

February 17, 2023

VIA ETARIFF

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

**RE: *PacifiCorp* Docket No. ER23-_____-000
Transmission Interconnection Agreement for Points of Delivery, Rate
Schedule No. 599**

Dear Secretary Bose:

Pursuant to Section 205 of the Federal Power Act (“FPA”)¹, Part 35 of the Federal Energy Regulatory Commission’s (“Commission”) regulations,² and Order No. 714³ regarding electronic filing of tariff submittals, PacifiCorp hereby submits for filing the following jurisdictional agreement:

Amended and Restated Transmission Interconnection Agreement for Points of Delivery, between PacifiCorp and Lehi City Power (“Lehi”), to be designated as PacifiCorp First Revised Rate Schedule No. 599 (Amended Agreement).

As discussed further below, PacifiCorp respectfully requests the Commission accept this Amended Agreement effective on April 19, 2023.

1. Background and Reason for Filing

PacifiCorp is an electric utility which owns and operates certain facilities for the transmission of electric power and energy in interstate commerce (the “Transmission System”). Lehi is an existing Interconnection Customer which interconnects its electric system with PacifiCorp’s Transmission System at various points.

¹ 16 U.S.C. § 824d (2018).

² 18 C.F.R. Part 35 (2022).

³ *Electronic Tariff Filings*, Order No. 714, 124 FERC ¶ 61,270 (2008), *order on reh’g*, Order No. 714-A, 147 FERC ¶ 61,115 (2014).

On December 15, 2006, PacifiCorp, and Lehi entered into an Interconnection Agreement for a new point of interconnection at Traverse Mountain and for four pre-existing points of interconnection, which was filed with, and accepted by, the Commission on April 10, 2007, in Docket No. ER07-544.⁴

On February 2, 2023, PacifiCorp and Lehi agreed to amend and restate the original agreement for clarification and to make certain modifications in order to update the names of the points of delivery, update certain references to PacifiCorp's operating practices and procedures, remove Appendix B, which restated now superseded PacifiCorp interconnection requirements, and clean-up the original formatting of the agreement.

Accordingly, PacifiCorp respectfully requests that the Commission accept the Amended Agreement, attached hereto, for filing.

2. Effective Date and Request for Waiver

PacifiCorp requests as effective date of April 19, 2023 for the Amended Agreement. To the extent that any filing requirement in Part 35 of the Commission's regulations is not satisfied by this filing and the materials enclosed herewith, PacifiCorp respectfully requests waiver of such requirements.

3. Designation

PacifiCorp respectfully requests that the Amended Agreement be designated as First Revised PacifiCorp Rate Schedule No. 599.

4. Enclosure

The following enclosure is attached hereto:

- This Transmittal Letter.
- Interconnection Agreement between Lehi and PacifiCorp, to be designated as First Revised PacifiCorp Rate Schedule No. 599.
- Redline version of the First Revised PacifiCorp Rate Schedule No. 599 as compared to PacifiCorp Rate Schedule No. 599.

⁴ *PacifiCorp*, Letter Order, Docket No. ER07-544-000 (April 10, 2007).

5. Communications

All communications and correspondence regarding this filing should be forwarded to the following persons:

Robert Eckenrod
Assistant General Counsel
PacifiCorp
825 N.E. Multnomah, Suite 2000
Portland, Oregon 97232
(503) 367-7259
Robert.Eckenrod@pacificorp.com

Rick Vail
Vice President, Transmission
PacifiCorp
825 N.E. Multnomah, Suite 1600
Portland, OR 97232
(503) 813- 6938
Richard.Vail@PacifiCorp.com

6. Notice

Pursuant to 18 C.F.R. § 35.2(e), a copy of this filing is being served on the following:

Joel Eves
Lehi City Power
560 West Glen Carter Drive
Lehi, UT 84043
jeves@leh-ut-gov

Utah Public Service Commission
Heber M. Wells Building
160 East 300 South
Salt Lake City, UT 84114
psc@utah.gov

7. Conclusion

For the reasons described herein, PacifiCorp respectfully requests that the Commission accept the Amended Agreement for filing with an effective date of April 19, 2023.

Respectfully Submitted,

/s/ Robert Eckenrod
Robert Eckenrod

Counsel for PacifiCorp

Clean Version

PACIFICORP

and

LEHI CITY POWER

**TRANSMISSION INTERCONNECTION AGREEMENT FOR POINTS OF
DELIVERY**

Transmission Interconnection Agreement for Points of Delivery

This Amended and Restated Transmission Interconnection Agreement ("Agreement"), executed as of the 2nd day of February, 2023, is by and between **PACIFICORP**, an Oregon Corporation, and **LEHI CITY POWER**, a municipal corporation and political subdivision of the State of Utah ("Interconnection Customer"). PacifiCorp and Interconnection Customer are sometimes referred to herein individually as "Party" and collectively as "Parties."

RECITALS

WHEREAS, PacifiCorp is an electric utility which owns and operates certain facilities for the transmission of electric power and energy in interstate commerce (the "Transmission System"); and

WHEREAS, Interconnection Customer desires to interconnect its electric system with PacifiCorp's Transmission System at various points; and

WHEREAS, the Parties have entered into various agreements for the design and construction of the facilities required for interconnection of the Interconnection Customer's electric system with PacifiCorp's Transmission System; and

WHEREAS, the Parties entered into the Transmission Interconnection Agreement for Points of Delivery dated December 15, 2006 ("Original Agreement"); and

WHEREAS, the Parties have agreed to amend and restate the Original Agreement for clarification and to make certain modifications.

NOW, THEREFORE, in consideration of the mutual covenants and agreements contained herein, the Parties undertake and agree as follows:

ARTICLE 1. DEFINITIONS

Business Day shall mean Monday through Friday, excluding federal holidays.

Point(s) of Interconnection shall mean the point(s) at which the Interconnection Customer's electric system interconnects with PacifiCorp's Transmission System further described in Appendix A and as may be added, inserted, removed or altered from time to time by agreement between the parties.

Good Utility Practice shall mean any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the

optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region.

ARTICLE 2. FILING, EFFECTIVE DATE, TERM AND TERMINATION

2.1 Filing of Agreement. This Agreement shall be subject to its acceptance for filing by the Federal Energy Regulatory Commission ("FERC"). The terms and conditions of this agreement shall not be subject to change through application to the FERC pursuant to the provisions of Sections 205 or 206 of the Federal Power Act absent a material change in operation or benefit to any of the Parties. If any provision of this Agreement is held to be void, voidable, contrary to public policy, or unenforceable, the Parties may terminate this Agreement upon mutual agreement. The Parties agree that no Party will be deemed the drafter of any term that may subsequently be found to be ambiguous or vague. PacifiCorp shall submit this Agreement for filing with FERC within thirty (30) calendar days after execution of the Agreement.

2.2 Effective Date. This Agreement shall become effective upon the later of: (i) the date of this Agreement; or (ii) the date established by FERC upon acceptance of the Agreement for filing ("Effective Date").

2.3 Term and Termination.

2.3.1 Subject to Section 2.3.2, this Agreement shall remain in effect for a term of thirty (30) years from the Effective Date and shall be automatically renewed for each successive one-year period thereafter.

2.3.2 This Agreement may be terminated effective on or after the expiration of the initial term specified in Section 2.3.1 by either Party after giving the non-terminating Party no less than three (3) years' advance written notice. The Parties may mutually agree to terminate this Agreement at any time through a written document signed by an authorized representative of each Party.

ARTICLE 3. INTERCONNECTION PERFORMANCE OBLIGATIONS

3.1 Interconnection Customer May Interconnect.

3.1.1 The Interconnection Customer may interconnect its electric system to PacifiCorp's Transmission System via the interconnection facilities identified in Appendix A.

3.1.2 Design, construction and continuing use, maintenance and operation of all interconnection facilities shall be pursuant to Good Utility Practice and meet to the extent relevant all applicable connection requirements, set forth in PacifiCorp's Facility Connection Requirements for Transmission Systems ("FCRTS"), as amended from time-to-time by PacifiCorp. PacifiCorp shall review and approve the Interconnection Customer's design prior to construction of the facilities prior to permitting interconnection.

3.1.3 The execution of this Agreement does not constitute a request for, nor the provision of, any transmission delivery service, and it does not convey any right to deliver electricity to any specific customer or point of delivery.

3.2 System Impact Study. Performance of and responsibility for the cost of system studies, design, procurement and installation of the interconnection facilities required to connect the Interconnection Customer's electric system to PacifiCorp's Transmission System at the Point(s) of Interconnection, including all modifications to PacifiCorp's Transmission System necessary to complete the interconnection, have been provided for in separate agreements.

3.3 Costs of Future Upgrades.

3.3.1 Interconnection Customer shall be responsible for all costs associated with any future modifications necessary to upgrade the interconnection facilities to meet requirements proposed by the Interconnection Customer.

3.3.2 Design and construction of any such future upgrade facilities shall be pursuant to Good Utility Practices and meet PacifiCorp's Transmission System design standards. PacifiCorp shall review and approve the upgrade design prior to construction of the facilities.

3.4 Change of Interconnecting System Voltage. In the event PacifiCorp changes the operating voltage of the Transmission System to which the Interconnection Customer is connected, Interconnection Customer shall be responsible for all costs associated with modifications necessary to upgrade Interconnection Customer's facilities to remain interconnected with PacifiCorp's Transmission System at the new operating voltage.

3.5 Ownership and Operational Control of Interconnection Facilities.

3.5.1 Interconnection Customer shall own all interconnection facilities installed on the Interconnection Customer's side of the point of change of ownership shown and marked as such on the one-line diagram in Appendix B unless otherwise indicated.

3.5.2 Unless it determines otherwise, PacifiCorp shall retain full ownership and operational control of any facilities and equipment that are on the path that delivers electric energy over PacifiCorp's Transmission System.

3.5.3 The Interconnection Customer shall operate and maintain Interconnection Customer's interconnection facilities in compliance with Good Utility Practices and with all Western Electricity Coordinating Council (WECC) or such other reliability criteria set or promulgated by a regional or national standard setting body with authority to do so (including, but not limited to, the North American Electric Reliability Corporation's (NERC) Reliability Standards) as such criteria may be adopted or modified from time to time. The Interconnection Customer shall be responsible for all costs associated with the operation and maintenance of the interconnection facilities it owns.

3.5.4 Interconnection Customer, at its expense and upon the written request of PacifiCorp, agrees to install or have installed switched capacitors or other equipment

as may be reasonably required to eliminate that portion of reactive power flow which causes the reactive factor to fall below the limits established herein. Such capacitors or other equipment shall be of a size consistent with voltage control requirements for PacifiCorp's system.

3.5.5 Interconnection Customer shall design and operate its system so it shall not cause abrupt voltage changes on PacifiCorp's Transmission System in excess of PacifiCorp's standards as set forth PacifiCorp's Planning Standards for Voltage, as amended from time to time. Should Interconnection Customer fail to take the corrective action requested by PacifiCorp within one (1) year after receipt of a notice detailing the corrective action to be taken, PacifiCorp may perform such services or supply and install such capacitors or other equipment as it deems necessary to provide the corrective action. Interconnection Customer shall compensate PacifiCorp for all amounts expended and all services contracted for or performed in taking the corrective action, including indirect costs and overheads. The total of these expenditures shall be paid by Interconnection Customer within thirty (30) days of receipt of an itemized statement of those expenditures reasonably incurred.

3.6 Interchange/Revenue Metering Equipment.

3.6.1 Interconnection Customer shall bear all reasonable documented costs associated with the purchase, installation, operation, testing and maintenance of the interchange and revenue metering equipment and unless interchange meters are located within PacifiCorp's switchyard or substation:

- (i) Interconnection Customer shall operate, test and maintain metering equipment and conform to the FCRTS;
- (ii) Interconnection Customer shall provide metering quantities, in analog and/or digital form, to PacifiCorp;
- (iii) meters shall be located on the high voltage side of transformers with the exception of Ashton which is metered on the low side of the transformer, and voltage and current transformers used for metering purposes shall be used for no other purpose;
- (iv) Interconnection Customer shall install, calibrate, and test interchange metering equipment in accordance with applicable ANSI standards. Interconnection Customer shall inspect and test all metering equipment upon installation and at least once every three (3) years thereafter. If requested to do so by PacifiCorp, Interconnection Customer shall, inspect or test metering equipment more frequently than every three (3) years; and
- (v) Interconnection Customer shall give reasonable notice of the time when any inspection or test shall take place, and PacifiCorp may have representatives present at the test or inspection. If at any time metering equipment is found to be inaccurate or defective, it shall be adjusted, repaired or replaced at Interconnection Customer's expense, in order to provide accurate metering.

3.6.2 Where interchange and/or revenue meters are located within PacifiCorp's switchyard or substation, PacifiCorp shall own and maintain the meters and metering equipment at the cost of the Interconnection Customer.

3.7 Telemetry and Communications Equipment.

3.7.1 Unless otherwise provided in the FCRTS, Interconnection Customer shall own, operate and maintain a Remote Terminal Unit at its interconnection facility to gather accumulated and instantaneous data to be telemetered to the location(s) designated by PacifiCorp. PacifiCorp will promptly advise the Interconnection Customer if it detects or otherwise learns of any metering, telemetry or communications equipment errors or malfunctions that require the attention and/or correction by Interconnection Customer. Interconnection Customer shall correct such error or malfunction as soon as reasonably feasible.

3.7.2 Interconnection Customer shall own, operate and maintain communication equipment at its interconnection facilities as required by PacifiCorp to deliver required interconnection data to PacifiCorp's control centers. PacifiCorp will promptly advise the Interconnection Customer if it detects malfunctions in the communication equipment. Interconnection Customer shall have call out repair crews available 24 hours a day 7 days a week. Interconnection Customer shall work diligently with PacifiCorp and any other entities that carry communication traffic back to PacifiCorp to resolve any such failure. Interconnection Customer and PacifiCorp shall correct such error or malfunction as soon as reasonably practicable.

3.7.3 All Remote Terminal Unit, telemetry and communications equipment shall conform to the FCRTS.

3.8 Property Rights. Interconnection Customer shall provide a document acceptable to PacifiCorp that authorizes and grants PacifiCorp an easement and right-of-way for the construction, reconstruction, operation, maintenance, repair, replacement enlargement and removal of the PacifiCorp interconnection facilities, if any, located within Interconnection Customer's switchyard or substation. PacifiCorp shall have the right to access Interconnection Customer's switchyard or substation to perform these activities.

3.9 Operational Control.

3.9.1 PacifiCorp shall retain full operational control of the transmission path to which the Interconnected Customer's facilities are connected whether or not PacifiCorp owns the facilities and equipment on that path.

3.9.2 All operation and maintenance activities by either Party shall be coordinated through the Parties' respective grid operations functions.

ARTICLE 4. CONTINUITY OF INTERCONNECTION

4.1 Continuous Physical Interconnection. PacifiCorp shall make reasonable provisions consistent with Good Utility Practice to provide a continuous physical interconnection at the Point(s) of Interconnection.

4.2 Temporary Interruptions with Reasonable Notice. PacifiCorp may temporarily interrupt or isolate the interconnection in order to: (i) maintain reliability on PacifiCorp's Transmission System; or (ii) avoid death or injury to any person or harm to any property. PacifiCorp shall attempt to provide Interconnection Customer as much notice as reasonably possible.

4.3 Temporary Interruptions with Minimum Notice. PacifiCorp may temporarily interrupt or isolate the interconnection for any planned interruption to the interconnection after giving at least seven (7) Business Days' notice to the Interconnection Customer. A planned outage may be taken in order to: (i) maintain, repair, replace or inspect any portion of PacifiCorp's Transmission System or (ii) install equipment. Notice shall be given to allow for the coordination of the date and time of the outage, in an effort to minimize the duration and number of the Interconnection Customer's customers affected by the outage.

ARTICLE 5. LIMITATION OF LIABILITY

5.1 Limitation of Liability. Neither Party nor its directors, board members, commissioners, officers, employees, or agents shall have any liability to the other Party for any injury or death to any person, or for any loss or damage to any property, or any lost profits, lost revenues, lost use of facilities, lost data, or any indirect, incidental, consequential, special, exemplary, or punitive damages caused by or arising out of any Electric Disturbance on the first Party's electric facilities, unless the Electric Disturbance is caused by the other Party's negligence or Willful Action.

5.2 Willful Action. "Willful Action" means an action that is knowingly or intentionally taken or not taken with the knowledge or intent that injury or damage would result, or with a reckless disregard for the result. Willful Action does not include any act or failure to act that is involuntary or accidental.

5.3 Electrical Disturbance. "Electrical Disturbance" means the following:

- (i) electric disturbances that produce abnormal power flows;
- (ii) power system faults or equipment failures;
- (iii) overvoltages during ground faults;
- (iv) audible noise, radio, television, and telephone interference;
- (v) power system harmonics; or
- (vi) other disturbances that might degrade the reliability of the interconnected PacifiCorp Transmission System.

ARTICLE 6. INDEMNIFICATION

6.1 PacifiCorp Indemnification of Interconnection Customer. Except as otherwise provided in Article 5 above, PacifiCorp will indemnify, defend, and hold harmless Interconnection Customer (and its directors, officers, employees, and agents) from and against any Third-Party Claims (as that term is defined in Section 6.4 below) resulting from any negligence or Willful Action of PacifiCorp or PacifiCorp's employees, agents, suppliers, or subcontractors in connection with this Agreement or its performance.

6.2 Interconnection Customer Indemnification of PacifiCorp. Except as otherwise provided in Article 5 above, Interconnection Customer will indemnify, defend, and hold harmless PacifiCorp (and its directors, officer, employees, and agents) from and against any Third-Party Claims resulting from any negligence or Willful Action of Interconnection Customer or Interconnection Customer's employees, agents, suppliers, or subcontractors in connection with this Agreement.

6.3 Joint Negligence of the Parties. If a Third-Party Claim arising out of or in connection with this Agreement results from the negligence of both Interconnection Customer and PacifiCorp (including their employees, agents, suppliers, and subcontractors), each Party will bear liability with respect to the Third-Party Claim in proportion to its own negligence, except to the extent Article 5 provides otherwise.

6.4 Definition of Third-Party Claim. For purposes of this Article, "Third-Party Claim" means all claims, demands, losses, costs, expenses, damages (including without limitation direct, indirect, incidental, consequential, special, exemplary, and punitive damages), judgments, actions, payments made in settlement, arbitration awards, and liabilities, including reasonable attorney's fees, relating to an action for damages, brought by any third party.

ARTICLE 7. TERMINATION

7.1 Termination for Breach. If a Party fails to perform its obligations under the Agreement, and the failure is not: (1) excused under Section 10.1 below; (2) timely disputed pursuant to Article 9 below; or (3) cured within fifteen (15) calendar days of tender of written notice from the other Party of the failure, then the other Party will have the right to terminate this Agreement by providing thirty (30) calendar days written notice to the Party that has failed to perform its obligations under this Agreement; provided however, if such breach is not capable of cure within fifteen (15) calendar days, the breaching Party shall commence such cure within fifteen (15) calendar days after tender of notice and continuously and diligently complete such cure within forty-five (45) calendar days from notice; and if cured within such time, the breach specified in such notice shall cease to exist.

ARTICLE 8. NOTICES

8.1 Notice Properly Given. Any notice, authorization, or consent required or permitted under this Agreement will be deemed properly given if: (1) provided in writing and delivered in person; (2) delivered to a nationally recognized overnight courier services and properly addressed with delivery charges prepaid; or (3) sent by electronic mail or facsimile, with

confirmation of successful transmission, to the intended recipients as follows.

8.2 Information of the Parties. Any written notices under this Agreement shall be directed to the appropriate persons as shown below:

8.2.1 Notice to PacifiCorp:
Director, Transmission Services
PacifiCorp
825 N.E. Multnomah St., Suite 1600
Portland, Oregon 97232

8.2.2 Notice to Interconnection Customer:
Joel Eves
Lehi City Power Department
560 West Glen Carter Drive
Lehi City 84043

8.3 Change in Address. Either Party may change its address, telephone number, electronic mail address, facsimile number, or contact person specified above by giving the other Party notice of the change in accordance with this Article 8.

8.4 Authority of Contact Persons. Any notice, authorization, or consent required or permitted under this Agreement may be given by or delivered to the applicable Party's contact person identified above, except that neither Party's contact person will have the authority to: (i) amend this Agreement or modify either Party's rights or obligations under it; or (ii) release the other Party from its obligations under this Agreement.

ARTICLE 9. DISPUTES

9.1 Dispute Resolution. Any controversy, claim or dispute of whatsoever nature or kind between or among the Parties arising out of or in connection with this Agreement (each a "Dispute") shall be resolved pursuant to the procedures of this Section. If a Dispute arises between or among the Parties, then any Party to such Dispute may provide written notice thereof to the other Party, including a detailed description of the subject matter of the Dispute. Thereafter, representatives from the Parties shall meet within thirty (30) calendar days of the initial notice and shall in good faith attempt to resolve such Dispute by informal negotiations within thirty (30) calendar days, or such later date as mutually agreed upon by the Parties, from the date of receipt of such notice. If the Dispute is not resolved within such 30-day period, or such later date as the Parties may mutually agree, then the Parties may seek the assistance of the Commission's Dispute Resolution Service or file such complaint or application as it deems appropriate at FERC or a court of competent jurisdiction. Each Party shall be responsible for its own costs incurred during any dispute resolution process.

ARTICLE 10. MISCELLANEOUS PROVISIONS

10.1 Force Majeure.

10.1.1 Neither Party shall be subject to any liability or damages for inability to meet its obligations under this Agreement to the extent that such failure shall be due to causes beyond the reasonable control of either Party, including, but not limited to the following: (a) the operation and effect of any new or modified rules, regulations and orders promulgated by the Commission, any applicable state public utility commission, any municipality, or any governmental agency of the United States, or subdivision thereof (so long as the claiming party has not applied for or assisted in the application for, and has opposed where and to the extent reasonable, such government action); (b) restraining order, injunction or similar decree of any court; or (c) any Force Majeure event.

10.1.2 Force Majeure shall mean any act of God, labor disturbance, act of the public enemy, war, insurrection, riot, fire, storm or flood, explosion, breakage or accident to machinery or equipment, any order, regulation or restriction imposed by governmental, military or lawfully established civilian authorities, or any other cause beyond a Party's reasonable control. A Force Majeure event does not include acts of negligence or intentional wrongdoing by the Party claiming Force Majeure.

10.1.3 Provided, the Party claiming Force Majeure shall make all reasonable efforts to mitigate the effects and remedy the cause thereof as diligently and expeditiously as possible. Except for the obligation to pay amounts owed when due, time periods for performance obligations of either Party herein shall be extended for the period during which Force Majeure was in effect.

10.2 Applicable Law.

10.2.1 The Parties in the performance of their obligations hereunder shall conform to all applicable laws, rules and regulations and, to the extent their obligations are subject to the jurisdiction of state or federal agencies, shall be subject to orders of such agencies.

10.2.2 The Parties explicitly recognize that the terms and conditions in this Agreement shall be subject to modification pursuant to: (i) the provisions of Section 205 or 206 of the Federal Power Act ("FPA"); and (ii) FERC rules, orders, and regulations applicable to the terms and conditions of this Agreement.

10.3 Waiver. Any waiver at any time by any Party of its rights with respect to any breach of this Agreement, or with respect to any other matter arising in connection with this Agreement, will not constitute or be deemed a waiver with respect to any other breach or other matter arising in connection with this Agreement.

10.4 Successors and Assigns.

10.4.1 PacifiCorp may at any time assign its rights and delegate its obligations under this Agreement, in whole or in part, including, without limitation, transferring

its rights and obligations under this Agreement to any: (i) affiliate; (ii) successor in interest, or (iii) corporation or any other business entity in conjunction with a merger, consolidation or other business reorganization to which PacifiCorp is a party. For PacifiCorp, an affiliate includes any entity in which Berkshire Hathaway Inc. owns more than a 5% interest, over which Berkshire Hathaway Energy exercises management control, or which is listed on an exhibit to this Agreement.

10.4.2 The transfer of ownership of all or substantially all of Interconnection Customer's interconnection facilities shall not become effective unless and until Interconnection Customer has received the prior written consent of PacifiCorp. PacifiCorp's consent to Interconnection Customer's transfer of ownership of all or substantially all of Interconnection Customer's interconnection facilities shall not be unreasonably withheld or delayed. If Interconnection Customer (i) transfers all or substantially all of Interconnection Customer's interconnection facilities without PacifiCorp's consent, or (2) transfers all or substantially all of Interconnection Customer's interconnection facilities without assignment of this Agreement to the same third party, PacifiCorp will have the right, at its option, to terminate this Agreement, as of the date the transfer or assignment becomes effective, by providing at least sixty (60) calendar days' written notice to Interconnection Customer.

10.5 No Dedication of Facilities. Except as provided in this Agreement, any undertaking by one Party to the other Party under any provision of this Agreement is rendered strictly as an accommodation and does not constitute the provision of a public utility service under applicable state law, nor the dedication of the facilities, personnel, or electric system, or any portion thereof, by the undertaking Party to the other Party, the public, or any other person or entity.

10.6 No Third-Party Beneficiaries. Nothing contained in this Agreement will be construed to create an association, joint venture, agency relationship, trust, or partnership, or impose a trust or partnership covenant, obligation, or liability on or with regard to either of the Parties. Each Party will be individually responsible for its own covenants, obligations, and liabilities under this Agreement. Nothing in this Agreement will be construed to create any duty to, any standard of care with reference to, or any liability or inference of liability to, a third party. This Agreement is not intended to and does not create rights, remedies, or benefits of any character whatsoever in favor of any persons, corporations, associations, or entities other than the Parties, and the obligations herein assumed are solely for the use and benefit of the Parties, their successors in interest and where permitted, their assigns.

10.7 Severability of Provisions. The provisions of this Agreement are independent of and separable from each other. If any provision of this Agreement shall for any reason be held invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of any other provision hereof, but this Agreement shall be construed as if such invalid or unenforceable provision had never been contained herein.

10.8 Effect of Recitals, Headings, and Subtitles. The recitals, headings, and subtitles in this Agreement are for the convenience and reference of the Parties and are not to be used for the construction or interpretation of the text of this Agreement. The Parties agree that no

Party will be deemed the drafter of any term that may subsequently be found to be ambiguous or vague.

10.9 Counterparts. This Agreement may be executed in counterparts and, upon execution by all Parties, each executed counterpart shall have the same force and effect as an original instrument.

10.10 Appendices. The Appendices, hereto together with all attachments referenced therein, are incorporated herein by reference and made a part of this Agreement. Unless otherwise stated, in the event of an inconsistency between a provision in the general terms of this Agreement and the terms contained in the Connection Requirements, the provisions of these general terms shall prevail to the extent there is inconsistency.

10.11 Complete Agreement; No Conflicting Agreements or Obligations. This Agreement constitutes the entire agreement between the Parties with respect to the subject matter of this Agreement and there are no oral or written understandings, representations or commitments of any kind, express or implied, which are not expressly set forth herein. Each Party represents and warrants that the execution of this Agreement, and the performance of its obligations under it, have been duly authorized and do not conflict with any other agreements or binding obligations applicable to it.

10.12 Modifications or Amendments. No modification or amendment of any provision of this Agreement shall be effective unless set forth in a written document signed by authorized representative of the Parties.

10.13 Reservation of Rights. PacifiCorp may make a unilateral filing with FERC to modify this Agreement with respect to any terms and conditions, charges, classifications of service, rule or regulation under Section 205 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that Interconnection Customer shall have the right to protest any such filing by PacifiCorp and to participate fully in any proceeding before FERC in which such modifications may be considered.

10.14 Contractors and Subcontractors. Nothing in this Agreement shall prevent either Party from utilizing the services of any third party contractor or subcontractor as it deems appropriate to perform its obligations under this Agreement; provided, however, that each Party shall require its third party contractors and subcontractors to comply with all applicable terms and conditions of this Agreement in providing such services and each Party shall remain primarily liable to the other Party for the performance of such third party contractor and subcontractor.

10.15 Provisional Remedies. Either Party may seek provisional legal remedies, if in such Party's judgment such action is necessary to avoid irreparable damage or preserve the status quo.

10.16 Survival. The provisions of Articles 5, 6, and Section 10.2, as well as all payment obligations and liabilities incurred before the termination or expiration of this Agreement, will survive its termination or expiration.

10.17 Waiver of Jury Trial. TO THE FULLEST ESTENT PERMITTED BY LAW, EACH OF THE PARTIES HERETO WAIVES ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN RESPOECT OF LITIGATION DIRECTLY OR INDIRECTLY ARISING OUT OF, UNDER OR IN CONNECTION WITH THIS AGREEMENT. EACH PARTY FURTHER WAIVES ANY RIGHT TO CONSILIDATE OR TO REQUEST THE CONSOLIDATION OF ANY ACTION IN WHICH A JURY TRIAL HAS BEEN WAIVED WITH ANY OTHER ACTION IN WHICH A JURY TRIAL CANNOT BE OR HAS NOT BEEN WAIVED.

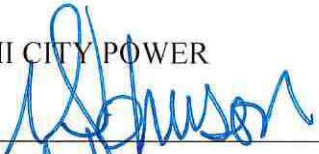
10.18 Execution. This Agreement has been executed by duly authorized representatives of the Parties.

[Signature Page Immediately Follows]

IN WITNESS WHEREOF, the Parties hereto have entered into this Agreement effective as of the day and year herein above written.

PACIFICORP
Kristopher J Kristopher J Bremer
2023.02.02
By: Bremer 16:12:06 -08'00'

Title: Director, Transmission Svcs.

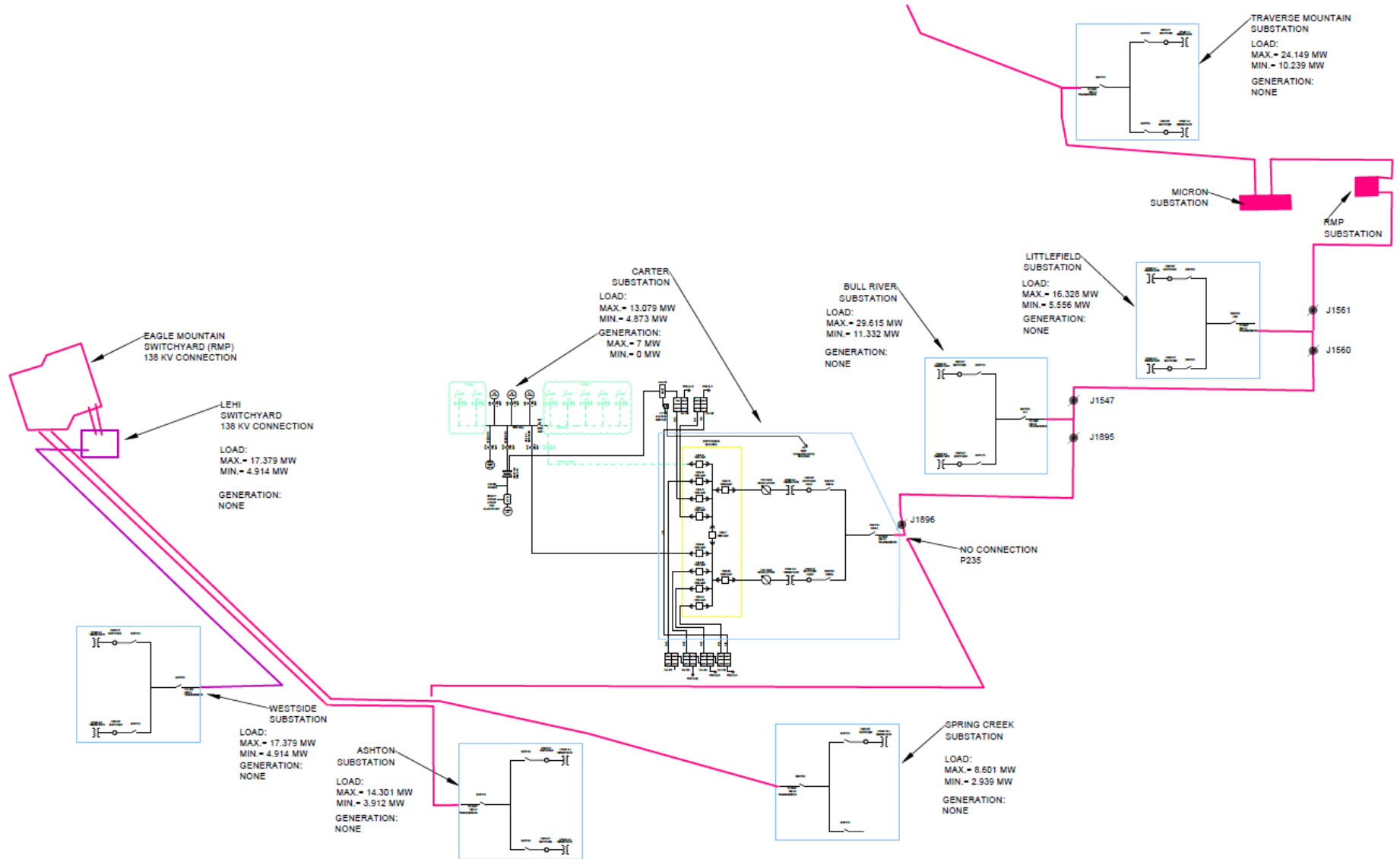
LEHI CITY POWER
By: 

Title: 

APPENDIX A
POINT(S) OF INTERCONNECTION

Glen Carter
Bull River
Ashton
Traverse Mtn.
Littlefield
Spring Creek
Westside
Eagle Mountain Switchyard
Northpoint Substation

APPENDIX B ONE-LINE DIAGRAM



Redline Version

PACIFICORP

and

LEHI CITY POWER

~~(Interconnection Customer)~~

**TRANSMISSION INTERCONNECTION AGREEMENT FOR POINTS OF
DELIVERY**

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Transmission Interconnection Agreement for Points of Delivery

This Amended and Restated Transmission Interconnection Agreement ("Agreement"), executed as of the 2nd day of ~~December~~February, ~~2006~~2023, is by and between **PACIFICORP**, an Oregon Corporation, and **LEHI CITY POWER**, a ~~Utah~~ municipal utility, corporation and political subdivision of the State of Utah ("Interconnection Customer"). PacifiCorp and Interconnection Customer are sometimes referred to herein individually as "Party" and collectively as "Parties."

WITNESSETH

RECITALS

WHEREAS, PacifiCorp is an electric utility which owns and operates certain facilities for the transmission of electric power and energy in interstate commerce (the "Transmission System"); and

WHEREAS, ~~The~~ Interconnection Customer desires to interconnect its electric system with PacifiCorp's Transmission System at various points; and

WHEREAS, the Parties have entered ~~in to~~into various agreements for the design and construction of the facilities required for interconnection of the Interconnection Customer's electric system with PacifiCorp's Transmission System; and

WHEREAS, the Parties entered into the Transmission Interconnection Agreement for Points of Delivery dated December 15, 2006 ("Original Agreement"); and

WHEREAS, the Parties have agreed to amend and restate the Original Agreement for clarification and to make certain modifications.

NOW, THEREFORE, in consideration of the mutual covenants and agreements contained herein, the Parties undertake and agree as follows:

~~Section 1:-~~ ARTICLE 1. DEFINITIONS

~~(A)~~ **Business Day** shall mean Monday through Friday, excluding ~~Federal Holidays~~federal holidays.

~~(b)~~ **Point(s) of Interconnection** shall mean the point(s) at which the Interconnection Customer's electric system interconnects with PacifiCorp's Transmission System further described in Appendix A ~~(inclusive of the "Pre-existing Point(s) of Interconnection" and "Other Point(s) of~~

~~Interconnection" identified therein and as may be added, inserted, removed or altered from time to time by agreement between the parties) and shown in the one-line diagram in Appendix C to this Agreement~~ and as may be added, inserted, removed or altered from time to time by agreement between the parties.

~~(c) **Pre-Existing Point(s) of Interconnection** shall mean the point(s) that were in existence at the time of this Agreement at which the Interconnection Customer's electric system interconnects with PacifiCorp's Transmission System as further described in Appendix A and shown in the one-line diagram in Appendix C to this Agreement.~~

~~(d) **Good Utility Practice**, shall mean any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region.~~

~~Section 2:~~ ARTICLE 2. FILING, EFFECTIVE DATE, TERM AND TERMINATION

2.1 Filing ~~agreement with FERC~~(a) of Agreement. This Agreement shall be subject to its acceptance for filing by the Federal Energy Regulatory Commission ("FERC"). The terms and conditions of this agreement shall not be subject to change through application to the FERC pursuant to the provisions of Sections 205 or 206 of the Federal Power Act absent a material change in operation or benefit to any of the Parties. If any provision of this Agreement is held to be void, voidable, contrary to public policy, or unenforceable, the Parties may terminate this Agreement upon mutual agreement. The Parties agree that no Party will be deemed the drafter of any term that may subsequently be found to be ambiguous or vague. PacifiCorp shall submit this Agreement for filing with FERC within thirty (30) calendar days after execution of the Agreement.

2.2 ~~(b) Effective Date.~~ This Agreement shall become effective upon the later of: (i) the date of this Agreement; or (ii) the date established by FERC upon acceptance of the Agreement for filing ("Effective Date").

2.3 ~~2.2~~ **Term and Termination.**

2.3.1 ~~(a)~~ Subject to Section ~~2.2(b)~~2.3.2, this Agreement shall remain in effect for a term of thirty (30) years from the ~~effective date~~Effective Date and shall be automatically renewed for each successive one-year period thereafter.

2.3.2 ~~(b)~~ This Agreement may be terminated effective on or after the expiration of the initial term specified in Section ~~2.2(a)~~2.3.1 by either Party after giving the non-terminating Party no less than three (3) years²¹ advance written notice. The Parties may ~~also~~ mutually agree to terminate this Agreement at any time through a written

document signed by an authorized representative of each Party.

~~Section 3:~~ **ARTICLE 3. INTERCONNECTION FACILITIES PERFORMANCE OBLIGATIONS**

3.1 Interconnection ~~Customers may~~ Customer May Interconnect.

3.1.1 ~~(a)~~—The Interconnection Customer may interconnect its electric system to PacifiCorp's Transmission System via the interconnection facilities identified in Appendix A ~~and described in one-line diagram format in Appendix C.~~

3.1.2 ~~(b)~~—Design, construction and continuing use, maintenance and operation of all interconnection facilities shall be pursuant to Good Utility ~~Practices~~ Practice and meet to the extent relevant ~~(excluding the Pre-Existing Points of Interconnection)~~, all applicable connection requirements, set forth in PacifiCorp's Facility Connection Requirements for Transmission System Interconnection Requirements Systems ("TSIRFCRTS"), ~~attached as Appendix B~~, as amended from time-to-time by PacifiCorp. PacifiCorp shall review and approve the Interconnection Customer's design prior to construction of the facilities prior to permitting interconnection.

~~(c) — Design, construction, continuing use, maintenance and operation of all Pre-existing Points of Interconnection facilities shall be pursuant to Good Utility Practices. Except as otherwise provided herein, Pre-existing Points of Interconnection are not subject to the requirements of the TSIR. If the Pre-existing Points of Interconnection facilities cause any reliability or safety issues as determined by PacifiCorp in its reasonable opinion, PacifiCorp may require Interconnection Customer to modify the interconnection facilities at the Pre-existing Points of Interconnection to conform to PacifiCorp's TSIR, attached as Appendix B, as amended from time to time. Interconnection Customer agrees to design, construct, install and test all facilities identified by PacifiCorp as necessary to correct the identified reliability issue(s). Interconnection Customer shall submit to PacifiCorp for review and approval the Interconnection Customer's design documentation, drawings and scope of work, allowing sufficient time for PacifiCorp to review and approve the Interconnection Customer's design documents, drawings and scope of work prior to commencement of construction of the facilities. The costs of and related to design, construction, installation and testing (including, but not limited to, the costs of PacifiCorp reviewing and approving the design documentation, drawings and scope of work) shall be borne by the Interconnection Customer.~~

3.1.3 The execution of this Agreement does not constitute a request for, nor the provision of, any transmission delivery service, and it does not convey any right to deliver electricity to any specific customer or point of delivery.

3.2 System Impact Study. Performance of and responsibility for the cost of system studies, design, procurement and installation of the interconnection facilities required to connect the Interconnection Customer's electric system to PacifiCorp's Transmission System at the Point(s) of Interconnection, including all modifications to PacifiCorp's Transmission System necessary to complete the interconnection, have been provided for in separate agreements.

3.3 Costs of Future Upgrades.

3.3.1 ~~(a)~~ Interconnection Customer shall be responsible for all costs associated with any future modifications necessary to upgrade the interconnection facilities to meet requirements proposed by the Interconnection Customer.

3.3.2 ~~(b)~~ Design and construction of any such future upgrade facilities shall be pursuant to Good Utility Practices and meet PacifiCorp's Transmission System design standards. PacifiCorp shall review and approve the upgrade design prior to construction of the facilities.

~~(c) Interconnection Customer shall be responsible for all costs associated with any modifications necessary to upgrade any Pre-existing Points of Interconnection (including without limitation any costs associated with PacifiCorp's review and approval or any design documentation, drawings and scope of work) pursuant to Section 3.1(e).~~

~~3.4~~

3.4 **Change of Interconnecting System Voltage.** In the event PacifiCorp changes the operating voltage of the Transmission System to which the Interconnection Customer is connected, Interconnection Customer shall be responsible for all costs associated with modifications necessary to upgrade Interconnection Customer's facilities to remain interconnected with PacifiCorp's Transmission System at the new operating voltage.

3.5 Ownership and ~~Operation~~Operational Control of Interconnection Facilities.

3.5.1 ~~(a)~~ Interconnection Customer shall own all interconnection facilities installed on the Interconnection Customer's side of the point of change of ownership shown and marked as such on the one-line diagram in Appendix ~~EB~~ unless otherwise indicated.

3.5.2 ~~(b)~~ Unless it determines otherwise, PacifiCorp shall retain full ownership and operational control of any facilities and equipment that are on the path that delivers electric energy over PacifiCorp's Transmission System.

3.5.3 ~~(c)~~ The Interconnection Customer shall operate and maintain Interconnection Customer's interconnection facilities in compliance with Good Utility Practices and with all Western Electricity Coordinating Council (WECC) or such other reliability criteria set or promulgated by a regional or national standard setting body with authority to do so (including, but not limited to, the North American Electric Reliability ~~Council~~Corporation's (NERC) Reliability Standards) as such criteria may be adopted or modified from time to time. The Interconnection Customer shall be responsible for all costs associated with the operation and maintenance of the interconnection facilities it owns.

3.5.4 ~~(d)~~ Interconnection Customer, at its expense and upon the written request of PacifiCorp, agrees to install or have installed switched capacitors or other equipment as may be reasonably required to eliminate that portion of reactive power flow which causes the reactive factor to fall below the limits established herein. Such capacitors or other equipment shall be of a size consistent with voltage control requirements for PacifiCorp's

system.

3.5.5 ~~(e)~~ Interconnection Customer shall design and operate its system so it shall not cause abrupt voltage changes on PacifiCorp's Transmission System in excess of PacifiCorp's standards as set forth ~~in section 5 of~~ PacifiCorp's Planning Standards for Voltage ~~set forth in Appendix D,~~ as amended from time to time. Should Interconnection Customer fail to take the corrective action requested by PacifiCorp within one (1) year after receipt of a notice detailing the corrective action to be taken, PacifiCorp may perform such services or supply and install such capacitors or other equipment as it deems necessary to provide the corrective action. Interconnection Customer shall compensate PacifiCorp for all amounts expended and all services contracted for or performed in taking the corrective action, including indirect costs and overheads. The total of these expenditures shall be paid by Interconnection Customer within thirty (30) days of receipt of an itemized statement of those expenditures reasonably incurred.

3.6 Interchange/Revenue Metering Equipment.

3.6.1 ~~(a)~~ Interconnection Customer shall bear all reasonable documented costs associated with the purchase, installation, operation, testing and maintenance of the interchange and revenue metering equipment and unless interchange meters are located within PacifiCorp's switchyard or substation:

~~(i)~~ (i) Interconnection Customer shall operate, test and maintain metering equipment and conform to the ~~TSR~~FCRTS;

~~(ii)~~ (ii) Interconnection Customer shall provide metering quantities, in analog and/or digital form, to PacifiCorp;

~~(iii)~~ ~~(excluding Pre Existing Points of Interconnection~~(iii) meters shall be located on the high voltage side of ~~transformation~~transformers with the exception of Ashton which is metered on the low side of the transformer, and voltage and current transformers used for metering purposes shall be used for no other purpose;

~~(iv)~~ (iv) Interconnection Customer shall install, calibrate, and test interchange metering equipment in accordance with applicable ANSI standards. Interconnection Customer shall inspect and test all metering equipment upon installation and at least once every three (3) years thereafter. If requested to do so by PacifiCorp, Interconnection Customer shall, inspect or test metering equipment more frequently than every three (3) years; and

~~(v)~~ (v) Interconnection Customer shall give reasonable notice of the time when any inspection or test shall take place, and PacifiCorp may have representatives present at the test or inspection. If at any time metering equipment is found to be inaccurate or defective, it shall be adjusted, repaired or replaced at Interconnection Customer's expense, in order to provide accurate metering.

3.6.2 ~~(b)~~ Where interchange and/or revenue meters are located within PacifiCorp's

switchyard or substation, PacifiCorp shall own and maintain the meters and metering equipment at the cost of the Interconnection Customer.

3.7 Telemetering and Communications ~~equipment~~Equipment.

3.7.1 ~~(a)~~ Unless otherwise provided in the ~~TSIR~~FCRTS, Interconnection Customer shall own, operate and maintain a Remote Terminal Unit at its interconnection facility to gather accumulated and instantaneous data to be telemetered to the location(s) designated by PacifiCorp. PacifiCorp will promptly advise the Interconnection Customer if it detects or otherwise learns of any metering, telemetry or communications equipment errors or malfunctions that require the attention and/or correction by Interconnection Customer. Interconnection Customer shall correct such error or malfunction as soon as reasonably feasible.

3.7.2 ~~(b)~~ Interconnection Customer shall own, operate and maintain communication equipment at its interconnection facilities as required by PacifiCorp to deliver required interconnection data to PacifiCorp's control centers. PacifiCorp will promptly advise the Interconnection Customer if it detects malfunctions in the communication equipment. Interconnection Customer shall have call out repair crews available 24 hours a day 7 days a week. Interconnection Customer shall work diligently with PacifiCorp and any other entities that carry communication traffic back to PacifiCorp to resolve any such failure. Interconnection Customer and PacifiCorp shall correct such error or malfunction as soon as reasonably practicable.

3.7.3 ~~(c)~~ All ~~RTU~~Remote Terminal Unit, telemetering and communications equipment shall conform to the ~~TSIR~~FCRTS.

3.8 Property Rights. Interconnection Customer shall provide a document acceptable to PacifiCorp that authorizes and grants PacifiCorp an easement and right-of-way for the construction, reconstruction, operation, maintenance, repair, replacement enlargement and removal of the PacifiCorp interconnection facilities, if any, located within Interconnection Customer's switchyard or substation. PacifiCorp shall have the right to access Interconnection Customer's switchyard or substation to perform these activities.

3.9 Operational Control.

3.9.1 ~~(a)~~ PacifiCorp shall retain full operational control of the transmission path to which the Interconnected Customer's facilities are connected whether or not PacifiCorp owns the facilities and equipment on that path.

3.9.2 ~~(b)~~ All operation and maintenance activities by either Party shall be coordinated through the Parties' respective grid operations functions.

~~Section 4:~~ ARTICLE 4. CONTINUITY OF INTERCONNECTION

4.1 Continuous Physical Interconnection. PacifiCorp shall make reasonable provisions consistent with Good Utility Practice to provide a continuous physical interconnection at the Point(s) of Interconnection.

4.2 Temporary Interruptions with Reasonable Notice. PacifiCorp may temporarily interrupt or isolate the interconnection in order to: ~~(a)~~ (i) maintain reliability on PacifiCorp's ~~system~~ Transmission System; or ~~(b)~~ (ii) avoid death or injury to any person or harm to any property. PacifiCorp shall attempt to provide ~~the~~ Interconnection Customer as much notice as reasonably possible.

4.3 Temporary Interruptions with Minimum Notice. PacifiCorp may temporarily interrupt or isolate the interconnection for any planned interruption to the interconnection after giving at least seven (7) Business Days' notice to the Interconnection Customer. A planned outage may be taken in order to: ~~(a)~~ (i) maintain, repair, replace or inspect any portion of PacifiCorp's ~~system~~ Transmission System or ~~(b)~~ (ii) install equipment. Notice shall be given to allow for the coordination of the date and time of the outage, in an effort to minimize the duration and number of the Interconnection Customer's customers affected by the outage.

~~Section 5: FORCE MAJEURE~~

~~Neither Party shall be subject to any liability or damages for inability to maintain a continuous interconnection to the extent that such failure shall be due to causes beyond the control of either PacifiCorp or Interconnection Customer, including, but not limited to the following:~~

- ~~(a) the operation and effect of any rules, regulations and orders promulgated by any Commission, municipality, or governmental agency of the United States, or subdivision thereof;~~
- ~~(b) restraining order, injunction or similar decree of any court;~~
- ~~(c) war or act of terrorism;~~
- ~~(d) flood;~~
- ~~(e) earthquake;~~
- ~~(f) act of God;~~
- ~~(g) sabotage; or~~
- ~~(h) strikes or boycotts.~~

~~The party claiming Force Majeure shall make every reasonable attempt to remedy the cause thereof as diligently and expeditiously as possible.~~

~~Section 6: ARTICLE 5. LIMITATION OF LIABILITY~~

5.1 Limitation of Liability. Neither Party ~~or~~ nor its directors, board members, commissioners, officers, employees, or agents shall have any liability to the other Party for any injury or death to any person, or for any loss or damage to any property, or any lost profits, lost revenues, lost use of facilities, lost data, or any indirect, incidental, consequential, special, exemplary, or punitive damages caused by or arising out of any Electric Disturbance on the ~~other~~ first Party's ~~Transmission System~~ electric facilities, unless the Electric Disturbance is caused by the other Party's negligence or Willful Action.

5.2 Willful Action. "Willful Action" means an action ~~taken or not taken by a Party~~ that is knowingly or intentionally taken or not taken with the knowledge or intent that injury or damage would result, or with a reckless disregard for the result. Willful Action does not include any act

or failure to act that is involuntary, ~~or~~ accidental ~~or negligent~~. ~~For the purposes of this clause, “~~

5.3 Electrical Disturbance. "Electrical Disturbance²²" means the following:

- ~~(a)~~ (i) electric disturbances that produce abnormal power flows;
- ~~(b)~~ (ii) power system faults or equipment failures;
- ~~(c)~~ (iii) overvoltages during ground faults;
- ~~(d)~~ (iv) audible noise, radio, television, and telephone interference;
- ~~(e)~~ (v) power system harmonics; or
- ~~(f)~~ (vi) other disturbances that might degrade the reliability of the interconnected PacifiCorp ~~system~~ Transmission System.

ARTICLE 6. INDEMNIFICATION

6.1 PacifiCorp Indemnification of Interconnection Customer. Except as otherwise provided in Article 5 above, PacifiCorp will indemnify, defend, and hold harmless Interconnection Customer (and its directors, officers, employees, and agents) from and against any Third-Party Claims (as that term is defined in Section 6.4 below) resulting from any negligence or Willful Action of PacifiCorp or PacifiCorp's employees, agents, suppliers, or subcontractors in connection with this Agreement or its performance.

6.2 Interconnection Customer Indemnification of PacifiCorp. Except as otherwise provided in Article 5 above, Interconnection Customer will indemnify, defend, and hold harmless PacifiCorp (and its directors, officer, employees, and agents) from and against any Third-Party Claims resulting from any negligence or Willful Action of Interconnection Customer or Interconnection Customer's employees, agents, suppliers, or subcontractors in connection with this Agreement.

6.3 Joint Negligence of the Parties. If a Third-Party Claim arising out of or in connection with this Agreement results from the negligence of both Interconnection Customer and PacifiCorp (including their employees, agents, suppliers, and subcontractors), each Party will bear liability with respect to the Third-Party Claim in proportion to its own negligence, except to the extent Article 5 provides otherwise.

6.4 Definition of Third-Party Claim. For purposes of this Article, "Third-Party Claim" means all claims, demands, losses, costs, expenses, damages (including without limitation direct, indirect, incidental, consequential, special, exemplary, and punitive damages), judgments, actions, payments made in settlement, arbitration awards, and liabilities, including reasonable attorney's fees, relating to an action for damages, brought by any third party.

ARTICLE 7. TERMINATION

7.1 Termination for Breach. If a Party fails to perform its obligations under the Agreement,

and the failure is not: (1) excused under Section 10.1 below; (2) timely disputed pursuant to Article 9 below; or (3) cured within fifteen (15) calendar days of tender of written notice from the other Party of the failure, then the other Party will have the right to terminate this Agreement by providing thirty (30) calendar days written notice to the Party that has failed to perform its obligations under this Agreement; provided however, if such breach is not capable of cure within fifteen (15) calendar days, the breaching Party shall commence such cure within fifteen (15) calendar days after tender of notice and continuously and diligently complete such cure within forty-five (45) calendar days from notice; and if cured within such time, the breach specified in such notice shall cease to exist.

ARTICLE 8.~~Section 7:~~ NOTICES

8.1 Notice Properly Given. Any notice, authorization, or consent required or permitted under this Agreement will be deemed properly given if: (1) provided in writing and delivered in person; (2) delivered to a nationally recognized overnight courier services and properly addressed with delivery charges prepaid; or (3) sent by electronic mail or facsimile, with confirmation of successful transmission, to the intended recipients as follows.

8.2 Information of the Parties. Any written notices ~~to be given to PacifiCorp~~ under this Agreement shall be directed to the appropriate persons as shown below:

8.2.1 Notice to PacifiCorp:
Director, Transmission Services
PacifiCorp
~~700~~825 N.E. Multnomah St., Suite ~~550~~1600
Portland, Oregon 97232

8.2.2 ~~Any written notices to be given~~Notice to Interconnection Customer ~~under this Agreement shall be directed to:~~

~~Section 8: APPLICABLE LAW~~Joel Eves
Lehi City Power Department
560 West Glen Carter Drive
Lehi City 84043

8.3 Change in Address. Either Party may change its address, telephone number, electronic mail address, facsimile number, or contact person specified above by giving the other Party notice of the change in accordance with this Article 8.

8.4 Authority of Contact Persons. Any notice, authorization, or consent required or permitted under this Agreement may be given by or delivered to the applicable Party's contact person identified above, except that neither Party's contact person will have the

authority to: (i) amend this Agreement or modify either Party's rights or obligations under it; or (ii) release the other Party from its obligations under this Agreement.

ARTICLE 9. DISPUTES

9.1 **Dispute Resolution.** Any controversy, claim or dispute of whatsoever nature or kind between or among the Parties arising out of or in connection with this Agreement (each a "Dispute") shall be resolved pursuant to the procedures of this Section. If a Dispute arises between or among the Parties, then any Party to such Dispute may provide written notice thereof to the other Party, including a detailed description of the subject matter of the Dispute. Thereafter, representatives from the Parties shall meet within thirty (30) calendar days of the initial notice and shall in good faith attempt to resolve such Dispute by informal negotiations within thirty (30) calendar days, or such later date as mutually agreed upon by the Parties, from the date of receipt of such notice. If the Dispute is not resolved within such 30-day period, or such later date as the Parties may mutually agree, then the Parties may seek the assistance of the Commission's Dispute Resolution Service or file such complaint or application as it deems appropriate at FERC or a court of competent jurisdiction. Each Party shall be responsible for its own costs incurred during any dispute resolution process.

ARTICLE 10. MISCELLANEOUS PROVISIONS

10.1 **Force Majeure.**

10.1.1 Neither Party shall be subject to any liability or damages for inability to meet its obligations under this Agreement to the extent that such failure shall be due to causes beyond the reasonable control of either Party, including, but not limited to the following: (a) the operation and effect of any new or modified rules, regulations and orders promulgated by the Commission, any applicable state public utility commission, any municipality, or any governmental agency of the United States, or subdivision thereof (so long as the claiming party has not applied for or assisted in the application for, and has opposed where and to the extent reasonable, such government action); (b) restraining order, injunction or similar decree of any court; or (c) any Force Majeure event.

10.1.2 Force Majeure shall mean any act of God, labor disturbance, act of the public enemy, war, insurrection, riot, fire, storm or flood, explosion, breakage or accident to machinery or equipment, any order, regulation or restriction imposed by governmental, military or lawfully established civilian authorities, or any other cause beyond a Party's reasonable control. A Force Majeure event does not include acts of negligence or intentional wrongdoing by the Party claiming Force Majeure.

10.1.3 Provided, the Party claiming Force Majeure shall make all reasonable efforts to mitigate the effects and remedy the cause thereof as diligently and expeditiously as possible. Except for the obligation to pay amounts owed when due, time periods for performance obligations of either Party herein shall be extended for the period during which Force Majeure was in effect.

10.2 **Applicable Law.**

10.2.1 The Parties in the performance of their obligations hereunder shall conform to all applicable laws, rules and regulations and, to the extent their obligations are subject to the jurisdiction of state or federal agencies, shall be subject to orders of such agencies. ~~This~~

10.2.2 The Parties explicitly recognize that the terms and conditions in this Agreement shall be construed in accordance with laws of subject to modification pursuant to: (i) the state provisions of Utah unless preempted by Section 205 or 206 of the Federal Power Act or other federal law ("FPA"); and (ii) FERC rules, orders, and regulations applicable to the terms and conditions of this Agreement.

~~Section 9: WAIVER~~

10.3 Waiver. Any waiver at any time by ~~either any~~ Party ~~hereto~~ of its rights with respect to ~~the other Party~~ any breach of this Agreement, or with respect to any other matter arising in connection with this Agreement ~~shall, will~~ not constitute or be considered deemed a waiver with respect to any ~~subsequent default of such matter~~ other breach or other matter arising in connection with this Agreement.

~~Section 10: SUCCESSORS AND ASSIGNS~~

~~This Agreement shall inure to the benefit of, and be binding upon, the Parties and their respective successors and assigns, and may be assigned by either Party with prior written consent of the other Party, which written consent shall not be unreasonably withheld.~~

~~Section 11: NO DEDICATION OF FACILITIES~~

~~Any~~

10.4 Successors and Assigns.

10.4.1 PacifiCorp may at any time assign its rights and delegate its obligations under this Agreement, in whole or in part, including, without limitation, transferring its rights and obligations under this Agreement to any: (i) affiliate; (ii) successor in interest, or (iii) corporation or any other business entity in conjunction with a merger, consolidation or other business reorganization to which PacifiCorp is a party. For PacifiCorp, an affiliate includes any entity in which Berkshire Hathaway Inc. owns more than a 5% interest, over which Berkshire Hathaway Energy exercises management control, or which is listed on an exhibit to this Agreement.

10.4.2 The transfer of ownership of all or substantially all of Interconnection Customer's interconnection facilities shall not become effective unless and until Interconnection Customer has received the prior written consent of PacifiCorp. PacifiCorp's consent to Interconnection Customer's transfer of ownership of all or substantially all of Interconnection Customer's interconnection facilities shall not be unreasonably withheld or delayed. If Interconnection Customer (i) transfers all or substantially all of Interconnection Customer's interconnection facilities without PacifiCorp's consent, or (2) transfers all or substantially all of Interconnection Customer's interconnection facilities without assignment of this Agreement to the same third party, PacifiCorp will have the right, at its option, to terminate this Agreement, as of the date the transfer or assignment becomes

effective, by providing at least sixty (60) calendar days' written notice to Interconnection Customer.

10.5 No Dedication of Facilities. Except as provided in this Agreement, any undertaking by one Party to the other Party under any provision of this Agreement is rendered strictly as an accommodation and does not constitute the provision of a public utility service under applicable state law, or nor the dedication of all the facilities, personnel, or electric system, or any portion of either Party's Transmission System or facilities thereof, by the undertaking Party to the other Party, the public, or any other person or entity.

10.6 No Third-Party Beneficiaries. Nothing contained in this Agreement will be construed to create an association, joint venture, agency relationship, trust, or partnership, or impose a trust or partnership covenant, obligation, or liability on or with regard to either of the Parties. Each Party will be individually responsible for its own covenants, obligations, and liabilities under this Agreement. Nothing in this Agreement will be construed to create any duty to, any standard of care with reference to, or any liability or inference of liability to, a third party.

~~Section 12: NO THIRD PARTY BENEFICIARIES~~ This Agreement is not intended to and does not create rights, remedies, or benefits of any character whatsoever in favor of any persons, corporations, associations, or entities other than the ~~parties~~ Parties, and the obligations herein assumed are solely for the use and benefit of the Parties, their successors in interest and, where permitted, their assigns.

~~Section 13: SEVERABILITY OF PROVISIONS.~~

10.7 Severability of Provisions. The provisions of this Agreement are independent of and separable from each other. If any provision of this Agreement shall for any reason be held invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of any other provision hereof, but this Agreement shall be construed as if such invalid or unenforceable provision had never been contained herein.

~~Section 14: EFFECT OF SECTION HEADING~~

Section

10.8 Effect of Recitals, Headings, and Subtitles. The recitals, headings, and subtitles in this Agreement are inserted for the convenience of and reference only of the Parties and shall not be construed to be interpretations used for the construction or interpretation of the text of this Agreement. The Parties agree that no Party will be deemed the drafter of any term that may subsequently be found to be ambiguous or vague.

~~Section 15: APPENDICES AND EXHIBITS~~

10.9 Counterparts. This Agreement may be executed in counterparts and, upon execution by all Parties, each executed counterpart shall have the same force and effect as an original instrument.

10.10 Appendices. The Appendices and Exhibits, hereto together with all attachments

referenced therein, are incorporated herein by reference and made a part of this Agreement. Unless otherwise stated, in the event of an inconsistency between a provision in the general terms of this Agreement and the terms contained ~~Appendix B~~ in the Connection Requirements, the provisions of these general terms shall prevail to the extent ~~of the~~ there is inconsistency.

~~Section 16: DISPUTE RESOLUTION~~

~~Any controversy, claim or dispute of whatsoever nature or kind between or among the Parties arising out of or in connection with this Agreement (each a "Dispute") shall be resolved pursuant to the procedures of this Section.~~

~~If a Dispute arises between or among the Parties, then any Party to such Dispute may provide written notice thereof to the other Party, including a detailed description of the subject matter of the Dispute. Thereafter, representatives from the Parties shall meet within thirty (30) days of the initial notice and shall in good faith attempt to resolve such Dispute by informal negotiations within thirty (30) days, or such later date as mutually agreed upon by the Parties, from the date of receipt of such notice. If the Dispute is not resolved within such 30-day period, or such later date as the Parties may mutually agree, then the Parties may seek the assistance of the ~~Federal Energy Regulatory Commission's Dispute Resolution Service~~. Each Party shall be responsible for its own costs incurred during any dispute resolution process.~~

~~Section 17: COMPLETE AGREEMENT~~

10.11 Complete Agreement; No Conflicting Agreements or Obligations. This Agreement ~~sets forth~~ constitutes the entire agreement between the Parties ~~on~~ with respect to the subject matter of this Agreement, ~~and supersedes all prior agreements of the Parties with respect to its subject matter. No amendment of any provision of this Agreement shall be effective unless set forth in a written document signed by authorized representatives of both Parties and there are no oral or written understandings, representations or commitments of any kind, express or implied, which are not expressly set forth herein. Each Party represents and warrants that the execution of this Agreement, and the performance of its obligations under it, have been duly authorized and do not conflict with any other agreements or binding obligations applicable to it.~~

~~Section 18: MODIFICATIONS~~

~~No~~

10.12 Modifications or Amendments. No modification or amendment of any provision of this Agreement shall be effective unless set forth in a written document signed by authorized representative of the Parties.

~~Section 19: RESERVATION OF RIGHTS~~

10.13 Reservation of Rights. PacifiCorp may make a unilateral filing with FERC to modify this Agreement with respect to any terms and conditions, charges, classifications of service, rule or regulation under ~~section~~ Section 205 or any other applicable provision of the ~~Federal Power Act~~ FPA and FERC's rules and regulations thereunder, ~~and;~~ provided that Interconnection Customer shall have the right to ~~make a unilateral filing with FERC to modify this Agreement~~

~~pursuant to section 206 or any other applicable provision of the Federal Power Act and FERC's rules and regulations thereunder; provided that each Party shall have the right to~~ protest any such filing by ~~the other Party~~ PacifiCorp and to participate fully in any proceeding before FERC in which such modifications may be considered.

~~Section 20: EXECUTION~~

10.14 Contractors and Subcontractors. Nothing in this Agreement shall prevent either Party from utilizing the services of any third party contractor or subcontractor as it deems appropriate to perform its obligations under this Agreement; provided, however, that each Party shall require its third party contractors and subcontractors to comply with all applicable terms and conditions of this Agreement in providing such services and each Party shall remain primarily liable to the other Party for the performance of such third party contractor and subcontractor.

10.15 Provisional Remedies. Either Party may seek provisional legal remedies, if in such Party's judgment such action is necessary to avoid irreparable damage or preserve the status quo.

10.16 Survival. The provisions of Articles 5, 6, and Section 10.2, as well as all payment obligations and liabilities incurred before the termination or expiration of this Agreement, will survive its termination or expiration.

10.17 Waiver of Jury Trial. TO THE FULLEST EXTENT PERMITTED BY LAW, EACH OF THE PARTIES HERETO WAIVES ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN RESPECT OF LITIGATION DIRECTLY OR INDIRECTLY ARISING OUT OF, UNDER OR IN CONNECTION WITH THIS AGREEMENT. EACH PARTY FURTHER WAIVES ANY RIGHT TO CONSOLIDATE OR TO REQUEST THE CONSOLIDATION OF ANY ACTION IN WHICH A JURY TRIAL HAS BEEN WAIVED WITH ANY OTHER ACTION IN WHICH A JURY TRIAL CANNOT BE OR HAS NOT BEEN WAIVED.

10.18 Execution. This Agreement ~~may be~~ has been executed ~~in counterparts and upon execution by all Parties, each executed counterpart shall have the same force and effect as an original instrument~~ by duly authorized representatives of the Parties.

[Signature Page Immediately Follows]

IN WITNESS WHEREOF, the Parties hereto have ~~caused~~entered into this Agreement ~~to be executed by their duly authorized officers~~effective as of the ~~date first entered~~day and year herein above written.

PACIFICORP

By: /s/ Kristopher J Bremer

Title: Director, Transmission Services

LEHI CITY POWER

By: _____

Title: _____

~~Appendix A: Point(s) of Interconnection~~

Point(s) of Interconnection	Point of Delivery	Meter Number	Number of Transformers and Capacity (MVA)	Voltage (kV)	One-line diagram
Pre-existing Points of Interconnection					
Lehi City Carter ¹	Lehi Tap #3(A)	M77290	1 x 7.5	46	Appendix C
	Lehi Tap #3(B)	M77293	1 x 7.5		
	Lehi Tap #3(C)	M77629	1 x 7.5		
Lehi City Spring Creek ²	Lehi Tap #4				Appendix C
Lehi City Bull River ¹	Lehi Tap #5	M77505	2 x 20	46	Appendix C
Lehi City Ashton	Lehi Tap #6	M77623	2 x 20	138	Appendix C
Other Points of Interconnection					
Lehi City Traverse Mt	Lehi Tap # 7 on 90th South Hale & Micon double circuit 138kV line between existing structures 84 and 85		2 x 20 ³	138	Appendix C

Additional Terms and Conditions: [APPENDIX A](#)

1. The Interconnection Customer agrees that PacifiCorp has operational control of the air break switches located within the Interconnection Customer's Lehi City Carter substation (identified as 46A, 47A and 48A on the one-line diagram in Appendix C) and Lehi City Bull River substation (identified as 53A, 54A and 55A on the one-line diagram attached as Appendix C). PacifiCorp shall retain keys to enable access to those substations for the purpose of manually isolating the interconnection upon PacifiCorp giving the Interconnection Customer's designated contact person reasonable notice that access is required.

2. Lehi City Sewer is currently decommissioned. PacifiCorp has installed a three-way switch on the adjacent Lindon Tap line in preparation for a future functioning interconnection to be called Lehi City Spring Creek. Should the Interconnection Customer wish to commission that Interconnection Point such that it becomes active, the Interconnection Customer shall first notify PacifiCorp in writing of that intention (via a new interconnection request) and provide to PacifiCorp information regarding the intended capacity of the transformers to be installed at the substation and any other information required

~~by PacifiCorp in order for it to conduct a study to investigate the effects of commissioning of the Interconnection Point at the requested capacity including information regarding projected loads. Connection of the Interconnection Point will not occur unless and until the requirements of the study have been carried out and the details of this Appendix in relation to that Interconnection Point have been agreed between the parties and completed.~~

~~3. The Customer intends to install two (2) transformers of 20 MVA each. The first shall operate as and from the date of this Agreement and the second at a date to be determined in the future. PacifiCorp shall not require the Customer to make a new interconnection request or submit to a System Impact and Facilities Study covering the second proposed transformer provided that with the new transformer installed, the total load that the two transformers together will draw from PacifiCorp's Transmission System is limited to 26 MW or a greater amount agreed in writing with PacifiCorp and the Interconnection Customer directly provides to PacifiCorp on an annual basis (by a date reasonably determined by PacifiCorp) its forecast of "Load and Resource" data in a format and with details reasonably acceptable to PacifiCorp.~~

| **Appendix B: Transmission System Interconnection Requirements**

~~1. General Requirements~~

~~1-A. Safety and Isolating Devices~~

~~At every Point of Interconnection with the PacifiCorp Electric System, an isolating device, which is typically a disconnect switch, shall be provided that physically and visibly isolates the PacifiCorp Electric System from the interconnected facilities. All switching equipment that could energize equipment shall be visibly identified, in a manner that will make maintenance crews aware of the potential hazards. The isolating device may be placed in a location other than the Point of Interconnection by agreement of PacifiCorp and Network Customer. In any case the device:~~

- ~~• Must simultaneously open all phases (gang operated) to the interconnected facilities;~~
- ~~• Must be accessible by PacifiCorp and must be under ultimate PacifiCorp Dispatcher jurisdiction;~~
- ~~• Must be lockable in the open position by PacifiCorp;~~
- ~~• Shall not be operated without advance notice to affected parties, unless an emergency condition requires that the device be opened to isolate the interconnected facilities; and~~
- ~~• Must be suitable for safe operation under all foreseeable operating conditions.~~

~~All work involving PacifiCorp owned, maintained, and/or operated equipment, shall be done in accordance with PacifiCorp safety practices, and shall be done at the direction of PacifiCorp Dispatchers. PacifiCorp personnel may lock the device in the open position and install safety grounds:~~

- ~~• If it is necessary for the protection of maintenance personnel when working on de-energized circuits;~~
- ~~• If the interconnected facilities or PacifiCorp equipment presents a hazardous condition;~~
- ~~• If the interconnected facilities jeopardize the operation of the PacifiCorp Electric System.~~

~~1-B. Point of Interconnection Considerations~~

~~1. General Constraints~~

~~Interconnected facilities shall not restrain PacifiCorp from taking a transmission line or line section or other equipment out of service for operation and maintenance purposes. The design and installation of the line and all components must be consistent with PacifiCorp's right to maintain its property.~~

~~2. General Configurations~~

~~PacifiCorp shall determine the appropriate interconnection configuration. The following are non-exclusive categorical examples of interconnection configurations that PacifiCorp may approve under appropriate circumstances. Interconnection with the PacifiCorp Electric System typically falls into one of four categories:~~

- ~~• Connection into an existing 46 to 500 kV bulk power substation, with (depending on the bus configuration) the existing transmission lines and new interconnecting lines each terminated into~~

- ~~• Connection at 46 to 500 kV by looping an existing transmission line into a new customer or PacifiCorp owned substation. This connection may result in a new, non PacifiCorp owned substation within an existing transmission path. PacifiCorp must maintain full operational control and ownership of the transmission path. This may include, but not be limited to, ownership, and Supervisory Control and Data Acquisition (SCADA) control and monitoring of circuit breakers, disconnects and other equipment in the new substation. Additionally, PacifiCorp will retain capacity rights on the contract path. Any new equipment shall not degrade the operational capability of the line.~~

~~A multi terminal line is created when the new connection, such as b or c above, becomes an additional source of real power and fault current beyond the existing sources at the line terminals. A line with three terminals affects PacifiCorp's ability to protect, operate, dispatch, and maintain the transmission line. The increased complexity of the control and protection schemes affects system stability and reliability. The additional terminal may also decrease the overall performance and availability of the existing line. PacifiCorp determines the feasibility of multi terminal line connections on a case by case basis.~~

~~3. Other Considerations~~

~~(a) Existing Equipment~~

~~Existing electrical equipment, such as transformers, power circuit breakers, disconnect switches, arresters, and line conductors shall be operated consistent with design criteria and Prudent Utility Practice. System modifications proposed by the Network Customer, such as the connection of a new line, equipment or load, may cause existing equipment to be inadequate, requiring replacement.~~

~~(b) System Stability and Reliability~~

~~The PacifiCorp Electric System has been developed with careful consideration for system stability and reliability during disturbances. The type of connection, size of the load, breaker configurations, load characteristics, and the ability to set protective relays will affect where and how a new Point of Interconnection is permitted by PacifiCorp. The Network Customer may also be required to participate in special protection schemes, called Remedial Action Schemes (RAS) such as generator dropping, load shedding, or load tripping. The portion of the transmission path capacity that the Network Customer uses will affect the share of the Network Customer's RAS obligations. If RAS participation is required, the Network Customer and PacifiCorp shall jointly plan and coordinate the RAS implementation.~~

~~(c) Control and Protection~~

~~PacifiCorp coordinates its protective relays and control schemes to provide for personnel safety and equipment protection and to minimize disruption of services during disturbances. New Points of Interconnection typically require the addition or modification of protective relays and/or control schemes. Sometimes the addition of voltage transformers, current transformers, or pilot schemes (transfer trips) is also necessary. Any necessary new protection must be compatible with PacifiCorp's existing protective relays and/or control schemes. PacifiCorp uses single pole protective relaying on most 500 kV lines and pilot tripping on all 500, 345, 230 and some 138 and 115 kV lines. Conventional directional zone protection is usually used on 115 to 46 kV lines. Distribution type protection is generally used for circuits~~

~~connections must not restrict timely outage coordination, automatic switching or equipment maintenance scheduling. Preserving reliable service to all PacifiCorp customers is essential and may require additional switchgear, equipment redundancy, or bypass capabilities at the Point of Interconnection for acceptable operation of the system. At the time of the connection request, PacifiCorp will determine the additional equipment suitable for the interconnection.~~

~~(e) *Atmospheric and Seismic*~~

~~The effects of atmospheric and seismic events (including, but not limited to wind storms, floods, lightning, elevation, temperature extremes, icing, contamination and earthquakes) on the reliability, safety, and stability of the PacifiCorp Electric System must be considered in the design and operation of the interconnected facilities. The Network Customer is responsible for ensuring that the appropriate standards, codes, criteria, recommended practices, guides and Prudent Utility Practices are satisfied for the equipment that it installs.~~

POINT(S) OF INTERCONNECTION

[Glen Carter](#)

[Bull River](#)

[Ashton](#)

[Traverse Mtn.](#)

[Littlefield](#)

[Spring Creek](#)

[Westside](#)

[Eagle Mountain Switchyard](#)

~~1-C.~~ ~~Transmission and~~ [Northpoint](#) Substation ~~Facilities~~

~~Some new connections to the PacifiCorp Electric System require that one or more PacifiCorp lines (a transmission path) be looped through the Network Customer's facilities, or sectionalized with the addition of switches. The design and ratings of these facilities and/or switches shall not restrict the capability of PacifiCorp's line(s) and contractual transmission path rights. PacifiCorp will design, own, and maintain any facilities that are part of PacifiCorp's transmission path.~~

~~If the customer provides a circuit breaker at the point of interconnection, then PacifiCorp will have no special requirements for the design and construction specifications of the customer's facilities. But, if at the point of interconnection, a breaker is not installed by the customer, the following requirements will need to be met by the customer due to the potential impact of the customer's facilities on PacifiCorp's facilities:~~

- ~~• Transmission line designs shall meet the requirements of PacifiCorp's design criteria. Specific criteria will be provided for each interconnection.~~

~~PacifiCorp takes no responsibility for determining whether the customer's facilities comply with any regulations. Any inspections performed by PacifiCorp of the customer's facilities do not constitute approval of the customer's design or construction. It is the customer's responsibility to be in compliance with all regulations.~~

~~1. Protection and Control~~

~~The protection and control requirements will be site specific for each interconnection but the follow are some general design criteria that need to be followed:~~

- ~~• Faults on the system that is operated at the same voltage as PacifiCorp's service voltage or faults in the customers transformers are to be detected and disconnected from PacifiCorp's system in less than 0.14 seconds.~~
- ~~• Faults on the low side of the customer's transformers are to be detected and disconnected from PacifiCorp's system in less than 1.0 second.~~
- ~~• PacifiCorp's Engineering will approve the customer's protection plan. The customer will provide a one line of the proposed substation and their electrical service requirements. PacifiCorp's Regional Asset Manager will provide the form with all required information. See attachment A "PacifiCorp Request for Electrical Service Requirements".~~
- ~~• Dependent on the load carrying capability of the customer's substation, PacifiCorp may require installation of underfrequency and/or undervoltage load shedding equipment.~~

~~2. Ownership and Maintenance~~

~~PacifiCorp must own and maintain all of the equipment associated with a continuous path of PacifiCorp's system through the customer's substation. For example, if PacifiCorp line loops into and then back out of the customer's substation, PacifiCorp would own all equipment associated with this path (switches, circuit breakers, CVT's, etc.). PacifiCorp will also own and maintain the revenue metering, battery and charger, RTU and all associated communication equipment.~~

~~3. Design and Construction~~

~~PacifiCorp will perform the design of all equipment that is owned by PacifiCorp within the customer's substation. Customer can elect to construct these facilities but must utilize PacifiCorp's design and construction standards. PacifiCorp's designs and standards given to the customer are intended for the specific site only and shall not be used elsewhere by the customer.~~

~~4. Acceptable Transformer Configurations~~

~~The transformers connected to PacifiCorp's system at 46kV or higher voltage need to conform to one of the following conditions:~~

- ~~• If the customer's substation is to be a tap on the PacifiCorp transmission line, no transmission line breakers at the customers' substation, the transformer windings connected to the Transmission System must be connected in a delta.~~

~~6.—Switches~~

~~For all PacifiCorp owned switches within the customer's substation, PacifiCorp will provide switch numbers. These numbers will be affixed to the switch structure per PacifiCorp's standards. PacifiCorp will provide its locks for these switches. PacifiCorp locks only will be allowed on these switches.~~

~~7.—Battery and Chargers~~

~~For customer owned substations that are looped through PacifiCorp's system, PacifiCorp must own and maintain the battery and charger. If the interconnection with PacifiCorp is radial, the customer will own and maintain the battery and charger and will agree to maintain both per the contract agreement.~~

~~8.—Final Inspection~~

~~For customer owned substations that are interconnected to PacifiCorp's system from a radial tap, PacifiCorp will only inspect the point of interconnection, metering, and communication's equipment owned by PacifiCorp.~~

~~For customer owned substation that are interconnected to PacifiCorp's system by a continuous path (loop in/out, ring bus, etc.) PacifiCorp will inspect all equipment owned by PacifiCorp.~~

~~When the construction is complete, an inspection shall be arranged through PacifiCorp engineer and Operation's Manager. A minimum of five days working notice is required to arrange this inspection.~~

~~9.—Grounding~~

~~The customer will provide PacifiCorp's engineer with the ground grid design and calculations, geotechnical report and resistivity report. The customer will also provide the grid continuity tests with measurements indicated on the grounding plan drawing. The ground grid resistance to remote earth tests shall also be provided. This measurement shall not exceed 3 ohms.~~

~~10.—Drawing Approval~~

~~For customer owned substations with a radial interconnection, the customer shall provide a complete One Line drawing of their substation to PacifiCorp's engineer as early as possible in the design phase. PacifiCorp will review to ensure the Customer's protection plan is in compliance with PacifiCorp's requirements for this substation interconnection.~~

~~For customer owned substations with a continuous path through PacifiCorp's system, the customer shall provide a complete One Line drawing of their substation, the grounding design and calculations, and all drawings associated with equipment owned by PacifiCorp that have been incorporated into the customer's substation drawings.~~

~~11.—Revisions to the customer owned substation after initial approval~~

~~Any revisions to the customer's substation that impacts PacifiCorp's system require notification to PacifiCorp. At the time of notification, PacifiCorp's engineer will determine if further actions are needed and the process would start again.~~

~~12.—Skill Requirements, Certified and Licensed~~

~~PacifiCorp takes no responsibility for determining whether the customer has complied with these regulations. This information is provided as part of this specification merely to alert the customer to the regulations. It is the customer's responsibility to assure that its substation is in compliance with the regulations.~~

~~1-D. Insulation Coordination~~

~~Power system equipment is designed to withstand voltage stresses associated with expected operation. Adding or connecting new facilities can change equipment duty, and may require that equipment be replaced or switchgear, telecommunications, shielding, grounding and/or surge protection added to control voltage stress to acceptable levels. PacifiCorp may require connection studies to evaluate the impact of a proposed interconnection on equipment insulation coordination. PacifiCorp may identify requirements or additions that the Network Customer must satisfy prior to interconnection to maintain an acceptable level of PacifiCorp Electric System availability, reliability, equipment insulation margins, and safety.~~

~~Voltage stresses, such as lightning or switching surges, and temporary over voltages may affect equipment duty. Remedies for these types of voltage stresses depend on the equipment capability and the type and magnitude of the stress. In general, stations with equipment operated at 15 kV and above, as well as all transformers and reactors, shall be protected against lightning and switching surges. Typically this includes station shielding against direct lightning strokes, surge arresters on all wound devices, and shielding with rod gaps (or arresters) on the incoming lines. The following is a list of non-exclusive requirements or additions that PacifiCorp may require the Network Customer to meet in order to satisfy the intent of PacifiCorp's reliability criteria.~~

~~1. Lightning Surges~~

~~If the Network Customer proposes to tap a shielded transmission line, the tap line to the substation must also be shielded. For an unshielded transmission line, the tap line does not typically require shielding beyond that needed for substation entrance. However, special circumstances such as the length of the tap line may affect shielding requirements. PacifiCorp shall determine the appropriate shielding requirements.~~

~~Lines at voltages of 69 kV and higher that terminate at PacifiCorp substations must meet additional shielding and/or surge protection requirements identified in Section 1-C. For certain customer service substations at 230 kV and below, PacifiCorp may require only an arrester at the station entrance in lieu of line shielding, or a reduced shielded zone adjacent to the station. These variations depend on the tap line length, the presence of a power circuit breaker on the transmission side of the transformer, and the size of the transformer and are wholly within the discretion of PacifiCorp based on Prudent Utility Practice.~~

~~2. Switching Surges~~

~~At voltages below 500kV, PacifiCorp will conduct a system impact and facility requirements study to identify the need for modifications to protect PacifiCorp Electric System equipment from switching surges. Typically such modifications are not required; however, such a determination is with the discretion of PacifiCorp based on the results of the study. At 500 kV, PacifiCorp requires that arresters be added to new line terminations at PacifiCorp substations.~~

~~(a) Local Islanding~~

~~When the interconnection involves tapping a PacifiCorp transmission line, a ‘local island’ may be created when the breakers at the ends of the transmission line open. This can leave generating resources and any other loads that also are tapped off this line isolated from the power system. Delayed fault clearing, over voltages, ferro resonance, extended under voltages, and degraded service to other PacifiCorp customers can result from this ‘local island’ condition. For these reasons, PacifiCorp does not allow local islands involving PacifiCorp transmission facilities to persist. Special relays to detect this condition and isolate the local generation from PacifiCorp facilities are described in Section 3-B.2.~~

~~(b) Neutral Shifts~~

~~When generation or a source of ‘back feed’ is connected to the low voltage side of a delta grounded wye customer service transformer, remote end breaker operations initiated by the detection of faults on the high voltage side can cause over voltages that can affect personnel safety and damage equipment. This type of over voltage is commonly described as a ‘neutral shift’ and can increase the voltage on the un-faulted phases to as high as 1.73 per unit. At this voltage, the equipment insulation withstand duration can be very short. The following is a list of non-exclusive remedies that PacifiCorp may require the Network Customer to meet in order to satisfy the intent of PacifiCorp’s reliability criteria.~~

- ~~• Provide an effectively grounded system on the high voltage side of the transformer that is independent of other Transmission System connections.~~
- ~~• Size the high voltage side equipment to withstand the amplitude and duration of the neutral shift.~~
- ~~• Rapidly separate the back feed source from the step up transformer by tripping a breaker, using either remote relay detection with pilot scheme (transfer trip) or local relay detection of over voltage condition (see Section 3-B.2).~~

~~As used in this section, “effectively grounded” is defined as an $X_0/X_1 \leq 3$ and $R_0/X_1 \leq 1$. Methods available to obtain an effective ground on the high voltage side of the transformer include but are not limited to the following:~~

- ~~• A transformer with the transmission voltage (PacifiCorp) side connected in a grounded wye configuration and low voltage (Point of Interconnection) side in closed delta.~~
- ~~• A three winding transformer with a closed delta tertiary winding. Both the transmission and distribution side windings are connected in grounded wye.~~
- ~~• Installation of a grounding transformer on the transmission voltage (PacifiCorp) side.~~

~~PacifiCorp shall determine the appropriate method for obtaining an effective ground.~~

1-E. Substation Grounding

~~Each customer built substation must have a ground grid that is solidly connected to all metallic structures and other non-energized metallic equipment. This grid shall limit the ground potential gradients to such voltage and current levels that will not endanger the safety of people or damage equipment which is in, or~~

~~transmission shield wires can all inadvertently connect ground grids. A fiber optic cable may be required for telecommunications and control between two substations to maintain isolated ground grids. If the ground grids are to be interconnected, the interconnecting cables must have sufficient capacity to handle fault currents and control ground grid voltage rises. PacifiCorp must approve any connection to a PacifiCorp substation ground grid.~~

~~New interconnections of transmission lines and/or generation may substantially increase fault current levels at nearby substations. Modifications to the ground grids of existing substations may be necessary to keep grid voltage rises within safe levels. PacifiCorp may require connection studies to determine if modifications are required and the estimated cost.~~

~~The Network Customer must design the ground grid to applicable ANSI and IEEE Standards relating to safety in substation grounding.~~

~~1-F.—Inspection, Test, Calibration and Maintenance for interconnections without a circuit breaker at the point of interconnection to PacifiCorp~~

~~Transmission elements (e.g., lines, line rights of way, circuit breakers, control and protection equipment, metering, and telecommunications) that are a part of the proposed connection and could affect the reliability of the PacifiCorp Electric System shall be inspected and maintained in conformance with regional standards. The Network Customer has full responsibility for the inspection, testing, calibration, and maintenance of its equipment, up to the location of change of ownership or Point of Interconnection. Transmission Maintenance and Inspection Plan (TMIP) requirements are a portion of the Western Systems Coordinating Council (WECC) Reliability Management System for transmission. The Network Customer or utility shall, as required by WECC or PacifiCorp, annually certify that it has developed, documented, and implemented an adequate TMIP.~~

~~1.—Pre-energization Inspection and Testing~~

~~Before initial energization, the Network Customer shall develop an Inspection and Test Plan for pre-energization and energization testing. Section 3-D below describes specific installation testing requirements for protection systems. PacifiCorp may request review of the test plan prior to the test(s). PacifiCorp may require additional tests. The Network Customer shall make available to PacifiCorp, upon request, all drawings, specifications, and test records of the Point of Interconnection equipment. Upon reasonable request PacifiCorp will make available to the Network Customer similar documents describing the PacifiCorp Point of Interconnection equipment.~~

~~2.—Summary of the WECC Transmission Maintenance and Inspection Plan (TMIP)~~

~~Network Customer shall prepare and provide to PacifiCorp a written description of, and update as necessary, its annual TMIP.~~

~~Pursuant to WSCC guidelines, the TMIP shall provide descriptions of the various maintenance activities, schedules and condition triggers for performing the maintenance, and samples of any checklists, forms, or reports used for maintenance activities. The TMIP may be performance-based, time-based, or both, as appropriate. Pursuant to WSCC guidelines, the TMIP shall:~~

- Describe and include specific details regarding transmission line and station maintenance and inspection practices as per Section 1-F.2.a and b below.

(a) Transmission Line Maintenance

The TMIP shall, at a minimum, describe the inspection and maintenance practices for all applicable transmission line activities including but not limited to:

- Patrols and inspections, routine, detailed and emergency.
- Vegetation management and right-of-way maintenance.
- Contamination control (insulator washing)

(b) Station Maintenance

The TMIP shall, at a minimum, describe the inspection and maintenance practices for all applicable station facilities including, but not limited to:

- Circuit breakers
- Power transformers
- Reactive devices (including, but not limited to, shunt capacitors, series capacitors, synchronous condensers, shunt reactors, and tertiary reactors)
- Regulators
- Protective relays

(c) Maintenance Record Keeping and Reporting

The transmission owner shall maintain maintenance records of all maintenance and inspection activities for at least five years. The transmission owner shall make available to PacifiCorp, and the WSCC or other regulatory body, as requested, the records of maintenance and inspection activities to demonstrate compliance with the TMIP. The maintenance and inspection records shall, at a minimum:

- Identify the person(s) responsible for performing the work or inspection;
- Indicate the date(s) the work or inspection was performed;
- Identify the transmission facility; and
- Describe the inspection or maintenance that was performed.

The transmission owner shall maintain and make available on request, records for substantial maintenance or inspection of the items listed in **a.** and **b.** above.

3. Calibration and Maintenance of Revenue and Interchange Metering

Meters shall be located on the high voltage side of transformation, and voltage and current transformers

~~standard(s) shall have been calibrated and certified within twelve months prior to the actual meter calibration.~~

~~1-G. Ancillary Services~~

~~All loads and transmission facilities must be part of a control area. The control area provides critical ancillary services, including load regulation, and frequency response, operating reserves, voltage control from generating resources, scheduling, system controls and dispatching service, as defined by the FERC, or its successors. The Network Customer shall maintain the new facilities in its own control area and will be the source or provider of ancillary services, or the Network Customer shall arrange for such services contractually, to the satisfaction of PacifiCorp.~~

~~The Network Customer shall select the source for regulating and contingency reserves, if required by Tariff or WSCC or other applicable requirements. PacifiCorp shall determine the telemetering, controls, and metering that will be required to integrate the load or facility into the applicable control area and to provide the necessary ancillary services. If the Network Customer chooses self or third party provision of reserves, then special certification and deployment procedures must be incorporated into the PacifiCorp Automatic Generation Control (AGC) system. The provision of the required ancillary services shall meet all relevant NERC, WSCC, and NWPP (or their successors') reliability policies and criteria, or their successors.~~

~~2. PERFORMANCE REQUIREMENTS~~

~~The following performance requirements shall be satisfied. The Network Customer shall propose its preferred method for satisfying the following performance requirements. PacifiCorp shall determine whether the proposed method is appropriate and satisfies the relevant performance requirement.~~

~~2-A. Electrical Disturbances~~

~~The new facilities shall be designed, constructed, operated, and maintained in conformance with this document and applicable laws, regulations, and standards to minimize the impact of the following:~~

- ~~• Electric disturbances that produce abnormal power flows,~~
- ~~• Power system faults or equipment failures,~~
- ~~• Overvoltages during ground faults,~~
- ~~• Audible noise, radio, television, and telephone interference,~~
- ~~• Power system harmonics, and~~
- ~~• Other disturbances that might degrade the reliability of the interconnected PacifiCorp Electric System.~~

~~2-B. Switching Equipment~~

~~1. All Voltage Levels~~

~~Circuit breakers, disconnect switches, and all other current-carrying equipment connected to PacifiCorp's~~

requirements, which are based on the greater of either the fault duties at the time of the interconnection request or the fault duties projected in long range plans.

The circuit breaker shall be capable of performing other duties as required for the specific application. These duties may include but are not limited to: capacitive current switching, load current switching, and out of step switching. The circuit breaker shall perform all required duties without creating transient overvoltages that may damage PacifiCorp equipment. Switchgear on the high side of a delta grounded wye transformer that can interrupt faults or load must be capable of the increased recovery voltage duty involving interruptions while ungrounded. The connection of a transmission line or load can coincidentally include other generating resources. When this system configuration is connected to the low voltage side of a delta grounded wye transformer, the high voltage side may become ungrounded when remote end breakers open, resulting in high phase to ground voltages. This phenomena is described in more detail in Section 1 D.3.b above under 'Neutral Shifts.'

2. ~~Circuit Breaker Operating Times~~

Table 2-1 below specifies the operating times generally required of circuit breakers on the PacifiCorp Electric System. These times will generally apply to equipment at or near the Point of Interconnection. System stability considerations may require faster opening times than those listed. Breaker close times are typically four to eight cycles. The automatic recloser times in Table 2-1 are the summation of the breaker close time plus delay to allow for extinction of the fault arc (de ionization), and the protective relay requirements. Circuit breaker interrupting time may vary from those in Table 2-1 but must coordinate with other circuit breakers and protective devices.

Table 2-1 Typical Circuit Breaker Operating Times

Voltage Class (kV L-L rms)	Rated Interrupting Time (Cycles)	Automatic Reclose Time (Cycles)
Below 100 kV	<5	*
115 to 161 kV	<3	20 to 120
230 kV	<3	20 to 60
345 kV	2	20 to 60
500 kV	2	45 to 90

*—Varies significantly by line.

3. ~~Other Fault Interrupting Device Operating Times~~

Depending on the application, PacifiCorp may permit the use of other fault interrupting devices such as circuit switchers. Fuses may be adequate for protecting the high voltage side of a high voltage delta low voltage grounded wye transformer. Trip times of these devices are generally slower, and current interrupting capabilities are often lower, than those of circuit breakers. If the Network Customer proposes to use these devices, the Network Customer must test the devices for the duty in which they are

~~Customer shall coordinate timed changes with the timed schedules established by the NWPP or its successor.~~

~~The Network Customer's transformers' winding configuration will not provide a ground source to PacifiCorp's system if breakers and protective relaying equipment are not installed at the interconnection site to detect and isolate faults on PacifiCorp's system. The Network Customer's transformers' winding configuration will provide a ground source to PacifiCorp's system if the Network Customer's system has a generation source, other than PacifiCorp's, or if breakers and protective relaying equipment are installed at the interconnection site to detect and isolate faults on PacifiCorp's system.~~

~~2-D.—Power Quality Requirements~~

~~1.—Voltage Fluctuations and Flicker~~

~~Voltage fluctuations may be noticeable as visual lighting variations (flicker) and can damage or disrupt the operation of electronic equipment and therefore must be managed and mitigated. IEEE Standard 1453-2004 provides definitions and limits on acceptable levels of voltage fluctuation. The new loads or system connections to the PacifiCorp Electric System shall not exceed the limits specified in IEEE Standard 1453-2004. If PacifiCorp determines that the new connection is the source of the fluctuations, the Network Customer shall be responsible for all necessary equipment to control the fluctuations to the limits identified in IEEE 1453-2004.~~

~~2.—Distortion~~

~~Harmonics and inter-harmonic distortion can cause telecommunication interference, increase thermal heating in transformers, disable solid state equipment and create resonant over voltages. In order to protect equipment from damage, distortion must be managed and mitigated. IEEE Standard 519-1922 provides definitions and limits on acceptable levels of harmonic distortion at a point of common coupling (PCC) between a facility and its sourcing power system. The new facility connection shall not cause harmonic voltage or currents on the PacifiCorp Electric System that exceed the limits specified in IEEE Standard 519-1922. Distortion measurements may be conducted at the PCC, or other locations on the PacifiCorp Electric System to determine whether the new connection is the source of excessive distortion. If PacifiCorp determines that the new connection is the source of the distortion, the Network Customer shall be responsible for all necessary equipment to control the distortion to the limits identified in IEEE 519-1922.~~

~~3.—Phase Unbalance~~

~~Unbalanced phase voltages and currents can affect protective relay coordination and cause high neutral currents and thermal overloading of transformers and therefore must be managed and mitigated. To protect PacifiCorp and customer equipment, the contribution from the new facilities at the Point of Interconnection shall not cause an unbalanced phase voltage greater than 1% or a current unbalance greater than 5%. Phase unbalance is defined as the percent deviation of one phase from the average of all three phases, measured phase neutral.~~

~~appropriate, which will be coordinated via time changes developed by the NWPP, or its successor, for such coordination purposes. Any such schedule shall take into account that PacifiCorp maintains voltages to its customers, when regulated, according to the ANSI Standard C84.1. This allows for variances of $\pm 5\%$ off nominal for all voltage levels except for the 500 kV system that normally operates between 500 and 550 kV.~~

~~5.—System Frequency During Disturbances~~

~~Power system disturbances initiated by system events such as faults and forced equipment outages, expose the system to oscillations in voltage and frequency. It is important that lines remain in service for dynamic (transient) oscillations that are stable and damped.~~

~~To avoid large scale blackouts that can result from excessive generation loss, major transmission loss, or load loss during a disturbance, Network Customer shall comply with regional or PacifiCorp underfrequency load shedding directives. Load shedding attempts to stabilize the system by balancing the generation and load. When system frequency declines, loads are automatically interrupted in discrete steps, with most of the interruptions between 59.3 and 58.6 Hz. It is important that lines remain interconnected to the system during frequency declines, both to limit the amount of load shedding required and to help the system avoid a complete collapse.~~

~~6.—Voltages During Disturbances~~

~~To avoid voltage collapse in certain areas of the Pacific Northwest, undervoltage load shedding has also been implemented. Most of the load interruptions will occur automatically near 0.9 per unit voltage after delays ranging from 3.5 to 8.0 seconds. Depending on the type and location of any new load, the Network Customer may be required to participate in this scheme. PacifiCorp shall determine whether such participation is necessary.~~

~~2.E.—Reliability and Availability~~

~~1.—Maintaining service.~~

~~To minimize risk of overloads, instability, or voltage collapse, reliable operation of the interconnected power system requires the owners to insure the following: reactive sources, control of real and reactive generation, adequate real and reactive reserves, and maintenance of Transmission System voltages.~~

~~2.—Transmission lines.~~

~~Key transmission lines and other facilities should be kept in service as much as possible. They may be removed from service for voltage control only after powerflow studies, in accordance with WECC requirements, indicate that system reliability will not be degraded below acceptable levels. The entity responsible for operating such transmission line(s) shall promptly notify other affected load control areas, per the WECC *Procedure for Coordination of Scheduled Outages and Notification of Forced Outages, or Other Applicable Outages*, when removing such facilities from, and returning them back to service.~~

~~3.—Switchable devices.~~

~~The owner shall ensure that devices frequently switched to regulate transmission voltage and reactive flow~~

~~5.—Frequency and Duration of Outages.~~

~~Planned outages of significant system equipment shall be coordinated with all affected parties to minimize their impact on the remaining system. Automatic and forced outages should be responded to promptly, mitigating any impacts on the remaining system, and in a manner that treats all customer interruptions with the same priority.~~

~~6.—Key Reliability and Availability Considerations~~

~~The Network Customer shall ensure the following key reliability and availability considerations are satisfied:~~

- ~~• The new connection shall meet the NWPP and WECC (or their successors) Minimum Reliability Standards for Planning and Operation.~~

~~2.F.—Power Factor Requirements~~

~~Each party's system shall provide for its own reactive power requirements, both leading and lagging. Reactive power control including reserves is required to maintain adequate voltage levels to prevent voltage instabilities and insure transient stability.~~

~~Interconnection Customer shall at all times effectively control and limit the flow of reactive power at the Point(s) of Interconnection to maintain a power factor of ninety five percent (95%) or higher lagging or leading. Interconnection Customer shall design and operate its system so it shall not cause abrupt voltage changes greater than +/- 3% on PacifiCorp's Transmission System.~~

~~The Network Customer shall maintain its own power factor without relying on the PacifiCorp Transmission System, especially under peak load conditions. Controlling reactive flow can enhance the transfer capability of the affected line and may also reduce system losses. Reactive flows at Interchange points between Control Areas shall be kept at the minimum specification pursuant to the WECC, *Minimum Operating Reliability Criteria*.~~

~~2.G.—Isolating, Synchronizing and Blackstarts~~

~~1.—Isolation~~

~~At the Point of Interconnection, the Network Customer shall not energize a de-energized PacifiCorp line unless the PacifiCorp Dispatcher specifically approves the energization. Where the connection is to a radial load, the circuit may be interrupted and reclosed by PacifiCorp. In cases where the connection breaks an existing path, an auto isolation scheme may be required to sectionalize the connection to the PacifiCorp Electric System. If the interconnected facilities are networked or looped back to the PacifiCorp Electric System or where generation resources are present, a switching device must open to eliminate fault contributions or neutral shifts (described in Section 1 D.3.b above). Once open, the device must not reclose until approved by the PacifiCorp dispatcher or as specified in the interconnection agreement.~~

~~2.—Synchronization~~

~~avoiding motor start-up loads and imposing block size limits (50 MW). During blackstart restoration, the tapped connection must be able to be opened to avoid interference with PacifiCorp restoration procedures on the PacifiCorp transmission path.~~

~~2.H.—Responsibilities During Emergency Conditions~~

~~Each Load Control Area operator has the ultimate responsibility to maintain the frequency within its control area boundaries. All emergency operation involving the PacifiCorp Transmission System must be coordinated with the PacifiCorp Dispatcher. Each party, as appropriate, must participate in any local or regional remedial action schemes. All loads tripped by underfrequency or undervoltage action must not be restored without the Load Control Area operator's permission. All schedule cuts need to be coordinated with the appropriate Load Control Area operator, and must be made promptly. All parties have the responsibility for clear communications regarding actual or suspected problems and must report promptly any actual or suspected problems affecting others.~~

~~3.—PROTECTION REQUIREMENTS~~

~~3.A.—Introduction~~

~~The protection requirements identified herein are intended to achieve the following objectives:~~

- ~~• Insure safety of the general public, PacifiCorp and other utility personnel.~~
- ~~• Minimize property damage to the general public, PacifiCorp, and PacifiCorp's customers.~~
- ~~• Minimize adverse operating conditions affecting PacifiCorp's Electric System and customers.~~
- ~~• Permit the Network Customer to operate its system in a safe and efficient manner with minimum impact to the PacifiCorp Electric System and PacifiCorp's customers.~~
- ~~• Comply with NERC, WSCC and NWPP (or their successors) protection criteria in existence at the time of the connection request.~~

~~To achieve these objectives, certain protective equipment (relays, circuit breakers, etc.) must be installed. These devices ensure that faults or other abnormalities initiate prompt and appropriate disconnection from the PacifiCorp Electric System. Protective equipment requirements depend on the plan of service. Significant issues that could affect these requirements include but are not limited to:~~

- ~~• The location and configuration of the proposed connection.~~
- ~~• The level of existing service and protection to adjacent facilities (including those of other PacifiCorp customers and potentially those of other utilities).~~

~~At the time of the interconnection request, PacifiCorp will supply the Network Customer with an approved list of protective relay systems considered to be suitable for use at the Point of Interconnection. The Network Customer shall design and propose a protection system based on that list that satisfies the criteria described in this section. PacifiCorp reserves the right to make the final determination as to the devices used for protecting the PacifiCorp Electric System and shall identify modifications and/or additions to the PacifiCorp Electric System that are required for protection. PacifiCorp will coordinate with the~~

~~3-B.—Protection Criteria~~

~~In designing the protection system, the Network Customer shall endeavor to design a system that reliably:~~

- ~~• Detects power system faults or various abnormal system conditions;~~
- ~~• provides an appropriate means and location to isolate the faulted equipment or system automatically; and~~
- ~~• detects abnormal operating conditions such as equipment failures or open phase conditions.~~

~~Special relaying practices may also be required for system disturbances, such as under voltage or under frequency detection for load shedding. PacifiCorp reserves the right to review and recommend changes to the protection system and settings for equipment at the Point of Interconnection proposed by the Network Customer.~~

~~1.—General Protection Practices~~

~~The following section provides a non-exhaustive list of the general protection practices as required by NERC and the WSCC and the specific practices and applications as applied to PacifiCorp Electric System transmission lines and interconnections. The protection schemes necessary to integrate the new connection and the equipment used to implement these schemes must be consistent with these practices. Table 3-1 gives relay and breaker operating time versus voltage levels.~~

~~(a) All Voltages~~

- ~~• It is preferred that relays, breakers, etc are installed at the Point of Interconnection to isolate PacifiCorp's equipment from faults on the Network Customer's system. Some minimal exposure will be accepted.~~
- ~~• At the Point of Interconnection, the Network Customer shall not energize a de-energized line in the PacifiCorp Electric System without prior approval of the PacifiCorp Dispatcher.~~
- ~~• Breaker reclose supervision (automatic and manual including SCADA) may be required at the connecting substation and/or electrically 'adjacent' stations (e.g., hot bus and dead line check, synchronization check, etc.).~~
- ~~• Dual batteries are not required but each set of relays must have its own separately protected DC source.~~
- ~~• Relay settings shall not infringe upon PacifiCorp's ability to operate at maximum transfer levels, even with system voltages as low as 0.85 per unit.~~
- ~~• Redundant relays shall not be connected to a common current transformer secondary winding.~~
- ~~• Redundant relay systems, which are electrically separated, are required in order to ensure that no single protection system component failure or other event or condition would disable the entire relay system.~~

- ~~If required, automatic under frequency load tripping total trip time, including relay operate time and breaker operate time shall not exceed 14 cycles.~~

~~(b) Voltages Below 100 kV~~

- ~~Redundant or overlapping relays systems are required in order to ensure that no single protection system component failure would disable the entire relay system and result in the failure to trip for a fault condition.~~
- ~~Total fault clearing times, with or without a pilot scheme, must be provided for PacifiCorp review and approval. Breaker operating times, relay makes, types and models, and relay settings must be identified specifically.~~
- ~~Multi-shot automatic reclosing is permitted; however the total number of automatic reclosures should not exceed three.~~

~~(c) Voltages Above 200 kV~~

- ~~Breaker failure relays (BFR) are required. Total time for BFR scheme fault clearing must not exceed 18 cycles. In calculating the total time, the time from fault initiation must be included. System requirements may dictate faster BFR operating times. Breaker failure relays do not have to be redundant.~~
- ~~Dual circuit breaker trip coils are required.~~
- ~~Redundant directional relay systems are required if a single point of failure could disable the entire relay system. Both relay systems shall contain an instantaneous tripping element capable of outputting a trip in 1.5 cycles or less for faults within 80% of the line. If ground distance elements are used, the relay must include ground overcurrent elements to provide tripping for high resistance ground faults.~~
- ~~Redundant telecommunications schemes may be required if time delayed fault clearing can result in stability, cascading or voltage problems.~~
- ~~The relay systems shall provide backup protection for loss of the telecommunication channel(s).~~
- ~~The selected pilot schemes and telecommunication system must be compatible with existing PacifiCorp protection and telecommunications equipment.~~
- ~~The telecommunications and pilot scheme(s) channels required for protection systems should be continuously monitored and automatically or manually tested.~~

~~(d) Additional Requirements for Voltages Between 100 and 200 kV~~

- ~~A pilot telecommunication scheme may be required if high speed clearing is required for any fault location for stability purposes or if remote tripping for equipment protection is required. If a pilot telecommunications scheme is required for stability purposes, it must be redundant or designed to allow high speed tripping by the protective relays upon failure of the pilot scheme.~~

- ~~Multi-shot automatic reclosing may be required for automatic line sectionalizing schemes; however, the total number of automatic reclosures should not exceed two.~~

~~(e) Additional Requirements for Voltages Between 230 and 345 kV~~

- ~~A pilot telecommunication scheme is required. Dual pilot schemes using separate diversely routed communication systems must be used for 345kV lines. Dual pilot schemes using one communication system is permitted for 230kV lines.~~
- ~~Total fault clearing time with a pilot scheme must not be more than four cycles for 345 kV and 5 cycles for 230 kV, including relay and breaker operating time, when connected to a Main Grid line. Slower times may be acceptable for some lines. Refer to Table 3.1.~~
- ~~Automatic reclosing for single line to ground faults shall be no faster than 20 cycles.~~
- ~~Automatic reclosing is not permitted for multi phase faults. Reclosing is to be blocked for time delayed trips.~~

~~(f) Additional Requirements for 500 kV~~

- ~~Two independent sets of directional line protection with separate pilot telecommunication for each relay set shall be installed at each line terminal to trip the line terminal breakers.~~
- ~~Total fault clearing time with a pilot scheme must not be more than 4 cycles, including relay and breaker time.~~
- ~~Line protection may be required to be compatible with existing or future series compensation.~~
- ~~Protection must be able to interface with PacifiCorp's single phase protection schemes.~~
- ~~Automatic reclosing shall be no faster than 45 cycles.~~
- ~~Automatic reclosing is not permitted for multi phase faults.~~

~~2. Protection Measures~~

~~Protection systems must be capable of performing their intended function during fault conditions. The magnitude of the fault that the protection system must be designed for depends on the fault type, system configuration, and fault location. PacifiCorp may in its discretion require the performance of extensive model line tests of the protective relay system to provide assurance the selected relay system is capable of detecting faults for various system configurations. Power system swings, major system disturbances and islanding may require the application of special protective devices or schemes. PacifiCorp reserves the right to make the final determination as to the devices necessary for the protection of the PacifiCorp Electric System. The following sections identify the conditions under which relay schemes must be capable of operating.~~

~~(a) Phase Fault Detection~~

~~Phase overcurrent (type 50/51) and neutral overcurrent (type 50/51-N) relays are provided to detect~~

~~(b) *Ground Fault Detection*~~

~~Ground fault detection has varying requirements. The availability of sufficient zero sequence current sources and the ground fault resistance both significantly affect the relay's ability to properly detect ground faults. The same types of relays used for phase fault detection discussed above are suitable for ground fault detection. If ground fault distance relays are used, backup ground time overcurrent relays should also be applied to provide protection for high resistance ground faults.~~

~~(c) *Islanding*~~

~~'Islanding' describes a condition where the power system splits into isolated load and generation groups, usually when breakers operate for fault clearing or system stability remedial action. Generally, the 'islanded groups' do not have a stable load to generation resource balance. However, it is possible that, under unique situations, generator controls can establish a new equilibrium in an islanded group.~~

~~PacifiCorp does not permit islanding conditions to exist that include its facilities, except for a controlled temporary separation.~~

~~While operating in an islanded condition or during a system disturbance, power swings may result which can affect the operation of protective relays, especially distance relays. Out of step blocking is commonly available for distance relays to prevent them from operating during a power swing. However, the application of such schemes must be coordinated with PacifiCorp to assure that the blocking of the distance elements will not result in inappropriate or undesirable formation of islands.~~

~~(d) *Load Shedding*~~

~~The proposed connection may require special load shedding schemes based upon PacifiCorp's Control Area requirements. These may include underfrequency load shedding, undervoltage load shedding, or direct load tripping. The intent of load shedding is to balance the load to the available generation, reduce the possibility of voltage collapse, and to minimize the impact of a system disturbance. Underfrequency load shedding generally includes a coordinated restoration plan, which is intended to minimize frequency overshoot following a load shedding condition. Tripping levels, restoration, and other details of load shedding schemes shall be determined by PacifiCorp, in accordance with NERC, WSCC and NWPP (or their successors') criteria.~~

~~(e) *Other Special Protection and Control Schemes*~~

~~PacifiCorp shall determine whether other special protection and control schemes are necessary. The location of the Point of Interconnection, amount of load transfer expected and various other system conditions may require other special protection schemes. The need for and type of schemes required will be determined by PacifiCorp as part of the system studies done following the request for a new connection. The following are non-exclusive examples of other schemes that PacifiCorp may require under appropriate circumstances:~~

- ~~• RAS may be required for stability purposes;~~
- ~~• Out of step tripping may be needed for controlled system grid separations;~~

(f) Relay Performance and Transfer Trip Requirements

Relay systems are designed to isolate the Network Customer's faulted transmission line and/or load facilities from the PacifiCorp Electric System. The Network Customer shall ensure that the protection equipment of the new connection must at a minimum maintain the performance level of the existing protection equipment at that location. This may require transfer trip (pilot telecommunications) to insure high-speed and secure fault clearing. Other types of pilot tripping such as directional comparison, phase comparison or current differential may be acceptable if the scheme chosen can achieve the total clearing times required. Transfer trip shall be required when any of the following conditions apply to the new connection:

- Transient or steady state studies identify conditions where maintaining system stability requires immediate isolation of the Point of Interconnection facilities from the power system.
- Special operational control considerations require immediate isolation of the Point of Interconnection.
- Extended fault duration represents an additional safety hazard to personnel and can cause significant damage to power system equipment (e.g., lines, transformers).
- Slow clearing or other undesirable operations (e.g., extended over voltages, ferro-resonance, etc.), which cannot be resolved by local conventional protection measures, will require the addition of pilot tripping using remote relay detection at other substation sites. This scenario is likely if a PacifiCorp circuit that connects other customer loads become part of a 'local island' that includes a generator.
- When Relay operating times are adjusted to coordinate for faults based on the local configuration (e.g., three terminal lines), fault currents available, etc. Total clearing times must be less than those listed in Table 3-1. Otherwise, immediate isolation of the Point of Interconnection is required.

Table 3-1—Relay and Breaker Operating Times by System Voltage

Connection Voltage (kV L-L rms)	Total Clearing Time (Cycles)	Maximum Relay Operate Time (Cycles)	PCB-Trip Time (Cycles)	Time-Delayed Tripping Acceptable?
≤46	65	≤60	≤5	Yes
46 to 200	5-30*	≤25	≤5	Yes
230	5	2	3	No
500 & 345	4	1	2	No

*This clearing time is only acceptable for faults remote from the substation and in some parts of the network 5-cycle-clearing time is required for all faults on the 161, 138, and 115kV networks.

(g) Synchronizing and Re-closing

~~(h) Protection System Performance Monitoring~~

~~Depending upon the type and location of the interconnection, monitoring equipment may be required. The monitoring equipment is intended to identify possible protection scheme problems and to provide power quality measurements. The monitoring equipment may provide information similar to that of an oscillograph or fault recorder. The availability of current and voltage measurements determines the number of channels for the device. Sequential event recorders and/or annunciators may also be required to record and time tag operations of protection equipment. In some cases, it may be acceptable to utilize the recording and monitoring capabilities of a protective relay system to provide for system monitoring and event recording.~~

~~These recorders shall be connected to a GPS satellite receiver or other time source with equivalent accuracy. Remote access to monitoring equipment may be required. PacifiCorp will supply a list of quantities to be monitored and the appropriate terminology when connections are made at a PacifiCorp owned substation. If monitoring or relay performance indicates inadequate protection of the PacifiCorp Electric System, PacifiCorp will notify the owner of the interconnected facilities of additional protection requirements or changes.~~

~~PacifiCorp may request limited remote telecommunications access to relay systems at the Point of Interconnection to query their operational history and fault data. Upon request, and if available, PacifiCorp will reciprocate by supplying the Network Customer with limited access to the appropriate PacifiCorp relays.~~

~~3-C. Protection System Selection and Coordination~~

~~1. Relays to be Installed for the Connection~~

~~At the time of the connection request, PacifiCorp will supply the Network Customer with an approved list of protective relay systems considered to be suitable for use at the Point of Interconnection. The performance of protective relays applied at the connection that can directly affect the performance of the PacifiCorp Electric System shall follow the recommendations from the supplied list. Should the Network Customer select a relay system not on PacifiCorp's approved list, PacifiCorp reserves the right, at the Network Customer's expense, to perform a full set of acceptance tests prior to granting permission to use the selected protection scheme. Alternatively, the relay vendor or a third party may be asked to perform thorough model line tests of the proposed relay system.~~

~~2. Protection System Coordination and Programming~~

~~Depending upon the complexity and criticality of the system at the Point of Interconnection, complete model line testing of the protection system, including the settings and programming, may be required prior to installation to verify the protection system performance. The following are non-exclusive, basic considerations that must be used in determining the settings of the protection systems:~~

- ~~• Fault study models used for determining protection settings should take into account significant mutual and zero-sequence impedances. Up-to-date fault study system models shall be used.~~

~~• Protection system applications and settings should not normally limit transmission capacity.~~

~~3-D.—Installation and Commissioning Test Requirements for Protection Systems~~

~~Thorough commissioning or installation testing of the protection system(s) shall be required for the installation of a new terminal or when changes to the prior protection system are made. The protection system includes the protective relays, the circuit breakers, instrument transformer inputs, and all other inputs and outputs associated with the protection scheme. The actual protection equipment used also will affect the type and extent of commissioning tests required. The following tests are the minimum tests that must be performed. These tests shall be performed on all protection schemes at the Point of Interconnection that could affect the performance of the PacifiCorp Transmission System.~~

- ~~• Verify all protective system inputs:
 - ~~○ Current and voltage transformers: check the ratio, polarity, accuracy class, and single point grounding.~~
 - ~~○ Verify all other inputs to the protection system including battery supplies, circuit breaker auxiliary switches, pilot channel inputs, etc.~~~~
- ~~• Verify protection system settings:
 - ~~○ Check protection system settings and programming.~~
 - ~~○ Perform acceptance testing of protection system if not done previously.~~
 - ~~○ Perform calibration tests of the protection system using actual settings.~~~~
- ~~• Protection system drawings and wiring
 - ~~○ Verify switchboard panel and equipment wiring is intact and matches drawings.~~
 - ~~○ Verify drawings are correct.~~~~
- ~~• Verify proper relay system operation and directionality.~~
- ~~• Verify all protective system outputs:
 - ~~○ Trip outputs: trip intended trip coil(s) and open breaker.~~
 - ~~○ Close outputs: energize close coils and close the breaker(s).~~
 - ~~○ Assure relay outputs to pilot channel are functional.~~
 - ~~○ Assure all other outputs such as breaker failure initiate, special protection scheme signals, alarms, event recorder points, etc. are functional.~~~~
- ~~• Perform trip or other operational tests:
 - ~~○ Assure correct operation of the overall protection systems.~~
 - ~~○ Test automatic re-closing.~~~~
- ~~• Pilot schemes~~

~~PacifiCorp uses coordinated end-to-end tests to verify the overall operation of the protection system and the pilot channel as part of their commissioning tests. This test may be required as part of the operational testing. Modifications to a protection system also require similar testing to ensure correct system operation. The extent of testing and types of tests required depend upon the modifications made. PacifiCorp shall determine the extent and types of testing required.~~

~~4. SYSTEM OPERATION AND SCHEDULING DATA REQUIREMENTS~~

~~4-A. Introduction~~

~~All transmission arrangements for power schedules within, across, into or out of the PacifiCorp Load Control Area require metering and telemetering. Transmission arrangements with loads or new transmission facilities may include wheeling, voltage control, and AGC. The technical plan of service for interconnecting a load or new transmission facility will include the metering and telemetering equipment consistent with the transmission contract provisions. Such metering and telemetering equipment may be owned, operated, and maintained by PacifiCorp or by other parties approved by PacifiCorp.~~

~~Revenue metering, system dispatching, operation, control, transmission scheduling and power scheduling each impose different requirements concerning metering, telemetering, data acquisition, and control. Specific requirements also vary depending upon whether the new connection is directly interconnected to the PacifiCorp Electric System or electronically interconnected via telemetering that places the connection within or outside the PacifiCorp Load Control Area.~~

~~4-B. System Operation Requirements~~

~~1. Telemetering Requirements~~

~~PacifiCorp Electric System Dispatching requires telemetering data for the integration of new interconnections at adjacent Load Control Area boundaries. This typically consists of the continuous telemetering of kW quantities and hourly transmission of the previous hour's kWh from the Point of Interconnection to the PacifiCorp transmission dispatching and control center.~~

~~Section 5 D discusses telecommunications requirements for telemetering and AGC. Table 4-1 summarizes telemetering requirements and Table 4-2 identifies requirements based on connection location. Typical requirements based on connection type include, but are not limited to the following:~~

- ~~• Telemetering is required for all normally closed interconnections at a PacifiCorp Load Control Area boundary. Telemetering of real power and energy (kW, kWh) is required. In addition, PacifiCorp may require reactive power (kvar, kvarh) information for power factor billing purposes. High capacity interconnections may require redundant metering and telemetering.~~
- ~~• For normally open or emergency tie connections, PacifiCorp shall determine telemetering needs on a case-by-case basis. FERC requires telemetering for these connections.~~
- ~~• For loads connected internally to the PacifiCorp Load Control Area, AGC telemetering is not normally required. For interruptible loads, PacifiCorp shall determine telemetering needs on a case-by-case basis. Connecting eccentric (non-conforming) loads may require an interface to the~~

~~generally one hour. Some types of dynamic signals may require shorter integration intervals. The integration interval shall be determined by the type of service provided consistent with PacifiCorp tariffs to properly account for transmission usage.~~

~~2.—Data Requirements for Load Control Area Services~~

~~Non-traditional sources are sometimes used for supplying ancillary services. If a load provides regulating or contingency reserve services, data requirements for deployment of the reserves will be similar to those applied to generating resources. To the extent that a third party may externally supply regulating or contingency reserve services at the PacifiCorp Load Control Area interconnecting boundary, data requirements for their deployment may be similar to those applied to generating resources.~~

~~Technical discussions between the Network Customer and PacifiCorp are necessary before the specific data requirements will be determined by PacifiCorp. The following provides a brief but non-exhaustive overview of these requirements:~~

~~If PacifiCorp is purchasing supplemental AGC services, AGC interface is required on a long term basis. Prior to purchasing supplemental services, an investigation into the capabilities, costs, and benefits of AGC control is required to determine the specific AGC requirements. Most supplemental services are scheduled and delivered using dynamic signals.~~

~~Ancillary Services requirements vary based on how the interconnected customer chooses to meet these obligations. Either the Network Customer or the entity making the transmission arrangements shall be responsible for the ancillary services obligations associated with the connection. Most self-provided ancillary services are scheduled and delivered using dynamic signals. The responsible party may fulfill its ancillary service obligations in any of the following ways:~~

- ~~○ Self provide ancillary services by making resources available to PacifiCorp to deploy.~~
- ~~○ Contract with a third party to make resources available to PacifiCorp to deploy.~~
- ~~○ Contract with PacifiCorp to cover this ancillary services obligation.~~
- ~~○ Where a third party is providing ancillary services, that entity shall provide the following data with a sampling rate of once per second or other rate established by NERC:~~
 - ~~▪ Net instantaneous power transferred (MW).~~
 - ~~▪ Instantaneous and total Mvar transferred.~~
 - ~~▪ Operating reserve capability during the next ten minutes.~~
 - ~~▪ kWh for last hour.~~

~~The Network Customer shall demonstrate that the selected options are technically sound and meet all relevant reliability policies and criteria of NERC, WSCC and NWPP or their successors. PacifiCorp reserves the right to modify or reject the selected option if it does not meet these requirements.~~

~~3.—Supervisory Control and Data Acquisition (SCADA) Requirements~~

4-C.—Interchange Scheduling Requirements

~~Loads integrated into the PacifiCorp Electric System shall adhere to the scheduling requirements of the prevailing tariff under which the load is taking transmission service from PacifiCorp. Customers will be required to provide PacifiCorp Transmission Scheduling with an estimate of their hourly load, hourly generation schedules, and/or net hourly interchange transactions. These estimates will be used both for pre-scheduling and planning purposes. PacifiCorp will require customers to provide these estimates as necessary in order for PacifiCorp to manage the load/resource balance within the PacifiCorp Load Control Area and to determine usage of the PacifiCorp Electric System.~~

~~In the case of transmission facilities, scheduling and accounting procedures shall be required if the facility is part of an interface between the PacifiCorp Load Control Area and another load control area. This scheduling and accounting of interchange between two load control areas generally requires telemetered data from the Point of Interconnection to the control centers of the Load Control Area operators. This data is termed “interchange metering and telemetering” by PacifiCorp and includes kW and kWh quantities. All Load Control Area transactions must be prescheduled for each hour using PacifiCorp’s normal scheduling procedures. The end of hour actual interchange must be conveyed each hour to PacifiCorp through the use of telemetering or data link.~~

~~When the interconnection represents a shared or jointly owned interface to PacifiCorp, then a calculated allocation is generally required to divide up the total metered interchange. This non-physical interface is accomplished by dynamic signal. A two-way dynamic signal is required when a combined request and response interface are used (e.g., supplemental AGC services). A one-way dynamic signal is required when a response (or following) interface is used (e.g., moving a control area boundary).~~

1.—Interchange Telemetering Requirements

~~Interchange telemetering generally consists of bi-directional meters and related telecommunications systems providing kW and kWh at or near the Point of Interconnection. The kW measurement is telemetered on a continuous basis for AGC. Hourly kWh information is sent each hour. Table 4-1 summarizes telemetering requirements. Table 4-2 identifies different scenarios that require telemetering. Interchange telemetering accuracy and calibration requirements are identical with those stated in Sections 4-D and 4-F.~~

~~Telemetering requires continuous knowledge of the quality of the meter reading. Associated with the telemetering signal are various indications of this quality. Analog telemetering is commonly accompanied with squelch and telemetering carrier fail alarms. A loss of meter potential or meter potential phase unbalance should trigger a telemetering carrier failure alarm. Digital telemetering has equivalent signal failure alarms. The metering equipment must also be monitored and alarmed in the telemetering signal. Typical alarms include but are not limited to:~~

- ~~●—Loss of meter potential~~
- ~~●—Loss of telemetering signal~~
- ~~●—Meter potential phase unbalance~~

4-D.—Revenue and Interchange Metering System

~~All connections of one kW or greater require PacifiCorp standard revenue or interchange metering system for the PacifiCorp billing and/or scheduling processes. Interchange metering will supply both dial-up readings and EMS SCADA output data to the Revenue Metering System (RMS). The KWH accumulator data collected through a remote terminal unit (RTU) will be compared monthly against the dial-up data for meter system accuracy. Metering data collected over a voice grade communication system will include working meter register reads, monthly register freeze reads and demand interval profile data. The meters shall be compatible with the PacifiCorp MV-90™ system and interrogated daily or whenever necessary for maintenance purposes. The KWH digital or analog accumulator data will be read hourly and compiled for the monthly KWH interchange report.~~

~~Interchange metering includes bi-directional energy data (kWh) and reactive data (kVARh) as well as telemetry requirements for alternate control purposes. The alternate control path is necessary in the event of a failure in the primary metering system. The metering shall be located to measure the net power at the Point of Interconnection delivered to or received from the PacifiCorp Load Control Area.~~

~~PacifiCorp typically owns and maintains the revenue metering at metering sites. PacifiCorp will supply the Network Customer the design details of the standard metering system should the Network Customer desire to furnish, own and/or maintain the metering system. If the selected system is not a PacifiCorp's standard metering system, PacifiCorp reserves the right to perform a full set of acceptance tests at the Network Customer's expense, prior to granting permission to use the non-standard system. Other meter types will be considered, subject to PacifiCorp approval, where a PacifiCorp authorized party performs the metering and telemetry functions.~~

1.—Revenue and Interchange Metering Requirements

~~PacifiCorp's standard meter package provides only three element meters for both grounded and ungrounded systems; for ungrounded metering, one element is unused.~~

~~The interchange metering package will include two revenue quality meters with all inputs and outputs terminated at a utility panel interposition block. One meter will be designated a primary meter and be used for EMS data that includes bidirectional KWH quantities, and instantaneous MW MVAR data. The second or backup meter will be used for telemetry MW data sent to the PacifiCorp alternate control center. All meters will be programmed identically as bi-directional meters in order to record real and reactive flow delivered or received from the Point of Interconnection. The standard revenue metering interval profile demand package includes bidirectional kWh and kVARh and per phase volthour demand interval recording. Additional quantities can be added if necessary in the PacifiCorp RMS.~~

~~The final metering design requirements including hardware I/O and software specifications will be written into the specific projects scoping documentation. Requests from foreign utilities for digital or analog metering outputs must be made prior to final design.~~

~~If the new Point of Interconnection results in the addition of generation to the PacifiCorp Electric System not previously accounted for, there will be additional metering requirements.~~

3.—Instrument Transformers

~~Voltage and current instrument transformers are required to be a wire wound extended range type with .15% metering accuracy class. The instrument transformers will maintain their accuracy ranging from 1 amp to 4000 amp current to .25 A to 750 amp current for both ratio error and phase angle error over the burden range of the installed metering circuit. Instrument transformers shall be standalone, located on the line at the delivery point such that the metering is not interrupted during possible switching configurations at the delivery point.~~

~~Paralleling CT's and internal CT's located inside breakers and power transformers for the purpose of revenue metering is not permitted. PacifiCorp may permit the use of optical transformers, if used additional equipment may be required for optical metering.~~

4.—Loss Compensation

~~PacifiCorp may require that Transmission System losses, such as those in lines and transformers, be accounted for in the revenue metering process. PacifiCorp requires that any applicable loss compensation be performed in the meter, rather than calculated in the billing system. PacifiCorp will modify the revenue metering to accommodate the transformer and/or line loss factors applicable to each site.~~

5.—Station Service Power

~~Depending upon its electrical source and electrical location, the station service power for the connecting substation facilities may also require Revenue Metering. It may or may not be necessary to meter station service varhours. The other requirements of this section apply to station service metering.~~

6.—Initial and Periodic System Verification

~~At least once, a documented verification of instrument transformer ratios shall be performed. This requires measurement of primary current simultaneously with secondary current to determine actual ratio to within 10% of marked nameplate ratio. Transformer turns ratio (TTR) on voltage transformers or CT tester check shall substitute if in service primary measuring equipment is unavailable. The objective is to ensure that the instrument transformer ratios are documented and are connected to known taps under known burden conditions. This test shall be performed during a scheduled bi-annual test if there is no record of a verification being performed and when instrument transformers are replaced.~~

~~PacifiCorp and the Network Customer agree that a certification of the meter system accuracy be done at least biannually or as specifically agreed upon in the interchange agreement. The owner of the facility shall give the other parties notification of at least two weeks for the impending test. A copy of the test results shall be available to all parties involved or on file for review.~~

Table 4-1—General Metering and Telemetry Data Requirements

System or Quantity	System Dispatching and Operations	Transmission Scheduling	Revenue Billing

System or Quantity	System Dispatching and Operations	Transmission Scheduling	Revenue Billing
Data Sample Rate	kW: 1 second or other approved rate compatible with NERC Policy	Last Hour kWh sent each hour	Hourly kWh Data Retrieved daily (RMS type system)²
Tie Capacity	all normally closed ties	all normally closed ties	all ties
AGC	all Load Control Area boundaries & customer connections providing ancillary services	No	No

Notes:

- ~~1. A kW reading for revenue billing may be required where special transmission arrangements are necessary.~~
- ~~2. Dial up phone line required for the RMS.~~

Table 4-2 Metering, Telemetry and SCADA Data Requirements vs. Connection Location

	Connection Located INSIDE PAC Load Control Area	Connection Located OUTSIDE PAC Load Control Area
Direct Electrical Connection to PacifiCorp's System	kW, kWh, RMS, kvar, kvarh, kV breaker status & control	kW, kWh, RMS, kvar, kvarh, kV breaker status & control
NO Direct Electrical Connection to PacifiCorp's System	kW, kWh, RMS	None

Note—Dedicated circuit is required for kW, kWh, kvar, kvarh, and kV

5. TELECOMMUNICATION REQUIREMENTS

5 A. Introduction

~~of any metering, telemetry or communications equipment errors or malfunctions that require the attention and/or correction by Interconnection Customer. Interconnection Customer shall correct such error or malfunction as soon as reasonably feasible.~~

~~Interconnection Customer shall own, operate and maintain communication equipment at its interconnection facilities as required by PacifiCorp to deliver required interconnection data to PacifiCorp's control centers. PacifiCorp will promptly advise the Interconnection Customer if it detects malfunctions in the communication equipment. Interconnection Customer shall have call-out repair crews available 24 hours a day 7 days a week. Interconnection Customer shall work diligently with PacifiCorp and any other entities that carry communication traffic back to PacifiCorp to resolve any such failure. Interconnection Customer and PacifiCorp shall correct such error or malfunction as soon as reasonably practicable.~~

~~All RTU, telemetering and communications equipment shall conform to PacifiCorp's Transmission System Interconnection Requirements attached as Appendix C~~

~~Telecommunications facilities shall be identified on the Project Requirements Diagram. The telecommunications facilities may consist of any or all of the following depending on the performance and reliability requirements of the control and metering systems to be supported:~~

~~1. Microwave Systems~~

~~A microwave system requires transmitters, receivers, telecommunication fault alarm equipment, antennas, batteries, and multiplex equipment. It may also include buildings, towers, emergency power systems, mountaintop repeater stations and their associated land access rights, as needed to provide an unobstructed and reliable telecommunications path. Where needed to meet power system reliability requirements by protecting against telecommunications outages caused by equipment failure or atmospheric conditions, microwave path diversity, equipment redundancy, and/or route redundancy shall be required.~~

~~2. Fiber Optic Systems~~

~~A fiber optic system requires light wave transmitters, receivers, telecommunication fault alarm equipment, multiplex equipment, batteries, emergency power systems, fiber optic cable (underground or overhead) and rights of way. Where needed to protect against cable breaks and resulting telecommunications outages, cable route redundancy shall be required.~~

~~3. Wireline Facilities~~

~~A wireline facility requires telecommunications cable (underground or overhead), high voltage isolation equipment and rights of way. It may also include multiplex equipment, emergency power systems, and batteries, depending on the wireline technology employed. Cable route redundancy may be required to protect against cable breaks and resulting telecommunications outage.~~

~~4. Power Line Carrier Current Systems~~

~~A power line carrier current system uses the actual power line conductor(s) as the transmission media. Coupling capacitors, line tuning units, and wave traps are connected to the circuit to connect the carrier transmitter and receiver to the power line. Because power line carrier availability and performance is greatly affected by line outages, its use for control, data, and voice communications is limited and must be~~

~~other than Main Grid, PacifiCorp may, in its discretion, approve the use of common carrier telecommunications alternatives, subject to reliability and availability requirements and capabilities.~~

~~2.—Main Grid~~

~~Telecommunications systems serving Main Grid Transmission Systems shall be fully redundant with a service availability time equal to or exceeding the power system availability goal. The design availability for telecommunications systems serving Main Grid transmission shall be at least 99.986%. This required percentage is based on total outage time of 24 hours in 20 years due to path or components. The design availability for telecommunications systems serving secondary transmission shall be at least 99.88%. This required percentage is based on total outage time of 10 1/2 hours per year due to path or components.~~

~~3.—Alternate Routing~~

~~If alternately routed telecommunications are required for Main Grid protective relaying schemes, the overall availability of the alternately routed telecommunications shall be at least 99.9998%. Availability is determined for the total path of the protective relaying circuit, from one end of the transmission line to the other. PacifiCorp will consider options for achieving these availability requirements by utilizing two or more separate telecommunication methods, routes or systems. When alternately routed telecommunications for protective relaying schemes are required, a combination of two of these telecommunications methods may be used to meet availability requirements.~~

~~5-C.—Voice Communications~~

~~If the Point of Interconnection is within the PacifiCorp Load Control Area:~~

~~1.—Voice Communications~~

~~Voice Communications between the PacifiCorp dispatchers and the Point of Interconnection operator or dispatcher shall be required whenever any type of telemetering is required.~~

~~2.—A Dedicated, Direct, Automatic Ringdown Trunk~~

~~A Dedicated, Direct, Automatic Ringdown Trunk (or equivalent) voice circuit between the PacifiCorp dispatchers and the Point of Interconnection operator or dispatcher may be required for:~~

- ~~○ Loads of 50 MW or greater,~~
- ~~○ Eccentric (non-conforming) Loads~~
- ~~○ Connected networks that include automatic generation dropping for PacifiCorp Transmission system remedial action.~~
- ~~○ A non-radial interconnection to another electric utility with a transfer capability in either direction of 50 MW or greater.~~
- ~~○ PacifiCorp shall determine whether a dedicated, direct, automatic ringdown trunk (or equivalent) voice circuit is required.~~
- ~~○ Independent Voice Communications for coordination of system protection, control, and~~

~~1.—SCADA Requirements~~

~~SCADA Requirements generally include one or more dedicated circuits between the new Point of Interconnection and the appropriate PacifiCorp transmission dispatching center(s).~~

~~2.—AGC Interchange and Control Telemetry~~

~~AGC Interchange and Control Telemetry for operations and scheduling applications generally require one or more dedicated circuits between the new Point of Interconnection and the appropriate PacifiCorp transmission dispatching center(s). Digital telecommunications capabilities from 1200 to 2400 baud rate shall be required. The Inter Control Center Communications Protocol Network can be used for AGC purposes upon the agreement of PacifiCorp and the Network Customer only for very small and/or radial interchanges and generation quantities. These situations may require a NERC waiver. (For these rare circumstances, refresh times as slow as one minute may be acceptable.)~~

~~3.—General Telemetry~~

~~General Telemetry for kWh and data acquisition systems generally require one or more dedicated circuits between the new Point of Interconnection and the appropriate kWh or data acquisition system master computer.~~

~~4.—Revenue Metering System~~

~~Revenue Metering System (MV 90™) remote equipment require commercial ‘dial up’ telephone exchange line facilities to communicate with the MV 90™ master computer at the PacifiCorp Control Center. The circuit used for this purpose may also be shared with voice communications and other dial up data communications.~~

~~5.E.—Telecommunications for Control and Protection~~

~~Telecommunications for Control and Protection shall be designed to function at the full performance level before, during, and after any power system fault condition. The delivery of a false trip or control signal, or the failure to deliver a valid trip signal is not acceptable. Active telecommunication circuits for control and/or protection shall not be tested, switched, shorted, grounded or changed in any manner by any person, unless prior arrangements have been made and approval granted through the PacifiCorp Dispatcher.~~

~~1.—Main Grid Transmission~~

~~New connections to the PacifiCorp Main Grid, and connections which require remedial actions on the PacifiCorp Electric System, shall have redundant (i.e., hot standby or frequency diversity) telecommunications systems. Alternately routed telecommunication circuits are required on 345kV and higher protection circuits.~~

~~2.—Secondary Transmission.~~

~~New connections to the PacifiCorp secondary grid transmission generally do not require redundant telecommunications systems. However, under some circumstances, redundant telecommunications are~~

~~4.—Equipment Compatibility~~

~~In order to provide maintainability and operability between the new connection and the PacifiCorp Electric System, the protection systems and their supporting telecommunications system equipment (teleprotection) shall be functionally compatible. At the time of the new connection request, PacifiCorp shall supply the Network Customer with a list of acceptable, prequalified equipment. Should the Network Customer choose to use something other than what has been prequalified by PacifiCorp, PacifiCorp reserves the right to test, at the Network Customer's expense, and approve or disapprove the equipment prior to installation.~~

~~PacifiCorp may permit the use of alternative equipment and/or technologies as proposed by the Network Customer where the equipment is suitable for the purposes of the control application required. The teleprotection systems, including transfer trip, proposed by the Network Customer must be engineered and tested to demonstrate that they perform their intended functions. When applying sophisticated digital telecommunications systems to certain protection schemes, the Network Customer shall avoid combining approaches with inherent technical conflicts or incompatible methodologies.~~

~~5-F.—Telecommunications during Emergency Conditions~~

~~1.—Emergency Conditions~~

~~The requirements discussed in the previous sections address the availability and redundancy for telecommunications systems and equipment to assure reliable operation of the PacifiCorp Electric System under normal telecommunications conditions. Normal conditions for telecommunications include both normal and emergency conditions for the Transmission System. However, emergency conditions may develop that affect power system telecommunications with or without directly affecting power Transmission System facilities.~~

~~Examples of telecommunications emergencies include but are not limited to the following:~~

- ~~• Interruption of power service to telecommunications repeater and relay stations.~~
- ~~• Telecommunications equipment failure, whether minor or catastrophic.~~
- ~~• Interruption or failure of commercial, public telephone network facilities or services.~~
- ~~• Damage to telecommunications facilities resulting from accident, acts of vandalism, or natural causes.~~

~~Equipment redundancy and telecommunications route redundancy can protect against certain kinds of failure and telecommunications path interruption. The Network Customer shall maintain a dedicated repair team along with an adequate supply of spare components.~~

~~2.—Backup Equipment~~

~~Where commercial public telephone network facilities or services support significant power system telecommunications, the Network Customer shall develop a backup strategy to protect against interruption of such services. Backup methodologies could include, but are not limited to, redundant services, self healing services, multiple independent routes and/or carriers, and combinations of independent~~

~~3.—Disaster Recovery~~

~~The Network Customer shall have in place a disaster recovery plan for telecommunications restoration, and should exercise this plan periodically. The disaster recovery plan shall include the ability to deploy transportable restoration equipment capable of temporarily bypassing or replacing entire telecommunication stations or major apparatus until permanent repairs can be made.~~

~~4.—Telecommunications Security~~

~~The Network Customer shall continuously monitor the operation of power system telecommunications facilities at a central alarm point so that trouble can be immediately reported, diagnosed, repaired and service restored. The Network Customer shall secure power system telecommunication sites and facilities against unauthorized access by means of locked gates, security fences, warning signs, security doors, and entry alarms.~~

~~5.—Definitions~~

~~For industry standard definitions of electric industry terminology, the *IEEE Standard Dictionary of Electrical and Electronic Terms*, IEEE Std 100-1992, as amended or replaced, shall apply.~~

~~For the purposes of this document the following definitions apply:~~

~~**ACE**—Area Control Error is the instantaneous difference between net actual and scheduled interchange, taking into account the effects of frequency bias including a correction for meter error.~~

~~**Active Power**—The component of total volt-amperes in an electric circuit where the voltage and current are in phase. It is also called real power and is measured in watts (W), kW or MW. This is the electrical power associated with useful energy, including mechanical work and heat. Active power used or transmitted over time is measured in kilowatt-hours (kWh) or MWh.~~

~~**Ancillary Services**—The term used by FERC to describe the special services that must be exchanged among generation resources, load customers and transmission providers to operate the system in a reliable fashion and allow separation of generation, transmission and distribution functions. These include: 1) scheduling, system control and dispatch, 2) reactive supply and voltage control from generators, 3) regulation and frequency response, 4) energy imbalance, 5) spinning reserves, and 6) supplemental reserves. FERC requires transmission providers to include these services in an open access transmission tariff. Most of these services are included in a similar set by NERC and termed Interconnected Operations Services, which also include load following and black start capability.~~

~~**Automatic Generation Control (AGC) System**—A system that measures instantaneous loads at interchange points (boundaries with adjacent Load Control Areas) and adjusts generation to follow load. It consists of continuous, real-time load signals (kW), telemetered to AGC computers at a transmission control center. At PacifiCorp this would require connection to the microwave system. An AGC System automatically adjusts a Load Control Area's generation from a central location to maintain its interchange schedule plus frequency bias.~~

~~**Baud Rate**—A unit of signaling speed equal to the number of discrete conditions or signal events per~~

Point of Interconnection—The location on the PacifiCorp Electric System where a new connection is established to serve a load or connect a line to another electrical system.

Demand—The rate at which energy is being used by a customer. (NERC)

Directional Relay—A relay that responds to the relative phase position of a current with respect to another current or voltage reference.

Distribution—The lower voltage lines and equipment directly serving electrical consumers. This is generally a radial circuit, operating at voltages at or below 69 kV. The term ‘distribution’ may also be used to refer to equipment operating at or below 69 kV.

Disturbance—An unplanned event that produces an abnormal system condition. (WSCC)

Dynamic Schedule—A telemetered reading or value which is updated in real time and which is used as schedule in the automatic generation control and area control error equation (AGC/ACE) and the integrated value of which is treated as a schedule for interchange accounting purposes. Commonly used for ‘scheduling’ jointly owned generation to or from another control area.

Dynamic Scheduling Service—Provides the metering, telemetering, computer software, hardware, telecommunications, engineering, and administration required to electronically move a transmission customer's generation or demand out of the Control Area to which it is physically interconnected and into a different Control Area.

Dynamic Signal—A telemetered reading or value that is updated in real time, and which is used either as a tie line flow or as a schedule in the AGC/ACE equation (depending on the particular circumstances). Common applications of dynamic signals include ‘scheduling’ jointly owned generation to or from another control area and to move control area boundaries. Another application provides for an entity to request (schedule) a change in power flow. The resulting response is telemetered to the entity signifying the actual movement of a resource. This form of dynamic signal is applied to supplemental control area services. The integrated value of this signal is used for interchange accounting purposes, as appropriate.

Eccentric (Non-Conforming) Loads—Any cyclic load with the ability to change periodically by more than 50MW at a rate of greater than 50MW per minute, regardless of the duration of this change.

Effectively Grounded—A system that provides an $X_0/X_1 < 3$ & $R_0/X_1 < 1$ where X_0 and R_0 are zero sequence reactance and resistance respectively, and X_1 is positive sequence reactance.

Fault—A short circuit on an electrical transmission or distribution system between phases or between phases(s) and ground, characterized by high currents and low voltages.

FERC—Federal Energy Regulatory Commission

Ferroresonance—A phenomenon usually characterized by overvoltages and very irregular voltage and current wave shapes and associated with the excitation of one or more saturable inductors through capacitance in series with the inductor (IEEE). A condition of sustained waveform distortion and overvoltages created when a relatively weak source of voltage energizes the combination of capacitance and saturable transformers. A sufficient amount of damping, or resistance, in the circuit usually controls

Interchange Metering—Metering at interchange points between two controlling utilities. Consists of AGC (continuous kW) telemetering and hourly kWh (on the hour hourly load kWh). These quantities must go to both controlling utilities so they can manage their respective Load Control Areas.

Interchange Point—Locations where power flows from one Load Control Area to another (i.e., connection between two controlling utilities).

Island—A portion of the interconnected WSCC system that has become isolated due to the tripping of Transmission System elements. ‘Local’ Island—A portion of the Transmission System, often a single line, that is isolated from the main system and energized by a local generator.

kWh System (Kilowatt Hour System)—Provides interchange point hourly data each hour (as compared to RMS system that reports hourly load data each day). Requires connection into the PacifiCorp microwave system. kWh data is used to verify hourly schedules.

Load Control Area—The electrical (not necessarily geographical) area within which a controlling utility has the responsibility to adjust its generation to match internal load and power flow across interchange boundaries to other Load Control Areas. A Load Control Area may include a resource or portion of a resource that is scheduled by a specific utility. If the utility schedules the resource, the resource becomes part of its Load Control Area. Physical location of the Point of Interconnection does not determine its Load Control Area. A Load Control Area contributes its frequency bias obligation to the interconnection.

Loop Flow—The unscheduled use of another utility’s transmission resulting from movement of electricity along multiple paths in a grid, whereby power, in taking a path of least resistance, might be physically delivered through any of a number of possible paths that are not easily controlled.

Main Grid—As presently defined PacifiCorp’s Main Grid transmission facilities include all 500 kV lines, 345 kV lines, and 230 kV lines that perform the main grid function. Those portions of substations, including transformers, supporting the main grid, are also included.

MV-90™—The Multi-Vendor Translation System interprets a variety of metering communication protocols used for data collection and analysis. Data is retrieved over dial-up (voice grade) telephone lines by the MV90™ master. Master automatically polls the remotes daily. Master can also be forced to poll a remote at any time through dial-in terminal ports available on the master. In addition to polling raw impulses from the recorders, MV-90™ can perform data validation, editing, reporting and historical database functions.

NERC—North American Electric Reliability Council is a not-for-profit company formed by the electric utility industry in 1968 to promote the reliability of the electricity supply in North America. NERC consists of nine Regional Reliability Councils, one of which is the Western Systems Coordinating Council.

Non-spinning Reserve—That portion of the operating reserve capable of being connected to the bus and loaded within ten minutes. Also included is any load which is designated for use as reserve and can be reduced by dispatcher action within ten minutes. (WSCC)

NWPP—Northwest Power Pool

Phase Unbalance—The percent deviation of voltage or current in one phase as compared to the average of all three phases.

Pilot Protection—A form of line protection that uses a communication channel as a means to compare electrical conditions at the terminals of a line. (IEEE) The communication channel may be power line carrier, microwave or other radio, fiber optics, leased telephone line or a dedicated hardwire circuit.

Power Factor—The ratio of real power in watts to the product of volts times amperes in an alternating current circuit. The power factor is unity when the voltage and current are in phase. A ‘lagging’ power factor is associated with a partially or wholly inductive load that ‘absorbs’ positive reactive power. A ‘lagging’ power factor is also associated with a generator that ‘delivers’ positive reactive power. A ‘leading’ power factor is associated with a capacitive load that ‘delivers’ or a generator that ‘absorbs’ positive reactive power.

Power System—The integrated electrical generation and transmission facilities owned or controlled by one electric utility organization. (WSCC)

Prudent Electric Utility Practices or ‘Prudent Utility Practice’—Any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region.

Pseudo-Tie—A telemetered reading or value that is updated in real time and used as a tie line flow in the AGC/ACE equation but for which no physical tie or energy metering actually exists. It usually represents a portion of an actual metered flow. The integrated value is used as a metered megawatthour (MWh) value for interchange accounting purposes. A pseudo-tie is one form of dynamic signal.

Radial Line—A transmission line that is connected to the transmission network only at one end, or a distribution line where only one end connects back to the network and loads are served at the other end and along the line.

Reactive Power—The component of total volt-amperes in an alternating current circuit where the voltage and current are out of phase by ninety electrical degrees. It is measured in units of volt-amperes reactive (var), kvar or Mvar. It represents the power involved in the alternating exchange of stored energy in inductive and capacitive electromagnetic fields. By convention, positive reactive power is ‘absorbed’ by an inductance and ‘generated’ by a capacitance. Reactive power transferred over time is measured in var-hours (varh).

Real Power—The component of total volt-amperes in an electric circuit where the voltage and current are in phase. It is also called active power and is measured in watts (W), kW or MW. This is the electrical power associated with useful energy, including mechanical work and heat. Real power used or transmitted over time is measured in kilowatt-hours (kWh) or MWh.

Real Time Data—Data used with real-time simulation (e.g., real-time) to determine the effects of

Network Customer—An electrical utility or other customer or their representative that is requesting a new connection to the PacifiCorp Transmission System.

Revenue Metering—General term for metering which is calibrated to ANSI Standards for Billing Accuracy.

Revenue Metering System (RMS)—Provides hourly data daily (as compared to kWh system that reports hourly load each hour). A meter and recording device is installed at points where billing quality data is required. The device meters kW and kvar (bi-directional for Points of Interconnection) and records kWh and kvarh data on a hourly basis.

SAIDI—System automatic interruption duration index is a measure of electric utility performance using the length of automatic interruptions as the measure.

SAIFI—System automatic interruption frequency index is a measure of electric utility performance using the number of automatic interruptions as the measure.

Single Pole Switching (SPS)—The practice of tripping and reclosing one pole (phase) of a three pole circuit breaker without changing the state of the remaining poles. Tripping is initiated by single pole relays that respond selectively to the faulted phase. Circuit breakers used for single pole switching must inherently be capable of independent pole opening. In most single pole switching schemes it is the practice to trip all poles for any fault involving more than one phase. (IEEE)

Spinning Reserve—That portion of the operating reserve which is synchronized to the system, responds automatically to fluctuations in system frequency, and is capable of assuming load up to the cited spinning reserve magnitude within ten minutes. (WSCC)

Station Service—The electric supply for the ancillary equipment used to operate a generating station or substation. (NERC)

Supervisory Control and Data Acquisition (SCADA)—A system of remote control and telemetering used to monitor and control the Transmission System. (NERC)

Tap Line—A line that connects to an existing transmission or distribution line without breakers at the tap point, resulting in an additional terminal on the existing line.

TCSC—Thyristor Controlled Series Capacitor

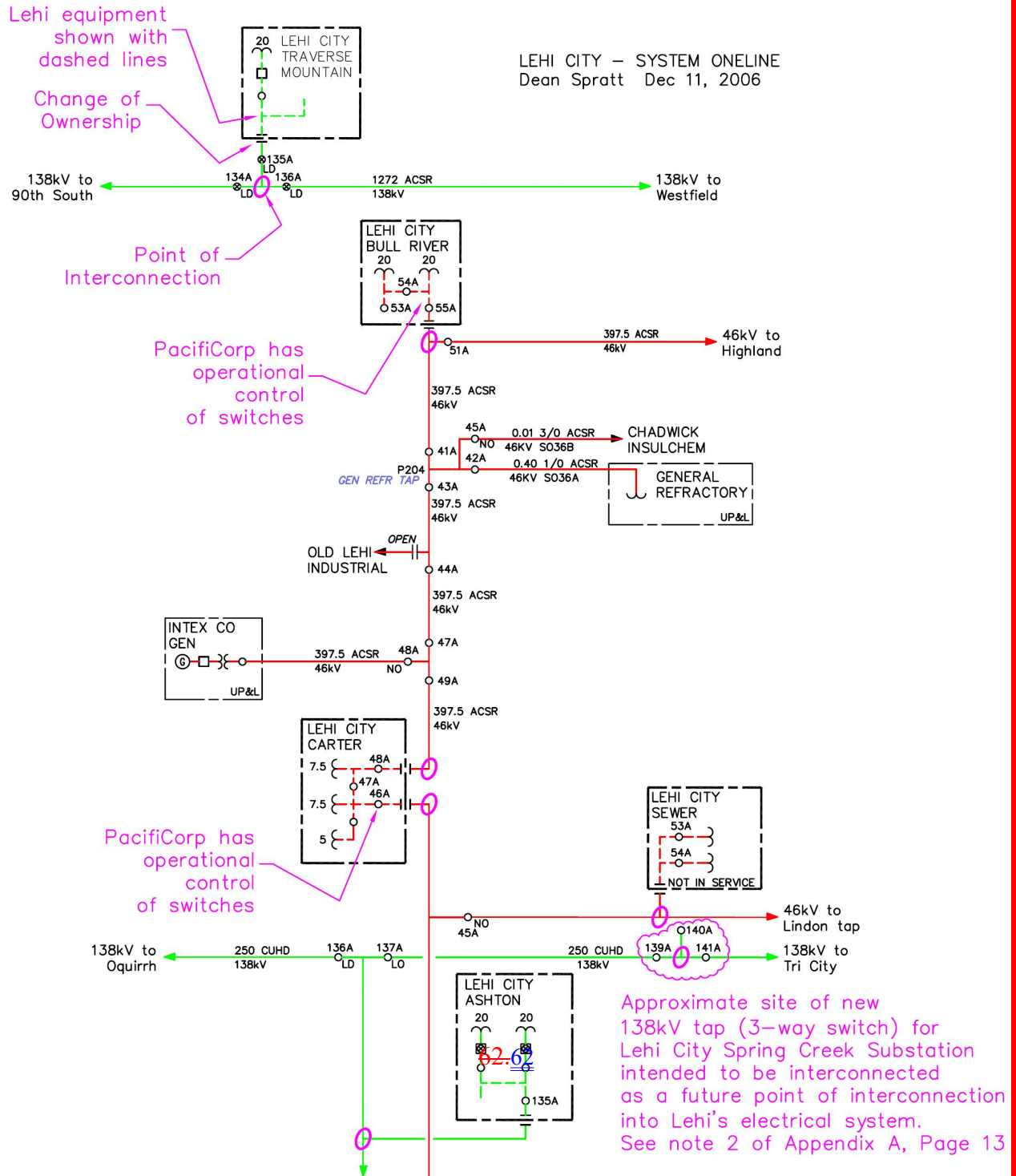
Telemetering—The process by which measurable electrical quantities from substations and generating stations are instantaneously transmitted using telecommunication techniques, including, but not limited to continuous real time data reporting for AGC and Generation kW (but not for kWh or RMS Systems, which are not continuously reported).

Three Pole Switching—A relay system and corresponding switchgear that trips or opens all three poles (phases) regardless of fault type.

Wheeling—Transmitting power from one point to another within a Load Control Area or between Load Control Areas.

~~Appendix C: One-Line Diagram(s)~~

LEHI CITY – SYSTEM ONELINE
Dean Spratt Dec 11, 2006



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Appendix D: PacifiCorp's Planning Standards for Voltage

APPENDIX B
ONE-LINE DIAGRAM

