



Western Area
Power Administration

Western Area Power Administration

General Requirements for Interconnection

APPROVED:

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Chair, Power Systems Operations Council

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I. Introduction

Western Area Power Administration (~~WAPA~~~~estern~~) is a Federal Power Marketing Administration within the U.S. Department of Energy (DOE). ~~Western~~WAPA's primary mission is to market Federal power to project use and preference customers comprised of non-profit public entities such as electric cooperatives, Native American tribes, municipal utilities, and Federal and state government entities. ~~Western~~WAPA owns and operates over 17,000 miles of high-voltage transmission lines throughout 15 central and western states, encompassing a geographic area of 1.3 million square miles. ~~Western~~WAPA's transmission system resides within both the Midwest Reliability Organization (MRO) and the ~~Western~~Western Electricity Coordinating Council (WECC). ~~Western~~WAPA has four Regional offices located in Phoenix, Arizona (Desert Southwest Region (DSWR)), Loveland, Colorado (Rocky Mountain Region (RMR)), Sacramento, California (Sierra Nevada Region (SNR)), and Billings, Montana (Upper Great Plains Region (UGPR)), as well as the Colorado River Storage Project (CRSP) Management Center located in Salt Lake City, Utah (collectively, Regions), and a ~~Corporate~~ServicesHeadquarters Office located in Lakewood, Colorado.

~~Western~~WAPA is not defined as a "public utility" under sections 205 and 206 of the Federal Power Act (FPA), and ~~Western~~WAPA therefore is not subject to the jurisdiction of the Federal Energy Regulatory Commission (FERC) under those statutes. ~~Western~~WAPA is, however, a transmitting utility subject to FPA sections 210-213. Nonetheless, ~~Western~~WAPA maintains a voluntary reciprocity Open Access Transmission Tariff (Tariff) on file with FERC, which codifies the procedures and general requirements for customers seeking to obtain transmission and/or generator interconnection services from ~~Western~~WAPA; in the Regions where WAPA's Tariff is utilized, WAPA's UGPR joined the Southwest Power Pool, Inc. (SPP), a Regional Transmission Organization (RTO) effective October 1, 2015, and therefore transmission (delivery point additions) and/or generation interconnection services in the UGPR will need to be obtained under Attachment AQ or Attachment V respectively of the SPP Open Access Transmission Tariff (SPP Tariff) instead of WAPA's Tariff for interconnections to UGPR's transmission facilities included under the SPP Tariff.

II. Purpose and Supersession

~~Western~~WAPA's General Requirements for Interconnection (Requirements) set forth the procedures and requirements for certain types of interconnection to ~~Western~~WAPA's

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transmission system that are not provided for in WesternWAPA's Tariff, or applicable RTO's Tariff – e.g., system-to-system interconnections not associated with transmission or generator interconnection service. Transmission service and generator interconnection requests must be submitted and will be evaluated according to the procedures outlined in WesternWAPA's Tariff, or applicable RTO's Tariff. However, Attachments C and E to these Requirements contain additional technical requirements applicable to generators and loads interconnecting to WesternWAPA's transmission system¹.

This version of the Requirements supersedes all previous versions distributed or posted by WesternWAPA.

III. Interconnection Process

A. Responsibility of WesternWAPA

WesternWAPA will receive and process an interconnection requested under these Requirements. WesternWAPA will be responsible for all aspects of the interconnection process. To the extent that WesternWAPA requires the expertise and services of others in providing the interconnection; WesternWAPA will enter into appropriate contracts with such entities.

Each interconnection request is evaluated on a case-by-case basis, and is subject to meeting the reasonable needs of the entity requesting interconnection to WesternWAPA's transmission system (Requestor). WesternWAPA generally assumes responsibility to operate and maintain facilities interconnected to WesternWAPA's transmission system pursuant to the terms of the Interconnection Agreement. Interconnection under these Requirements does not involve or guarantee transmission service or generation interconnection service on WAPA's transmission system, and requests for such service must be submitted in accordance with the procedures and general requirements codified in WesternWAPA's Tariff, or applicable RTO's Tariff.

B. Process Overview

¹ If the interconnection is to a WAPA transmission facility included under a RTO's Tariff, additional RTO criteria and requirements (e.g. SPP criteria and requirements in the case of UGPR's transmission facilities included under the SPP Tariff) may apply. Consult with the WAPA Regional representative for information, if applicable.

WesternWAPA will coordinate all aspects of the proposed interconnection, including but not limited to: processing the interconnection request; preparing agreements; performing interconnection studies and environmental review; acquiring land; constructing facilities; and administering billing and payment of study, land, construction, and any other costs. If the interconnection is to a WAPA transmission facility included under a RTO Tariff, WAPA will coordinate and process the interconnection request consistent with these Requirements and the applicable RTO procedures and study requirements. In that regard, the interconnection process follows these general steps:

- (1) Initial contact
- (2) Submittal of interconnection application
- (3) Conduct System Impact Study
- (4) Conduct Facilities Study
- (5) Initiate environmental review
- (6) Initiate land acquisition
- (7) Develop Construction and Interconnection Agreements
- (8) Construct facilities
- (9) Energize facilities
- (10) Project closeout

Within legal and technical parameters, the interconnection process steps may be modified by WesternWAPA on a case-by-case basis depending upon the specific circumstances of the interconnection request.

C. Process in Detail

1. Initial Contact

Potential Requestors are encouraged to discuss their proposed interconnection projects with a representative at the applicable WesternWAPA Regional Office (see Attachment A to these Requirements for contact information). This will facilitate WesternWAPA's understanding of the proposal, and will help better familiarize the Requestor with WesternWAPA's interconnection process.

In addition, prior to contacting ~~Western~~WAPA, Requestors are encouraged to visit ~~Western~~WAPA's Internet site (www.wapa.gov)² and review the following documents, copies of which will also be provided upon request:

- ~~Western~~WAPA's [Tariff](#)
- ~~Western~~WAPA's [General Power Contract Provisions](#)
Or for UGPR: [General Interconnection Contract Provisions](#)
- Other ~~d~~Documents outlined in Attachment D

2. Submittal of Application for Interconnection

a. Required Information

A formal interconnection request begins with the submittal of an Application for Interconnection (see Attachment B to these Requirements). If the interconnection is to a WAPA transmission facility included under a RTO Tariff, the RTO Tariff may outline certain application requirements, and the Requestor should contact the applicable WAPA Regional representative to obtain information regarding the application requirements and process and coordination between the application requirements set forth herein and the application requirements under the RTO Tariff. The interconnection request should be submitted well in advance of the anticipated construction start date. The Requestor needs to consider the required time to perform the environmental review and land acquisition, as described later herein. The Application for Interconnection must contain the following information:

- (1) The application date; proposed/estimated in-service date of the interconnection facilities; and the name, title, organization/company name, Federal tax ID number, full address, telephone number, fax number, and email address of the Requestor's primary contact person.
- (2) Type of interconnection (transmission interconnection; substation breaker bay addition; and/or other type of interconnection).

² In UGPR, Requestors are encouraged to also visit SPP's Internet site (www.spp.org) to review the SPP Tariff and other applicable SPP documents and procedures.

- (3) Ten-year projections of winter and summer peaks for any generation delivered or load served through the point of interconnection, if applicable.
- (4) A description of requested interconnection, including as much of the following information as possible that apply to the request:
 - (a) Single-line diagram(s) showing the proposed interconnection.
 - (b) Drawing(s) indicating physical arrangements of existing and proposed facilities.
 - (c) Geographic location of proposed interconnection and ~~Western~~WAPA structure numbers, if available.
 - (d) Description of proposed routing, and dimensions and configurations of new structures and facilities.
 - (e) Description of generating resources or loads, if applicable.
 - (f) Description and ratings of proposed transformers, circuit breakers, switches, metering, associated communications, and relaying and other equipment.
 - (g) Proposed transmission path(s) and service arrangements between generation resources and associated loads, where applicable.
 - (h) Appropriate revenue and telemetering equipment specifications.
 - (i) Copies of relevant planning or operational studies.
 - (j) Proposed construction schedule.
 - (k) Copies of relevant environmental impact assessments, reports, or projections; or description of anticipated scope of environmental review.
- (5) Name, title, and signature of the Requestor's authorized representative and date executed.

- (6) A deposit of \$5,000 to be applied by [WesternWAPA](#) toward its costs of conducting meetings, contract preparation, and other such work.
- (7) Ability of the Requestor to be bonded (if required by [WesternWAPA](#)) – at [WesternWAPA](#)'s sole discretion, the Requestor may be required to submit proof of bonding at the time of construction.

An Application for Interconnection shall not be considered to be a valid interconnection request until all of the above information and the requisite deposit have been received by [WesternWAPA](#). If an Application for Interconnection fails to meet these conditions, [WesternWAPA](#) will notify the Requestor that the Application for Interconnection does not constitute a valid request and will provide an explanation of the reason(s) for such failure. The Requestor shall provide [WesternWAPA](#) with the additional requested information needed to constitute a valid request within 10 business days after receipt of such notice.

Upon receipt of a valid interconnection request, [WesternWAPA](#) will notify the Requestor accordingly and schedule a scoping meeting, if necessary, to review the interconnection request.

b. Multiple Sites

A separate Application for Interconnection must be submitted for each separate site to be considered for interconnection. The studies associated with separate applications for several sites may include the impacts of multiple sites.

3. Withdrawal of Interconnection Request

The Requestor may withdraw its interconnection request at any time by written notice of such withdrawal to [WesternWAPA](#). In addition, if the Requestor fails to adhere to all provisions of these Requirements, including any timeline or funding provision set forth herein, [WesternWAPA](#) will deem the interconnection request to be withdrawn and will provide written notice to Requestor of the deemed withdrawal and an explanation of the reason(s) for such deemed withdrawal. Upon receipt of such written notice, the Requestor shall have 15 business days to respond with information or action that cures the deficiency; provided, however, such deficiency does not include the failure to deliver an agreement or deposit by the required deadline.

4. Coordination with Affected Systems

~~WesternWAPA~~ will provide notice of the request to any affected ~~regional transmission organization (RTO)~~, transmission owner, and local distribution utility that may be affected by the proposed interconnection, subject to confidentiality requirements in Section IV.E.

~~WesternWAPA~~ will coordinate with such affected RTOs, transmission owners, and local distribution utilities in the performance of the interconnection studies and the construction of any facilities necessitated by the interconnection request.

5. Modifications

During the course of the interconnection studies, either ~~WesternWAPA~~ or the Requestor (individually, Party) may identify changes to the planned interconnection that may improve the costs and benefits (including reliability) of the interconnection, and improve ~~WesternWAPA's~~ ability to accommodate the interconnection request consistent with these Requirements, and/or applicable RTO Tariff. The Requestor shall submit its proposed modifications in writing to ~~WesternWAPA~~, with acceptance of such modifications to be made at ~~WesternWAPA's~~ sole discretion (or consistent with applicable RTO Tariff provisions).

6. Use of Deposits

If ~~WesternWAPA's~~ costs of conducting meetings, contract preparation, interconnection studies, and other such work does not exceed the amount of the applicable deposits required herein, ~~WesternWAPA~~ will refund, without interest, any portion of the deposits that exceed the cost of such work if and when the interconnection request is withdrawn, or if and when the interconnection request has moved into the construction phase of the project. Additionally, at the request of the Requestor, any outstanding deposit balance may be applied toward the costs of construction when requested in writing.

If ~~WesternWAPA's~~ cost of conducting meetings, contract preparation, interconnection studies, and other such work exceeds the amount of the applicable deposits, ~~WesternWAPA~~ will invoice the Requestor for all such additional costs on a monthly basis in advance. The Requestor shall pay such invoiced amounts within 30 calendar days of its receipt of the invoice.

~~WesternWAPA~~ will utilize actual cost accounting when performing the interconnection studies, and will keep detailed records of costs incurred.

7. System Impact Study

a. Scope

The System Impact Study consists of power flow, short circuit, and stability analyses. The power flow analysis will evaluate the impact of the interconnection on the thermal loading and voltages on WesternWAPA's transmission system and the systems of any affected RTOs, and transmission owners. The short circuit analysis will evaluate the impact of the proposed capacity changes on the short circuit current capability of the circuit breakers and other equipment at the point of interconnection and at other affected stations. The stability analysis will determine whether any instability or inadequately damped response to system disturbances results from the interconnection.

The planning criteria that WesternWAPA will use in the System Impact Study will be the applicable Electric Reliability Organization (ERO) and Regional Reliability Organization (RRO) reliability standards, relevant RTO criteria (if applicable), and WesternWAPA's relevant planning criteria. In conducting the System Impact Study, WesternWAPA will utilize existing studies to the extent practicable.

At WesternWAPA's option, interconnection requests may be studied serially or in clusters for the purpose of the System Impact Study, and the terms for cluster studies will be set forth in the System Impact Study Agreement.

b. Agreement

As soon as practicable after receipt of a valid interconnection request, WesternWAPA will tender to the Requestor a System Impact Study Agreement. The System Impact Study Agreement will provide that the Requestor shall compensate WesternWAPA for the actual cost of the System Impact Study. WesternWAPA will also provide non-binding good faith estimates of the cost and timeframe for completing the System Impact Study.

The Requestor shall execute the System Impact Study Agreement and deliver it to WesternWAPA no later than 30 calendar days after its receipt, along with a deposit equal to WesternWAPA's good faith estimated costs of conducting the System Impact Study. If WesternWAPA requests additional data to conduct the System Impact Study and the Requestor does not provide all such data when it delivers the executed System Impact Study Agreement,

WesternWAPA will notify the Requestor of the deficiency, and the Requestor shall cure the deficiency within 10 business days of its receipt of the notice. However, such deficiency does not include the failure to deliver an agreement or deposit by the required deadline.

WesternWAPA will begin conducting the System Impact Study as soon as practicable after the System Impact Study Agreement has been executed by both WesternWAPA and the Requestor (collectively, Parties).

c. Report

Upon completion of the System Impact Study, WesternWAPA will provide to the Requestor a System Impact Study report, which will state the results of the power flow, short circuit, and stability analyses, and will provide the requirements or potential impediments to the requested interconnection, including a preliminary indication of the cost and length of time that would be necessary to correct any problems identified in the analyses and implement the interconnection. The System Impact Study report will also provide a preliminary list of facilities that are required as a result of the interconnection request, and non-binding good faith estimates of cost responsibility and time to construct.

If the System Impact Study report identifies any unexpected results not contemplated previously, a substitute point of interconnection identified by either Party, and acceptable to the other, may be substituted for the originally designated point of interconnection. In this event and if necessary, WesternWAPA at its option will conduct a restudy of the System Impact Study, with the cost of the restudy to be borne solely by the Requestor.

8. Facilities Study

a. Scope

The Facilities Study provides a definitive evaluation of the transmission system additions necessary to mitigate the impacts identified in the System Impact Study, while meeting all applicable ERO and RRO reliability standards, and relevant RTO criteria (if applicable). The Facilities Study also provides a determination of the nature and estimated cost of any facilities necessary to accomplish the interconnection, and an estimate of the time required to complete the construction and installation of such facilities.

b. Agreement

As soon as practicable after providing to the Requestor a final System Impact Study report, WesternWAPA will tender to the Requestor a Facilities Study Agreement. The Facilities Study Agreement will provide that the Requestor shall compensate WesternWAPA for the actual cost of the Facilities Study. WesternWAPA will also provide non-binding good faith estimates of the cost and timeframe for completing the Facilities Study.

The Requestor shall execute the Facilities Study Agreement and deliver it to WesternWAPA no later than 30 calendar days after its receipt, along with a deposit equal to WesternWAPA's good faith estimated costs of conducting the Facilities Study. If WesternWAPA requests additional data to conduct the Facilities Study and the Requestor does not provide all such data when it delivers the executed Facilities Study Agreement, WesternWAPA will notify the Requestor of the deficiency, and the Requestor shall cure the deficiency within 10 business days of its receipt of the notice. However, such deficiency does not include the failure to deliver an agreement or deposit by the required deadline.

WesternWAPA will begin conducting the Facilities Study as soon as practicable after the Facilities Study Agreement has been executed by both Parties.

c. Report

Upon completion of the Facilities Study, WesternWAPA will provide to the Requestor a Facilities Study report, which will specify and estimate the cost of the equipment, engineering, procurement and construction work needed to implement the conclusions of the System Impact Study report. The Facilities Study report shall also identify the electrical switching configuration of the connection equipment, including: the transformer, switchgear, meters, and other station equipment; the nature and a +/- 20 percent cost estimate of any facilities necessary to accomplish the interconnection; and an estimate of the time required to complete the construction and installation of such facilities.

Regardless of the amount of the estimated facility costs, the Requestor shall be invoiced by WesternWAPA and shall pay all actual costs associated with the equipment, environmental, engineering, procurement, construction, and any other work needed to accomplish the interconnection.

If the Facilities Study report identifies any unexpected results not contemplated previously, [WesternWAPA](#) at its option may conduct a restudy of the Facilities Study, with the cost of the restudy to be borne solely by the Requestor.

9. Environmental Review

a. Scope

[WesternWAPA](#) is required to assess the potential environmental impacts of any proposed interconnection in accordance with the National Environmental Policy Act, 42 U.S.C. § 4321, *et seq.*, as amended (NEPA), and other environmental regulations. DOE's NEPA Implementing Procedures (10 CFR Part 1021) require that [WesternWAPA](#) begin environmental review as soon as practicable. The Requestor is advised to consult with [WesternWAPA](#) as early as possible in the interconnection process to obtain guidance with respect to the appropriate level and scope of any studies or environmental information that [WesternWAPA](#) requires. A detailed, firm project proposal from the Requestor and a well-defined [WesternWAPA](#) proposed action facilitate efficient compliance with environmental review requirements.

A more detailed discussion of [WesternWAPA](#)'s environmental review requirements is contained in Attachment E, Environment Requirements.

[WesternWAPA](#) reviews each proposed interconnection request to determine the appropriate level of environmental analysis required. The simplest review is the categorical exclusion (CX), which despite its name, requires compliance with several environmental regulations and may require up to six months to complete, depending on the scope of the interconnection. Most interconnection requests exceed the limitations of CXs. The next level of review is an environmental assessment (EA), which typically requires 9 to 12 months to complete at a cost of at least \$200,000. In some cases an environmental impact statement (EIS) may be required, which may require 18 months or longer to complete at a cost of at least \$500,000, depending on the amount of public controversy or project complexity. The Requestor must pay both its costs and [WesternWAPA](#)'s costs to comply with these requirements.

The environmental review process is likely to be influenced by the results of the System Impact Study or Facilities Study. If the results of those studies demonstrate a need for transmission system additions to support the interconnection, the environmental studies must address such additions along with the interconnection facilities.

Typically, the Requestor is responsible for performance of the required environmental studies, and ~~WesternWAPA~~, as the lead Federal agency, will review those studies for conformance and compliance to applicable policies, regulation, practices, and legislation.

~~WesternWAPA~~ may participate in the environmental process of another Federal or state agency involved with a project to satisfy portions of its NEPA requirements. However, ~~WesternWAPA~~ cannot adopt environmental reviews and related studies conducted by other agencies without evaluating the information and ensuring that the documentation meets ~~WesternWAPA~~'s regulatory requirements. Environmental reviews and studies must meet the standards placed on ~~WesternWAPA~~ by DOE's NEPA Implementing Procedures, and the applicable NEPA documents must be completed before ~~WesternWAPA~~ may render a final decision on the interconnection request. A copy of all environmental documents prepared by, or for, another Federal or state agency involved with the project shall also be furnished to ~~WesternWAPA~~.

~~WesternWAPA~~ considers the environmental analysis contained in those documents in rendering its decision, as stipulated in the DOE's NEPA Implementing Procedures. If more than one Federal agency must make a decision on a project (e.g. the Bureau of Land Management and ~~WesternWAPA~~) ~~WesternWAPA~~ may be either the lead Federal agency for environmental reviews or a cooperating agency with the other agency. In these situations one environmental document would be prepared that would satisfy the NEPA requirements of both agencies, but each agency would issue its own decision on the Requestor's project.

When the Requestor will own equipment that would be located in ~~WesternWAPA~~'s substation, switchyard, or right-of-way, the Requestor shall be financially responsible for all activities necessary to comply with the requirements of existing or subsequent applicable Federal or state environmental laws and regulations.

b. Agreement

Unless otherwise agreed, as soon as practicable after providing to the Requestor a final System Impact Study report, ~~WesternWAPA~~ will tender to the Requestor an Environmental Review Agreement authorizing ~~WesternWAPA~~, at the Requestor's expense, to perform an environmental review of the proposed interconnection, including review under NEPA, and setting forth the Requestor's responsibilities in connection with such environmental review. The Requestor shall execute the Environmental Review Agreement and return it, along with the

required funds set forth therein, to [WesternWAPA](#) within 30 calendar days of receipt of the final version tendered for execution.

If at any time prior to the issuance of [WesternWAPA](#)'s final NEPA decisional document the Requestor fails to comply with the terms of the Environmental Review Agreement, [WesternWAPA](#) reserves the right to deem the interconnection request withdrawn. If the costs incurred by [WesternWAPA](#) are less than the funds submitted by the Requestor, [WesternWAPA](#) will refund the difference, without interest, as soon as the necessary vouchers may be prepared.

10. Land Acquisition

The land acquisition process may begin as soon as the Application for Interconnection is received—by initiating research of property ownership—and continue through the other interconnection process steps with appraisals, preparation of legal descriptions, and title searches. The process may extend through the completion of construction. Typically, negotiations between [WesternWAPA](#), the Requestor, and/or affected landowners will not begin until [WesternWAPA](#)'s environmental review is complete and [WesternWAPA](#) renders its final decision on the interconnection.

Facilities necessitated by the interconnection and to which [WesternWAPA](#) takes ownership will require [WesternWAPA](#) to own new land rights. [WesternWAPA](#) typically conducts all land acquisition activities, including appraisals, legal descriptions, title evidence, negotiations, title clearance, recordation, and payment. Projects may also require damage resolution with landowners following construction. All land rights must be acquired pursuant to Federal laws governing acquisition of real property, which is particularly important when other Federal and institutional lands are affected by the interconnection.

In certain circumstances, [WesternWAPA](#) may determine that the Requestor is capable of performing the necessary land acquisition activities. When this is the case, [WesternWAPA](#) will coordinate closely with the Requestor to ensure proper procedures are followed, and the proper land rights are obtained. Agreements concerning land acquisition issues such as fee or easement, right-of-way width, and title acceptability must be executed between the Parties before any land rights are acquired and transferred to [WesternWAPA](#).

11. Construction Agreement

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The Construction Agreement sets forth the terms and conditions of construction activities related to the interconnection. The cost breakdown and a schedule for payments also will be outlined in the Construction Agreement. WesternWAPA will design the interconnection, unless otherwise agreed. WesternWAPA will also, unless otherwise agreed, perform all construction. WesternWAPA cannot proceed with any construction without funding in place.

The Requestor shall execute the Construction Agreement and return it, along with the required funds set forth therein, to WesternWAPA within 30 calendar days of receipt of the final version tendered for execution. If the Requestor fails to comply with the terms and conditions of the Construction Agreement, WesternWAPA reserves the right to deem the interconnection request withdrawn. If the costs incurred by WesternWAPA under the Construction Agreement are less than the funds submitted by the Requestor, WesternWAPA will refund the difference, without interest, as soon as the necessary vouchers may be prepared.

Once construction has been completed—and before energizing the new interconnection—WesternWAPA will review and test the new facilities. Before energizing, WesternWAPA must also receive the appropriate as-built drawings, operating instructions and other relevant materials described in Attachment C to these Requirements.

12. Interconnection Agreement

WesternWAPA will issue an Interconnection Agreement to the Requestor that describes the terms under which the interconnection will be allowed. The Interconnection Agreement—which may also be termed a Mutual Services, Operations and Maintenance, Balancing Authority Area, or Consolidated Agreement, or other—provides for the long-term operation and maintenance of the interconnected facilities. It generally includes provisions regarding licensing, ownership, maintenance, replacements, operations, special instructions, and funding. The Interconnection Agreement will be forwarded to the Requestor as soon as practicable after the Construction Agreement has been executed by both Parties.

WesternWAPA will inform the Requestor in writing of the interconnection in-service date. The interconnected facilities will be energized following execution of the Interconnection Agreement by both Parties. WesternWAPA will maintain direct control of any facilities directly affecting the reliability of WesternWAPA's transmission system. WesternWAPA will maintain backup control of all facilities deemed to be vital to system reliability.

13. Project Closeout

WesternWAPA will develop a final report with a list of lessons learned, if beneficial, to help facilitate future interconnections. WesternWAPA invites the Requestor to participate in the development of a joint final report that benefits both Parties.

WesternWAPA will audit construction costs, study costs, maintenance support costs, and refund to the Requestor any surplus project funding, without interest, as appropriate, upon project completion.

IV. Other Requirements

A Contractual Arrangements

All arrangements for interconnection studies, environmental review, design and construction, ownership, operations, maintenance, replacement of equipment, and any other work must be set forth in written contractual agreements between the Parties prior to commencement of work and at appropriate intervals thereafter.

In addition, all work related to interconnecting to WesternWAPA's facilities is subject to WesternWAPA's applicable General Power Contract Provisions or General Interconnection Contract Provisions in effect at the time of contract execution.

B. Funding/Potential Crediting

1. Advance Funding

Advanced funds are required before WesternWAPA performs any interconnection studies, environmental review, design, land acquisition, construction, or other work. The relevant agreement will specify the amount of funds required to be advanced. Upon receipt by WesternWAPA, advance funds will be placed in an account associated with the project. Periodic cost statements will be furnished on an as-requested basis.

Transmission credits (including potential interest payments on advances for network upgrades by the Requestor) may be applicable if the interconnection facilities are determined by WesternWAPA, in its sole discretion, to be eligible network upgrades and qualified transmission service is currently being taken from WesternWAPA. Transmission credits will be determined in

accordance with WAPA'sthe "Transmission System Network Upgrades Policy", or RTO crediting policy if applicable, posted on WesternWAPA's Regional Open Access Same-Time Information System (OASIS) sites under the "Business Practices" folder, or directly at the following URL: <http://www.oasis.oati.com/WAPA/WAPAdocs/Western-Common-Business-Practices.html>. ÷ www.westtrans.net (CRSPCRM for Colorado River Storage Project, LAPT for Loveland Area Project, WALC for Desert Southwest Region's transmission, and WASN for Central Valley Project, DSWR, RMR, and SNR) and (UGPR).

2. Equipment Replacement

Should replacement of existing equipment be required, the equipment will be removed and replaced at the sole expense of the Requestor. However, WesternWAPA at its sole discretion and option may:

- (1) Participate in the cost of the proposed project; and/or
- (2) Allow ownership of replaced WesternWAPA equipment to be transferred to the Requestor in exchange for transfer of ownership of the new equipment to WesternWAPA. The Requestor would then receive a contract right for the incremental capacity of the new equipment.

C. Reliability

A proposed interconnection shall not degrade the reliability or operating flexibility of the existing power system, and must meet all applicable ERO and RRO reliability standards, procedures, and reporting requirements. When involving WesternWAPA-owned, -operated and/or -maintained facilities, the interconnection must also comply with WesternWAPA's Standard Design Criteria. Additionally, the interconnection must adhere to any applicable RTO reliability criteria.

D. Safety

When making an interconnection to WesternWAPA's facilities, the Requestor shall comply with applicable safety laws and building and construction codes. These include applicable provisions of: the Contract Work Hours and Safety Standards Act, 40 U.S.C. 3701, as amended or supplemented, and regulations promulgated by the Secretary of Labor pursuant to the Act; state and local safety, health, and/or industrial regulations or codes; WAPA Order 440.1A, Occupational Safety and Health Program; and Power System Safety Manual, established by

WAPA Order 440.3. Copies of [WesternWAPA](#)'s Occupational Safety and Health Program and Power System Safety Manual will be provided upon request.

Each interconnecting facility must be constructed in accordance with [WesternWAPA](#)'s Standard Design Criteria. Safety-related standard design features include, but are not limited to:

- (1) A ground grid that solidly grounds all metallic structures and other non-energized metallic equipment, to include any perimeter fencing.
- (2) Modifications to ground grids of existing substations (if necessary) to keep grid voltage rise within safe levels.
- (3) Switch operating platforms for all disconnect switches, with ground conductors connected to the operating mechanisms.
- (4) Disconnect switches (gang-operated) that are lockable in the open position by [WesternWAPA](#).
- (5) Fall protection features permanently installed on equipment.

The Requestor must adhere to [WesternWAPA](#)'s General Power Contract Provision No. 28 ([or General Interconnection Contract Provision No. 15 in UGPR](#)), Construction and Safety Procedures. In the event that the Requestor does not adhere to construction and safety procedures, [WesternWAPA](#) may issue an order to stop all or any part of the work until such time that the Requestor demonstrates compliance with the provision at issue. The Requestor cannot make a claim for compensation or damage resulting from such work stoppage.

The requirements for reporting all security offenses and incidents occurring on property under the charge and control of [WesternWAPA](#) are required by: 18 U.S.C. § 1366; DOE Order 470.4a, Safeguards and Security Program; and WAPA Order 470.1G, Safeguards and Security Program. Prompt and accurate reporting to the local law enforcement agency as well as the applicable [WesternWAPA](#) dispatch center will aid in the protection of people and property.

E. Confidentiality/Critical Energy Infrastructure Information (CEII)

Confidential information shall include, without limitation, all information relating to technology, research and development, business affairs, and pricing, and any information supplied by either Party to the other prior to the execution of an Interconnection Agreement. Information is confidential only if it is clearly designated or marked in writing as confidential on the face of the

document. If the information is conveyed orally or by inspection, it will only be considered confidential if [WesternWAPA](#) or the Requestor providing the information informs the other receiving the information that the information is confidential. Each Party shall use at least the same standard of care to protect confidential information it receives as it uses to protect its own confidential information from unauthorized disclosure, publication, or dissemination.

Neither Party shall release or disclose confidential information to any other person unless such person has a need-to-know such information and first has been advised of the confidentiality provisions of these Requirements and has agreed to comply with such provisions. Notwithstanding the general prohibition against disclosure, either Party may disclose confidential information provided by the other to the extent such disclosure is: (1) requested by FERC or its staff during the course of an investigation or otherwise; (2) required by law; (3) reasonably deemed by the disclosing Party to be required to be disclosed in connection with a dispute between or among the Parties, or the defense of litigation or dispute; (4) otherwise permitted by consent of the other Party, such consent not to be unreasonably withheld; or (5) necessary to fulfill the disclosing Party's obligations under these Requirements or as a transmission service provider or a Balancing Authority, including disclosing the confidential information to a RTO or to a sub-regional, regional, or national reliability organization or planning group.

Prior to any disclosures of the other Party's confidential information, or if any third party or governmental authority makes any request or demand for any confidential information, the disclosing Party agrees to promptly notify the other Party in writing and agrees to assert confidentiality and cooperate with the other Party in seeking to protect the confidential information from public disclosure by confidentiality agreement, protective order, or other reasonable measures.

Either Party shall, at request of the other, destroy, in a confidential manner, or return the confidential information at the time such information is no longer needed to fulfill the Parties' obligations under these Requirements.

Certain information may also be subject to Critical Energy Infrastructure Information ("CEII") release restrictions and the Requestor will be required to execute a Confidentiality and Non-Disclosure Agreement [in order to receive such information](#), pursuant to [WesternWAPA's](#) CEII Policy posted on [WesternWAPA's](#) OASIS sites [under the "Business Practices" folder, or directly](#)

at the following URL: <http://www.oasis.oati.com/WAPA/WAPAdocs/Western-Common-Business-Practices.html>, in order to receive such information.

F. Delegation of Responsibility

WesternWAPA may use the services of subcontractors as it deems appropriate to perform its obligations under these Requirements. WesternWAPA will be liable to the Requestor for the performance of such subcontractors only in accordance with the Federal Tort Claims Act , 28 U.S.C. §§ 1346(b), 1346 (c), 2401(b), 2402, 2671, 2672, 2674-2680, as amended, and as set forth in Attachment J of WesternWAPA's Tariff.

Attachment A –
Regional Contact Information

Colorado River Storage Project

www.wapa.gov/rm

Attn: VP of Transmission Services

www.wapa.gov/regions/rm/Pages/rm.aspx

Manager (J7000)

5555 E. Crossroads Blvd.

Loveland, CO 80 539

615 South 43rd Ave.

Phoenix, AZ 85009

602-605-2525

www.wapa.gov/crsp

www.wapa.gov/regions/crsp/Pages/crsp.aspx

Desert Southwest Region

Attn: VP of Transmission Services

Manager (J7000)

5555 E. Crossroads Blvd.

Loveland, CO 80 539

615 South 43rd Ave.

Phoenix, AZ 85009

602-605-2525

www.wapa.gov/regions/dsw/Pages/dsw.aspx

www.wapa.gov/dsw

Rocky Mountain Region

Attn: VP of Transmission Services

Manager (J7000)

5555 E. Crossroads Blvd.

Loveland, CO 80 539

615 South 43rd Ave.

Phoenix, AZ 85009

602-605-2525

Western Area Power Administration, General Requirements for Interconnection – Attachment A, Regional Contact Information

Issue Date: 06/27/2017~~07/14/2011~~, DRAFT~~FINAL~~, Version 1.10 ~~(Replaces September 1999 Document)~~

Effective Date: XX/XX/2017~~07/22/2011~~

Sierra Nevada Region
Attn: Transmission Planning (N4400)
114 Parkshore Dr.
Folsom, CA 95630
916-353-4400

www.wapa.gov/sn

www.wapa.gov/regions/sn/Pages/sn.aspx

Upper Great Plains Region
Attn: Operations and Transmission
Advisor

2900 4th Ave. North

Billings, MT 59101

406-255-2840

www.wapa.gov/ugp

www.wapa.gov/regions/ugp/Pages/ugp.aspx

Attachment B –
Application for Interconnection

WesternWAPA Area Power Administration
Application for Interconnection

For <u>WesternWAPA</u> Use
Date of receipt: _____
By whom: _____
Project manager: _____

Thank you for your interest in interconnecting to WesternWAPA Area Power Administration's (WesternWAPA) transmission system. This Application for Interconnection is intended to be used only for interconnections that are not subject to WesternWAPA's Open Access Transmission Service Tariff or other applicable Tariff. Completing this Application for Interconnection does not qualify the Requestor for, or otherwise pertain to, the receipt of transmission or generator interconnection service on WesternWAPA's transmission system.

1. Date of Application: _____ 2. Proposed/Estimated Date of Interconnection: _____
3. Name of Contact: _____ 4. Title of Contact: _____
5. Company/Organization Name: _____ 6. Federal TX ID number: _____
7. Full Street Address (include State and ZIP): _____
8. Telephone and Fax Numbers: _____ 9. E-mail: _____
10. Name, Title, Company/Organization, Address, Phone, Fax and E-mail address of Authorized Interconnecting Contractor/Representative, if applicable:
- _____
- _____

11. Type of Interconnection (mark all that apply):
- Transmission interconnection
 - Substation breaker bay additions
 - Other (please specify) _____

12. Description of Requested Interconnection (include as much of the following information as possible on attached sheets; mark all that apply):
- Single-line diagram(s) showing the proposed interconnection
 - Drawing(s) indicating physical arrangements of existing and proposed facilities
 - Geographic location of proposed interconnection and structure numbers, if available
 - Description of proposed routing and dimensions and configurations of new structures and facilities
 - Description and ratings of proposed transformers, circuit breakers, switches, metering, associated communications, and relaying and other equipment
 - Proposed transmission path(s) and service arrangements between resources and associated loads, where applicable
 - Appropriate revenue and telemetering equipment specifications
 - Copies of relevant planning or operational studies
 - Proposed construction schedule
 - Ten-year land plan and other land acquisition projections
 - Copies of relevant environmental impact assessments, reports, or projections; or description of anticipated scope of environmental review

13. Name and Title of Authorized Representative: _____
14. Signature of Authorized Representative: _____ Date: _____

Please send the completed Application for Interconnection to the appropriate WesternWAPA office, as described in Attachment A to WesternWAPA's General Requirements for Interconnection. A WesternWAPA representative will contact you when the Application for Interconnection is received. Please allow up to 30 calendar days for processing after receipt by WesternWAPA. For further information, see WesternWAPA's General Requirements for Interconnection available upon request or at WesternWAPA's Internet site at www.wapa.gov, or contact the appropriate WesternWAPA office.

Attachment C –
Technical Requirements

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This document establishes criteria for interconnecting to WAPA's transmission system. The technical requirements apply to interconnections and facility replacements to WAPA's transmission line facilities, substations, or switching stations. Facility replacements and interconnections to WAPA's facilities must not degrade the reliability, maintainability, or operating flexibility of WAPA's transmission system or other interconnected transmission systems and shall not reduce the capability of WAPA's transmission system to meet existing or committed transmission obligations. The equipment requirements, relay recommendations, communication needs, and station layout for a proposed interconnection facility shall be determined by WAPA.

I. Interconnection Studies

WesternWAPA and/or RTO staff, if applicable, will conduct or review all load, system-to-system, and other applicable interconnection studies under these procedures as needed to determine the reliability and capability impacts to WesternWAPA's transmission system given the addition of the requested interconnection. The System Impact Studies will include, but not be limited to, powerflow, system stability, and short circuit analyses. Sub-synchronous resonance analyses may also be required. It is the responsibility of the entity requesting interconnection to WesternWAPA's transmission system (Requestor) to provide any specialized modeling data compatible with Institute for Electrical and Electronics Engineering (IEEE), MRO, or WECC formats for either powerflow or dynamic simulations. Evaluation of alternatives to the proposed interconnection, such as lower voltage construction, reactive support facilities, or upgraded facilities, may be requested or conducted. Powerflow analysis will include 10-year resource or load growth projections and the planned facilities needed to satisfy such requirements. If the studies indicate that additions or upgrades to the existing transmission facilities are necessary, WesternWAPA will conduct or review Facilities Studies to determine the cost of additions or upgrades and the time frame for implementing system additions or upgrades.

Special region-specific operational studies will evaluate the transmission system and reliability considerations. The North American Electric Reliability CouncilCorporation's (NERC), ERO and RRO Reliability Standards and criteria, and RTO criteria, if applicable, will be used by WesternWAPA to evaluate system operating considerations.

II. Power Quality

A. Prevention of Interference

No generator, load, or transmission interconnection shall superimpose a voltage or current upon [WesternWAPA's](#) transmission system that interferes with [WesternWAPA's](#) Balancing Authority Area [or transmission system](#) operations, transmission service deliveries, or communication facilities. If such interference occurs, the generator/load owner will diligently pursue and take corrective action at its own expense, [pursuant to the applicable interconnection agreement](#), after being given notice and reasonable time to do so by [WesternWAPA](#). If such corrective action is not taken, [WesternWAPA](#) may, without liability, [subject to the applicable interconnection agreement](#), disconnect the generator, load, or transmission interconnection from [WesternWAPA's](#) transmission system. Each generator/load/transmission interconnection shall meet the following criteria, as applicable:

1. Operating Voltage Range

Generators and loads must be designed to remain connected to [WesternWAPA's](#) transmission system under the steady state and transient voltage conditions outlined in [WesternWAPA's](#) Planning Criteria Document [and RTO planning criteria, if applicable](#).

[WesternWAPA](#) maintains transmission system voltages at levels required for reliable transmission of electricity. Regulation to keep voltage variations within limits acceptable to end-use customers is typically provided by the end-use customer on the relevant distribution system. Voltage regulation at transmission voltage levels is different from that at distribution voltage levels. Load serving entities are strongly urged to install their own voltage regulation equipment. Check with the appropriate [WesternWAPA](#) Regional office for specific requirements.

2. Voltage Schedules

Voltage schedules are necessary for the efficient and reliable electrical power transmission and for adequate service to loads. Voltage schedules establish hourly operating requirements and may be set for seasons, holidays, days of the week, and time of day. All interconnected synchronous generators are required to participate in voltage regulation by meeting voltage schedules, [unless exceptions are allowed by a RTO's criteria, if applicable](#).

Pursuant to provisions of ~~Western~~WAPA's Tariff, or applicable RTO's Tariff, provisions, induction generators and other intermittent generation may not be required to participate in voltage regulation; however, they must not adversely affect voltage schedules. Integration studies may be necessary to determine the reactive power capability necessary to ensure related schedules are maintained.

3. Power Factor Correction

~~Western~~WAPA requires that the following conditions be met for all load, and transmission interconnections to ~~Western~~WAPA's transmission system:

- 1) A power factor between 0.95 lag and 0.95 lead measured at the point of interconnection to ~~Western~~WAPA's transmission system.
- 2) Power factor correction equipment (e.g. shunt capacitors or reactors) installed by the Requestor to meet power factor requirements shall be designed to meet ~~Western's~~ WAPA's voltage step switching criteria for reactive equipment as outlined in ~~Western's~~ WAPA's Planning Criteria Document. The Requestor can contact the appropriate ~~Western~~WAPA Regional office for specific requirements.

The power factor correction requirements for generation interconnections are outlined in ~~Western~~WAPA's Tariff, or applicable RTO's Tariff. If the power factor requirements are not met for the interconnection, ~~Western~~WAPA may, after giving notice to correct the condition, install power factor correction equipment at the interconnected entity's expense as allowed by WAPA's Tariff or RTO's Tariff, if applicable.

4. Load Shedding/Generator Protection CoordinationFrequencies

To meet the reliability requirements of the MRO and WECC regions, under frequency and/or under voltage load shedding schemes may be required. Any load connected to ~~Western~~WAPA's transmission system will be expected to participate in under frequency and/or under voltage load shedding if ~~Western~~WAPA determines such action is necessary, or required under RTO criteria, if applicable, to maintain system reliability.

Generators shall operate in synchronism with ~~Western~~WAPA's transmission system. The system frequency is normally maintained at 60 Hz; however it can vary under certain operating

conditions and during system disturbances. All generators must be able to operate in coordination with the area automatic load shedding program ~~(either WECC or MRO).~~

Within the WECC region, oOver/under frequency generator protection relays shall meet the following settings in Table 1 established by the WECC Coordinated Off-Nominal Frequency Load Shedding and Restoration Program.³ All Ggenerator Owners registered in the SPP Planning Coordinator footprint~~MRO region~~ shall meet the SPP requirements.⁴ ~~WECC requirements until MRO regional guidelines are established.~~ The Requestor is required to report their generator off-nominal frequency tripping relay settings to ~~Western~~WAPA, and to the applicable Planning Coordinator, as required.

Table 1 WECC Under and Over frequency Generator Relay Settings and Operate Times

<u>Under Frequency (Hz)</u>	<u>Over Frequency (Hz)</u>	<u>Minimum Time</u>
60.0 > f > 59.4	60.0 < f < 60.6	N/A (Continuous operating range)
59.4 ≥ f > 58.4	60.6 ≤ f < 61.6	3 minutes
58.4 ≥ f > 57.8	61.6 ≤ f < 61.7	30 seconds
57.8 ≥ f > 57.3		7.5 seconds
57.3 ≥ f > 56.8		45 cycles
56.8 ≤ f > 56.4		7.2 cycles
f ≤ 56.4	≥ 61.7 Hz	Instantaneous trip

³ When the “WECC Coordinated Off-Nominal Frequency Load Shedding and Restoration Program” is utilized by the NERC Planning Coordinator on the system where the generator is interconnected. The latest approved WECC Program should be reviewed to confirm the requirements, and is available upon request.

⁴ SPP is UGPR’s Planning Coordinator (PC) in the Eastern and Western Interconnections. The “SPP PC UFLS Plan” is utilized by SPP for its PC footprint in the Eastern Interconnection (see Section 11.0 – Generator Owner Trip Verification). The “WECC Coordinated Off-Nominal Frequency Load Shedding and Restoration Program” is utilized by SPP for its PC footprint in the Western Interconnection. A copy of the latest “SPP PC UFLS Plan” is available upon request.

5. Harmonics/Voltage Unbalance

Harmonics can cause telecommunication interference and thermal heating in transformers, disabling solid state equipment and creating resonant over voltages. To protect equipment from damage, harmonics must be managed and mitigated. An interconnection shall not create voltage and current harmonics on [WesternWAPA's](#) transmission system that exceed the limits specified in IEEE Standard 519, Recommended Practices and Requirements for Harmonic Control in Electric Power Systems. Harmonic distortion is defined as the ratio of the root mean square value of the harmonic to the root mean square value of the fundamental voltage or current. Single frequency and total harmonic distortion measurements may be conducted at the point of interconnection, generation or load site, or other locations on [WesternWAPA's](#) transmission system to determine whether the project is the source of excessive harmonics.

Many methods may be used to restrict harmonics. The preferred method is to install a transformer with at least one delta connection between the generator or load and [WesternWAPA's](#) transmission system. This method significantly limits the amount of voltage and current harmonics entering [WesternWAPA's](#) transmission system.

The Requestor must provide values of harmonic currents created at the point of interconnection to [WesternWAPA's](#) transmission system. These harmonic currents, expressed in percent of the total generated current (15-minute demand) at the system frequency of 60 Hz (fundamental), should be within the limits specified by IEEE Standard 519. These limits are a function of the short circuit duty level at the point of interconnection to [WesternWAPA's](#) transmission system.

Unbalanced phase voltages and currents can affect protective relay coordination and cause high neutral currents and thermal overloading of transformers. To protect [WesternWAPA](#) and its customers' equipment, the generator, load, or transmission interconnection contribution at the point of interconnection shall not cause a voltage unbalance greater than one percent or a current unbalance greater than five percent.

6. Ferro Resonance

Any generating units requiring corrective step-switched capacitors or other techniques which may introduce Ferro resonance into [WesternWAPA's](#) transmission system will require pre-

approval from [WesternWAPA](#) in writing. If counter measures (e.g. additional capacitors) are installed on the generator side of the point of interconnection, they must be pre-approved by [WesternWAPA](#) in writing. Additional equipment may be required to resolve this problem, as determined during the interconnection study process.

7. Flicker

Any voltage flicker at the point of interconnection caused by a generating facility, load, or transmission interconnection should not exceed the limits defined by the Maximum Borderline of Irritation Curve identified in IEEE Standard 519. This requirement is necessary to minimize the adverse voltage affects experienced by other entities interconnected to [WesternWAPA](#)'s transmission system. Induction generating units may be connected and brought up to synchronous speed (as an induction motor) provided these flicker limits are not exceeded. Voltage fluctuations may be noticeable as visual lighting variations (flicker) and can damage or disrupt the operation of electronic equipment. IEEE Standard 519 provides definitions and limits on acceptable levels of voltage fluctuation. All generators, loads, and transmission interconnections to [WesternWAPA](#)'s transmission system shall comply with the limits set by this Standard.

III. Design

[WesternWAPA](#) will provide for the design, specification, and construction of interconnection facilities that may affect the reliability of [WesternWAPA](#)-owned, -operated, and -maintained transmission facilities, pursuant to its Tariff, and/or applicable RTO Tariff. Approval of a proposed interconnection with WAPA's transmission system requires an engineering technical review. WAPA is responsible for the engineering design, protection, and control of the interconnection facility, pursuant to its Tariff, and/or applicable RTO Tariff. WAPA's Transmission Planning and Maintenance/Operations Engineering will be advised of requests for new interconnections and shall participate in the preliminary reliability assessment considerations from both a feasibility and system impact perspective. For transmission line taps owned by others, prints of applicable facility drawings will be furnished by [WesternWAPA](#) upon request. All work performed by [WesternWAPA](#), including revisions to existing [WesternWAPA](#) drawings, will be at the expense of the Requestor.

The Requestor is required to submit the following information with the interconnection application to begin these assessments:

- 1) A single-line diagram to show the Requestor's proposed facilities, including the Requestor's preliminary proposals for equipment protection and control, communication, and metering. The meter and ancillary equipment for interconnections to WAPA's transmission system shall be in accordance with ~~Western~~WAPA's Meter Policy posted on its OASIS sites under the "Business Practices" folder, or directly at the following URL: <http://www.oasis.oati.com/WAPA/WAPAdocs/Western-Common-Business-Practices.html>.
- 2) A drawing showing proposed general arrangement of Rrequestor's facilities.
- 3) Approximate location of the point of interconnection relative to the nearest switching stationfacility.
- 4) Approximate length, conductor size, spacing, and configuration of the Requestor's interconnecting transmissiontie line.
- 5) Requestor's interconnecting transmissionTie line terminal transformer winding connections, size, impedance (if available), and proposed method of protection for the Requestor's tap line and transformer.
- 6) The following information about the loads to be served, if applicable:
 - a. Power requirements.
 - b. Size, type, and frequency of start-up of large motors.
 - c. Reliability and special operating requirements.
 - d. Fault impedance data if the interconnection can be a source.

Modifications to ~~Western~~WAPA's transmission facilities to accommodate the proposed interconnection shall adhere to ~~Western~~WAPA's Standard Design Criteria and Engineering Manual 6430.1, System Design Guide for Tap Stations. Any variation from the Standard Design

Criteria may be considered on a case-by-case basis. Copies of these documents are available upon request.

Drawings for facility additions must conform to [WesternWAPA's](#) Drafting Standards and be approved by [WesternWAPA](#). The Requestor must supply drawings in an electronic file, compatible with [WesternWAPA's](#) computer-aided design system, AutoCAD. The Requestor must also reimburse [WesternWAPA](#) for drawing costs. Drawings become or remain the property of [WesternWAPA](#). Copies of [WesternWAPA's](#) Drafting Standards will be furnished to the Requestor if the design is not produced by [WesternWAPA](#). "As-built" drawings shall be provided to [WesternWAPA](#) within 60 calendar days of facility energization to assure that interconnection facilities and stand-alone network upgrades are built to [WesternWAPA's](#) standards and specification requirements. Three complete sets of accurate substation drawings shall be provided to [WesternWAPA](#) for non-[WesternWAPA](#)-owned substations. These drawings shall include, but not be limited to, station plot plans, equipment layouts, single-line diagrams, control circuit schematics, and wiring diagrams. Updated copies of these drawings shall be furnished to [WesternWAPA](#) within 60 calendar days of any modification to non-[WesternWAPA](#)-owned equipment or substations within [WesternWAPA's](#) facilities.

Power circuit breakers, disconnecting switches, and other equipment installed in [WesternWAPA's](#) facilities shall adhere to [WesternWAPA](#) numbering schemes. Breaker and switch operating numbers will be assigned by [WesternWAPA](#). All switches to be operated by [WesternWAPA](#) will be locked with locks furnished by [WesternWAPA](#). All switches to be operated by [WesternWAPA](#) shall be designed in accordance with [WesternWAPA's](#) Standard Design Criteria.

A. Substation Equipment

Power system equipment is designed to withstand voltage stresses associated with expected operation. Interconnecting new generation resources can change equipment duty, and may require that equipment be replaced, or that switchgear, communications, shielding, grounding and/or surge protection be added to restrict voltage stress to acceptable levels. The System Impact Study and/or Facilities Study will include the evaluation of the impact of an interconnected generator on equipment insulation. [WesternWAPA](#) will identify any additions required to maintain an acceptable level of transmission facility availability, reliability, equipment insulation margins, and safety.

Generally, power circuit breakers must be installed for all interconnections. Specifications covering circuit breakers are available from [WesternWAPA](#) upon request. A review of the surrounding area power system characteristics, including system stability studies, will be made for a final determination when the need for out-of-step switching capability is questionable.

Installation of equipment in substations must conform to [WesternWAPA](#)'s requirements and must be approved by [WesternWAPA](#). Oil-filled equipment, including bushings, shall not contain polychlorinated biphenyls (PCB). In addition, oil-filled equipment shall be permanently labeled by the manufacturer as non-PCB. Certification shall be provided to [WesternWAPA](#) at or before the time of installation. Oil-filled equipment may require an oil spill containment system to comply with Federal or state regulations. Any increased equipment costs due to these requirements shall be borne solely by the Requestor.

Interconnecting substations must have a ground grid that solidly grounds 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 located in, or immediately adjacent to, the station under normal and fault conditions.

Generator, load, or transmission interconnections 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. The ground grid should be designed to American National Standards Institute (ANSI)/IEEE Standard 80, IEEE Guide for Safety in AC Substation Grounding.

Should replacement of existing equipment be required as a result of the interconnection, [WesternWAPA](#) will retain equivalent capacity and operational control as previously existed.

B. Transmission Line Taps

Proposed taps to [WesternWAPA](#)'s transmission facilities are subject to approval on a case-by-case basis. Additional taps may be placed on existing lines as long as N-1 outage criteria are not violated and all loads can be fed radially from either terminal.

N-1 outage criteria means the interconnected power system shall be operated at all times so that general system instability, uncontrolled separation, cascading outages, and/or voltage collapse will not occur as a result of the loss of a single system element.

Taps to 69-kilovolt (kV), 115-kV, and 138-kV transmission lines must meet the following minimum criteria:

- (1) A line section protected by circuit breakers may have a mileage maximum for tap lines that are not protected by circuit breakers, determined on a case-by-case basis.
- (2) A proposed interconnection to a transmission line, whenever possible as determined by [WesternWAPA](#), will be connected to the line at the high-side or low-side of an existing tap. Two or more connections at the high-side of an existing tap are considered multiple taps and may require sectionalizing circuit breakers. Connections at the low-side of an existing tap may require appropriate compensation to the owner of an existing transformer for use of the tap substation facilities by [WesternWAPA](#) or the Requestor.
- (3) Normally, no more than one connection, without sectionalizing circuit breakers, is permitted between 115-kV and 138-kV transmission line breakers. [The same guideline applies to 69-kV sub-transmission lines if the line parallels a 115-kV or higher voltage transmission line.](#) [WesternWAPA](#) may, at its discretion, allow two or more connections between transmission line breakers if (a) there is no degradation of system reliability, and (b) there is no impact to safety or maintenance activities, or such impacts are mitigated.
- (4) New lines of 69-kV and above will have overhead ground wire shielding over the entire length of the tap-line. A breaker may be required for the tap line due to relaying or specific reliability criteria.
- (5) Interrupter switches or equivalent capable of interrupting load and charging current shall be installed in the line sectionalizing positions for all tap substations. These interrupters will be used to de-energize line sections without interruption of the tapped loads, if necessary. Line sectionalizing switches installed in transmission lines shall be furnished with grounding blades, and must have a visible air gap. Normally, [WesternWAPA](#) assumes ownership of the sectionalizing switches. If [WesternWAPA](#) does not assume ownership, however, [WesternWAPA](#) will still maintain operational control.

- (6) An ungrounded high-voltage winding is the preferred transformer connection on the tapped line; however, no more than one grounded transformer will be permitted to tap a 69-kV, 115-kV, and 138-kV line.

Taps to transmission lines of 161-kV and higher voltages are not normally allowed by WAPA since lines at these voltage levels require the highest reliability. If exceptions are made, as determined by WAPA in its sole discretion, approved taps to transmission lines of voltages up to 161-kV and 230-kV (where no permanent taps to 230-kV or higher voltage transmission lines will be allowed) must meet the following criteria:

- (1) Only one tap between sectionalizing circuit breakers will be allowed. The Requestor, at its cost, will be responsible for adding necessary circuit breakers when the requested tap exceeds one connection between circuit breakers.
- (2) A section of line protected by circuit breakers may have a mileage maximum for tap lines that are not protected by circuit breakers, as determined on a case-by-case basis.
- (3) All tap lines will have overhead ground wire over their entire length.
- (4) Nearly all WesternWAPA high-voltage lines are protected by high-speed pilot relaying. Relaying for tap-line circuit faults must not measurably degrade the line relaying or interfere with the capability of high-speed re-closing of the tapped transmission line.
- (5) High-speed clearing of all tap-line faults from the tap station will be required under normal operating conditions if the tap station is a source of positive-sequence fault current to faults on the tapped line.
- (6) Interrupter switches or equivalent capable of interrupting load and charging current shall be installed in the line sectionalizing positions for all tap substations. These interrupters will be used to de-energize line sections without interruption of the tapped loads, if necessary. Line sectionalizing switches installed in transmission lines shall be furnished with grounding blades, and must have a visible air gap. Normally WesternWAPA assumes ownership of the sectionalizing switches. If WesternWAPA does not assume ownership, however, WesternWAPA will still maintain operational control.

The tap should not adversely affect the protection scheme or outage number on any existing taps. Additional taps can be placed on existing lines where delta-wye transformers are used. Auto-transformers or three-winding transformers present sources of zero sequence current and can make both directional ground over current and ground distance relaying complicated. It is best to sectionalize whenever auto-transformers or three-winding transformers are needed.

The proximity of the tap to either line terminal may affect the protective relaying scheme on the transmission line. The tap transformer impedance and relative location of the tap on the transmission line may necessitate that pilot relaying be installed on the line in order to prevent tripping of the line for faults in the low-voltage tap system.

Transmission line taps configured with load interrupting disconnect switches (e.g. vacuum disconnect switches) and a fault interrupting device shall be installed on a self-supporting steel box structure or individual self-supporting steel structures, approved by WAPA (no guyed structures).

Entities requesting non-~~Western~~WAPA designed transmission line taps shall submit designs, calculations, and drawings demonstrating the structures and foundations have been designed in accordance with ~~Western~~WAPA's Standard Design Criteria.

Taps to transmission lines with insulated overhead ground wires shall not degrade the capability of the existing overhead ground wires.

C. Switching Station Requirements

Generally switching stations are WAPA's minimum requirement for interconnections, and the need for a switching station (and required bus configuration) will be determined by WAPA, in its sole discretion, based upon the nature and impact of the interconnection to ensure that WAPA maintains the reliability of its transmission system.

This section defines requirements for the WAPA's switching stations. Station layout should consider future expansion and allow for conversion of bus configurations for connecting additional system elements. Facilities will be designed in accordance with WAPA's current standards at the applicable voltage class. WAPA will have operational control and dispatch authority in its switching stations for switches, interrupters, or circuit breakers at the

interconnection facility that impact WAPA's transmission system. The switches that will be used for clearances shall have the ability to be locked and tagged per WAPA's operating procedures, and also provide a means of visually confirming they are open. Gas Insulated Switchgear (GIS) equipment will require disconnect switches on both sides for isolation. Protection, control, and communication will be designed by WAPA, subject to WAPA's Tariff, or applicable RTO Tariff. Drawings showing WAPA's standard designs for various interconnections and bus configurations are available upon request.

New Switching Station Requirements:

Generally, at a minimum, a three breaker ring bus with associated isolating disconnect switches, a control building, and communication facilities for supervisory control is required. WAPA will consider factors including the impact of the interconnection, the criticality of the transmission line being interconnected to, the amount of load being connected to the line in its determination of the required interconnection switching station bus configuration. The general arrangement for a ring bus shall allow for expansion to a maximum of a four breaker ring and for future conversion to a breaker and a half scheme. WAPA's drawing(s) showing its typical ring bus layout arrangement that allows for expansion and conversion is available upon request.

Existing Facility Requirements:

Interconnections at existing facilities may require modification or expansion of the general facility arrangement and the control building.

- (1) For new interconnection at existing Ring Bus: A bay addition including circuit breaker, disconnecting switches, communications and equipment for SCADA and metering is required. Ring bus configuration is limited to four bays. Interconnection requests that would constitute a fifth bay will require additional modifications as dictated by the Facilities Study.

- (2) For new interconnection at existing Main and Transfer Bus: A bay addition including circuit breaker, disconnecting switches (3) and equipment for protection, supervisory control and metering is required. Main and Transfer bus configurations may require modifications to the main and transfer system other than the addition

of the bay. When the Main/Transfer bus arrangement is used, the protection requirements shall be explicit in the requirement that both the primary and backup protection have communications tripping. Required changes will be evaluated by WAPA on a case-by-case basis.

For cases where the System Impact Study indicates circuit breakers have reached or exceeded 95% of their continuous rating and/or fault duty interrupting capability due to the interconnection, the identified circuit breakers shall be replaced. The historical operational use of the circuit breakers may be considered when making the replacement decision.

IV. Operation, Maintenance, Ownership, and Replacement

Operation and dispatching authority of the circuit breakers, disconnects, interrupters, and motor-operated disconnect switches that are an integral part of ~~Western~~WAPA's transmission system generally shall remain with ~~Western~~WAPA. The appropriate ~~Western~~WAPA dispatch center will order switching and issue all clearances and hot-line orders on the transmission portion of the interconnection or substation. This will involve use of ~~Western~~WAPA's switching and clearance procedures, including use of ~~Western~~WAPA locks and tags. Issuance of clearances, hot-line orders, or general switching may be in the form of an inter-company clearance to a dispatching agent of the entity owning the facility, rather than directly to a job supervisor. Switching on the equipment that is interconnected to and/or associated with ~~Western~~WAPA's transmission system shall be directed by the ~~Western~~WAPA dispatcher according to ~~Western~~WAPA's Power System Switching Procedure.

The owner of installed equipment will be responsible for its proper operation and maintenance. Equipment must be operated and maintained in accordance with the manufacturer's recommendations, prudent utility practices, and applicable environmental, ~~and~~ safety and compliance standards. This may include fall protection requirements (design and maintenance). ~~Western~~WAPA may require additional equipment to assure a reliable interconnection, and to safeguard the proper operating conditions of its transmission system. ~~Western~~WAPA prefers, in most cases, to provide the requisite operation and maintenance services, with funds advanced through the Interconnection Agreement to cover the costs of providing those services. Such costs may include training on maintenance procedures for unfamiliar equipment.

The Requestor shall provide five sets of instructions and manufacturer's drawings to WesternWAPA for each piece of equipment that WesternWAPA operates. WesternWAPA and the Requestor will jointly write Standard Operating Procedures for the interconnected facility.

System margins allow for operational flexibility in the areas of: (1) power flow, for impedance concerns; (2) fault duty, for reliability during switching and line fault tripping; (3) sub-synchronous resonance, affecting new equipment through ground paths on existing equipment; and (4) stability, relating to overloads or VAR support on existing system components. If the interconnection uses system reliability margin (e.g. degradation of system voltages) in WesternWAPA's facilities other than at the specific interconnection, the Requestor shall:

- (1) Rebuild facilities affected to add or replace the margin consumed; or
- (2) Meet other such requirements as agreed to between the parties.

WesternWAPA will demonstrate the impact to system reliability margin using systems planning models for power flow, fault duty, sub-synchronous resonance and stability.

If construction is done by others, WesternWAPA may require at least one WesternWAPA representative be present to coordinate and provide for switching, clearances, special work permits, and inspections during construction work on WesternWAPA's right-of-way. WesternWAPA's representative will also conduct operability checkout on equipment, including metering, relay settings and tests and protective device operation (e.g., circuit breakers, motor-operated disconnects, etc.). Final electrical connections to WesternWAPA's facilities will be made by WesternWAPA or under WesternWAPA's supervision.

WesternWAPA reserves the right to maintain backup control on all facilities that interconnect with WesternWAPA's transmission system that may be vital to system reliability and telemetry values. WesternWAPA also reserves the right to approve transmission system changes at the tap, substation, or point of interconnection that may affect operation of WesternWAPA's transmission facilities and/or the interconnection facilities of a third party.

WesternWAPA will perform routine maintenance on facilities located in its substations unless otherwise specified in the Interconnection Agreement. Maintenance will normally be performed by and at the expense of the entity that owns the equipment or facility when the proposed interconnection involves a tap or substation that sectionalizes one of WesternWAPA's transmission lines, in accordance with the Interconnection Agreement. WesternWAPA shall be

notified and have the right to witness settings and testing of relays, meters, and controls that could affect the integrity and security of WesternWAPA's transmission system. WesternWAPA shall also have the right of entry to interconnected facilities for emergency operation and maintenance of equipment or structures that WesternWAPA deems necessary to maintain a reliable power system.

WesternWAPA will perform maintenance on relaying and control equipment and other associated equipment for which WesternWAPA has operating responsibility, unless otherwise agreed. Periodic advances of funds may be required to cover the estimated cost of operation and maintenance work to be performed by WesternWAPA on equipment owned by others, as set forth in the Interconnection Agreement.

Ownership of installed facilities is determined on a case-by-case basis. Contractual agreements implementing interconnection by others to WesternWAPA's transmission system will normally allow WesternWAPA or WesternWAPA's customers the right to interconnect to either the high-side or low-side bus of the substation in which WesternWAPA maintains ownership rights, at the incremental cost of the additions. The owner of equipment installed on WesternWAPA's property is financially responsible for proper maintenance of that equipment in accordance with the manufacturer's recommendations and prudent utility practices. WesternWAPA reserves the right to perform all maintenance on equipment installed on WesternWAPA property at the expense of the owner.

When any proposed replacements or additions are located in a WesternWAPA substation, contractual arrangements will include provisions for an advance of funds for the costs of labor and other expenses, including allocable overhead costs, associated with operation and routine maintenance work performed by WesternWAPA.

Requirements for operations, maintenance, ownership and replacement of equipment and facilities necessitated by an interconnection will be specified in a new or amended Interconnection Agreement with the Requestor.

V. System Protection

Protective relaying requirements for each interconnection will be determined by WesternWAPA after its receipt from the Requestor of a preliminary single-line drawing of the proposed

interconnection, and a single-line drawing and maps of the Requestor’s facilities or transmission or distribution system in the area. The Requestor should provide re-closer and fuse ratings, relaying data, and line and transformer impedances. High-speed pilot, backup, breaker failure, and out-of-step relaying are normal requirements for 230-kV or greater voltage interconnections. ~~Specialized relaying may be required to provide automatic generation or load shedding, or interconnected system separation.~~ The table below identifies the minimum requirements for Protection and Communication.

<u>Protection & Communication Requirements</u>	<u>For Loads or Generation < 5 MW</u>			<u>For Loads or Generation >= 5 MW</u>		
	<u>AGC</u>	<u>AGC/Transmission</u>	<u>Transmission</u>	<u>AGC</u>	<u>AGC/Transmission</u>	<u>Transmission</u>
<u>COMMUNICATIONS</u>						
<u>1. Single form of Communications (Fiber Optics or Microwave)</u>						
<u>2. RTU</u>						
<u>3. Channel Bank (Associated Channel Cards for Relaying, Metering, RTU and Misc.)</u>	X	X	X	X-	X-	X-
<u>4. DSX</u>						
<u>PROTECTION</u>						
<u>1. Redundant Relays specified by WAPA for WAPA O&M facilities</u>						
<u>2. Metering specified by WAPA</u>	X	X	X	X	X	X
<u>3. Control Panels designated for WAPA equipment specified by WAPA</u>						

A typical disturbance, as it is considered in the planning and design of a transmission system, is the sudden loss of one or more critical transmission lines or transformers. If the System Impact Study for interconnecting generation or load identifies conditions or disturbances which create

system instability or unacceptable loading or voltage levels because of transmission system inadequacies, specialized relaying may be required to provide automatic generation or load shedding, or interconnected system separation.

An example of a ~~A widely applied~~ corrective measure is to instantaneously drop sufficient generation on the sending end of the lost transmission facility. This is known as generator curtailing or tripping~~“dropping,”~~ and a participating generating facility may be disconnected from the transmission system by an automatic Remedial Action Scheme (RAS)~~controller,~~ in much the same way as by a transfer-trip scheme. A RAS is designed to detect predetermined system conditions or disturbances and automatically take corrective actions that may include, but are not limited to, curtailing or tripping generation or other sources, curtailing or tripping load, or reconfiguring the system~~a special protection system that automatically initiates one or more pre-planned corrective measures~~ to restore acceptable power system performance following a disturbance. RAS application is generally intended to mitigate transient and dynamic performance issues, and may also be allowable to mitigate thermal overloads and post-transient voltages issues. A generating facility should have full load-rejection capability as needed both for local line protection and for a the RAS, if needed. A generation curtailment RAS is considered by WAPA on a case-by-case basis.

A participating load may be disconnected from the transmission system by an automatic RAS ~~controller,~~ in much the same way as by a transfer-trip scheme. The load owner should therefore have full load-rejection capability as needed both for local line protection and for a the RAS, if needed. A load shedding RAS is considered by WAPA on a case-by-case basis.

If ~~Western~~WAPA allows or requires RAS participation for a particular generating facility or load, the generator/load owner shall be responsible for all related costs, pursuant to the applicable interconnection agreement.

Whether a RAS ~~will~~shall be allowed or required depends on: the overall location and size of the generator and/or load on ~~Western~~WAPA's transmission system; the nature, consequences, and expected frequency of disturbances; and the nature of potential alternative transmission reinforcements. The implementation of a RAS may also be subject to provisions of a RTO Tariff

and associated RTO RAS criteria, if applicable. Also if required, the RAS may be subject to approval of the WECC subcommittee governing RAS.

No synchronous generator may be connected to WesternWAPA's transmission system out of synchronization. Therefore, automatic synchronization shall be supervised by a synchronizing check relay IEEE Device 25. This assures that generators meet all applicable ANSI and IEEE standards. The prime mover and the generator should also be able to operate within the full range of voltage and frequency excursions that may exist on WesternWAPA's transmission system without damage to them.

WesternWAPA's system protection requirements are designed and intended to protect WesternWAPA's facilities only. Additional protective relays are typically needed to protect interconnected generation, load, or transmission facilities. It is the generator, load, and/or transmission equipment owner's responsibility to install the proper protective relaying needed to protect its equipment. WesternWAPA does not assume any responsibility for protection of the interconnected generation, load, or transmission facilities. The generator, load, and/or transmission equipment owner is solely responsible for protection of the interconnected equipment in such a manner that faults, imbalances, or other disturbances on WesternWAPA's transmission system do not cause damage to the generator, load, or transmission equipment facilities. A study of system protection requirements, funded by the Requestor, may be necessary.

Power system disturbances initiated by faults and forced equipment outages expose interconnected generators to oscillations in voltage and frequency. It is important that generators remain in service to help ensure dynamic or transient oscillations are stable and damped. Therefore, each generator must be capable of continuous operation at 0.95 to 1.05 per unit voltage and 59.5 to 60.5 Hertz, and for even larger deviations for short periods of time. Nearly all generators have inherent capability for off-nominal operation. Over/under voltage and over/under frequency relays are normally installed to protect generators from extended off-nominal operation. To ensure that the interconnected generators do not trip prematurely, the time delays for these relays must be coordinated with WesternWAPA.

VI. Supervisory Control

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Attachment C, Technical Requirements

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Supervisory control by [WesternWAPA](#) of line power circuit breakers, interrupters, or motor-operated disconnects shall be required on all interconnections where breaker, interrupter, or disconnect switch operation can, in [WesternWAPA](#)'s opinion, directly affect the reliability of [WesternWAPA](#)'s transmission system. The remote terminal units (RTU) for supervisory control and data acquisition (SCADA) shall be compatible with the SCADA system used within the [WesternWAPA](#) Region in which the interconnection is located. Installation of a RTU at a new location or modification of a RTU at an existing facility will generally be performed by [WesternWAPA](#), at the expense of the Requestor. [WesternWAPA](#) will perform the necessary expansion, including hardware and software changes, to the SCADA master station equipment at the Requestor's expense for that portion attributed to the new interconnection. The Requestor shall provide transducers, interface hardware, and appropriate communication channels that are compatible with [WesternWAPA](#)'s existing SCADA system requirements. The Requestor shall also provide necessary auxiliary and control relays, hot-line indication, local-supervisory switches, hot-line order lamp, and all other equipment necessary to interface with [WesternWAPA](#)'s supervisory control equipment. [WesternWAPA](#) will provide specifications for such equipment upon request.

Interconnections that establish additional or new Balancing Authority Area boundaries require the Requestor to furnish all necessary Balancing Authority Area metering equipment. These requirements may include, but are not limited to:

- (1) An analog and/or digital telemeter at the point of interconnection;
- (2) Analog to digital conversion equipment and tone gear, as required, at both the point of interconnection and [WesternWAPA](#)'s dispatch center(s) and other organization's dispatch center(s), if applicable⁵;
- (3) Totalizing equipment at the point of interconnection or some intermediate point on the communications link. A multiport RTU may be substituted in some cases. If a multiport RTU is used, a "points list" identifying alarms, events, and telemetered quantities will be jointly developed between [WesternWAPA](#) and the Requestor. The service agreement implementing the multiport RTU will include operating/dispatch

⁵ For example, [WAPA UGPR's Eastern Interconnection Balancing Authority Area \(WAUE\) was merged into the SPP Balancing Authority Area on October 1, 2015.](#)

- jurisdiction, primary and backup service control design, switching procedures, and definitions of terms used by the system operators;
- (4) Communications links to both WesternWAPA and the other organization's ~~power system control~~dispatch center(s); and/or
 - (5) Automatic generation control hardware and software changes or additions at the ~~dispatch~~power system control center(s).

WesternWAPA's telemetering, scheduling and interconnection metering are performed on a megawatt (MW) or whole MW-hour basis; therefore, interconnection metering and totalizing equipment shall meet this criterion. In some of WesternWAPA's Balancing Authority Areas, a dynamic schedule to the appropriate automatic generation controller may be a consideration for radial tap lines to WesternWAPA's transmission system whenever the load is supplied from a source outside WesternWAPA's Balancing Authority Area. Similarly, internal generation resources supplying loads outside WesternWAPA's Balancing Authority Area may require special equipment at WesternWAPA's and other entities' dispatch centers.

A. Starting Scenario of Induction Generators (if applicable)

Induction generators, such as those used on a wind generating facility, shall contain a signal showing the status of the generating facility, e.g. whether output has stopped due to lack of wind, too much wind, forced outage, external signals, etc. Together with signals from the system operator and local measurements (e.g., voltage, frequency, and wind speed), this signal shall be part of a logic managing the release of the wind generating units for operation.

The wind generating facility developer shall provide the following:

- (1) The starting scenario of each wind generating unit, which is MW generation, VAR load, and operation of capacitor banks, step by step;
- (2) The starting sequence of wind generating units if more than one, and an indication of the maximum number of units that could be started simultaneously; and
- (3) The voltage trip setting, pick up time, and reconnection time for each unit.

B. Curtailment and Disconnection

WesternWAPA may limit the operation and/or disconnect or require the disconnection of generating facility, load, or transmission interconnection from WesternWAPA's transmission system at any time, with or without notice, in the event of an emergency or to correct unsafe operating conditions. WesternWAPA may also limit the operation and/or disconnect or require the disconnection of a generating facility, load, or transmission interconnection from WesternWAPA's transmission system upon the provision of reasonable notice, as follows: (1) to allow for routine maintenance, repairs, or modifications to WesternWAPA's transmission system; (2) upon WesternWAPA's determination that a generating facility, load, or transmission interconnection is not in compliance with these Requirements; or (3) upon termination of the applicable interconnection agreement.

C. Generation/Load Tripping

Automatic generator or load tripping will be assessed on a case-by-case basis and allowed as determined by WesternWAPA, in its sole discretion, consistent with WesternWAPA's Planning Criteria Document and RTO Tariff provisions and associated criteria, if applicable.

VII. Communications and Metering

A. Communications

WesternWAPA or the Requestor shall provide communications equipment sufficient to meet WesternWAPA's telephone, radio, system protection, remote meter reading and Energy Management System/SCADA requirements. WesternWAPA will, unless otherwise agreed, design, furnish, and install all communications equipment that WesternWAPA determined to be integral to its facilities.

The communication channel and channel hardware will be provided by the Requestor. WesternWAPA will specify the type, speed, and characteristics of the communication channel equipment so that compatibility with existing communications, supervisory control, relaying, and telemetering equipment is maintained. The specific type of communication equipment to be furnished by the Requestor shall be reviewed and approved by WesternWAPA. The Requestor shall reimburse WesternWAPA for the costs of any additional equipment provided by WesternWAPA.

Fiber optic additions to new or existing WesternWAPA transmission lines will be considered on a case-by-case basis. Technical analysis of clearances, structural loads, and electrical field effects may limit applications. Outage restrictions and maintenance responsibilities may also impact potential fiber paths. WesternWAPA reserves the right to negotiate the acquisition of individual optical fibers on the circuit, as agreed to between WesternWAPA and the Requestor.

B. Metering

~~Revenue meters and associated cCurrent and voltage transformers shall meet the requirements outlined in WAPA's Meter Policy. used for revenue metering circuits must meet the accuracy standards specified under ANSI/IEEE Standard C57.13, Standard Requirements of Instrument Transformers, for an accuracy of 0.3 percent with all burdens. The thermal current rating of current transformers shall exceed the maximum current capacity of the circuit involved by a factor of 1.5 to 2.0.~~

~~Voltage transformers used for revenue metering circuits must meet the accuracy standards specified under ANSI/IEEE C57.13, for an accuracy of 0.3 percent with the following burdens:~~

- ~~—— (1) "W" through "Y" burden for 25-kV and below; and~~
- ~~—— (2) "W" through "ZZ" burden for above 25-kV.~~

~~Revenue metering with mass memory storage shall be used if the estimated maximum demand is 500-kV-amperes or greater, or if maximum simultaneous demand billing is contractually required. Such revenue metering shall be compatible with the metering policy established by the Western Region in which the revenue meter will be located. On Western-owned facilities, meters shall be installed on the primary side of the system.~~

VIII. Additional Generator Requirements

All generating facilities connected to WesternWAPA's transmission system must meet the power quality standards set forth in Power Quality section of this Attachment, as discussed earlier. Generator owners must pay for any mitigation efforts necessary to meet those standards.

The excitation system/automatic voltage control system of synchronous generators, and other generators required to provide continuous reactive capability, must respond quickly, i.e., voltage response time is 0.5 seconds or less. A power system stabilizer uses auxiliary stabilizing signals to control the excitation system to improve power system dynamic performance. A power system stabilizer is required with the excitation system for all synchronous generators located in the WECC region that are 50 megavolt-ampere (MVA) and larger, and for all synchronous generators located in the MRO region that are 75 MVA and larger. However, it may be necessary to use a power system stabilizer on a smaller generator, depending on the location of the interconnection to ~~Western~~WAPA's transmission system.

A speed governor system is required on all synchronous generators. The governor regulates the output of the generator as a function of system frequency. That function (called the governor's "droop" characteristic) must be coordinated with the governors of all other resources located within the same Balancing Authority Area, to ensure proper system response to frequency variations. The speed governor system shall have a droop characteristic settable between three and seven percent, and is typically set to five percent.

IX. Physical Security Requirements

WAPA will coordinate with the Requestor to negotiate the design and specification of physical security requirements for any WAPA owned, operated, or maintained transmission facilities. All physical security work performed by WAPA, including revisions, will be at the expense of the Requestor.

X. Compliance Requirements

WAPA will coordinate with the Requestor to determine the NERC compliance requirements for any WAPA owned, operated, or maintained transmission facilities. It should be noted that under certain NERC CIP Standards, there are thresholds which trigger additional requirements. For example a substation with four 230kV connections might be classified as a low impact asset. Adding a 5th 230kV line will likely cause that substation to be classified as a medium impact asset. Medium impact assets have many additional requirements including increased security, access control, additional communications bandwidth requirements and quarterly reviews. All impacted requirements will be satisfied at the expense of the Requestor.

XI. Access Requirements

WAPA will coordinate with the Requestor to facilitate access for any WAPA owned, operated, or maintained transmission facilities. All facility access development will be at the expense of the Requestor.

Attachment D –

Bibliography⁶

- ANSI and/or IEEE Standards
 - [ANSI/IEEE Standard 80, Guide for Safety on AC Substation Grounding](#)
 - [ANSI/IEEE Standard C57.13, Standard Requirements of Instrument Transformers](#)
 - [IEEE Standard 519, Recommended Practices and Requirements for Harmonic Control in Electric Power Systems](#)
- ~~Western~~WAPA-specific Documents
 - Engineering ~~Manual 6403.4~~, Drafting Standards
 - Engineering ~~Manual 6430.1~~, System Design Guides ~~for Tap Stations~~
 - Environmental Compliance
 - [General Power Contract Provisions \(GPCPs\)](#)
 - [General Interconnection Contract Provisions \(GICPs\) \(UGPR\)](#)
 - [Meter Policy](#)
 - [Open Access Transmission Tariff](#)
 - Order 440.1A, Occupational Safety and Health Program
 - Order 470.1G, Safeguards and Security Program
 - Planning Criteria Document
 - Power System Safety Manual, established by Order 440.3
 - Power System Switching Procedure
 - Responsibility for Hazardous Materials

⁶ Information from non-~~Western~~WAPA hyperlinks [in this document](#) is provided for convenience only. ~~Western~~WAPA makes no warranty, express or implied, including the warranties of merchantability and fitness for a particular purpose, nor does it assume any liability or responsibility for the accuracy, completeness, or usefulness of any such information. ~~Western~~WAPA does not represent that use of such information will not infringe upon privately owned rights. A hard-copy of most listed ~~Western~~WAPA documents will be provided upon request.

- Standard Design Criteria
- Other Material
 - [DOE NEPA Implementing Procedures](#)
 - DOE Order 470.4 Safeguards and Security Program
 - [NERC Reliability Standards](#)
 - 18 U.S.C. § 1366
 - [Southwest Power Pool, Inc. Open Access Transmission Tariff, and Criteria](#)

Attachment E

Environmental Requirements

WesternWAPA is required to assess the potential environmental impacts of any proposed interconnection in accordance with the National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321-4347 (NEPA) and other environmental regulations. Applicants are advised to consult with WesternWAPA as early as possible in the planning process to obtain guidance on the studies or environmental information that WesternWAPA requires. The U.S. Department of Energy's *NEPA Implementing Procedures*, 10 CFR Part 1021 (NEPA Implementing Procedures) require that WesternWAPA begin environmental review as soon as practicable. WesternWAPA will consider several factors in its decision on when to begin the NEPA review. Among these are the degree to which the proposed project has been described; and whether there would be significant project changes. Changes in the project description during the NEPA process will cause delays. The nature of the interconnection request will dictate the level of NEPA compliance required.

Funding of Environmental Reviews

Unless agreed to otherwise in a contract or other agreement, applicants are required to pre-fund all of WesternWAPA's requirements for undertaking environmental studies; and WesternWAPA's labor and other costs associated with the review. WesternWAPA prefers the applicant perform all studies, draft reports, draft public notifications for WesternWAPA's approval, and generally conduct most aspects of the environmental review process in close coordination with WesternWAPA. Early discussions and arrangements with WesternWAPA will identify required formats and other requirements. Some portions of the environmental review process are inherently governmental that must be conducted by WesternWAPA. For example, WesternWAPA may be obligated to consult directly with the U.S. Fish and Wildlife Service under the Endangered Species Act 16 U.S.C. §§ 1531-1544 (ESA); the states; Tribes, State Historic Preservation Officers/Tribal Historic Preservation Officers, and the Advisory Council on Historic Preservation for compliance with the National Historic Preservation Act 16 U.S.C. §§ 470-470x-6 (NHPA), and related legislation. If an environmental impact statement (EIS) is required, WesternWAPA must prepare the EIS or select and manage a contractor to prepare the EIS. If other Federal agencies have jurisdiction over the proposed project, WesternWAPA and the other Federal agencies will need to determine which agency has the lead status on required consultations and for preparing the required NEPA document (i.e. EA or EIS).

WesternWAPA and an applicant will discuss the status of the interconnection studies (System Impact Study and Facilities Study) and their relationships prior to the start of the

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Attachment E, Environmental Requirements

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environmental review. Starting the environmental review process before the completion of interconnection studies may pose certain risks to the environmental review and its schedule, resulting in additional costs to the applicant. Generally, starting the NEPA review and the studies required by other environmental regulations prior to the completion of interconnection studies is not advised. The less the project proposal changes after the environmental reviews have begun, the greater the chance of meeting estimated schedules and budgets.

National Environmental Policy Act Reviews

For compliance with NEPA, three levels of review and documentation are allowed, depending on the nature of the project. U.S. Department of Energy (DOE) regulations determine which of the three options are normally required. The levels are:

1) A categorical exclusion (CX) applies to classes of action for which, under normal conditions, neither an environmental assessment (EA) nor an environmental impact statement would be required. Applicants must remember that the CX only excludes the project from the requirement to prepare an EA or an EIS. It does not offer any relief from compliance with any other environmental regulation or requirement. Public controversy, impacts to resources that would be considered adverse and other issues may require that an environmental assessment or an environmental impact statement be prepared for projects that otherwise would be categorically excluded. Compliance with other regulations is required before the categorical exclusion can be approved. This generally could take up to, or more than, 6 months.

2) An EA is normally required for actions which do not fit within the CX classification and would not normally require an EIS. EAs have two possible outcomes: a finding of no significant impact (FONSI) or the requirement to prepare an EIS if a FONSI cannot be supported by the impact analysis and proposed mitigation to render impacts insignificant. An EA generally requires 6 to 12 months to complete.

3) An EIS is normally required for projects that would be expected to have significant impacts or controversy. The EIS process would end with a [WesternWAPA](#) Record of Decision (ROD) on whether or not to grant the interconnection request. EIS's generally take 12 to 18 months to complete, or more depending on the complexity of the project.

Internal Scoping Requirements

DOE policy requires [WesternWAPA](#) to conduct an early internal scoping process for EA and EIS processes. Internal scoping also may benefit proposed projects that normally do not require the preparation of an EA or EIS. [WesternWAPA](#) and the applicant need to consult prior to the

initiation of environmental review activities to determine what information is needed to initiate an environmental review. At a minimum, [WesternWAPA](#) will need a complete description of the applicant's proposed project, a clearly articulated purpose & need statement for the applicant's proposed project, and a list of stakeholders that may have an interest in the proposed project and its environmental effects. Based on the results of internal scoping, [WesternWAPA](#) will define its proposed Federal action and its need for agency action. The results of internal scoping normally facilitate a public scoping process for a project, if required. A public scoping process normally lasts at least 30 days once notification to begin an EA or EIS process is issued.

Determining the Scope of the NEPA Review

[WesternWAPA](#) complies with the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Requirements of NEPA and DOE Regulations for Implementing NEPA. [WesternWAPA](#) relies on these regulations along with case law and DOE guidance to determine the scope of the NEPA document. Scope consists of the range of actions, alternatives to the proposed Federal actions, and impacts that need to be considered during NEPA review. The scope of Federal environmental reviews under NEPA often includes the environmental impacts of the entire project, and is not limited to those impacts associated with a narrower Federal action. The ESA and the NHPA have scope requirements that may be more inclusive than NEPA, but these broader scopes are addressed in the documentation supporting compliance with those particular regulations.

[WesternWAPA](#) considers three types of actions, three types of alternatives, and three types of impacts to determine the scope of a NEPA document. All of these are described and analyzed in the EA or EIS.

Actions

Connected actions are closely related and are evaluated in the NEPA review and documentation. Actions are connected if they: 1) automatically trigger other actions that may require additional environmental review; 2) cannot or will not proceed unless other actions are taken previously or simultaneously, 3) are interdependent parts of a larger action and depend on the larger action for their justification. Generally, interconnection requests result in the classification of the applicant's generation resource and associated facilities being considered as connected to [WesternWAPA](#)'s decision on interconnection; therefore the applicant's proposal must be covered in the environmental review.

Cumulative actions are actions which, when viewed with other proposed actions have cumulatively significant impacts and, therefore, are discussed in the same impact statement.

Similar actions are actions which, when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together. Examples are common timing or geography.

Alternatives

- The no action alternative is analyzed in every EA and EIS. For interconnection requests, this is usually the scenario in which [Western WAPA](#) would deny the interconnection request.
- Proposed action.
- Other reasonable courses of action.
- Mitigation measures that are not already a part of the proposal developed by the applicant.

Impacts

Impacts are synonymous with “effects.” They include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects.

Direct impacts are caused by the action and occur at the same time and place.

Indirect impacts are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. These may include growth inducing effects and other effects related to induced changes in the patterns of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Cumulative impacts are the impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (Federal or non-Federal) or entity undertakes the other action.

Mitigation Commitments and Requirement to Implement

Mitigation includes: avoiding impacts by not taking certain actions; minimizing impacts by limiting the degree of magnitude of the action; rectifying the impact by repairing, rehabilitating or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources or environments.

[WesternWAPA](#)'s environmental reviews rely on mitigation to reduce the impacts of proposals. Mitigation is often a cornerstone of a FONSI that is issued based on an EA. Sometimes, without agreeing to and implementing mitigation, a FONSI could not be supported and an EIS would be required. If [WesternWAPA](#) determines there are significant impacts, it will publish a notice of intent to prepare an EIS in the Federal Register. An EIS usually contains mitigation that will lessen certain impacts and includes additional public involvement. Mitigation is often negotiated with regulatory agencies, landowners, and the public in general.

For portions of an applicant's proposal where [WesternWAPA](#) or another Federal agency do not have jurisdiction, [WesternWAPA](#) will need a commitment from the applicant that its proposed mitigation will be implemented. This mitigation becomes a part of the applicant's proposed project and must be implemented. [WesternWAPA](#) prepares a mitigation plan after an EA that identifies mitigation that is required to render impacts insignificant and how and when it will be implemented.

When the requesting entity will own equipment located in [WesternWAPA](#)'s substation, switchyard, or right-of-way, the requesting entity shall be financially responsible for all activities necessary to comply with the requirements of existing or subsequent applicable Federal or state environmental laws and regulations.

Data Requirements, Study and Document Formats

The Department of Energy has specific requirements for format and content of EAs and EISs. EAs, EISs, FONSI, and RODs are published electronically on [WesternWAPA](#)'s and DOE's NEPA website, unless for security reasons [WesternWAPA](#) determines that web publishing would disclose sensitive facility information. The document format requirements are described on the

DOE website. These are available from DOE or will be provided by [WesternWAPA](#). [WesternWAPA](#) has general format and content requirements for Biological Reports and Cultural Resource Survey Reports. EAs and EISs are written in specific formats following regulatory and agency guidelines. These formats will be provided to an applicant. Several Federal, state, or local agencies with jurisdiction, require that data be obtained and reported in specific formats or on specific forms. An applicant is expected to comply with these requirements. Failure to meet these requirements could put the project schedule at risk and increase the costs for the environmental review.

[WesternWAPA](#)'s Costs Associated with Environmental Reviews

Per the Environmental Review Agreement, an applicant funds [WesternWAPA](#) management for the environmental review process. [WesternWAPA](#)'s cost to manage an EA process is, generally, between \$50,000 and \$150,000, and between \$150,000 and \$300,000 for an EIS process. Depending on the complexity of the project, the costs could be more. These are estimates to give an applicant a rough idea of the costs. The costs will vary by project.

Options for Preparing Environmental Studies, Collecting Information

Categorical Exclusions: [WesternWAPA](#) generally requires the applicant to undertake all required surveys and report preparation. [WesternWAPA](#) reviews draft reports, undertakes consultation with the U.S. Fish and Wildlife Service (USFWS), State Historic Preservation Officers/Tribal Historic Preservation Officers, and Tribal governments. All surveys will meet the requirements of the appropriate regulatory agency (e.g. Class III surveys will be done in accordance with the National Park Service requirements and State Historic Preservation Office requirements; Biological surveys will be done in accordance with USFWS requirements). The applicant will ensure that local, state and other Federal agencies with jurisdiction are included in the project development and review. The applicant is responsible for identifying, obtaining, and implementing all required permits and approvals. [WesternWAPA](#) uses the results of the applicants' surveys to support its review for a CX.

Environmental Assessments: If [WesternWAPA](#) determines that an EA is required, the applicant may prepare the EA and submit it to [WesternWAPA](#) for approval. [WesternWAPA](#) will provide examples of acceptable EAs from past projects to ensure that the format is acceptable and that the appropriate resource topics are analyzed. Typically, the applicant is responsible for performing the required environmental studies and [WesternWAPA](#) will, as the lead Federal Agency, review studies for conformance and compliance with applicable policies, regulations, practices, and legislation. A contractor may prepare the preliminary draft, draft, and final EA,

with coordination, review, and approval by [WesternWAPA](#). Format and content requirements apply. If requested by the applicant, [WesternWAPA](#) can prepare the EA internally if sufficient staff is available, or contract the preparation of the EA. All require funding from the applicant that is non-reimbursable.

Environmental Impact Statements: If [WesternWAPA](#) determines that an EIS is required, [WesternWAPA](#) must either prepare the EIS or select and manage a contractor to prepare the EIS. CEQ regulations require that the EIS contractor be selected by the lead agency, or by the lead agency in cooperation with the cooperating agencies. The applicant will be required to fund the EIS contractor.

Options for selecting a contractor to prepare an EIS:

- Third-Party Contracts. A ‘third party contract’ refers to the preparation of an EIS by a contractor paid for by the applicant, but selected by [WesternWAPA](#) with direct oversight by [WesternWAPA](#). Generally, the applicant issues a request for proposals (RFP) developed and/or approved by [WesternWAPA](#). Following a review of proposals received in response to an RFP, [WesternWAPA](#) selects the contractor and the applicant contracts with the contractor. Environmental resource information, surveys, etc. may either be provided by an applicant or an applicant’s consultants; or acquired by the third party contractor.
- [WesternWAPA](#) Contract. [WesternWAPA](#) contracts for an EIS contractor. With this option the applicant must advance the funds before a contract request is initiated.

With each option above, the EIS contractor must complete a no financial conflict of interest disclosure statement and submit it to [WesternWAPA](#) for review and approval. Once the disclosure is approved, it must be published with the draft EIS.

The basic requirement for the EIS contractor is to prepare the preliminary draft, draft (for public review) and final EIS documents for [WesternWAPA](#)’s review and approval. The resource information such as surveys, resource inventories, and project information may be provided by the applicant or the EIS contractor.

Environmental Reviews Involving Other Federal and State Agencies and Cooperating Agencies

[WesternWAPA](#) may participate in the environmental process of another Federal or state agency involved with a project to satisfy portions of its NEPA requirements. Environmental reviews and related studies conducted by another agency cannot, however, be routinely adopted. They must meet the standards placed upon [WesternWAPA](#) by the *NEPA Implementing Procedures*.

Western Area Power Administration, General Requirements for Interconnection – 7
Attachment E, Environmental Requirements

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Other Federal agencies may participate in the environmental process initiated by [WesternWAPA](#) when these agencies have jurisdiction for issuing permits or related decisions. Other Federal agencies may require cost recovery from an applicant to support their participation. An applicant will be responsible for funding other agencies in the environmental review process.

If a state agency has jurisdiction over a portion of an applicant's project and the state requires an environmental review, [WesternWAPA](#) will work with the state agency to define opportunities to reduce or eliminate duplication of environmental review requirements. This could result in a joint environmental review process. .

Relationship Among the NEPA Review, System Impacts Studies and Facilities Studies

The scope of the environmental review will be influenced by system impact and/or facilities studies. If the results of the studies demonstrate a need for system additions to support the interconnection, the environmental review must address the additions along with the interconnection. The applicable NEPA documents will be completed before [WesternWAPA](#) renders a final decision on the request for interconnection. [WesternWAPA](#) considers the environmental analysis contained in the NEPA documents in reaching its decisions concerning the interconnection, as stipulated in the *NEPA Implementing Procedures*.

Limitations on Actions During NEPA Process

Applicants and [WesternWAPA](#) are prohibited from taking actions on the proposed interconnection prior to completion of the environmental review. For an EA this means prior to issuing the finding of no significant impact, if appropriate; for an EIS this would be prior to signing and distributing the ROD. This prohibition applies to any action which would have an adverse environmental impact or limit the choices of reasonable alternatives.

Under some limited circumstances, [WesternWAPA](#) may allow certain actions to be undertaken if the actions are justified independently of the proposal, the action is accompanied by an adequate environmental review, AND the action will not prejudice the decision. An interim action prejudices the decision when it tends to determine subsequent development or limit alternatives. This prohibition does not apply to the development of plans or designs or performance of other work necessary to support the application, or to support other applications for other Federal, State or local permits or assistance. Resources expended on interim actions are usually at risk if the interconnection request is ultimately denied.

[WesternWAPA](#) may not prepare a categorical exclusion for actions that are part of a proposal

for which an EIS is being prepared unless they meet all of the requirements for an interim action.

Often during the NEPA review, interested parties request that the project design include elements that may mitigate impacts. Applicants may not commit [WesternWAPA](#) to a specific course of action or make any commitments that would require the expenditure of Federal funds or equipment. All such agreements will be fully coordinated with [WesternWAPA](#) prior to discussions with regulatory agencies, the public, or state, local or federal agencies. Applicants may commit themselves to undertake any courses of actions that are cost-neutral to [WesternWAPA](#).

Changes in Project Requirements During Environmental Review

Applicants are advised that project changes identified after the environmental review process has begun, usually result in a delay in the review process. Project changes may require modification of contracts for environmental contractors, additional surveys and reports, additional consultations with regulatory agencies, redrafting of documents or other actions. These changes are accompanied by increases in costs and lengthened schedules. Although it is advisable to begin environmental reviews as early as practicable, beginning them before significant project features have been identified or decided on is not advised.