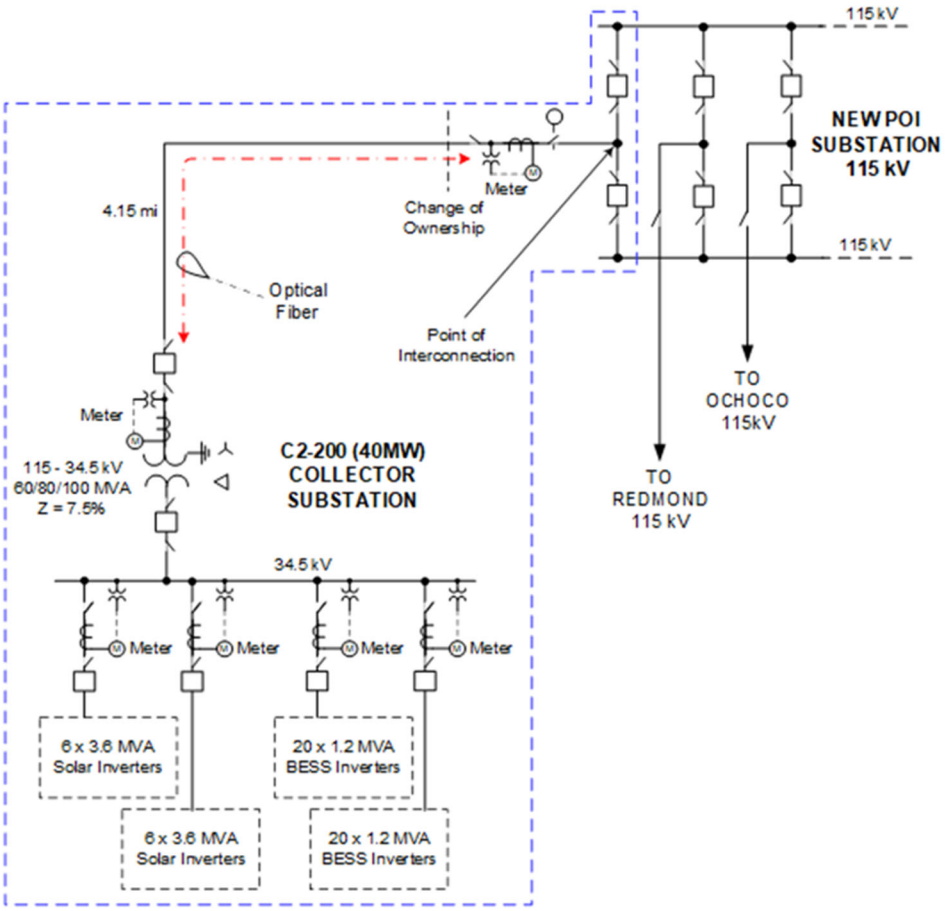

Figure 17: Simplified System One Line Diagram C2-200

6.0 SITE SPECIFIC GENERATING FACILITY REQUIREMENTS

In addition to the requirements described above the following Generating Facility are required for the specific Interconnection Requests listed below.

None identified.

7.0 TRANSMISSION PROVIDER SYSTEM REQUIREMENTS - ERIS

7.1 Transmission System Requirements

The following transmission system improvements are required to accommodate the Interconnection Requests in this Cluster Area:

- Construct new 500kV and 230 kV substation yards at Corral Substation to interconnect projects in the local area:
  - Construct a new four breaker ring bus 500 kV yard at Corral Substation for four connections laid out for future conversion to breaker and a half ("BAAH")
  - Loop the PGE Grizzly-Malin 500 kV Transmission Line in and out of the new Corral 500kV bus 18.4 miles south of Grizzly Substation
  - Install two (2) new 500/230 kV 1600 MVA transformers at Corral (six single-phase units with one spare phase).
  - Construct a new double bus double breaker ("DBDB", due to space considerations) 230 kV yard with room for 8 bay positions ultimately (16 breakers)
  - Terminate the low side of the 500/230 kV transformers from the Corral 500 kV yard in the new 230 kV yard with one transformer connected directly to each 230 kV bus (4000 A capacity each)

- Rebuild the 115 kV transmission line between the new switching station near Redmond substation and Houston Lake with a conductor having a minimum rating of 2000 A
  - Operate the 115 kV line normally open between BPA Redmond and PAC Redmond

- Increase the capacity of the Ochoco 230/115 kV substation:
  - Build out the 230 kV BAAH bus at Ochoco to add two new positions
  - Construct a new four breaker ring 115 kV substation bus at the existing Ochoco substation location to accommodate four new 115 kV positions
  - Install two (2) 280 MVA 230/115kV transformers at Ochoco and connect to the new positions on the 230 kV and 115 kV bus.
  - Loop the existing Redmond – Houston Lake 115 kV line in and out of the new Ochoco 115 kV bus

Note: Existing mitigation procedures in place for this area may warrant curtailment of all CA18 generation to 0 MW following the loss of a single element to avoid overloads for a subsequent outage, or to reduce loading back down to continuous ratings.

Refer to Appendix 1 for more details regarding the necessity for these required upgrades.

Any overloads and associated mitigation projects on the BPA system are subject to verification by an Affected System study performed by BPA. Identification of overloads outside the Transmission Provider's system are for informational purposes only and BPA will determine the scope of any required mitigation on the BPA system.

The following are station upgrades required for each of the Interconnection Requests within this Cluster Area.

C2-114, C2-117, C2-135, C2-147, C2-158, C2-159, C2-177 and C2-178
A new 500/230 kV substation will be constructed adjacent to the existing Corral substation to serve as the Point of Interconnection for these Interconnection Requests. Two new 230 kV circuit breakers and supportive equipment in double breaker/bus configuration will be installed for each tie line. A voltage coordinating study will be required for all Interconnection Requests.

C2-06, C2-08, C2-197, C2-198, C2-199 and C2-200
A new breaker and-a-half 115 kV substation will be constructed tapping the Houston Lake-Redmond transmission line to serve as the Point of Interconnection for these Interconnection Requests. The exact location of the new substation has not been determined but is assumed to be east of the existing Redmond substation. The substation will contain nine 115 kV circuit breakers and supportive equipment in double breaker/bus configuration. A voltage coordinating study will be required for all Interconnection Requests.

C2-07
A new 115 kV three-breaker ring bus substation will be constructed tapping the Baldwin Road-Ponderosa transmission line to serve as the Point of Interconnection for this Interconnection Request. A voltage coordinating study will be required for this Interconnection Request.

C2-09
Expand the 115 kV yard at Ponderosa Substation to allow the construction of one new position to accommodate this Interconnection Request. One new circuit breaker and supportive equipment will be installed. A voltage coordinating study will be required for this Interconnection Request.

7.2 Distribution System Requirements

None.

7.3 Transmission Line Requirements

The following transmission line upgrade is required to support the Interconnection Requests in this Cluster Area. The Transmission Provider assumes that for line rebuilds, a new line will be constructed next to the existing line and the existing line will be removed once the new line is energized. This will likely require new rights-of-way.

- Rebuild the approximately 14-mile section of the Houston Lake–Redmond 115kV transmission line between the new POI substation and Houston Lake substation

Each of the Interconnection Requests in this Cluster Area shall construct its last structure and span/bus connection into the POI substation to Transmission Provider standards. The Transmission Provider will review the design of the Interconnection Customer line for the last

span into the POI substations. The Interconnection Customers shall coil enough fiber and conductor on the last deadend structure to make the span into the POI substations. The Transmission Provider shall construct the final terminations into the POI substations.

If the Interconnection Customer's tie line is required to cross a Transmission Provider line, the Interconnection Customer shall make application with the Transmission Provider to do so. The Customer's line shall cross below the Transmission Provider's line in all cases unless the Customer's line is of a greater voltage.

7.4 Existing Circuit Breaker Upgrades – Short Circuit

Based on the information provided by the Interconnection Customers for all the Interconnection Requests in this Cluster Area, the calculated short-circuit currents do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-06
With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-07
With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-08
With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-09
With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-114
With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-117
With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-135
With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-147
With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-158
With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-159
With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-177
With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-178
With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-197

With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-198
With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-199
With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

C2-200
With the Interconnection Customer's system information, including the transformers' impedances, the calculated short-circuit currents considering this plant alone do not violate the interrupting capacity of the Transmission Provider to values higher than the presently existing ratings.

Protection Requirements
The new Corral 500kV substation will be constructed as a four-bay double-breaker double-bus configuration. The 500kV line to Grizzly (PGE) substation and 500kV line to Malin substation will both be protected using the Transmission Provider standard line protection using permissive overreaching transfer trip scheme with redundant digital relays and communications (POTTD). The two 500/230kV transformer banks will be protected using the Transmission Provider standard redundant transformer and bus differential relays. Install standard breaker protection panels for the eight new 500kV breakers and eighteen new 230kV breakers. Install standard redundant bus differential system for the 500kV east and west bus and 230kV east and west bus. The two tie-lines between the 230kV yard and low-side of transformers will be protected with SEL-411L relays.

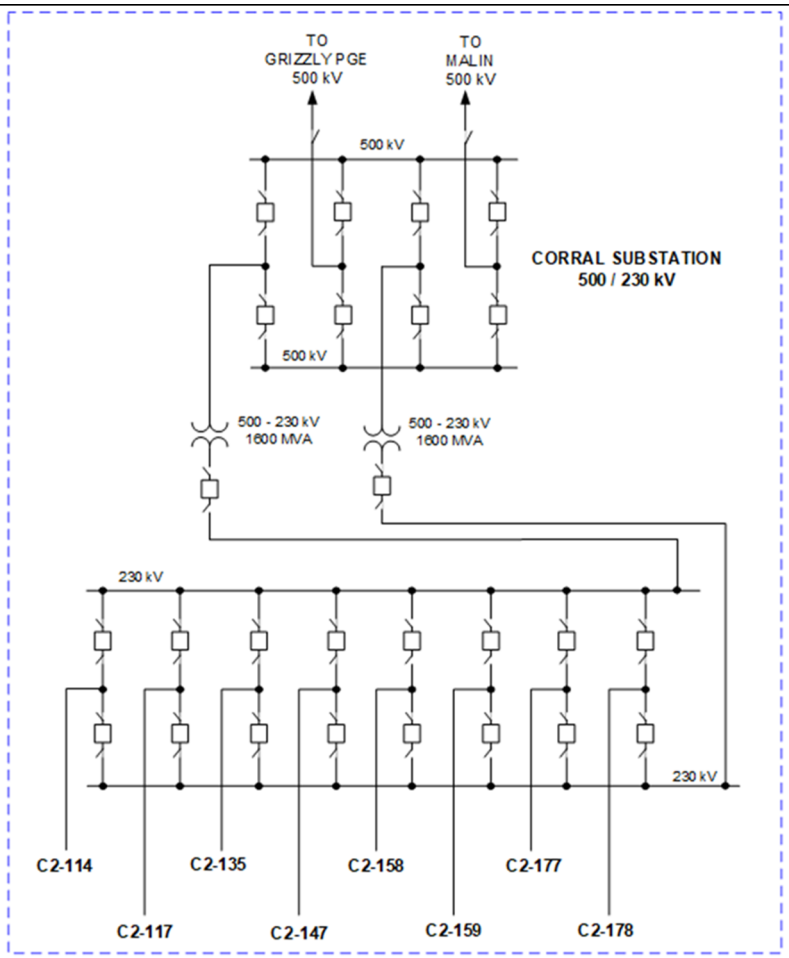

Figure 18: Simplified System One Line Diagram Corral Substation

Ochoco substation 230kV yard will require four new 230kV breakers. Two new 230/115kV transformers will be protected using the Transmission Provider standard redundant transformer and bus differential relays. Also, a new 115kV three-breaker ring bus will be constructed at Ochoco substation. The 115kV line to Houston Lake substation will be protected using the Transmission Provider standard line differential relays. The 115kV line to new POI substation will also be protected using the Transmission Provider standard line differential relays. Install standard breaker protection panels for the four new 230kV breakers and four new 115kV breakers. Install standard bus differential system for the 230kV east and west bus.

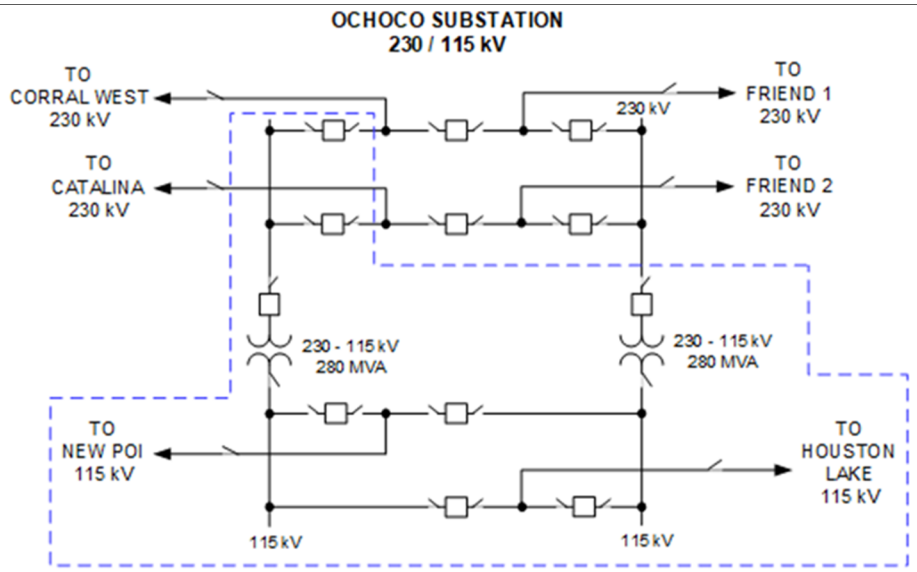

Figure 19: Simplified System One Line Diagram Ochoco Substation

Houston Lake substation will require relay upgrades for the 115kV line to Ochoco substation (previously Redmond line). Install Transmission Provider standard line differential relays.

The 115kV line to Ochoco substation will be protected using the Transmission Provider standard line differential relays. The 115kV line to Redmond substation will be protected using the Transmission Provider standard line relays using step distance protection scheme. Install standard bus differential system for the 115kV east and west bus. Install standard breaker protection panels for sixteen new 115kV breakers.

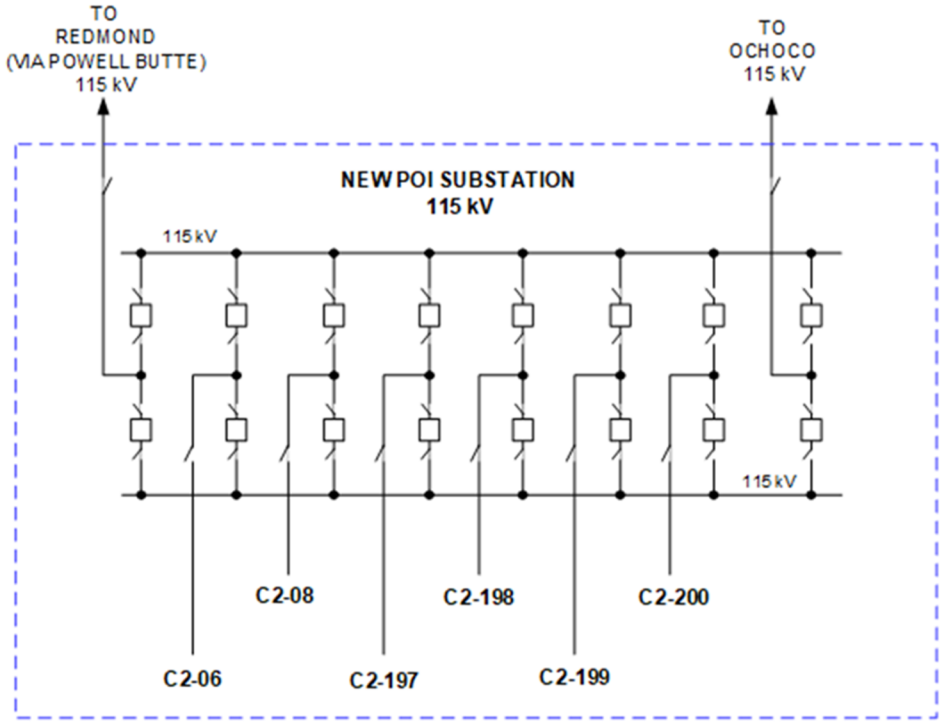

Figure 20: Simplified System One Line Diagram C2-06, 08, 197, 198, 199, 200 POI Substation

New POI substation for C2-07 will be constructed as a two-bay double-breaker double-bus configuration. The 115kV line to Baldwin Road substation will be protected using the Transmission Provider standard line differential relays. The 115kV line to Ponderosa substation will be protected using the Transmission Provider standard line differential relays. Install standard breaker protection panels for four new 115kV breakers. Install standard bus differential system for the 115kV bus.

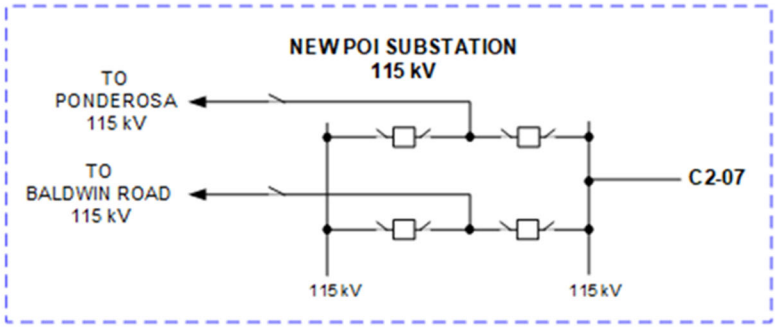

Figure 21: Simplified System One Line Diagram C2-07 POI Substation

Baldwin Road substation will require relay upgrade for the 115kV line to C2-07 POI substation (previously Ponderosa line). Install Transmission Provider standard line differential relays.

Ponderosa substation will require relay upgrade for the 115kV line to C2-07 POI substation (previously Baldwin Road line). Install Transmission Provider standard line differential relays. Also install two new 115kV breakers to allow C2-09 to interconnect. Install standard breaker protection panels for the two new 115kV breakers.

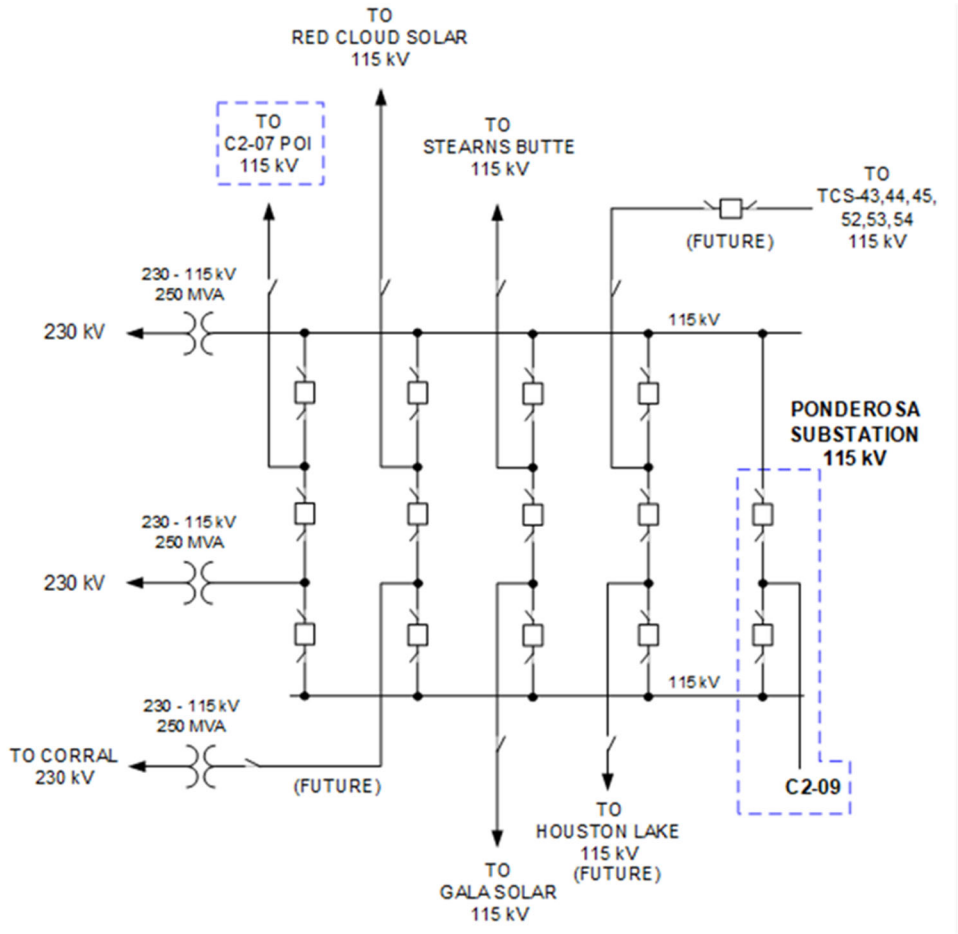

Figure 22: Simplified System One Line Diagram Ponderosa Substation

C2-06

The C2-06 interconnection line between the POI substation and the C2-06 collector substation will be protected with the Transmission Provider standard line differential relays using optical fiber. The Interconnection Customer will provide the relays in their control house and the Transmission Provider will determine the relay settings and will have access to the relays at all times. Voltage and frequency monitoring, synchro-check, and breaker failure functions will be implemented using the corresponding elements of the digital multifunction line protection relays. Additionally, a multifunction direction overcurrent relay must be installed in the POI substation to monitor the voltage and frequency on this line and serve as an overcurrent back-up to the short segment differential scheme. The relay will issue a trip signal to the breakers at the POI substation and tie-line interconnection substation breaker.

C2-07
The C2-07 collector substation will be adjacent to the new POI substation. The grounding grids of the POI substation and C2-07 collector substation will be connected, and a high impedance bus differential system will be implemented to protect the short interconnection line segment. The differential relays and lockout will be installed in the POI substation control house. The Interconnection Customer will make the provision to have current transformers whose maximum transformation ratio matches the maximum transformation ratio of the POI's circuit breakers. Additionally, a multifunction direction overcurrent relay must be installed in the POI substation to monitor the voltage and frequency on this line and serve as an overcurrent back-up to the short segment differential scheme. The relay will issue a trip signal to the breakers at the POI substation and Collector substation breaker.

C2-08
The C2-08 interconnection line between the POI substation and the C2-08 collector substation will be protected with the Transmission Provider standard line differential relays using optical fiber. The Interconnection Customer will provide the relays in their control house and the Transmission Provider will determine the relay settings and will have access to the relays at all times. Voltage and frequency monitoring, synchro-check, and breaker failure functions will be implemented using the corresponding elements of the digital multifunction line protection relays.

C2-09
The C2-09 Collector substation will be adjacent to the new POI substation. The grounding grids of the POI substation and C2-09 Collector substation will be connected, and a high impedance bus differential system will be implemented to protect the short interconnection line segment. The differential relays and lockout will be installed in the POI substation control house. The Interconnection Customer will make the provision to have current transformers whose maximum transformation ratio matches the maximum transformation ratio of the POI's circuit breakers. Additionally, a multifunction direction overcurrent relay must be installed in the POI substation to monitor the voltage and frequency on this line and serve as an overcurrent back-up to the short segment differential scheme. The relay will issue a trip signal to the breakers at the POI substation and Collector substation breaker.

C2-114
The C2-114 interconnection line between the POI substation and the collector substation will be protected with the Transmission Provider standard line differential relays using optical fiber. The Interconnection Customer will provide the relays in their control house and the Transmission Provider will determine the relay settings and will have access to the relays at all times. Voltage and frequency monitoring, synchro-check, and breaker failure functions will be implemented using the corresponding elements of the digital multifunction line protection relays.

C2-117
The C2-117 interconnection line between the POI substation and the collector substation will be protected with the Transmission Provider standard line differential relays using optical fiber. The Interconnection Customer will provide the relays in their control house and the Transmission

Provider will determine the relay settings and will have access to the relays at all times. Voltage and frequency monitoring, synchro-check, and breaker failure functions will be implemented using the corresponding elements of the digital multifunction line protection relays.

C2-135
The C2-135 interconnection line between the POI substation and the collector substation will be protected with the Transmission Provider standard line differential relays using optical fiber. The Interconnection Customer will provide the relays in their control house and the Transmission Provider will determine the relay settings and will have access to the relays at all times. Voltage and frequency monitoring, synchro-check, and breaker failure functions will be implemented using the corresponding elements of the digital multifunction line protection relays.

C2-147
The C2-147 interconnection line between the POI substation and the collector substation will be protected with the Transmission Provider standard line differential relays using optical fiber. The Interconnection Customer will provide the relays in their control house and the Transmission Provider will determine the relay settings and will have access to the relays at all times. Voltage and frequency monitoring, synchro-check, and breaker failure functions will be implemented using the corresponding elements of the digital multifunction line protection relays.

C2-158
The C2-158 interconnection line between the POI substation and the collector substation will be protected with the Transmission Provider standard line differential relays using optical fiber. The Interconnection Customer will provide the relays in their control house and the Transmission Provider will determine the relay settings and will have access to the relays at all times. Voltage and frequency monitoring, synchro-check, and breaker failure functions will be implemented using the corresponding elements of the digital multifunction line protection relays.

C2-159
The C2-159 interconnection line between the POI substation and the collector substation will be protected with the Transmission Provider standard line differential relays using optical fiber. The Interconnection Customer will provide the relays in their control house and the Transmission Provider will determine the relay settings and will have access to the relays at all times. Voltage and frequency monitoring, synchro-check, and breaker failure functions will be implemented using the corresponding elements of the digital multifunction line protection relays.

C2-177
The C2-177 interconnection line between the POI substation and the collector substation will be protected with the Transmission Provider standard line differential relays using optical fiber. The Interconnection Customer will provide the relays in their control house and the Transmission Provider will determine the relay settings and will have access to the relays at all times. Voltage and frequency monitoring, synchro-check, and breaker failure functions will be implemented using the corresponding elements of the digital multifunction line protection relays.

C2-178
The C2-178 interconnection line between the POI substation and the collector substation will be protected with the Transmission Provider standard line differential relays using optical fiber. The Interconnection Customer will provide the relays in their control house and the Transmission Provider will determine the relay settings and will have access to the relays at all times. Voltage and frequency monitoring, synchro-check, and breaker failure functions will be implemented using the corresponding elements of the digital multifunction line protection relays.

C2-197
The C2-197 tie-line interconnection substation will be adjacent to the new POI substation. The grounding grids of the POI substation and C2-197 tie-line interconnection substation will be connected, and a high impedance bus differential system will be implemented to protect the short interconnection line segment. The differential relays and lockout will be installed in the POI substation control house. The Interconnection Customer will make the provision to have current transformers whose maximum transformation ratio matches the maximum transformation ratio of the POI's circuit breakers. Additionally, a multifunction direction overcurrent relay must be installed in the POI substation to monitor the voltage and frequency on this line and serve as an overcurrent back-up to the short segment differential scheme. The relay will issue a trip signal to the breakers at the POI substation and tie-line interconnection substation breaker.

C2-198
The C2-198 tie-line interconnection substation will be adjacent to the new POI substation. The grounding grids of the POI substation and C2-198 tie-line interconnection substation will be connected, and a high impedance bus differential system will be implemented to protect the short interconnection line segment. The differential relays and lockout will be installed in the POI substation control house. The Interconnection Customer will make the provision to have current transformers whose maximum transformation ratio matches the maximum transformation ratio of the POI's circuit breakers. Additionally, a multifunction direction overcurrent relay must be installed in the POI substation to monitor the voltage and frequency on this line and serve as an overcurrent back-up to the short segment differential scheme. The relay will issue a trip signal to the breakers at the POI substation and tie-line interconnection substation breaker.

C2-199
The C2-199 tie-line interconnection substation will be adjacent to the new POI substation. The grounding grids of the POI substation and C2-199 tie-line interconnection substation will be connected, and a high impedance bus differential system will be implemented to protect the short interconnection line segment. The differential relays and lockout will be installed in the POI substation control house. The Interconnection Customer will make the provision to have current transformers whose maximum transformation ratio matches the maximum transformation ratio of the POI's circuit breakers. Additionally, a multifunction direction overcurrent relay must be installed in the POI substation to monitor the voltage and frequency on this line and serve as an overcurrent back-up to the short segment differential scheme. The relay will issue a trip signal to the breakers at the POI substation and tie-line interconnection substation breaker.

C2-200
The C2-200 tie-line interconnection substation will be adjacent to the new POI substation. The grounding grids of the POI substation and C2-200 tie-line interconnection substation will be connected, and a high impedance bus differential system will be implemented to protect the short interconnection line segment. The differential relays and lockout will be installed in the POI substation control house. The Interconnection Customer will make the provision to have current transformers whose maximum transformation ratio matches the maximum transformation ratio of the POI's circuit breakers. Additionally, a multifunction direction overcurrent relay must be installed in the POI substation to monitor the voltage and frequency on this line and serve as an overcurrent back-up to the short segment differential scheme. The relay will issue a trip signal to the breakers at the POI substation and tie-line interconnection substation breaker.

7.5 Data (RTU) Requirements

C2-06/08/197/198/199/200 POI Substation
Install new Transmission Provider owned RTU. Primary metering to be integrated into the existing primary RTU. Provide a backup data concentrator RTU to acquire data from the backup metering. Integrate the new C2-06, C2-08, C2-197, C2-198, C2-199, C2-200 interchange metering into these RTUs accordingly. The RTU's will capture the alarms from the Transmission Provider owned relays and communications equipment.

The metering will capture the high side instantaneous real/reactive/apparent power, instantaneous voltage, amps and the power factor.

C2-06 Collector Substation
The Interconnection Customer provided RTU will pass DNP 3.0 serial data over fiber to the C2-06/08/197/198/199/200 POI substation for direct integration into the Transmission Provider's EMS via the Transmission provider's communications equipment. At a minimum this will include:
Meteorological data:

- Global Horizontal Irradiance (GHI)
- Average Plant Atmospheric Pressure (Bar)
- Average Plant Temperature (Celsius)

Analog Controls and Feedback:

- Max Generator Limit MW (set point control)
- Max Generator Limit MW (set point control) Feedback
- Potential power MW

Breaker Status:

- High side breaker status
- Low side breaker status

C2-08 Collector Substation:

The Interconnection Customer provided RTU will pass DNP 3.0 serial data over fiber to the C2-06/08/197/198/199/200 POI substation for direct integration into the Transmission Provider's EMS via the Transmission provider's communications equipment. At a minimum this will include:
Meteorological data:

- Global Horizontal Irradiance (GHI)
- Average Plant Atmospheric Pressure (Bar)
- Average Plant Temperature (Celsius)

Analog Controls and Feedback:

- Max Generator Limit MW (set point control)
- Max Generator Limit MW (set point control) Feedback
- Potential power MW

Breaker Status:

- High side breaker status
- Low side breaker status

C2-197 Collector Substation

The Interconnection Customer provided RTU will pass DNP 3.0 serial data over fiber to the C2-06/08/197/198/199/200 POI substation for direct integration into the Transmission Provider's EMS via the Transmission provider's communications equipment. At a minimum this will include:
Meteorological data:

- Global Horizontal Irradiance (GHI)
- Average Plant Atmospheric Pressure (Bar)
- Average Plant Temperature (Celsius)

Battery data:

- BESS current energy capacity (MWh)
- BESS current energy capacity (%)
- BESS cycles or health (cycle count or % health)

Analog Controls and Feedback:

- Max Generator Limit MW (set point control)
- Max Generator Limit MW (set point control) Feedback
- Potential power MW

Breaker Status:

- High side breaker status
- Low side breaker status (5)
- Tie line breaker status (hardwired to C2-06/08/197/198/199/200 POI substation)

Integrate the Transmission Provider's BESS inverter metering (2 sets) and solar inverter metering (2 sets) located at the C2-197 collector sub into the Transmission Provider's EMS via the C2-06/08/197/198/199/200 POI sub. The metering will capture the instantaneous real/reactive/apparent power, instantaneous voltage, amps and the power factor.

Transmission Provider to also install a small RTU in the Transmission Provider's control house to concentrate alarms from any communications equipment.

C2-198 Collector Substation
The Interconnection Customer provided RTU will pass DNP 3.0 serial data over fiber to the C2-06/08/197/198/199/200 POI substation for direct integration into the Transmission Provider's EMS via the Transmission provider's communications equipment. At a minimum this will include:
Meteorological data:

- Global Horizontal Irradiance (GHI)
- Average Plant Atmospheric Pressure (Bar)
- Average Plant Temperature (Celsius)

Battery data:

- BESS current energy capacity (MWh)
- BESS current energy capacity (%)
- BESS cycles or health (cycle count or % health)

Analog Controls and Feedback:

- Max Generator Limit MW (set point control)
- Max Generator Limit MW (set point control) Feedback
- Potential power MW

Breaker Status:

- High side breaker status
- Low side breaker status (5)
- Tie line breaker status (hardwired to C2-06/08/197/198/199/200 POI substation)

Integrate the Transmission Provider's BESS inverter metering (2 sets) and solar inverter metering (2 sets) located at the C2-198 collector sub into the Transmission Provider's EMS via the C2-06/08/197/198/199/200 POI sub. The metering will capture the instantaneous real/reactive/apparent power, instantaneous voltage, amps and the power factor.

Transmission Provider to also install a small RTU in the Transmission Provider's control house to concentrate alarms from any communications equipment.

C2-199 Collector Substation
The Interconnection Customer provided RTU will pass DNP 3.0 serial data over fiber to the C2-06/08/197/198/199/200 POI substation for direct integration into the Transmission Provider's EMS via the Transmission provider's communications equipment. At a minimum this will include:
Meteorological data:

- Global Horizontal Irradiance (GHI)
- Average Plant Atmospheric Pressure (Bar)
- Average Plant Temperature (Celsius)

Battery data:

- BESS current energy capacity (MWh)
- BESS current energy capacity (%)
- BESS cycles or health (cycle count or % health)

Analog Controls and Feedback:

- Max Generator Limit MW (set point control)
- Max Generator Limit MW (set point control) Feedback
- Potential power MW

Breaker Status:

- High side breaker status
- Low side breaker status (5)
- Tie line breaker status (hardwired to C2-06/08/197/198/199/200 POI substation)

Integrate the Transmission Provider's BESS inverter metering (2 sets) and solar inverter metering (2 sets) located at the C2-199 collector sub into the Transmission Provider's EMS via the C2-06/08/197/198/199/200 POI sub. The metering will capture the instantaneous real/reactive/apparent power, instantaneous voltage, amps and the power factor.

Transmission Provider to also install a small RTU in the Transmission Provider's control house to concentrate alarms from any communications equipment.

C2-200 Collector Substation

The Interconnection Customer provided RTU will pass DNP 3.0 serial data over fiber to the C2-06/08/197/198/199/200 POI substation for direct integration into the Transmission Provider's EMS via the Transmission provider's communications equipment. At a minimum this will include:
Meteorological data:

- Global Horizontal Irradiance (GHI)
- Average Plant Atmospheric Pressure (Bar)
- Average Plant Temperature (Celsius)

Battery data:

- BESS current energy capacity (MWh)
- BESS current energy capacity (%)
- BESS cycles or health (cycle count or % health)

Analog Controls and Feedback:

- Max Generator Limit MW (set point control)
- Max Generator Limit MW (set point control) Feedback
- Potential power MW

Breaker Status:

- High side breaker status
- Low side breaker status (5)
- Tie line breaker status (hardwired to C2-06/08/197/198/199/200 POI substation)

Integrate the Transmission Provider's BESS inverter metering (2 sets) and solar inverter metering (2 sets) located at the C2-200 collector sub into the Transmission Provider's EMS via the C2-06/08/197/198/199/200 POI sub. The metering will capture the instantaneous real/reactive/apparent power, instantaneous voltage, amps and the power factor.

Transmission Provider to also install a small RTU in the Transmission Provider's control house to concentrate alarms from any communications equipment.

C2-07 POI Substation
Install new Transmission Provider owned RTU. Integrate the new C2-07 interchange metering into the Transmission Provider's EMS via direct polling. The RTU's will capture the alarms from the Transmission Provider owned relays and communications equipment.

The metering will capture the high side instantaneous real/reactive/apparent power, instantaneous voltage, amps and the power factor.

C2-07 Collector Substation
The Interconnection Customer provided RTU will pass DNP 3.0 serial data over fiber to the C2-07 POI substation for direct integration into the Transmission Provider's EMS via the Transmission provider's communications equipment. At a minimum this will include:
Meteorological data:

- Global Horizontal Irradiance (GHI)
- Average Plant Atmospheric Pressure (Bar)
- Average Plant Temperature (Celsius)

Analog Controls and Feedback:

- Max Generator Limit MW (set point control)
- Max Generator Limit MW (set point control) Feedback
- Potential power MW

Breaker Status:

- High side breaker status
- Low side breaker status

Ponderosa Annex Substation
Install new Transmission Provider owned RTU. Integrate the new C2-09 interchange metering into the Transmission Provider's EMS via direct polling. The RTU's will capture the alarms from the Transmission Provider owned relays and communications equipment.

The metering will capture the high side instantaneous real/reactive/apparent power, instantaneous voltage, amps and the power factor.

C2-09 Collector Substation
The Interconnection Customer provided RTU will pass DNP 3.0 serial data over fiber to the Ponderosa Annex substation for direct integration into the Transmission Provider's EMS via the Transmission provider's communications equipment. At a minimum this will include:

Meteorological data:

- Global Horizontal Irradiance (GHI)
- Average Plant Atmospheric Pressure (Bar)
- Average Plant Temperature (Celsius)

Analog Controls and Feedback:

- Max Generator Limit MW (set point control)
- Max Generator Limit MW (set point control) Feedback
- Potential power MW

Breaker Status:

- High side breaker status
- Low side breaker status

C2-114, C2-117, C2-135, C2-147, C2-158, C2-159, C2-177 and C2-178
New 500-230KV Substation
Install new Transmission Provider owned RTU.

Corral Substation
Install new Transmission Provider owned RTU. Integrate the new C2-114, C2-117, C2-135, C2-147, C2-158, C2-159, C2-177, and C2-178 interchange metering into the Transmission Provider's EMS via direct polling. The RTU's will capture the alarms from the Transmission Provider owned relays and communications equipment.

The metering will capture the high side instantaneous real/reactive/apparent power, instantaneous voltage, amps and the power factor.

C2-114 Collector Substation
The Interconnection Customer provided RTU will pass DNP 3.0 serial data over fiber to Corral substation for direct integration into the Transmission Provider's EMS via the Transmission provider's communications equipment. At a minimum this will include:
Meteorological data:

- Global Horizontal Irradiance (GHI)
- Average Plant Atmospheric Pressure (Bar)
- Average Plant Temperature (Celsius)

Battery data:

- BESS current energy capacity (MWh)
- BESS current energy capacity (%)
- BESS cycles or health (cycle count or % health)

Analog Controls and Feedback:

- Max Generator Limit MW (set point control)
- Max Generator Limit MW (set point control) Feedback
- Potential power MW

Breaker Status:

- High side breaker status
- Low side breaker status (6)

Integrate the Transmission Provider's BESS inverter metering (2 sets) and solar inverter metering (4 sets) located at the C2-114 collector sub into the Transmission Provider's EMS via Corral sub. The metering will capture the instantaneous real/reactive/apparent power, instantaneous voltage, amps and the power factor.

Transmission Provider to also install a small RTU in the Transmission Provider's control house to concentrate alarms from any communications equipment.

C2-117 Collector Substation

The Interconnection Customer provided RTU will pass DNP 3.0 serial data over fiber to Corral substation for direct integration into the Transmission Provider's EMS via the Transmission provider's communications equipment. At a minimum this will include:

Meteorological data:

- Global Horizontal Irradiance (GHI)
- Average Plant Atmospheric Pressure (Bar)
- Average Plant Temperature (Celsius)

Battery data:

- BESS current energy capacity (MWh)
- BESS current energy capacity (%)
- BESS cycles or health (cycle count or % health)

Analog Controls and Feedback:

- Max Generator Limit MW (set point control)
- Max Generator Limit MW (set point control) Feedback
- Potential power MW

Breaker Status:

- High side breaker status
- Low side breaker status (6)

Integrate the Transmission Provider's BESS inverter metering (2 sets) and solar inverter metering (4 sets) located at the C2-117 collector sub into the Transmission Provider's EMS via Corral sub. The metering will capture the instantaneous real/reactive/apparent power, instantaneous voltage, amps and the power factor.

Transmission Provider to also install a small RTU in the Transmission Provider's control house to concentrate alarms from any communications equipment.

C2-135 Collector Substation

The Interconnection Customer provided RTU will pass DNP 3.0 serial data over fiber to Corral substation for direct integration into the Transmission Provider's EMS via the Transmission provider's communications equipment. At a minimum this will include:
Meteorological data:

- Global Horizontal Irradiance (GHI)
- Average Plant Atmospheric Pressure (Bar)
- Average Plant Temperature (Celsius)

Battery data:

- BESS current energy capacity (MWh)
- BESS current energy capacity (%)
- BESS cycles or health (cycle count or % health)

Analog Controls and Feedback:

- Max Generator Limit MW (set point control)
- Max Generator Limit MW (set point control) Feedback
- Potential power MW

Breaker Status:

- High side breaker status
- Low side breaker status (9)

Integrate the Transmission Provider's BESS inverter metering (3 sets) and solar inverter metering (6 sets) located at the C2-135 collector sub into the Transmission Provider's EMS via Corral sub. The metering will capture the instantaneous real/reactive/apparent power, instantaneous voltage, amps and the power factor.

Transmission Provider to also install a small RTU in the Transmission Provider's control house to concentrate alarms from any communications equipment.

C2-158 Collector Substation
The Interconnection Customer provided RTU will pass DNP 3.0 serial data over fiber to Corral substation for direct integration into the Transmission Provider's EMS via the Transmission provider's communications equipment. At a minimum this will include:
Meteorological data:

- Global Horizontal Irradiance (GHI)
- Average Plant Atmospheric Pressure (Bar)
- Average Plant Temperature (Celsius)

Battery data:

- BESS current energy capacity (MWh)
- BESS current energy capacity (%)
- BESS cycles or health (cycle count or % health)

Analog Controls and Feedback:

- Max Generator Limit MW (set point control)
- Max Generator Limit MW (set point control) Feedback
- Potential power MW

Breaker Status:

- High side breaker status (2)
- Low side breaker status (3)

Integrate the Transmission Provider's GSU metering, BESS inverter metering (3 sets) and solar inverter metering (3 sets) located at the C2-158 collector sub into the Transmission Provider's EMS via Corral sub. The metering will capture the instantaneous real/reactive/apparent power, instantaneous voltage, amps and the power factor.

Transmission Provider to also install a small RTU in the Transmission Provider's control house to concentrate alarms from any communications equipment.

C2-159 Collector Substation

The Interconnection Customer provided RTU will pass DNP 3.0 serial data over fiber to Corral substation for direct integration into the Transmission Provider's EMS via the Transmission provider's communications equipment. At a minimum this will include:
Meteorological data:

- None

Battery data:

- BESS current energy capacity (MWh)
- BESS current energy capacity (%)
- BESS cycles or health (cycle count or % health)

Analog Controls and Feedback:

- Max Generator Limit MW (set point control)
- Max Generator Limit MW (set point control) Feedback
- Potential power MW

Breaker Status:

- High side breaker status (2)
- Low side breaker status (3)

Integrate the Transmission Provider's GSU metering (2 sets) located at the C2-159 collector sub into the Transmission Provider's EMS via Corral sub. The metering will capture the instantaneous real/reactive/apparent power, instantaneous voltage, amps and the power factor.

Transmission Provider to also install a small RTU in the Transmission Provider's control house to concentrate alarms from any communications equipment.

C2-177 Collector Substation

The Interconnection Customer provided RTU will pass DNP 3.0 serial data over fiber to Corral substation for direct integration into the Transmission Provider's EMS via the Transmission provider's communications equipment. At a minimum this will include:
Meteorological data:

- None

Battery data:

- BESS current energy capacity (MWh)
- BESS current energy capacity (%)
- BESS cycles or health (cycle count or % health)

Analog Controls and Feedback:

- Max Generator Limit MW (set point control)
- Max Generator Limit MW (set point control) Feedback
- Potential power MW

Breaker Status:

- High side breaker status (2)
- Low side breaker status (3)

Integrate the Transmission Provider's GSU metering (2 sets) located at the C2-177 collector sub into the Transmission Provider's EMS via Corral sub. The metering will capture the instantaneous real/reactive/apparent power, instantaneous voltage, amps and the power factor.

Transmission Provider to also install a small RTU in the Transmission Provider's control house to concentrate alarms from any communications equipment.

C2-178 Collector Substation
The Interconnection Customer provided RTU will pass DNP 3.0 serial data over fiber to Corral substation for direct integration into the Transmission Provider's EMS via the Transmission provider's communications equipment. At a minimum this will include:
Meteorological data:

- None

Battery data:

- BESS current energy capacity (MWh)
- BESS current energy capacity (%)
- BESS cycles or health (cycle count or % health)

Analog Controls and Feedback:

- Max Generator Limit MW (set point control)
- Max Generator Limit MW (set point control) Feedback
- Potential power MW

Breaker Status:

- High side breaker status (2)
- Low side breaker status (3)

Integrate the Transmission Provider's GSU metering (2 sets) located at the C2-178 collector sub into the Transmission Provider's EMS via Corral sub. The metering will capture the instantaneous real/reactive/apparent power, instantaneous voltage, amps and the power factor.

Transmission Provider to also install a small RTU in the Transmission Provider's control house to concentrate alarms from any communications equipment.

7.6 Substation Requirements

Shared Network Upgrades

The Houston Lake-Redmond line will be reconductored to 2000A requiring switch and bus upsizing to meet this ampacity requirement. The following equipment will be required at the following substations, but may change during detailed design:

Redmond Sub

- 4 – 115 kV Group Operated Switches

Powell Butte Sub

- 2 – 115 kV Group Operated Switches

Transmission upgrades are also required at Ochoco substation. A CDEGS analysis will be required. The following equipment will be required, but may change during detailed design:

- 4 – 230 kV Circuit Breaker
- 7 – 230 kV Group Operated Switch
- 2 – 230 kV CCVT
- 1 –Control House
- 2 – New 230/115 kV Transformer
- 4 – 115 kV Circuit Breaker
- 14 – 115kV Group Operated Switch
- 6 – 115 kV Lightning Arresters
- 12 – 115 kV CCVTs

C2-06, C2-08, C2-197, C2-198, C2-199 and C2-200

A new POI substation will be required between Redmond and Powell Butte substation for the interconnects. A CDEGS analysis is required. The new POI substation will be double bus double breaker, the following equipment will be required but may change during detailed design:

- 20 – 115 kV Circuit Breaker
- 50 – 115 kV Group Operated Switch
- 18 – 115 kV CT/VT Combination Unit
- 24 – 115 kV Lighting Arresters
- 6 – 115 kV CCVTs

C2-06 collector substation
The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the Interconnection Customer. Three (3), 115 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. A tie line 115 kV circuit breaker will be provided by the Interconnection Customer, with 2 associated group operated switches. High side transformer protection will be provided by the Interconnection Customer, and will be a 115kV circuit breaker, with 2 associated group operated switches.

C2-08 Collector Substation
The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the Interconnection Customer. Three (3), 115 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. High side transformer protection will be provided by the Interconnection Customer, and will be a 115kV circuit breaker, with 2 associated group operated switches.

C2-197 Collector Substation
The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the Interconnection Customer. Three (3), 115 kV, and twelve (12) total 34.5 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. A tie line 115 kV circuit breaker will be provided by the Interconnection Customer, with 2 associated group operated switches. High side transformer protection will be provided by the Interconnection Customer, and will be a 115kV circuit breaker, with 2 associated group operated switches.

C2-198 Collector Substation

The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the Interconnection Customer. Three (3), 115 kV, and twelve (12) total 34.5 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. A tie line 115 kV circuit breaker will be provided by the Interconnection Customer, with 2 associated group operated switches. High side transformer protection will be provided by the Interconnection Customer, and will be a 115kV circuit breaker, with 2 associated group operated switches.

C2-199 Collector Substation

The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the Interconnection Customer. Three (3), 115 kV, and twelve (12) total 34.5 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. A tie line 115 kV circuit breaker will be provided by the Interconnection Customer, with 2 associated group operated switches. High side transformer protection will be provided by the Interconnection Customer, and will be a 115kV circuit breaker, with 2 associated group operated switches.

C2-200 Collector Substation

The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the Interconnection Customer. Three (3), 115 kV, and twelve (12) total 34.5 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. A tie line 115 kV circuit breaker will be provided by the Interconnection Customer, with 2 associated group operated switches. High side transformer protection will be provided by the Interconnection Customer, and will be a 115kV circuit breaker, with 2 associated group operated switches.

C2-07
A new POI substation will be required, it will be looped in between Ponderosa and Baldwin Road substations. A CDEGS analysis is required. The new POI substation will be double bus double breaker, the following equipment will be required but may change during detailed design:

- 1 – Control House
- 4 – 115 kV Circuit Breakers
- 14 – 115 kV Group Operated Switch
- 3 – CT/VT Combination Unit
- 9 – 115kV Lightning Arresters
- 6 – 115 kV CCVTs

C2-07 Collector Substation
The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the Interconnection Customer. Three (3), 115 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. High side transformer protection will be provided by the Interconnection Customer, and will be a 115kV circuit breaker, with 2 associated group operated switches.

C2-09
The C2-09 interconnection line will be out of Ponderosa substation under the assumption of TCA-08 adding the Ponderosa Annex and a breaker and a half bay for TCS-43,44,45,52,53, and 54. In that assumed Ponderosa Annex Substation the following equipment will be required but may change during detailed design:

- 6 – 115kV Group Operated Switch
- 2 – 115kV Circuit Breakers
- 3 – 115kV CT/VT Combination Unit
- 3 – 115kV Lightning Arresters

C2-09 Collector Substation
The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the

Interconnection Customer. Three (3), 115 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. High side transformer protection will be provided by the Interconnection Customer, and will be a 115kV circuit breaker, with 2 associated group operated switches.

C2-114, C2-117, C2-135, C2-147, C2-158, C2-159, C2-177 and C2-178

Transmission requirements are going to necessitate the building of a new 500-230 kV substation north of Ponderosa and Corral substations. A CDEGS analysis will be required. This will be contingent on coordinating property issues with the developers. The following equipment will be required but may change on detailed design:

- 10 – 500 kV Circuit Breakers (Groups of Three Phases)
- 66 – 500 kV Individual Phase Switches
- 7 – Single Phase 500/230 kV Transformers
- 13 – 500 kV Lightning Arresters
- 10 – 500kV CCVTs
- 1 – Control House
- 12 – 230 kV Circuit Breakers
- 30 – 230 kV Group Operated Switches
- 12 – 230 kV Lightning Arresters
- 20 – 230 kV CCVTs

Transmission requirements will necessitate the expansion of Corral substation for the interconnects. The yard will have to be expanded, this will require a CDEGS analysis. The following equipment will be required but may change on detailed design:

- 12 – 230 kV Circuit Breakers
- 40 – 230 kV Group Operated Switches
- 24 – 230 kV Lightning Arresters
- 24 – 230 kV CT/VT Combination Units
- 6 – 230 kV CCVTs

C2-114 Collector Substation

The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the Interconnection Customer. Three (3), 230 kV, and eighteen (18) total, 34.5 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. High side transformer protection will be provided by the Interconnection Customer, and will be a 230kV circuit breaker, with 2 associated group operated switches.

C2-117 Collector Substation
The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the Interconnection Customer. Three (3), 230 kV, and eighteen (18) total, 34.5 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. High side transformer protection will be provided by the Interconnection Customer, and will be a 230kV circuit breaker, with 2 associated group operated switches.

C2-135 Collector Substation
The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the Interconnection Customer. Three (3), 230 kV, and twenty-seven (27) total, 34.5 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. High side transformer protection will be provided by the Interconnection Customer, and will be a 230kV circuit breaker, with 2 associated group operated switches.

C2-147 Collector Substation
The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the Interconnection Customer. Three (3), 230 kV, and thirty-six (36) total, 34.5 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. High side transformer protection will be provided by the Interconnection Customer, and will be a 230kV circuit breaker, with 2 associated group operated switches.

C2-158 Collector Substation
The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication

equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the Interconnection Customer. Six (6), 230 kV, and sixty (60) total, 34.5 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. High side transformer protection will be provided by the Interconnection Customer and will be two (2) 230kV circuit breakers, with 2 associated group operated switches per breaker.

C2-159 Collector Substation
The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the Interconnection Customer. Six (6), 230 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. High side transformer protection will be provided by the Interconnection Customer and will be two (2) 230kV circuit breakers, with 2 associated group operated switches per breaker.

C2-177 Collector Substation
The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the Interconnection Customer. Six (6), 230 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. High side transformer protection will be provided by the Interconnection Customer and will be two (2) 230kV circuit breakers, with 2 associated group operated switches per breaker.

C2-178 Collector Substation
The Interconnection Customer will provide a separate graded, grounded, and fenced area along the perimeter of the Interconnection Customer's Generating Facility for the Transmission Provider to install a control house for any required metering, protection and/or communication equipment. This area will share a fence and ground grid with the Generating Facility and have separate, unencumbered access for the Transmission Provider. The Interconnection Customer shall perform and provide a CDEGS grounding analysis. AC station service will be supplied by the Interconnection Customer. DC power for the control house will be supplied by the

Interconnection Customer. Six (6), 230 kV combined CT/VT metering instrument transformers will be installed. A disconnect switch shall be installed on each side of each metering instrument transformer such that a visible open can be achieved. High side transformer protection will be provided by the Interconnection Customer, and will be two (2) 230kV circuit breakers, with 2 associated group operated switches per breaker.

7.7 Communication Requirements

ADSS fiber optic cable, 48 count, will be installed between Redmond substation and Powell substation. The POI Substation will have a Carrier Ethernet terminal, Loop Channel Bank, Fuse Panel, 48VDC rectifier/battery system, data router/switch and supporting ancillary equipment to allow for remote monitoring of the new POI Substation as well as all interconnection Customers.

C2-06

Fiber optic cable, 48 count, is to be installed between the Transmission Provider POI substation and the Interconnection facility control house supporting Transmission Provider communication and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility.

C2-07

A new POI substation is required, it will be looped in between Ponderosa and Baldwin Road substations. Existing fiber between Ponderosa and Baldwin will drop into the new POI substation. The POI Substation will have a Carrier Ethernet terminal, Loop Channel Bank, Fuse Panel, 48VDC rectifier/battery system, data router/switch and supporting ancillary equipment to allow for remote monitoring of the new POI Substation as well as all interconnection Customers.

For the C2-07 collector substation Fiber optic cable, 48 count, is to be installed between the Transmission Provider POI substation and the Interconnection facility control house supporting Transmission Provider communication and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility.

C2-08

Fiber optic cable, 48 count, is to be installed between the Transmission Provider POI substation and the Interconnection facility control house supporting Transmission Provider communication and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility.

C2-09
Fiber optic cable, 48 count, is to be installed between the Transmission Provider Ponderosa substation and the Interconnection facility control house supporting Transmission Provider communication and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility.

C2-114
Fiber optic cable, 48 count, is to be installed between the Transmission Provider Corral substation and the Interconnection facility control house supporting Transmission Provider communication, protection and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility

C2-117
Fiber optic cable, 48 count, is to be installed between the Transmission Provider Corral substation and the Interconnection facility control house supporting Transmission Provider communication, protection and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility

C2-135
Fiber optic cable, 48 count, is to be installed between the Transmission Provider Corral substation and the Interconnection facility control house supporting Transmission Provider communication, protection and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility

C2-147
Fiber optic cable, 48 count, is to be installed between the Transmission Provider Corral substation and the Interconnection facility control house supporting Transmission Provider communication, protection and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility

C2-158

Fiber optic cable, 48 count, is to be installed between the Transmission Provider Corral substation and the Interconnection facility control house supporting Transmission Provider communication, protection and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility

C2-159
Fiber optic cable, 48 count, is to be installed between the Transmission Provider Corral substation and the Interconnection facility control house supporting Transmission Provider communication, protection and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility

C2-177
Fiber optic cable, 48 count, is to be installed between the Transmission Provider Corral substation and the Interconnection facility control house supporting Transmission Provider communication, protection and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility

C2-178
Fiber optic cable, 48 count, is to be installed between the Transmission Provider Corral substation and the Interconnection facility control house supporting Transmission Provider communication, protection and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility

C2-197
Fiber optic cable, 48 count, is to be installed between the Transmission Provider POI substation and the Interconnection facility control house supporting Transmission Provider communication and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility.

C2-198

Fiber optic cable, 48 count, is to be installed between the Transmission Provider POI substation and the Interconnection facility control house supporting Transmission Provider communication and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility.

C2-199
Fiber optic cable, 48 count, is to be installed between the Transmission Provider POI substation and the Interconnection facility control house supporting Transmission Provider communication and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility.

C2-200
Fiber optic cable, 48 count, is to be installed between the Transmission Provider POI substation and the Interconnection facility control house supporting Transmission Provider communication and metering. Either OPGW in the static wire position or ADSS fiber in the communication space on the transmission line will be used for fiber attachment. OPGW or ADSS will be determined by the transmission design. Install fiber patch panel, Carrier Ethernet terminal, fuse panel, 48VDC power system, channel bank, router/data switch as required to accommodate remote monitoring of the Interconnection facility.

7.8 Metering Requirements

Shared Network Upgrades

New Corral 500/230 expansion
Check Metering
Check metering is required on the lines to PGE Grizzly and PGE Malin. The check metering will be at Corral substation and rated for the total line rating. The Transmission Provider will specify and order all interconnection revenue metering, including the meters, meter panel, and secondary metering wire.
The metering design package will include one revenue quality meter for each metering point.

A Direct Serial Connection is required for retail sales and generation accounting via the MV-90 translation system.

C2-06
Interchange Metering
The overall project metering will be located at the Point of Interconnection at the New POI substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering

transformers will be combination 115kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet Connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power
Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located.
Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

C2-07
Interchange Metering
The overall project metering will be located at the Point of Interconnection at the New POI substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 115kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet Connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power
Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located.
Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

C2-08
Interchange Metering

The overall project metering will be located at the Point of Interconnection at the New POI substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 115kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet Connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power
Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located.
Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

C2-09
Interchange Metering
The overall project metering will be located at the Point of Interconnection at the Ponderosa substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 115kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet Connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power
Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located.

Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

C2-114

Interchange Metering

The overall project metering will be located at the Point of Interconnection at Corral substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 230kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

A Direct Serial Connection is required for retail sales and generation accounting via the MV-90 translation system.

Generation Metering

(6) Metering points

The metering to separate generation resources will be located at the Interconnection Customer's collector Substation and rated for the generation nameplate value. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be 34.5kV CT/VT units with extended range CTs for high-accuracy metering.
The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power

Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located.
Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

C2-117

Interchange Metering

The overall project metering will be located at the Point of Interconnection at Corral substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 230kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

A Direct Serial Connection is required for retail sales and generation accounting via the MV-90 translation system.

Generation Metering
(6) Metering points
The metering to separate generation resources will be located at the Interconnection Customer's collector Substation and rated for the generation nameplate value. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be 34.5kV CT/VT units with extended range CTs for high-accuracy metering.
The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power
Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located.
Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

C2-135
Interchange Metering
The overall project metering will be located at the Point of Interconnection at Corral substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 230kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

A Direct Serial Connection is required for retail sales and generation accounting via the MV-90 translation system.

Generation Metering
(9) Metering points
The metering to separate generation resources will be located at the Interconnection Customer's collector substation and rated for the generation nameplate value. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be 34.5kV CT/VT units with extended range CTs for high-accuracy metering.
The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power
Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located.
Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

C2-147
Interchange Metering
The overall project metering will be located at the Point of Interconnection at Corral substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 230kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also

include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

A Direct Serial Connection is required for retail sales and generation accounting via the MV-90 translation system.

GSU Metering

The GSU metering will be located at the Interconnection Customer's collector substation and rated for the transformer size. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 230kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include (2) metering points each with two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet connection is required for retail sales and generation accounting via the MV-90 translation system.

Generation Metering

(4) Metering points

The metering to separate generation resources will be located at the Interconnection Customer's collector substation and rated for the generation nameplate value. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 34.5kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power

Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located.
Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

C2-158

Interchange Metering

The overall project metering will be located at the Point of Interconnection at Corral substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 230kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

A Direct Serial Connection is required for retail sales and generation accounting via the MV-90 translation system.

GSU Metering

The GSU metering will be located at the Interconnection Customer's collector substation and rated for the Transformer size. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 230kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include (2) metering points each with two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet connection is required for retail sales and generation accounting via the MV-90 translation system.

Generation Metering

(6) Metering points

The metering to separate generation resources will be located at the Interconnection Customer's collector substation and rated for the generation nameplate value. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 34.5kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power

Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located. Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

C2-159

Interchange Metering

The overall project metering will be located at the Point of Interconnection at Corral substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 230kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

A Direct Serial Connection is required for retail sales and generation accounting via the MV-90 translation system.

GSU Metering

The GSU metering will be located at the Interconnection Customer's collector substation and rated for the Transformer size. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 230kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include (2) metering points each with two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH

revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power

Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located. Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

C2-177

Interchange Metering

The overall project metering will be located at the Point of Interconnection at Corral substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 230kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

A Direct Serial Connection is required for retail sales and generation accounting via the MV-90 translation system.

GSU Metering

The GSU metering will be located at the Interconnection Customer's collector substation and rated for the transformer size. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 230kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include (2) metering points each with two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power

Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located. Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

C2-178

Interchange Metering

The overall project metering will be located at the Point of Interconnection at Corral substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 230kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

A Direct Serial Connection is required for retail sales and generation accounting via the MV-90 translation system.

GSU Metering

The GSU metering will be located at the Interconnection Customer's collector substation and rated for the Transformer size. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 230kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include (2) metering points each with two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power

Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located. Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

C2-197

Interchange Metering

The overall project metering will be located at the Point of Interconnection at the New POI substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 115kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet Connection is required for retail sales and generation accounting via the MV-90 translation system.

Generation Metering

(4) Metering points

The metering to separate generation resources will be located at the Interconnection Customer's collector substation and rated for the generation nameplate value. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be 34.5kV CT/VT units with extended range CTs for high-accuracy metering.
The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power

Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located. Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

C2-198

Interchange Metering

The overall project metering will be located at the Point of Interconnection at the New POI substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 115kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet Connection is required for retail sales and generation accounting via the MV-90 translation system.

Generation Metering

(4) Metering points

The metering to separate generation resources will be located at the Interconnection Customer's collector substation and rated for the generation nameplate value. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be 34.5kV CT/VT units with extended range CTs for high-accuracy metering.
The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power

Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located. Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

C2-199

Interchange Metering

The overall project metering will be located at the Point of Interconnection at the New POI

substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 115kV CT/VT units with extended range CTs for high-accuracy metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet Connection is required for retail sales and generation accounting via the MV-90 translation system.

Generation Metering
(4) Metering points
The metering to separate generation resources will be located at the Interconnection Customer's collector substation and rated for the generation nameplate value. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be 34.5kV CT/VT units with extended range CTs for high-accuracy metering.
The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power
Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located. Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

C2-200
Interchange Metering
The overall project metering will be located at the Point of Interconnection at the New POI substation and rated for the total net generation of the Project. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be combination 115kV CT/VT units with extended range CTs for high-accuracy

metering.

The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet Connection is required for retail sales and generation accounting via the MV-90 translation system.

Generation Metering
(4) Metering points
The metering to separate generation resources will be located at the Interconnection Customer's collector substation and rated for the generation nameplate value. The Transmission Provider will specify and order all interconnection revenue metering, including the instrument transformers, meters, meter panel, junction box, and secondary metering wire. The primary metering transformers will be 34.5kV CT/VT units with extended range CTs for high-accuracy metering.
The metering design package will include two revenue quality meters with DNP real time digital data terminated at a metering interposition block. One meter will be designated as primary SCADA meter with DNP data delivered to the primary control center. A second meter will be designated as backup SCADA meter with DNP data delivered to the alternate control center. The metering data will include bidirectional KWH and KVARH revenue quantities. The meter data will also include instantaneous PF, MW, MVAR, MVA, per-phase voltage, and per-phase amps data.

An Ethernet connection is required for retail sales and generation accounting via the MV-90 translation system.

Station Service/Construction Power
Prior to construction, Applicant must arrange construction power with the Public Utility holding the certificated service territory rights for the area in which the load is physically located. Please note, prior to back feed, Applicant must arrange retail meter service for electricity consumed by the Project when not generating.

8.0 CONTINGENT FACILITIES (ERIS)

Contingent Facilities Table

Potential Contingent Facility Description	Outage(s)	Pre-CA18 Overload/ Violation Level	Post-CA18 Overload/ Violation Level	% Change	Contingent Facility (Yes/No)	Responsible Entity	Planned ISD
Ochoco 230/115 kV Capacity Increase Project	Various; See Appendix 1, Table 15.2	No Overload	Overloads ranging from 131% to 212%	Not Calculated: Significant overloads	No	CA-8 (mitigation project)	Needed prior to CA-18 generation addition. Ten-year

Contingent Facilities Table							
Potential Contingent Facility Description	**Outage(s)**	**Pre-CA18 Overload/ Violation Level**	**Post-CA18 Overload/ Violation Level**	**% Change**	**Contingent Facility (Yes/No)**	**Responsible Entity**	**Planned ISD**
							plan ISD: May 2031
Houston Lake – Ponderosa, Add Second Line	None	No overload in selected base case	No overload in selected base case	N/A	No	PacifiCorp	N/A

9.0 COST ESTIMATE (ERIS)

The following estimate represents only scopes of work that will be performed by the Transmission Provider. Costs for any work being performed by the Interconnection Customer and/or Affected Systems are not included.

9.1 Interconnection Facilities

The following facilities are directly assigned to Interconnection Customer(s) using such facilities. If multiple Interconnection Requests are utilizing the same Transmission Provider Interconnection Facilities the costs shall be shared pursuant to Section 39.2.3 of Transmission Provider's OATT.

C2-06

C2-06 POI Substation $570,000
Line termination and metering

C2-06 Collector Substation $700,000
Control building & communications equipment

Total: $1,270,000

C2-07

C2-07 POI Substation $570,000
Line termination and metering

C2-07 Collector Substation $480,000
Control building & communications equipment

Total: $1,050,000

C2-08

C2-08 POI Substation $570,000
Line termination and metering

C2-08 Collector Substation $700,000
Control building & communications equipment

Total: $1,270,000

C2-09

C2-09 POI Ponderosa Substation $570,000
Line termination and metering

C2-09 Collector Substation $700,00
Control building, metering & communications equipment

Total: $1,270,000

C2-114

Corral Substation $750,000
Line termination and metering

C2-114 Collector Substation $1,210,000
Control building, metering & communications equipment

Total: $1,960,000

C2-117

Corral Substation $750,000
Line termination and metering

C2-117 Collector Substation $1,210,000
Control building, metering & communications equipment

Total: $1,960,000

C2-135

Corral Substation $750,000
Line termination and metering

C2-135 Collector Substation $1,470,000
Control building, metering & communications equipment

Total: $2,220,000

C2-147

Corral Substation $750,000
Line termination and metering

C2-147 Collector Substation $1,370,000
Control building, metering & communications equipment

Total: $2,120,000

C2-158

Corral Substation $750,000
Line termination and metering

C2-158 Collector Substation $1,550,000
Control building, metering & communications equipment

Total: $2,300,000

C2-159
Corral Substation $750,000
Line termination and metering

C2-159 Collector Substation $1,030,000
Control building, metering & communications equipment

Total: $1,780,000

C2-177
Corral Substation $750,000
Line termination and metering

C2-177 Collector Substation $1,030,000
Control building, metering & communications equipment

Total: $1,780,000

C2-178
Corral Substation $750,000
Line termination and metering

C2-178 Collector Substation $1,030,000
Control building, metering & communications equipment

Total: $1,780,000

C2-197
C2-197 POI Substation $570,000
Line termination and metering

C2-197 Collector Substation $1,040,000
Control building, metering & communications equipment

Total: $1,610,000

C2-198
C2-198 POI Substation $570,000
Line termination and metering

C2-198 Collector Substation $1,040,000
Control building, metering & communications equipment

Total: $1,610,000

C2-199
C2-199 POI Substation $570,000

Line termination and metering

C2-199 Collector Substation $1,040,000
Control building, metering & communications equipment

Total: $1,610,000

C2-200
C2-200 POI Substation $570,000
Line termination and metering

C2-200 Collector Substation $1,040,000
Control building, metering & communications equipment

Total: $1,610,000

9.2 Station Equipment

The following are Network Upgrades which are allocated based on the number of Generating Facilities interconnecting at an individual station on a per Interconnection Request basis. Interconnection Requests utilizing the same Interconnection Facilities shall be consider one request for this allocation.

C2-06, C2-08, C2-197, C2-198, C2-199, and C2-200
POI Substation $17,700,000
Build new 115 kV DBDB POI substation

Prineville-Redmond 115 kV transmission Line $460,000
Loop line in/out of POI substation

C2-07
POI Substation $7,600,000
Build new 115 kV switching station

Loop Baldwin Rd-Ponderosa 115 kV line $460,000
Loop in and out of new 115 kV POI switching station

C2-09
Poderosa Substation $1,500,000
Add 115 kV BAAH bay with 2 breakers

C2-114, C2-117, C2-135, C2-147, C2-159, C2-177, and C2-178
Corral Substation $12,400,000
Expansion of 230 kV yard with 8-line positions

9.3 Network Upgrades

The funding responsibility for Network Upgrades other than those identified in the previous section shall be allocated based on the proportional capacity of each individual Generating Facility.

North Corral 500/230 kV Substation $146,500,000
Construct new substation

Ochoco Substation $23,800,000
Construct new four breaker ring 115 kV bus

Houston Lake–Redmond Transmission Line $24,900,000
Rebuild ~14 miles of 115 kV transmission line

Redmond Substation $1,010,000
Install four 115 kV switches. Replace existing substation conductor

Powell Butte Substation $380,000
Replace 115 kV switches

Houston Lake Sub $227,000
Install 2000' of 1272 AAC conductor

Network Upgrade Total: $196,817,000

9.4 Total Estimated Project Costs

C2-06

Interconnection Facilities	$1,270 ,000
Station Equipment	$3,027,000
Network Upgrades	$7,783,000
Total:	**$12,080,000**

C2-07

Interconnection Facilities	$1,050,000
Station Equipment	$8,060,000
Network Upgrades	$7,783,000
Total:	**$16,893,000**

C2-08

Interconnection Facilities	$1,270,000
Station Equipment	$3,027,000
Network Upgrades	$7,783,000
Total:	**$12,080,000**

C2-09

Interconnection Facilities	$1,270,000

Station Equipment	$1,500,000
Network Upgrades	$19,361,000
	Total: $22,131,000

C2-114

Interconnection Facilities	$1,960,000
Station Equipment	$1,550,000
Network Upgrades	$19,361,000
	Total: $21,476,000

C2-117

Interconnection Facilities	$1,960,000
Station Equipment	$1,550,000
Network Upgrades	$14,593,000
	Total: $18,103,000

C2-135

Interconnection Facilities	$2,220,000
Station Equipment	$1,550,000
Network Upgrades	$19,361,000
	Total: $23,131,000

C2-147

Interconnection Facilities	$2,120,000
Station Equipment	$1,550,000
Network Upgrades	$19,361,000
	Total: $23,031,000

C2-158

Interconnection Facilities	$2,300,000
Station Equipment	$1,550,000
Network Upgrades	$19,361,000
	Total: $23,211,000

C2-159

Interconnection Facilities	$1,780,000
Station Equipment	$1,550,000
Network Upgrades	$19,361,000
	Total: $22,691,000

C2-177

Interconnection Facilities	$1,780,000
Station Equipment	$1,550,000
Network Upgrades	$19,361,000
	Total: $21,296,000

C2-178

Interconnection Facilities	$1,610,000
Station Equipment	$1,550,000
Network Upgrades	$19,361,000
	Total: $22,521,000

C2-197

Interconnection Facilities	$1,610,000

Station Equipment	$3,027,000
Network Upgrades	$3,892,000
	Total: $8,529,000
C2-198	
Interconnection Facilities	$1,610,000
Station Equipment	$3,027,000
Network Upgrades	$3,892,000
	Total: $8,529,000
C2-199	
Interconnection Facilities	$1,610,000
Station Equipment	$3,027,000
Network Upgrades	$3,892,000
	Total: $8,529,000
C2-200	
Interconnection Facilities	$1,610,000
Station Equipment	$3,027,000
Network Upgrades	$3,892,000
	Total: $8,529,000
	Total: $272,760,000

10.0 SCHEDULE (ERIS)

The Transmission Provider estimates it will require approximately 60 months to design, procure and construct the facilities described in this report following the execution of Interconnection Agreements. The schedule will be further developed and optimized during the Facilities Studies.

11.0 TRANSMISSION PROVIDER SYSTEM REQUIREMENTS – NRIS

11.1 Transmission System Requirements

The addition of the combined output of the Interconnection Requests in this Cluster Area exceeds the peak load in the Prineville/Redmond load pocket. Therefore, for NRIS the generation proposed in this Cluster Area must be exported to other locations with available load. The closest load pocket with additional load is the eastern Oregon/Boardman region. However, there is also not enough load in that region to accept all of the generation being proposed in this Cluster Area. Therefore, additional export to the Transmission Provider's PACE balancing authority area will be required. To accomplish this, the following are required for NRIS.

The Transmission Provider currently has planned projects to construct additional 500 kV transmission from the eastern Oregon region to its PACE balancing authority area. These lines will be required to be in-service for the Interconnection Requests in this Cluster Area for NRIS.

- Construct a new 500 kV line, approximately 164 miles, from Corral substation to Transmission Provider and BPA's jointly owned Longhorn substation in Boardman, Oregon

- Expand the 500 kV yard at the proposed Corral 500 kV Substation bus to add an additional line position to accommodate the termination of this 500 kV line
- Construct a new 500 kV line position at Longhorn Substation to accommodate the termination of this new 500 kV line

12.0 CONTINGENT FACILITIES (NRIS)

- The Transmission Provider's planned Boardman-Hemingway 500kV transmission line (Q4 2026)
- The Transmission Provider's planned Gateway West Segment E (Populus-Hemingway) 500 kV transmission line (Q4 2030)

13.0 COST ESTIMATE (NRIS)

The following estimate represents only scopes of work that will be performed by the Transmission Provider. Costs for any work being performed by the Interconnection Customer and/or Affected Systems are not included.

13.1 Network Upgrades

The funding responsibility for Network Upgrades other than those identified in the previous section shall be allocated based on the proportional capacity of each individual Generating Facility.

Please note that the following upgrades have been identified as a requirement in Cluster 2 Cluster Areas 18, 19 and 20 therefore the cost estimates have been assigned to Interconnection Requests in all Cluster Areas based on proportional capacity.

Corral-Longhorn Transmission Line *Construct new ~164-mile 500 kV transmission line*	$1,231,800,000
Corral Substation *Expansion, line position*	$7,800,000
Longhorn Substation *Expansion, line position*	$8,200,000
Total	**$1,247,800,000**

13.2 Total Estimated Project Costs

C2-06	**$13,294,000**
C2-07	**$13,294,000**
C2-08	**$13,294,000**
C2-09	**$13,294,000**
C2-114	**$33,069,000**
C2-117	**$33,069,000**
C2-135	**$24,927,000**
C2-147	**$33,219,000**

C2-158	**$33,069,000**
C2-159	**$33,069,000**
C2-177	**$33,069,000**
C2-178	**$33,069,000**
C2-197	**$6,647,000**
C2-198	**$6,647,000**
C2-199	**$6,647,000**
C2-200	**$6,647,000**

14.0 AFFECTED SYSTEMS

Transmission Provider has identified the following affected systems: Bonneville Power Administration (BPA); Portland General Electric (PGE)

A copy of this report will be shared with each Affected System.

15.0 APPENDICES

Appendix 1: Cluster Area Power Flow and Stability Study Results
Appendix 2: Higher Priority Requests
Appendix 3: Property Requirements

15.1 Appendix 1: Cluster Area Power Flow and Stability Study Results

The Western Electricity Coordinating Council (WECC) approved 2020 Heavy Summer case was used to perform the power flow studies using PSS/E version 34.6. The 2020 Heavy Summer case was modified for the study year, 2025. The local 345 kV, 230 kV and 138 kV transmission system outages were considered during the study. The following table describes the outage, the issue(s) that arises from each outage and the proposed mitigation.

The contingency table at the end of this section lists the contingencies studied for Cluster Area 18. The list includes all single contingency outages in the local region including all transformer and line sources or ties to nearby areas, and it also includes a study of the normal configuration that in the pre-cluster case is defined as follows:

- Ponderosa Substation 115 kV bus supplied from the energized 230 kV and 500 kV grids via two existing 500/230 kV transformers and three existing and planned 230/115 kV transformers
- The existing 115 kV line CO19 path (Ponderosa-Stearns Butte-Houston Lake) is closed
- The proposed 115 kV line from Ponderosa to Houston Lake is in service and closed
- The existing 115 kV line CO14 path (Ponderosa-Baldwin Road-Prineville-Houston Lake) is closed
- The 115 kV line CO3 and CO7 path between Houston Lake Substation and BPA's Redmond substation is open between PAC Redmond and Powell Butte
- BPA's Redmond Substation is supplied from the energized 230 kV grid

The contingencies shown in the contingency table start from the normal configuration described above, and for each contingency, the described element was removed from service in a steady state power flow simulation and the response of the transmission system was evaluated to determine adverse impacts between the pre-cluster and post-cluster cases.

Local area summer peak loads were modeled based upon annual load projections and ramp schedules provided by the data center customers.

Addition of the CA18 Cluster generation to the 115 kV system in Prineville, Oregon, causes overloads for numerous contingency conditions. Due to these significant overloads, the following mitigation projects have been proposed, as detailed in Section 7.1:

1. Construct new 500kV and 230 kV substation yards at Corral Substation to interconnect projects in the local area including the looping of the PGE Grizzly-Malin 500 kV Transmission Line 18.4 miles south of Grizzly Substation, installation of two new 500-230 kV transformers, and the construction of new 500 & 230 kV buses
   - This project is required to avoid overloading 230 kV lines and 500/230 kV transformation connecting to Ponderosa Substation
2. Construct a new 115 kV switching station east of Redmond Substation that loops the PAC Redmond-Powell Butte-Houston Lake 115 kV transmission line and rebuild the line sections between the new Redmond SS, Powell Butte, and Ochoco Sub. Normally serve the PAC Redmond 115 kV load from this rebuilt line rather than from BPA Redmond.

- This project is required to avoid overloading 115 kV lines and 230/115 kV transformation connecting to BPA's Redmond Substation and/or Ponderosa Substation

3. Construct the Ochoco 230/115 kV Capacity Increase Project, including a new 230/115 kV transformer at Ochoco, expansion of the existing 230 kV bus, and construction of a new 115 kV bus and looping of the Redmond – Houston Lake 115 kV line[1]
   - This project is required to avoid overloading 115 kV lines as well as 230/115 kV and 500/230 kV transformation connecting to Ponderosa Substation

For the transmission line work associated with the mitigation projects summarized above, Table 15.1 below details the required ratings for existing and new transmission lines.

Table 15.1 – Required Minimum Ratings for Transmission Line Projects

Line Name	Voltage (kV)	Length (miles)	Existing Normal/Summer 30 Min. Emergency Rating (Amps)	Required Normal/Summer 30 Min. Emergency Rating (Amps)**
Redmond SS – Powell Butte (section of PAC Redmond – Powell Butte)	115	~7 mi (depends on new station location)	595 / 833	1600 / 1860
Ochoco – Powell Butte	115	~6 mi	595 / 833	1600 / 1860

** A 10% margin was applied to determine the required rating (also based on a 0.95 power factor line loading assumption). Though these three connected line segments have different rating requirements, the same conductor is recommended to be used for each for consistency.

The results of the CA18 contingency analysis for the studied Heavy Summer condition are presented in Table 15.2 below.

Table 15.2 – Identified Worst-Case Overloads (Heavy Summer Loading)

Overloaded Branch	Contingency Name	Rating	Study Case			NOTES
			Pre-CA18	Post-CA18	Post-CA18 +Mitigation	
---	RDMND_W -YEW AV T 115 Line #1	---	*Diverged*	*Diverged*	*Diverged*	*(Known pre-cluster divergence issue; no mitigation necessary.)*
44568 CORRAL 230 - 408361 PON_COR2_CIO 230 #2	PONDROSA-PON_COR1 230 Line #1	1418 Amp		285%		Severe overloads in post-cluster case; mitigation resolves all issues.
40836 PONDROSA_AIS 230 - 408360 PON_COR1_CIO 230 #1	CORRAL -PON_COR2 230 Line #2	1418 Amp		284%		Severe overloads in post-cluster case; mitigation resolves all issues.
44568 CORRAL 230 - 408360 PON_COR1_CIO 230 #1	CORRAL -PON_COR2 230 Line #2	1418 Amp		284%		Severe overloads in post-cluster case; mitigation resolves all issues.
40836 PONDROSA_AIS 230 - 408361 PON_COR2_CIO 230 #2	CORRAL -PON_COR1 230 Line #1	1550 Amp		261%		Severe overloads in post-cluster case; mitigation resolves all issues.
40838 PONDROSA_GIS 230 - 45247 PONDROSA 115 #1	PONDROSA-PONDROSA 230 Line #1	280 MVA		212%		Severe overloads in post-cluster case; mitigation resolves all issues. *(Post-mitigation values included for reference only.)*
	CORRAL -PONDROSA 230 Line #1	280 MVA		187%	91%	
	PONDROSA-PONDROSA 230/115 #1	280 MVA		148%	91%	
40837 PONDROSA 500 - 40838 PONDROSA_GIS 230 #1	PONDROSB-PONDROSA 500/230 #2	865.5 MVA		206%		Severe overloads in post-cluster case; mitigation resolves all issues.
	ALL LINES IN SERVICE	710.7 MVA		152%		

[1] Though a similar project has been proposed as a planned expansion to the PacifiCorp transmission system in the past, this project is *not* considered a Contingent Project for Cluster 2 since there is no system violation in the base study scenario without modeling this project.

Overloaded Branch	Contingency Name	Rating	Study Case			NOTES
			Pre-CA18	Post-CA18	Post-CA18 +Mitigation	
40834 PONDROSB 500 - 40836 PONDROSA_AIS 230 #2	PONDROSA-PONDROSA 500/230 #1	882 MVA		186%		Severe overloads in post-cluster case; mitigation resolves all issues.
40836 PONDROSA_AIS 230 - 40838 PONDROSA_GIS 230 #1	PONDROSB-PONDROSA 500/230 #2	2000 Amp		167%		Severe overloads in post-cluster case; mitigation resolves all issues.
948529 TCA-8 POI 115 - 40836 PONDROSA_AIS 230 #1	CORRAL -PONDROSA 230 Line #1	280 MVA		161%		Severe overloads in post-cluster case; mitigation resolves all issues.
45247 PONDROSA 115 - 44569 PONDROSA 230 #1	PONDROSA_GIS-PONDROSA 230/115 #1	280 MVA		131%		Severe overloads in post-cluster case; mitigation resolves all issues.

Based on power flow simulations, no adverse voltage impacts are expected to be caused by the addition of the Cluster Area 18 generation projects with all mitigation projects modeled.

Contingencies for CA18 Analysis:

Ctg	Contingency Name
0	ALL LINES IN SERVICE
1	OCHOCO 230/115kV XFMR BANK #1
2	OCHOCO-POWELL BUTTE 115 Line
3	OCHOCO-HOUSTON LAKE 115 Line
4	PWELLBUTTE-NEW REDMOND_SS 115
5	NEW REDMOND_SS-REDMOND PPL 115
6	GRIZZLY -CORRAL 500 Line #2
7	CORRAL 500/230kV XFMR #1
8	CORRAL 500/230kV XFMR #2
9	SUMMER L-SwSta_83 500 Line #1
10	SwSta_83-BURNS 500 Line #1
11	BURNS -HEMINWAY 500 Line #1
12	PONDEROSA-CPTJACK 500 Line #1
13	PONDEROSA-SUMRLAK 500 Line #1
14	GRIZZLY-PONDEROSA 500 Line #1
15	BUCKLEY -GRIZZLY 500 Line #1
16	JOHN DAY-GRIZZLY 500 Line #1
17	JOHN DAY-GRIZZLY 500 Line #2
18	GRIZZLY -PONDROSB 500 Line #1
19	GRIZZLY -ROUND BU 500 Line #1
20	CORRAL-MALIN 500 Line #2
21	SUMMER L-MALIN 500 Line #1
22	MALIN-CAPTJACK 500 Line #1
23	MALIN-CAPTJACK 500 Line #2
24	MALIN-MALIN CAPS 500 Line #C4
25	CAPTJACK SVD LINE 500 Line #C3
26	CAPTJACK-OLINDA 500 Line #1
27	SNOGOOSE-CAPTJACK 500 Line #1
28	CANBY -CANBY# 230 Line #1
29	CANBY# -HIL TOP 230 Line #1
30	CANBY# -MALIN 230 Line #1
31	CHILQUIN-YAMSAY 230 Line #1
32	HIL TOP -HIL TO_R 230 Line #R1
33	HIL TOP -WARNER 230 Line #1
34	LAPINE -YAMSAY 230 Line #1
35	MAUPIN -RDMND_E 230 Line #1
36	PONDROSA-PONDROSA 230 Line #1
37	PONDROSA-PON_COR1 230 Line #1
38	PONDROSA-PON_COR2 230 Line #2
39	RDMND_E -RDMND_W 230 Line #BS
40	RDMND_W -ROUNDB S 230 Line #1
41	BROTHERS-BRASADA 115 Line #1
42	CATLOW+ -DOG_MNTN 115 Line #1

Ctg	Contingency Name
43	CATLOW+ -FIELDS_S 115 Line #1
44	CEDRVIL_-ALTURAS 115 Line #1
45	CEDRVIL_-DAVIS CR 115 Line #1
46	CHRSTMS_-RADAR_5+ 115 Line #1
47	DAVIS CR-BULLARD 115 Line #1
48	DOG_MNTN-HANLY R2 115 Line #1
49	FIELDS_S-FIELDS_H 115 Line #1
50	FORTROCK-LAPINE 115 Line #1
51	HAMPTON+-BROTHERS 115 Line #1
52	HAMPTON+-RILEY+ 115 Line #1
53	HARNEY -HANLY R1 115 Line #1
54	HARNEY -HINES 115 Line #1
55	HARNEY -RILEY+ 115 Line #1
56	LAWEN_HE-CRANE_HE 115 Line #1
57	LAWEN_HE-HANLY R1 115 Line #1
58	MILLICAN-FORTROCK 115 Line #1
59	MILLICAN-RADAR_5+ 115 Line #1
60	RDMND_E -RDMND_W 115 Line #BS
61	WARNER -ALTURAS 115 Line #1
62	AUSTIN# -ADINTAP 69 Line #1
63	CANBY -ADINTAP 69 Line #1
64	CANBY_SV-CANBY 69 Line #1
65	CORRAL -CATALINA 230 Line #1
66	CORRAL -PONDROSA 230 Line #1
67	CORRAL -PON_COR1 230 Line #1
68	CORRAL -PON_COR2 230 Line #2
69	FRIEND_2-OCHOCO 230 Line #1
70	FRIEND_2-OCHOCO 230 Line #2
71	LAPINE -PILOTBT 230 Line #1
72	OCHOCO -CATALINA 230 Line #1
73	OCHOCO -CORRAL 230 Line #2
74	PONDROSA-PILOTBT 230 Line #1
75	RDMND_W -PILOTBT 230 Line #1
76	ROUNDB S-COVE 230 230 Line #1
77	ROUNDB S-COVE 230 230 Line #2
78	BALDWIN -PRINVILE 115 Line #1
79	BALDWIN -PRNVL SL 115 Line #1
80	BALDWIN -SS_C2-07 115 Line #1
81	SS_C2-07-PONDROSA 115 Line #1
82	GALA -PONDROSA 115 Line #1
83	HOUSTNLK-PONDROSA 115 Line #1
84	HOUSTNLK-POWLBUPL 115 Line #1
85	HOUSTNLK-PRINVILE 115 Line #1
86	Q443-726-PONDROSA 115 Line #1

Ctg	Contingency Name
87	Q731-HIG-STRNSBT 115 Line #1
88	RDMND_E -RDMNDPPL 115 Line #1
89	RDMND_W -YEW AV T 115 Line #1
90	STRNSBT -HOUSTNLK 115 Line #1
91	STRNSBT -PONDROSA 115 Line #1
92	TCA-8 PO-PONDROSA 115 Line #1
93	YEW AV T-BRASADA 115 Line #1
94	YEW_AVE -YEW AV T 115 Line #1
95	BEND PLT-MDST TAP 69 Line #1
96	BEND PLT-OVERPASS 69 Line #1
97	CECC TAP-CHERRYLN 69 Line #1
98	CECC TAP-MADRAS 69 Line #1
99	CLEVELND-PILOTBT1 69 Line #1
100	CLEVELND-CHINAHAT 69 Line #1
101	CLEVELND-CLEVELND 69 Line #1
102	CLEVETP1-PILOTBT1 69 Line #1
103	COLD TAP-BOND ST 69 Line #1
104	COLD TAP-CLEVETP1 69 Line #1
105	COLD TAP-COID TAP 69 Line #1
106	COVE 69 -CULVER 69 Line #1
107	COVE 69 -MADRAS 69 Line #1
108	COVE 69 -PELTONRR 69 Line #1
109	HUNTERSC-PILOTTAP 69 Line #1
110	OPAL TAP-CROOKDRV 69 Line #1
111	OPAL TAP-CULVER 69 Line #1
112	OPAL TAP-OPAL 69 Line #1
113	OVERPASS-PILOTTAP 69 Line #1
114	PELTONRR-WARMSPGS 69 Line #1
115	PENSTOCK-DESCHUTE 69 Line #1
116	PENSTOCK-HUNTERSC 69 Line #1
117	PILOTBT1-PILOTTAP 69 Line #1
118	REDMOND -RDMNDPPL 69 Line #1
119	SHEVLNPK-BOND ST 69 Line #1
120	SHEVLNPK-MDST TAP 69 Line #1
121	MALIN -MALIN 500/230 #1
122	PONDROSA-PONDROSA 500/230 #1
123	PONDROSB-PONDROSA 500/230 #2
124	HIL TOP -HIL TOP 345/230 #1
125	LAPINE -LAPINE 230/115 #1
126	RDMND_E -RDMND_W 230/115 #3
127	RDMND_W -RDMND_E 230/115 #5
128	WARNER -WARNER 230/115 #1
129	CANBY -CANBY 230/ 69 #1
130	RDMND_W -REDMOND 230/ 69 #1

Ctg	Contingency Name
131	RDMND_W -REDMOND 230/ 69 #2
132	HANLY R1-HANLY R2 115/115 #1
133	FRIEND_2-FRIEND_1 230/115 #1
134	FRIEND_2-FRIEND_1 230/115 #2
135	PONDROSA-PONDROSA 230/115 #1
136	PONDROSA-TCA-8 PO 230/115 #1
137	PONDROSA-PONDROSA 230/115 #1 a
138	COVE 230-COVE 69 230/ 69 #1
139	COVE 230-COVE 69 230/ 69 #2
140	PILOTBT -PILOTBT1 230/ 69 #1
141	PILOTBT -PILOTBT1 230/ 69 #2
142	PILOTBT -PILOTBT1 230/ 69 #3
143	GALAPV 0.60 #1 Generator
144	MILCN SL 0.63 #1 Generator
145	PELTONR1 6.90 #1 Generator
146	PRNVL SL 0.63 #1 Generator
147	Q443-LOW 34.50 #N Generator
148	Q731-LOW 34.50 #N Generator
149	Q734-LOW 34.50 #N Generator
150	Q824-LOW 34.50 #N Generator

15.2 Appendix 2: Higher Priority Requests

All active higher priority Transmission Provider projects, and transmission service and/or generator interconnection requests will be considered in this cluster area study and are identified below. If any of these requests are withdrawn, the Transmission Provider reserves the right to restudy this request, as the results and conclusions contained within this study could significantly change.

Transmission/Generation Interconnection Queue Requests considered:

Q0443 – 34.5 MW
Q0731 – 55 MW
Q0734 – 63.5 MW
Q0824 – 40 MW
TCS-43 – 40 MW
TCS-44 – 80 MW
TCS-45 – 40 MW
TCS-52 – 20 MW
TCS-53 – 20 MW
TCS-54 – 20 MW

BPA Requests
G0501 - 1100
G0527 - 105
G0539 - 600
G0640 - 238.5

PGE Requests
QF17-068 - 65
QF19-081 - 53

15.3 Appendix 3: Property Requirements

Property Requirements for Point of Interconnection Substation

Requirements for rights of way easements
Rights of way easements will be acquired by the Interconnection Customer in the Transmission Provider's name for the construction, reconstruction, operation, maintenance, repair, replacement and removal of Transmission Provider's Interconnection Facilities that will be owned and operated by Transmission Provider. Interconnection Customer will acquire all necessary permits for the Project and will obtain rights of way easements for the Project on Transmission Provider's easement form.

Real Property Requirements for Point of Interconnection Substation
Real property for a POI substation will be acquired by an Interconnection Customer to accommodate the Interconnection Customer's Project. The real property must be acceptable to Transmission Provider. Interconnection Customer will acquire fee ownership for interconnection substation unless Transmission Provider determines that other than fee ownership is acceptable; however, the form and instrument of such rights will be at Transmission Provider's sole discretion. Any land rights that Interconnection Customer is planning to retain as part of a fee property conveyance will be identified in advance to Transmission Provider and are subject to the Transmission Provider's approval.

The Interconnection Customer must obtain all permits required by all relevant jurisdictions for the planned use including but not limited to conditional use permits, Certificates of Public Convenience and Necessity, California Environmental Quality Act, as well as all construction permits for the Project.

If eligible, Interconnection Customer will not be reimbursed through network upgrades for more than the market value of the property.

As a minimum, real property must be environmentally, physically, and operationally acceptable to Transmission Provider. The real property shall be a permitted or able to be permitted use in all zoning districts. The Interconnection Customer shall provide Transmission Provider with a title report and shall transfer property without any material defects of title or other encumbrances that are not acceptable to Transmission Provider. Property lines shall be surveyed and show all encumbrances, encroachments, and roads.

Examples of potentially unacceptable environmental, physical, or operational conditions could include but are not limited to:

1. Environmental: known contamination of site; evidence of environmental contamination by any dangerous, hazardous or toxic materials as defined by any governmental agency; violation of building, health, safety, environmental, fire, land use, zoning or other such regulation; violation of ordinances or statutes of any governmental entities having jurisdiction over the property; underground or above ground storage tanks in area; known remediation sites on property; ongoing mitigation activities or monitoring activities; asbestos; lead-based paint, etc. A

phase I environmental study is required for land being acquired in fee by the Transmission Provider unless waived by Transmission Provider.

2. Physical: inadequate site drainage; proximity to flood zone; erosion issues; wetland overlays; threatened and endangered species; archeological or culturally sensitive areas; inadequate sub-surface elements, etc. Transmission Provider may require Interconnection Customer to procure various studies and surveys as determined necessary by Transmission Provider.

Operational: inadequate access for Transmission Provider's equipment and vehicles; existing structures on land that require removal prior to building of substation; ongoing maintenance for landscaping or extensive landscape requirements; ongoing homeowner's or other requirements or restrictions (e.g., Covenants, Codes and Restrictions, deed restrictions, etc.) on property which are not acceptable to the Transmission Provider.