Evergy Transmission Facility Interconnection Requirements

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Applies to Evergy Kansas Central, Evergy Metro, Evergy Missouri West, and Transource, Missouri.

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Document Approval

Approved By	Title	Signature
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Applicable NERC Reliability Standards

Standard and Revision	Registered Entity	NERC Functional Entity
FAC-001-4	Evergy	Transmission Owner

Document Revision History

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2	2019-11-1	Katy Onnen	Updated document approvers, errata changes to align with company integration.
3	2020-3-4	Katy Onnen	Updated document to clarify that upgrades are required to be completed prior to interconnection, upgrades will use Evergy's standard design and equipment, and the cost of upgrades are the customer's responsibility.
4	2020-7-31	Katy Onnen	Updates Sections 1.D, 1.1.6.2, and 1.2.2.8 to incorporate system protection changes, incorporated Transource Energy, and updated references to Evergy from legacy company names.
5	2021-12-01	Katy Onnen	Updated Purpose section for document review to be as needed. Updated personnel titles and document dates. Updated formatting of Table of Contents and headings throughout document.

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Acronyms

Acronym	Definition
ANSI	American National Standards Institute
BES	Bulk Electric System (generally, Facilities operated at 100kV or above)
BPS	Bulk Power System (generally, Facilities operated at 60kV or above)
EMS	Energy Management System
EMT	Electro-magnetic transient
ESR	Electric Storage Resource.
GFM	Grid-Forming [operational mode].
GIC	Geo-magnetically induced current
GMD	Geo-magnetic disturbance
GO	Generator Owner (NERC functional entity)
GSU	Generator step-up [transformer]
IBR	Inverter-based resource
IEEE	Institute of Electrical and Electronic Engineers
MLS	Manual load shedding
MVAR	Mega-volt-ampere reactive
MW	Megawatt
NEC	National Electric Code (NFPA 70)
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code (ANSI C2)
OASIS	Open Access Same-Time Information System
OATT	Open Access Transmission Tariff
OPGW	Optical ground wire
PC	Planning Coordinator (NERC functional term)
PCC	Point of Common Coupling
POI	Point of Interconnection
POM	Point of Measurement
PQR	Power Quality Requirements
RC	Reliability Coordinator (NERC functional term)
RPA	Reference Point of Applicability (as defined in IEEE Std. 2800)
SCADA	Supervisory Control and Data Acquisition
SPP	Southwest Power Pool
SVC	Static VAR Compensator (a dynamic reactive device)
TDD	Total Demand Distortion
TO	Transmission Owner (NERC functional entity)
TOP	Transmission Operator (NERC functional entity)
TP	Transmission Planner (NERC functional entity)
UFLS	Under-frequency load shedding
ZPC	Zonal planning criteria
ZPP	Zonal planning process

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Definitions

For the purposes of this document, a "defined term" is a word that begins with a capital letter. Defined terms have a specific, agreed-upon meaning. Customers can find the definition of defined terms in the NERC Glossary of Terms, the SPP OATT, or the table below. If the terms defined in this table conflict with terms as defined by the NERC Glossary of Terms or the SPP OATT, the NERC or SPP definition shall take precedent over Evergy's definition.

Defined Term	Definition
Battery Energy Storage System (BESS)	Interconnection Facility owner or requester who will apply for a new interconnection or qualified change to an existing interconnection.
Customer, Interconnection Customer	An Interconnection Facility owner seeking a new interconnection or qualified change to an existing interconnection affecting Evergy's Transmission System or Evergy's Distribution System.
Distribution Element	Equipment operated at a nominal voltage of below 60kV that constitutes, or interconnects with, Evergy's Distribution System. This may include any element used to transfer power between Evergy's Transmission System and a retail Customer's point of service.
Distribution Facility	Facilities with a nominal operating voltage of less than 60kV necessary to connect the Interconnection Customer's Facility to the Transmission System.
Distribution System	A collection of one or more Distribution Facility(ies), including the associated Distribution Element(s) owned and operated by Evergy for the purpose of delivering electric energy to one or more Customer(s).
Double Circuit Transmission Line	Two (2) transmission lines that 1) have the same FROM and TO Transmission stations; 2) are built on a common transmission structure for at least 50% or greater of the overall line length; and 3) operate at a common nominal transmission voltage.
Emergency Condition	A condition or situation: (i) that in the judgment of either party is imminently likely to endanger life or property; (ii) that in the sole judgment of Evergy is imminently likely to affect adversely or impair the Transmission System or imminently will affect or impair the transmission system(s) of others to which the Transmission System is directly or indirectly connected; or (iii) that in the sole judgment of the generation Interconnection Customer is imminently likely to adversely affect or impair the Facility. Such a condition or situation includes, but is not limited to, overloading or potential overloading of, excessive voltage drops, or other unusual operating conditions on the Transmission System or the generation Interconnection Customer's Facility such that the output of the Facility must be shut down or curtailed to avoid damaging the Facility or the Transmission System.

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Defined Term	Definition
Enter Service	In reference to an IBR plant, Enter Service is the condition in which the plant is first being energized or has otherwise been offline for an extended duration, typically greater than one (1) hour.
Electric Storage Resource (ESR)	See SPP OATT, Section 1 (Definitions).
Evergy	For the purposes of this document, the term "Evergy" shall, unless expressly stated, encompass Evergy's solely or partially transmission and distribution entities within the functional authority of an Evergy transmission or distribution system operator and/or planner. This includes: Evergy Kansas Central; Evergy Metro (Kansas); Evergy Metro (Missouri), Evergy Missouri West; and Transource, Missouri.
Facility	See definition in NERC Glossary of Terms[i].
Generating Source	Any device, including IBRs and energy storage systems (ESS), intended or connected to inject active power, reactive power, voltage, and/or current onto Evergy's electrical equipment. This includes periods when Evergy's equipment may be de-energized or is intended to be de-energized.
Good Utility Practice	Any of the practices, methods, and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts that, in the exercise of reasonable judgment in light of the facts known at the time the decision is made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but intended to include acceptable practices, methods, or acts generally accepted in the region. FERC, Order No. 888, 75 FERC 61,080 (1996); FERC Policy Statement on Matters Related to Bulk Power System Reliability, 107 FERC ¶ 61,052, clarified, 108 FERC ¶ 61,288 (2004), Supplement to Policy Statement On Matters Related to Bulk Power System Reliability, 110 FERC ¶ 61,096 (2005).
Governmental Authority	Any federal, state, local, or other governmental, regulatory, or administrative agency, court, commission, department, board, or other governmental subdivision, legislature, rulemaking board, tribunal, arbitrating body, or other governmental authority.

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Defined Term	Definition
Grid-Forming (GFM)	An inverter-based resource (IBR) operational model that includes controls with the primary objective of maintaining an internal voltage phasor that is constant (or nearly constant) in the sub-transient to transient time frame to maintain synchronism with other devices in the grid and regulate active/reactive power. This allows the IBR to immediately respond to changes in the external system and maintain IBR control stability during normal and abnormal network conditions.
Inverter Based Resource (IBR)	See definition in NERC Glossary of Terms [i].
Large Load	For the purposes of this document, a "Large Load" is a Customer end-use Facility that meets the SPP definition of Large Load, or is otherwise qualified by Evergy Staff as a Large Load (e.g., 10MW connected to distribution, etc.)
Metering Equipment	All metering equipment currently installed at the Interconnection Customer's Facility and/or any other metering equipment to be installed at the metering points designated in the Interconnection Facilities, including Revenue Meters.
Point of Common Coupling (PCC)	Point of Common Coupling (defined by IEEE Std. 1453). See POI definition.
Point of Interconnection (POI)	Point of Interconnection. The point at which the Facilities are physically connected to the Transmission System (including any Distribution Facilities required to facilitate the interconnection).
Point of Measurement (POM)	Point of Monitor. The point on the Transmission system at which a power park controller regulates voltage. Generally associated with IBRs and defined by IEEE Std. 2800.
Project	Any electric system upgrade or alteration required to accommodate an Interconnection. This includes (but is not limited to) extensions or improvements of lines, addition of disconnecting devices, transformers, meters, breakers, relays, controls, data systems, or to make any other equipment modifications relating to circuits, substations, or apparatus necessary to connect Customer's Facility.
Regional Transmission Organization (RTO)	The entity of which Evergy is a member that is responsible for regional acting as the regional Transmission Provider or otherwise performing regional functions of energy balancing, operational reliability, and long-term planning. The SPP is Evergy's RTO.

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Defined Term	Definition
Requirements	An abbreviated reference to this document. I.e., These Facility interconnection requirements.
Return to Service	In reference to an IBR plant, Return to Service is the condition in which the plant is re-energized after being forced out of service (e.g., tripping due to a grid event), typically less than or equal to one (1) hour.
Transmission Element	Primary equipment (operated at a nominal voltage of 60kV or greater) that constitutes, or interconnects with, Evergy's Transmission System. Examples include buses, lines, or transformers with low side voltage 69kV or above, regardless of BES status.
Transmission Provider	The SPP, acting in its role as administrator of the SPP OATT.
Transmission System	The Facilities owned by Evergy that are used to provide transmission service, including any Distribution Facilities, required to provide Wholesale Distribution Service, under the SPP OATT. For the purposes of this document, the Transmission System encompasses those interconnections to Distribution Facilities that have an adverse impact (as defined by SPP) on the Transmission system.
Wholesale Distribution Service	The provision of distribution service to wholesale customers, including generator Facilities, over Distribution Facilities as necessary to effectuate transmission service under the SPP OATT.
Zonal Planning Criteria (ZPC)	Established steady state, short circuit, and dynamic stability planning criteria for the Zones within the SPP region in which Evergy exists.

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Introduction

Purpose

The purpose of this document is to establish the minimum requirements for Customers seeking a new or modified connection with Evergy's Transmission System. As a NERC-registered GO, TO and TP, Evergy has the responsibility to plan and operate its Transmission System in a reliable manner. This includes planning for reliable operation of generation and transmission Facilities to withstand a single transmission fault and/or the removal of a single transmission element such that the maximum number of end-use Facilities can continue to be served.

As a GO registered with the NERC, Evergy has the responsibility to document Facility interconnection requirements and make them available upon request within 45 calendar days of full execution of an Agreement to conduct a study on the reliability impact of interconnecting a third-party Facility to the Generator Owner's existing Facility that is used to interconnect to the Transmission system.

As a TO registered with the NERC, Evergy has the responsibility to document and make its Facility interconnection requirements available so entities seeking a new interconnection or seeking to make a qualified change to an existing interconnection, will have the necessary information.

These Requirements shall be publicly available and posted on Evergy's OASIS websites[ii] [iii] [iv]. Additionally, these Requirements will be made available upon request.

Scope

These Requirements apply to any Customer seeking new or "qualified change[1]" to an existing interconnection with Evergy's Transmission System. In this context, the term "Customer" is inclusive of Evergy and its affiliates, and applies to:

1. Generation Facilities;
2. Transmission Facilities; or
3. End-use Facilities.

Under certain circumstances, applicable Customer generation or end-use Facilities may be physically connected to Evergy's Distribution System. Applicability of such Facilities to these requirements will be evaluated on a case-by-case basis and depends on the reliability impact to Evergy's Transmission System and/or the transmission system of another entity. For instance, a large Generating Source interconnected on Evergy's sub-transmission (e.g., 34.5kV) system may: 1) seek to be a designated network resource under the SPP OATT; and/or 2) cause adverse reliability impacts on Evergy's Transmission System.

[1] The term "qualified change" is defined by Evergy's Planning Coordinator, the Southwest Power Pool. These definitions are maintained in the SPP Planning Criteria document, publicly available on the SPP website: SPP Documents & Filings - Southwest Power Pool.

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1. Procedures to Initiate an Interconnection Request

This section addresses FAC-001 Requirement R3 and its sub-parts and Requirement R4 and its sub-parts.

1.1. General Interconnection Information

Evergy owns and operates electrical facilities in the states of Kansas, Missouri, and Oklahoma, USA. All facilities owned/operated by Evergy are located solely within the Eastern Interconnection of the United States.

Evergy is a member of the SPP, who acts as Evergy's Balancing Authority, Planning Coordinator, and Reliability Coordinator. Any interconnection to Evergy's Transmission System is subject to the requirements of the SPP OATT as it applies to the Eastern Interconnection.

Customers seeking a new, or to make a qualified change to an existing, interconnection of generation, transmission, or end-use to one or more 345kV sources (existing or planned) to the Wolf Creek nuclear plant listed in Table 6 are subject to additional requirements documented in Section 20 of these Requirements.

The Customer must supply information about the location, voltage, and other pertinent connection requirements as stated in the interconnection request. Certain areas within the Evergy Transmission System can accept only limited amounts of additional generation or end-use without costly reinforcements. Substantial additions or modifications to Evergy's Transmission System may be required before connecting a new Project. Customers interconnecting an IBR Generating Source shall review and complete data requests from Attachment B. Customers interconnecting an end-use Facility of Large Load shall complete Attachment C.

1.2. General Interconnection Inquiries

Customers may direct general interconnection inquiries to Evergy's Long-Term Transmission Planning department (longtermplanning@evergy.com).

1.3. Generation Interconnection Inquiries

The responsible party for managing and studying the interconnection of Generating Sources depends on the size, type, and location of the proposed or modified interconnection.

1.3.1. Generator Interconnections to Evergy's Transmission System

New or modified existing Generating Source interconnections to Evergy's Transmission System, or to an existing Evergy-owned Transmission-connected Generating Source, are required to follow the SPP Generator Interconnection Procedures (GIP) as governed by Attachment V of the SPP OATT.

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SPP Staff, not Evergy, is responsible for and manages such proceedings. Inquiries about the SPP GIP should be directed to GIStudies@spp.org. More information about the SPP GIP is available on the SPP website[v].

The Customer is responsible for actively participating in the SPP GIP and for coordinating in a timely fashion with both SPP and Evergy. Project delays due to untimely submittal of required information and/or documents to SPP or Evergy is the responsibility of Customer. Customers interconnecting with Evergy's Transmission System are beholden to the requirements of SPP and Evergy as outlined in these Requirements.

1.3.2. Generator Interconnections to Evergy's Distribution System

New or, to the extent possible, modified existing Generating Source interconnections to Evergy's Distribution System, or to an existing Evergy-owned distribution-connected Generating Source, must start with Evergy's distribution interconnection process outlined on Evergy's website[vi]. The Customer may send inquiries to either:

- netmeteringapp@evergy.com for net-metering applications; or
- wholesaleinterconnection@evergy.com for front-of-the-meter applications.

Distribution interconnection Customers must be aware that the distribution interconnection process may require a Transmission interconnection review that could result in the project being evaluated in the SPP GIP.

1.4. Transmission Interconnection Inquiries

New or modified existing Transmission interconnections to Evergy's Transmission System must follow the process established by SPP OATT Attachment O and executed through SPP's Integrated Transmission Plan (ITP)[vii] process, according to the latest approved version of the ITP Manual. The results and associated solutions identified are documented in the annual SPP Transmission Expansion Plan (STEP) and posted to the SPP website. Inquiries about this process can be submitted in an SPP RMS[viii] ticket.

A Transmission interconnection that involves two or more SPP members, or a SPP member and a non-member, is required to go through the SPP (transmission) Interconnection Review Process as defined in the SPP Planning Criteria[2] and SPP OATT Attachment Z1 – Aggregate Transmission Service Studies Procedures. Additional information about this process is available on the SPP OASIS website[ix]. SPP requires that inquiries about these studies be submitted in an RMS ticket.

For Customers seeking to interconnect a new IBR Generating Source, Evergy requires the completion of Attachment B of these Requirements to be submitted to longtermplanning@evergy.com along with any necessary diagrams or system data.

[2] SPP Planning Criteria 5.5 Interconnection Review Process, Section 14 Interconnection Review Process Details.

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1.5. End-Use Interconnection

New or modified existing end-use interconnections to Evergy's Transmission System may obtain the necessary information, including application and contacts, on the Evergy Economic Development website[x].

The end-use interconnection process is a joint effort between SPP Staff and Evergy Staff. SPP has established end-use interconnection procedures through the Attachment AQ Delivery Point Addition Process of the SPP OATT. Inquiries about this process must be submitted through SPP's RMS and additional information is available on the SPP OASIS website[xi].

For Customers seeking to connect a Large Load, Evergy requires the completion of Attachment C of these Requirements to be submitted to longtermplanning@evergy.com along with any necessary diagrams or system data.

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2. General Interconnection Requirements

This section covers broadly applicable requirements, regardless of interconnection type or location.

2.1. Regulatory and Jurisdictional Requirements

2.A. Interconnections to Evergy's Transmission System shall be constructed or modified to be compliant with the permits, licenses, fees, rules, regulations, standards, agreements, ordinances, and/or statues of NERC, SPP, Evergy, and all applicable Governmental Authorities.

2.A.1. Customer is responsible for determination of all applicable Governmental Authorities for any Facility(ies) solely owned/operated by Customer.

2.A.2. Customer shall coordinate with Evergy to determine the applicable Governmental Authority(ies) for any Facility(ies) jointly owned by Customer and Evergy.

2.B. Customer shall be responsible for ensuring Customer Facility(ies) is/are compliant with all permits, licenses, fees, rules, regulations, standards, agreements, ordinances, inspections, and other requirements imposed by NERC, SPP, Evergy, and all applicable Government Authority having jurisdiction.

2.C. Customer's Facility(ies) shall be installed in accordance with the latest approved set of applicable provisions set forth in:

2.C.1. These Requirements.

2.C.2. Evergy's Electric Service Standards[xii].

2.C.3. Evergy's Zonal Planning Criteria posted on Evergy's OASIS website[xiii].

2.C.4. All applicable NERC Reliability Standards[xiv].

2.C.5. All applicable SPP[xv] requirements and OATT obligations.

2.C.6. The NESC.

2.C.7. The NEC.

2.C.8. All applicable ANSI Standards.

2.C.9. All applicable IEEE Standards.

2.D. Interconnection of Customer's Facility(ies) with Evergy's Transmission System shall further be governed by any applicable statute, rule, order, provision, guide, or code of an organization, council, institute, regulatory, or governing body having authority over such matters.

2.E. Evergy shall bear no obligation to interconnect, or to remain interconnected, when Customer's Facility(ies) is/are out of compliance with any of these Requirements.

2.F. When an interconnection requires Evergy to incur expenses for one or more Project to accommodate the Customer's interconnection, all costs incurred by Evergy for the Facility Interconnection shall be borne by Customer as established in the interconnection agreement.

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2.F.1. If one or more Project is necessary to accommodate the Customer's interconnection, whether directly related to or resulting from the interconnection, all applicable Projects shall be completed prior to commercial operation of the interconnection.

2.F.2. Evergy may approve a temporary operating procedure for use while Project(s) is/are constructed.

2.F.3. For a Generating Source interconnection, temporary operating procedures may be implemented in a Limited Operation Interconnection Agreement (LOIA) according to the SPP OATT Attachment V. A LOIA shall not be used as a permanent replacement for necessary Projects.

2.G. When required to accommodate a Customer's interconnection, any Projects or modifications to Evergy's Transmission System or Evergy's Distribution System shall be made according to Evergy's latest approved equipment and design standards.

2.H. Customer and Evergy shall execute appropriate agreement(s) for interconnected service prior to installation of any equipment.

2.I. Interconnection approval shall be deemed accepted upon written notice by Evergy. Approval by Evergy does not waive any requirements pertaining to Customer's installation that may be governed directly by other jurisdictional bodies including, but not limited to, SPP.

2.J. Energy supplied to Evergy, as well as energy used by Customer, shall be compensated in accordance with applicable tariffs, rules, and regulations currently on file with the appropriate regulatory body having jurisdiction, or which may be filed and approved by the regulatory body having jurisdiction.

2.K. Customer shall assume responsibility to review and address system performance issues affecting the Customers radially connected transmission or distribution Facility(ies) that are identified by the SPP Planning Coordinator Planning Assessments (TPL-001, TPL-007, and TPL-008).

2.L. Evergy shall not be responsible for mitigating system performance issues that solely affect a Customers radially connected transmission or distribution Facility(ies) for which the Customer is responsible for providing complete and accurate models.

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2.2. General System and Design Requirements

2.M. Transmission structures at the Facility Interconnection shall be of self-supporting steel construction complying with Evergy's structural design loading requirements.

2.N. Evergy reserves the right to review, inspect, and approve Customer's design and shall not approve synchronization of interconnection facilities until any concerns relating to Customer's design have been remedied.

2.O. Because of increased risks and potential hazards inherent with operating Customer's facilities interconnected with Evergy's Transmission System, overall safety for life, quality of service, and property is paramount. Evergy shall have the authority and ability to disconnect Customer's Facility(ies) any time they pose a dangerous condition, when such disconnection is appropriate to protect the safety of Evergy's employees, Evergy's customers, the public, or to maintain integrity of the Evergy's Transmission System or the Bulk Electric System (BES) at large.

2.P. Customer shall be aware that, under certain circumstances outside Evergy's control, it may be possible for damage to occur to Customer's equipment. These vulnerabilities include (but are not limited to) geomagnetically induced current (GIC) resulting from a geomagnetic disturbance (GMD), nearby faults, sub-synchronous oscillations (SSO), and transient voltage spikes due to equipment switching or lightning. Customer bears responsibility for understanding these risks and responding appropriately to protect Customer's equipment against circumstances and events outside Evergy's control.

2.Q. Evergy (or the appropriate Underfrequency Load Shed, UFLS, entity) shall have the authority and ability to, if necessary, include part or whole of Customer's end-use Facility in the Manual Load Shed Plan (MLSP) and/or UFLS program(s). Customer's end-use Facility may be exempt from MLSP and/or UFLS program(s) if, through determination solely by Evergy (or the appropriate UFLS entity), the end-use is deemed critical to:

2.Q.1. Maintain the reliability of the BES.

2.Q.2. The operation of important public services (e.g., a major hospital with a trauma ward).

2.Q.3. Operations necessary to ensure and/or protect national security.

2.Q.4. Or are otherwise deemed necessary to enable the functioning of critical services during periods of emergency.

2.R. All facilities and equipment within Customer's Facility shall be capable of withstanding expected system short-circuit requirements as determined through appropriate short-circuit studies.

2.S. During normal and emergency operations, Customer's Facility shall operate the POI within the established steady state voltage planning limits established in the latest applicable approved version of Evergy's ZPC.

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2.T. If transmission interconnection studies determine the new or modified existing interconnection Facility causes a base-case steady state voltage at the point of interconnection (POI) to fall outside the range of 0.98 to 1.02 per-unit, one or more Projects shall be developed to correct voltage at the POI to within the range of 0.98 to 1.02 per-unit.

2.U. Where a new interconnection of generation, Transmission, or end-use seeks to interconnect along one line of an Evergy-owned Double Circuit Transmission Line, Evergy shall evaluate the prudence of tying both lines into the new POI station.

2.V. Where a new interconnection of Large Load end-use seeks to interconnect 100MW or more of peak capacity, a minimum of ring-bus configuration shall be used for the interconnecting substation.

2.W. Interconnection of Customer end-use Facilities to Evergy's Transmission System shall only connect with Facilities operated at 345kV or lower. Voltage classes above 345kV are reserved for large power system transfers and are not intended for Customer use.

Public

3. Interconnection Study Requirements

Planning for transmission interconnections is done to ensure that the transmission system can continue to supply energy to customers and support power transfers between utilities, including firm transactions, following a fault or failure that forces the removal of a generator and/or transmission element from service.

As a member of the SPP RTO, Evergy is required to coordinate with and participate in joint studies with SPP, other SPP members, and neighboring entities not within the SPP RTO. As a result, interconnections with Evergy's Transmission System are required to be evaluated consistent with the SPP OATT, SPP Planning Criteria, these Requirements, and the interconnection requirements of those entities impacted by the Customer's proposed or modified Facility.

3.1. General Interconnection Study Requirements

3.A. The power system simulations required to evaluate the impact to Evergy's Transmission system studies shall be:

3.A.1. Determined by SPP and/or Evergy depending on the specific interconnection requirements and the party(ies) responsible for performing such studies.

3.A.2. For studies in which Evergy is responsible for performing some aspects, the necessary studies are determined on a case-by-case basis depending on the location, nominal operating voltage, and capacity of the requested interconnection Facility per Evergy's Policy TDP-001 (available upon request from longtermplanning@evergy.com).

3.B. In cases where system deficiencies are identified post-interconnection and directly attributed to the new or modified interconnection of generation, Transmission, or end-use, Evergy reserves the right to develop and implement the necessary operating guides or procedures to maintain system reliability until such time as a permanent solution is commercially operational.

3.C. For those interconnections at or along a source to Wolf Creek as listed in Table 6, supplemental studies and data requirements outlined in Section 20 shall be incorporated as appropriate.

3.2. Generation Facility Interconnection Study Requirements

Interconnection study requirements for generator interconnection studies are administered by SPP as part of the SPP OATT, Attachment V.

3.3. Transmission Facility Interconnection Study Requirements

Transmission interconnections are analyzed as SPP performs annual studies to evaluate transmission system reliability as part of its Integrated Transmission Planning (ITP) process, per Attachment O of the SPP OATT.

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Transmission Owner to Transmission Owner interconnections are evaluated in accordance with SPP Planning Criteria (posted on the SPP website) and the applicable Zonal Planning Criteria (posted on the applicable Evergy OASIS website).

3.4. End-Use Facility Interconnection Study Requirements

Study requirements for new and modified existing interconnections of end-use are established in the SPP Attachment AQ Delivery Point Addition Process. As part of the SPP AQ Delivery Point Addition Process, Evergy is required to perform a load connection study (LCS). The LCS is performed according to Evergy Policy TDP-002 (available upon request from longtermplanning@evergy.com).

The following end-use types are known, or highly probable, to cause system-wide issues that require additional study and consideration and, therefore, automatically qualify as Large Load:

- Electric arc furnace.
- Data centers with at least one module dedicated to AI training or inference.
- Crypto mining.
- Hydrogen production using electrolysis.

Other end-use Facilities may qualify as Large Load. These determinations are based on industry thresholds established by the Southwest Power Pool "HILL Fault Ride-Through Requirements". Evergy reserves the right to designate any Customer end-use interconnection request as Large Load dependent upon factors such as, but not limited to, interconnection voltage, local system strength, proximity to baseload generation, size of peak load request (in MVA), etc.

For Customers seeking a new or modified existing interconnection of Large Load end-use, if, at any point during the interconnection study phase, the Customer changes end-use type or end-use mix (e.g., switches the end-use type to 100% AI training from 100% file hosting, changes end-use type from 100% file hosting to 50% file hosting and 50% AI inference, etc.) the original request, including any upgrade costs or other determinations, shall be considered invalid. Customer is required to re-submit the request with updated information and may be subject to additional study costs.

Public

4. Model Data Requirements

Both Evergy and SPP have vested interest in operating and planning the transmission system in the most economical manner to meet reliability criteria. Therefore, both Evergy and SPP require detailed technical data to understand the nature of the interconnection Facility(ies), as well as appropriately represent the Facility(ies) in SCADA and EMS, positive sequence transmission system models (power flow, short circuit, and dynamic stability), electromagnetic transient (EMT) models, and system protection models.

4.1. General Model Data Requirements

4.A. Customer shall be responsible for submitting power flow, short circuit, positive sequence phasor domain dynamic stability, and EMT model data to SPP's model building efforts as required by the presently enforceable version of NERC Reliability Standard MOD-032. These efforts are overseen by SPP Modeling staff (SPPEngineeringModeling@spp.org) and follows the requirements set forth in the latest approved Model Development Manual. More information is available on the SPP website [xvi].

4.B. Power flow, short circuit, and positive sequence phasor domain dynamic stability model data shall be compatible with the version of Siemens PTI's Power System Simulator® for Engineering (PSS®E) listed in the latest approved version of the SPP Model Development Manual.

4.C. EMT models shall:

4.C.1. Be compatible with the version of both PSCAD and Intel Fortran Compiler specified by Evergy.

4.C.2. Include documentation specifying which version(s) of PSCAD and Intel Fortran Compiler is/are compatible with the model.

4.D. Interconnection Facility models shall include the appropriate level of detail to sufficiently represent anticipated or validated electrical characteristics and behavior of the Facility.

4.E. Customer shall ensure model data meets the following requirements:

4.E.1. For new interconnections, accurately reflects the Facility design (pre-energization) or Facility as built if it differs from design data (post-energization).

4.E.2. For modified existing interconnections, accurately reflects the validated as-built characteristics (post-energization).

4.E.3. Accurately represents the Facility or, in the case of IBRs, an equivalent of the Facility.

4.E.4. All sequence topology representations are consistent (i.e., power flow, short circuit, and (if applicable) dynamic stability models shall utilize the same topology).

Public

4.F. Prior to energizing a new Facility or re-energizing a modified existing Facility following a qualified change, the Customer shall provide Evergy with data, or affirm that existing data is, sufficient to represent the known or expected harmonic injection (both frequency and magnitude for both current and voltage) at the POI created by the interconnecting Facility.

4.2. Generation Facilities Model Data Requirements

4.G. All general requirements of this section shall apply for new and, to the extent possible, modified existing interconnections of Generating Sources.

4.H. Model data supplied for generator interconnection studies shall:

4.H.1. Meet SPP's requirements established by Attachment V of the SPP OATT, and the subsequent processes and procedures administered by SPP to support Attachment V obligations.

4.H.2. Insofar as it does not conflict with SPP requirements, meet the requirements established by Evergy's Generating Plant Model Requirement.

4.H.3. Include consistent system topology among all model information provided for grid-scale studies (i.e., power flow topology should match short circuit topology should match positive sequence phasor domain dynamic stability topology).

4.H.4. For new and, to the extent possible, modified existing interconnections of IBR Generating Sources, equivalent plant models shall be provided for grid-level simulations according to the requirements of Attachment B.

4.H.5. For new and, to the extent possible, modified existing interconnections of IBR Generating Sources, include the following types of stability models:

(1) Standard library models tuned to approximate the expected behavior of the plant and match with justifiable accuracy, user-written and EMT models (PSS®E version based on requirements of SPP Model Development Procedure Manual).

(2) User-written models tuned to represent the most accurate response possible for the required plant equivalent (PSS®E and Intel Fortran complier version based on requirements of SPP Model Development Procedure Manual).

(3) EMT models that contain sufficient information to accurately represent the expected response of the plant and/or individual equipment and enable the evaluation of complex control interactions and sub-synchronous oscillations (PSCAD and Intel Fortran complier version based on requirements of Evergy's Generating Plant Model Requirements).

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4.I. For those interconnections of synchronous Generating Sources, a simplified set of mass/spring model data representing the entire turbine/generator/excitation system shaft (up to six, as applicable) shall be provided to support evaluations of sub-synchronous resonance and sub-synchronous oscillations in the PSCAD software. This includes:
4.I.1. The number of masses.
4.I.2. The machine's total MVA.
4.I.3. Mechanical synchronous speed (rpm).
4.I.4. The machine's total inertia.
4.I.5. The per-unit inertia constant for each mass.
4.I.6. The per-unit spring constant for each connection between masses.
4.I.7. The per-unit torque share of each mass.
4.I.8. The self-damping of each mass.
4.I.9. The mutual damping of each connection between masses.

4.J. Customer shall be responsible for annual submission and participation in annual model building efforts of the SPP Model Development Advisory Group, including fulfillment of the requirements of NERC Reliability Standard MOD-032.

4.K. Customer shall submit complete, accurate, and consistent model data to both SPP and Evergy.

4.L. Customer models shall exclude any that are listed as "unusable" in the latest approved version of the Evergy Generating Plant Model Requirements.

4.M. Customer shall provide a measured or estimated peak demand (megawatt and mega-VAR) for the fixed and variable auxiliary loads (synchronous units) or station service (IBR).
4.M.1. This data shall be included in Evergy's Network Integrated Transmission Service filed annually with SPP.

4.3. Transmission Facilities Model Data Requirements

4.N. All general requirements of this section shall apply for new and, to the extent possible, modified existing interconnections of Transmission.

4.O. Model data supplied for transmission interconnection studies shall:
4.O.1. Meet the requirements of SPP's MDAG Model Development Procedure Manual.
4.O.2. Include, at a minimum, positive and zero sequence model data and the associated Facility rating information.
4.O.3. For transmission lines, include per-unit mutual impedance data (as applicable) when the line runs parallel to one or more external transmission lines for 0.1 miles or longer and are within 250 feet or closer to the centerline unless otherwise agreed.

Public

4.O.4. If necessary, include PSPD transient stability model data (e.g., for a synchronous condenser).

4.O.5. If necessary, include EMT model data (e.g., line design data for EMT studies; detailed STATCOM models, etc.)

4.O.6. GIC model data for power transformers interconnected on the low side or GSUs interconnecting on the high side to a nominal system voltage of 200kV or greater.

4.4. End-Use Facilities Model Data Requirements

Model data requirements for new or modified existing interconnections of end-use depends on the peak MW demand and type of end-use being interconnected.

4.P. All general requirements of this section shall apply for new and, to the extent possible, modified existing interconnections of end-use.

4.Q. End-use model data requirements vary but, at a minimum, all end-use interconnection Customers shall:

4.Q.1. Coordinate with Evergy Long-Term Transmission Planning to determine the full set of requirements (longtermplanning@evergy.com).

4.Q.2. Supply the maximum requested peak load amount in MW.

4.Q.3. Supply at least one of the following:

(1) The maximum MVAR requirement while at peak MW; or

(2) The power factor associated with peak MW.

4.Q.4. Supply a general indication of end-use (e.g., data center, crypto-mine, arc furnace, intermodal, mixed-use, etc.)

4.R. For end-use applications such as arc furnaces and data centers, Customer shall provide the anticipated MW and MVAR load profile, this includes:

4.R.1. A typical load profile for a 60-second period.

4.R.2. A typical load profile for a 1-hour period.

4.S. Customer shall supply any additional data as required by Evergy and/or SPP Staff to assess the reliability or SPP OATT impacts of the end-use Facility.

Public

5. Breaker Duty and Surge Protection

This section establishes baseline expectations for protective equipment specifications.

5.1. General Requirements

5.A. All fault-interrupting devices shall be capable of safely interrupting fault currents for any fault that they may be required to interrupt as determined through short-circuit studies.

5.B. Fault interruption or isolation equipment shall fully comply with the latest approved ANSI/IEEE C37 collection of standards for circuit breakers, switchgear, substations, and fuses.

5.C. Circuit breakers shall be rated for a minimum of 1.05 per-unit of the rated nominal voltage of the electric system to which they connect.

5.D. Circuit breakers shall be rated for the interrupt times based on the nominal voltage of the system to which they connect according to Table 1. For Generator breakers, the nominal voltage applies to the high side of the GSU.

Table 1: Minimum Rated Breaker Interrupt Times Based on Nominal System Voltage

System Nominal Operating Voltage [kV]	Minimum Rated Breaker Operating Time [cycles]
345 or greater	2
230	3
161, 138, or 115	5
69	5

5.2. Generation Facilities

To ensure system reliability, breakers used to isolate a single, synchronous Generating Source, or a collective IBR Generating Source (e.g., a wind plant) interconnected with Evergy's Transmission System must meet or exceed additional requirements:

5.E. Any breaker dedicated for the sole purpose of isolating the interconnecting Generating Source from Evergy's Transmission System shall:

5.E.1. Open all three phases simultaneously.

5.E.2. Be rated for 2.0 per-unit voltage across open contacts.

5.E.3. Utilize synchronism check within ± 10° and ± 5 percent of nominal voltage on each side of the breaker prior to closing the breaker between Evergy's and Customer's facilities.

5.E.4. Provide ground fault detection and tripping any time an ungrounded circuit configuration exists as the result of opening Evergy's source to the Facility Interconnection.

5.E.5. Continuously monitor the breaker control power source.

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5.E.6. Include an EMS warning to report failures of the breaker control power source to the Generator Operator.

5.E.7. Have primary and backup relays installed and enabled to reduce single-point-of-failure modes in the protection system.

Public

6. System Protection and Coordination

The information in this section is provided to identify general protection practices as applied to the Evergy Transmission System and connections.

6.1. General System Protection Requirements

Evergy may require Customer's Facility design to include one or more appropriate automatic disconnecting device(s) to be controlled by any or all the following: overcurrent relays, automatic synchronizing relays, voltage relays, frequency relays, ground fault detection relays, or any other automatic relaying equipment necessary to ensure proper protection and safety of Company employees, customers, equipment, and overall system integrity.

Customer should be aware that one or more sectionalizing device may be required at the Facility Interconnection. Such devices may require load breaking and/or fault interrupting capability and may require protective relays.

6.A. For new, and to the extent possible, modified existing interconnections of generation, transmission, or end-use, fiber optics shall be the means of relay communications, unless another acceptable communications method is approved by Evergy.

6.A.1. Microwave and power line carrier shall be acceptable alternatives, as agreed to by Evergy, if fiber optics cannot be used.

6.A.2. Audio tone over phone line shall not be considered an acceptable alternative for relay communications.

6.B. Disconnecting equipment shall have a visible break between Customer and Evergy facilities for any connection at 600 volts or higher.

6.C. Where adjoining power systems share a common zone of protection between two parties, the design shall provide coordination of speed and sensitivity to maintain power system security, stability, and reliability.

6.D. Where the interconnection 1) includes construction of a new transmission line or generator lead line; and 2) communication scheme(s) for two high-speed protection schemes are required: two separate OPGW shall be installed for relay communications.

6.E. The protection system (protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuitry) arrangement necessary to integrate Customer's Facility(ies) shall be consistent with the following practices:

6.E.1. Utility-grade protective relays and fault clearing systems meeting NERC, SPP, and Evergy Standards shall be installed by Customer on the interconnected power system. Evergy reserves the right to require Evergy-owned protective equipment to be installed adjacent to the POI.

Public

6.E.2. All protective relays shall meet or exceed the latest approved version of ANSI/IEEE Standard C37.90.

6.E.3. The protection system shall be compatible with the protection system used to protect Evergy's Transmission System.

(1) Compatible relaying equipment shall be used for a given zone of protection.

(2) Compatibility includes protection application, redundancy, operating speed, communication type, and communication medium.

6.E.4. A power source for tripping and control shall be provided for the protection system by a DC storage battery.

(1) The battery shall be sized with enough capacity to operate all tripping devices after eight hours without a charger, per IEEE standards.

(2) An under-voltage alarm shall be provided for remote monitoring by the facilities owners, who shall take immediate action to restore power to the protective equipment.

(3) Where a ring-bus or breaker-and-a-half facility is installed, redundant DC supply systems shall be used.

(4) For Customer Facilities operated at 200kV or above:

(a) Control power shall be supplied from redundant DC supply systems.

(b) Protective relaying shall include dual primary schemes.

6.E.5. Mechanical and electrical logic and interlocking mechanisms shall be used between interconnected facilities to ensure safe and reliable operation. These include, but are not limited to, breaker and switch auxiliary contacts, synch-check relays, and physical locking devices.

6.E.6. Customer is responsible for providing a protection system that will protect its equipment against disturbances on Evergy's Transmission System and minimize the effects of disturbances from its facilities on Evergy's equipment and Evergy's Transmission System.

(1) Customers connecting to the Evergy's Transmission System shall investigate and keep a log of all protective relay actions and mis-operations, as required by NERC and SPP.

(2) Customers shall establish a maintenance program for their protection systems in accordance with the latest approved applicable NERC Reliability Standards.

(a) Documentation of the protection maintenance program shall be supplied to Evergy, SPP, and NERC upon request.

(b) As outlined in the maintenance program, test reports shall be made available for review by Evergy.

(c) At intervals described in the documented maintenance program and following any apparent malfunction of the protection equipment, Customer shall perform both calibration and functional trip tests of its protection equipment as outlined by NERC.

6.F. Evergy shall have the right to specify interconnecting transformer connections. For example, small to medium distributed energy resource Interconnections may be required to have a delta connection on the utility side while larger generation may be required to have a grounded wye connection on the utility side.

Public

6.G. The Customer shall:

6.G.1. Provide interconnecting transformer and/or neutral grounding device specifications to Evergy and SPP.

6.G.2. Address any aspects of the specification that Evergy finds unacceptable.

6.2. Generation Facilities

6.H. All general requirements of this section shall apply in addition to the specific requirements for the interconnection of new and, to the extent possible, modified existing Generating Sources.

6.I. Generator interconnections shall be equipped with circuit breakers or other appropriate interrupting devices to protect those facilities.

6.I.1. The generator owner shall provide and own the primary circuit breaker or other interrupting device that protects the Facility and disconnects it from Evergy's Transmission System.

6.J. Generator relay settings shall adhere to the latest approved version of IEEE standard C37.102 and any applicable NERC, SPP, or Evergy requirements.

6.K. Generating Sources shall not provide sustained (i.e., for a duration greater than 1 second) fault current to Evergy's Transmission System.

6.L. Generating Sources shall not close or reclose automatically onto a de-energized Evergy Facility Interconnection.

6.M. Interconnections of new Generating Sources shall connect to Evergy's Transmission System at a Transmission station, and only if the line protection can be coordinated without compromising reliability, system stability, or quality of service to existing Evergy interconnections and/or customers. Hard taps to existing Transmission lines are unacceptable.

6.N. New and, to the extent possible, modified existing synchronous Generating Sources shall be protected by:

6.N.1. Current differential protection around the generator.

6.N.2. Current differential protection around the generator step-up transformer.

6.N.3. Any additional necessary protective functions designed for the specific type of generator according to the latest approved version of IEEE C37.102. This may include, but is not limited to, reverse power, out-of-step, loss of field, negative sequence current, and inadvertent energization.

6.O. New and, to the extent possible, modified existing IBR Generating Sources shall protect the main power transformer(s) with current differential protection around the transformer(s).

Public

6.P. New and, to the extent practical, modified existing interconnections of Generating Sources shall be designed, to the extent practical, support the reliability of the interconnected grid, even in severe conditions.

6.2.1. Ride-Through Characteristics for Generating Facilities

The Customer is not obligated to trip a unit for voltage or frequency excursions. However, to the extent Customer's Generating Source is protected by one or more frequency and/or voltage ride-through trip settings, this section provides the minimum design requirements. RPA and POM for IBRs are both established in Section 18 of these requirements.

6.Q. Interconnections of Generating Sources shall be designed to withstand temporary excursions of frequency, voltage, and power (both real and reactive). Detailed ride-through requirements for specific generator types are listed in Section 18.

6.R. All Generating Source ride-through settings shall be designed to provide the maximum acceptable level of grid support for the longest practical duration during excursions of frequency, voltage, and/or power (real or reactive) at the POM to prevent or limit the prospect of cascading.

6.2.1.1. Synchronous Generator Frequency and Voltage Ride-Through Performance

6.S. New and, to the extent possible, modified existing interconnections of synchronous Generating Sources shall derive both frequency and voltage ride-through requirements based on, at a minimum, the latest enforceable version of NERC Reliability Standard PRC-024.

6.2.1.2. IBR Plant Frequency Ride Through Capability and Performance

6.T. New and, to the extent possible, modified existing interconnections of IBR Generating Sources shall:

6.T.1. Adhere to the frequency ride-through capability and performance requirements specified in the latest approved version of IEEE Standard 2800, Clause 7.3, Table 15 of the Standard, and Figure 12 of the Standard. This includes performance according to the requirements specified in Subclauses 7.3.2.2 and 7.3.2.3 for frequency disturbances within the continuous operation and mandatory operation regions, respectively.

6.T.2. Frequency ride-through settings shall be set for the widest range and longest duration(s) possible. For frequency excursions outside the "mandatory operation" and "continuous operation" regions of IEEE 2800 Figure 12, "may ride-through or may trip" shall not be interpreted as a "must trip" region.

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6.T.3. Provide Evergy with a frequency ride-through chart for each type of inverter associated with the IBR Generating Source. In reference to Figure 12 from the latest approved version of IEEE Standard 2800, each chart shall:

(1) Be formatted consistent with Figure 12.

(2) Define and clearly demarcate the regions for each operating mode: continuous, mandatory, permissive, momentary cessation, and trip.

(3) Define and clearly demarcate any internal, factory-set inverter protection trip settings added by the OEM.

6.T.4. Provide Evergy with a tabular representation (e.g., Microsoft Excel® workbook) of the operating modes and internal inverter protection trip settings in a format like that of Table 15 from the latest approved version of IEEE Standard 2800.

6.T.5. Be capable of the change in voltage phase angle ride-through requirements specified in Subclause 7.3.2.4 of the latest approved version of IEEE Standard 2800.

6.2.1.3. IBR Plant Rate of Change of Frequency Performance

6.U. New and, to the extent possible, modified existing interconnections of IBR Generating Sources shall:

6.U.1. Per Clause 7.3 of the latest approved version of IEEE Standard 2800, be capable of riding through all events with a Rate of Change of Frequency (ROCOF) of 5 Hz / second or less.

6.U.2. Ensure that ROCOF protection described in Clause 9.2 of the latest approved version of IEEE Standard 2800 is disabled unless it is:

(1) Reviewed and approved by Evergy.

(2) Needed to satisfy an OEM requirement.

6.2.1.4. IBR Plant Voltage Fault Ride Through Capability and Performance

6.V. New and, to the extent possible, modified existing interconnections of IBR Generating Sources shall:

6.V.1. Adhere to the voltage ride-through capability and performance requirements specified in Clause 7.2 of the latest approved version of IEEE 2800, with the following exceptions:

(1) GFM ESRs are exempt from the requirements of Subclauses 7.2.2.3.2 and 7.2.2.6 per SPP exception.

(2) The RPA for the voltage ride-through requirements of an IBR plant shall be the POM as specified by Evergy.

(3) The IBR Plant shall continue mandatory operation when the applicable voltage at the POM is less than 10%.

(4) The IBR Plant shall provide 100% of pre-disturbance apparent current (given equivalent power source conditions, e.g., wind, solar, etc.) post-disturbance even when the applicable voltage at the POI drops below 50% nominal during the disturbance.

6.V.2. Correct any issues with individual inverter tripping in a timely manner.

Public

6.V.3. Provide Evergy with voltage ride-through capability chart for each type of inverter and:

(1) Define the regions for each operating mode (continuous, mandatory, permissive, momentary cessation, and trip).

(2) Be formatted consistently with the figures in Appendix D of the latest approved version of IEEE Standard 2800.

(3) Include any internal inverter protection trip settings factory-set by the manufacturer.

6.V.4. Provide the numerical data that defines the operating modes and any internal inverter protection trip settings factory-set by the manufacturer and:

(1) Be formatted like IEEE Standard 2800 Table 11 and Table 12.

(2) Include ride-through capability of the plant if it differs from the inverter(s).

6.V.5. Adhere to consecutive voltage deviation ride-through capability specified in the latest approved version of IEEE Standard 2800, Subclause 7.2.2.4.

(1) Additional ride-through requirements for dynamic voltage oscillations will be specified on a case-by-case basis if 1) they identified during interconnection studies, or 2) there are known existing oscillations on the system at the point of interconnection.

6.V.6. Adhere to transient over-voltage ride-through capability requirements specified in Clause 7.2.3 of the latest approved version of IEEE Standard 2800. The reference point shall be the POM unless otherwise agreed by Evergy.

6.V.7. Supply current injection to provide fault ride-through capability when the voltage at the RPA is outside the normal operational range.

6.V.8. Operate in the reactive current priority mode while operating in a voltage ride-through mode, unless otherwise specified by Evergy.

6.V.9. For unbalanced faults, inject negative sequence current depending on the negative sequence terminal voltage.

6.V.10. Unless specified otherwise in Table 2 (see below), by mutual agreement with Evergy, or through SPP's GFM ESR exemption, the current injection from the IBR during ride-through mode shall meet the specifications in the latest approved version of IEEE 2800 Subclauses 7.2.2.3.4 and 7.2.2.3.5.

6.V.11. Be configured to meet the following requirements:

(1) While in reactive current priority mode, be capable of injecting reactive current equal to its maximum current rating when the IBR unit terminal voltage is less than or equal to 50% of nominal voltage.

(2) Injection of the maximum current rating for less severe voltage deviation is allowable and is dependent upon the k-factors outline in Table 2 (see below).

(3) Prioritize absorption of reactive current equal to 30% of its maximum current rating when the IBR plant terminal voltage is equal to 115% of nominal voltage.

Public

Table 2: Reactive Current Injection Fault Ride-Through Requirements per IEEE Std. 2800 Subclauses 7.2.2.3.4 and 7.2.2.3.5

Parameter	Performance Target
Magnitude	During a fault (balanced or unbalanced), change in positive sequence reactive current shall be proportional to the positive sequence voltage change using a k-factor (slope) of 2.0 or higher. Evergy reserves the right to specify a higher k-factor. During an unbalanced fault, change in negative sequence reactive current shall be proportional to the change in negative sequence voltage using a k-factor (slope) of 2.0 or higher. Evergy reserves the right to specify a higher k-factor. Injection of zero sequence current is not required. Should the IBR total current limit be reached, both reactive positive and negative sequence current shall be reduced in equal amounts to stay below the total current limit. At no point should negative sequence current injection exceed positive sequence current injection.
Angle	The negative sequence reactive current angle shall lead the negative sequence voltage by an angle of between 90 to 100 degrees for full-converter IBRs.
Reaction Time	The time between the step change in the voltage and the beginning of the injection of positive and negative sequence reactive current shall be less than 16 milliseconds.
Rise Time	The time between the step change in voltage and when the inverter reaches 90% of the new steady state reactive current output shall be less than 25 milliseconds.
Settling Time / Settling Band	The settling time shall be less than 50 milliseconds. The settling band shall be -2.5 % / +10.0% of IBR maximum current.

6.W. For IBR Generating Sources, ride-through protection design shall meet, to the extent possible, the requirements of the latest approved version of IEEE 2800 and, to the extent possible, comply with the latest approved version of NERC Reliability Standard PRC-024.

6.W.1. If the IBR Generating Source cannot deliver both active and reactive power, due to its current limit or apparent power limit, when the Applicable Voltage is below 95%, then preference shall be given to reactive power while minimizing any reductions in active power (IEEE 2800 Subclause 7.2.2.2)

6.W.2. The IBR Generating Source shall give preference to reactive current and minimize reductions in active power while carrying out the reactive current priority mode response (IEEE 2800 Subclause 7.2.2.3).

Public

6.X. For IBR Generating Sources, when instantaneous generator tripping based on RMS voltage or current values is used, a time window (a.k.a., filtering constant) of no less than 17 milliseconds[xvii] shall be applied to prevent tripping based on high-speed transient spikes or measurement error.

6.Y. For IBR Generating Sources, when instantaneous generator frequency tripping is used, a time window (a.k.a., filtering constant) of no less than 100 milliseconds [xvii] shall be applied to prevent tripping based on high-speed transient spikes or measurement error.

6.3. Transmission Facilities

6.Z. All general requirements of this section shall apply in addition to the specific requirements for the interconnection of new and, to the extent possible, modified existing transmission.

6.AA. New and, to the extent practical, modified existing transmission interconnections to Evergy's Transmission System shall have a dual protective relaying scheme that provides both primary and backup coverage of the remote bus.

6.AA.1. Communications-aided tripping using a dedicated communications channel shall be required as needed based on system stability requirements.

6.AA.2. Communications redundancy shall be required as needed based on the critical clearing time.

6.BB. Communications redundancy shall be required in the following circumstances:

6.BB.1. If the interconnection is between two systems operated at a nominal voltage of 200kV or above.

6.BB.2. Delayed fault clearing due to failure of a single-channel communication scheme is shown to affect system stability.

6.BB.3. A reliability need is determined based on a critical clearing time evaluation.

6.CC. Evergy shall reserve the right to require a transfer trip for backup protection and islanding schemes as needed.

6.CC.1. If a transfer trip is required, it shall follow the latest approved version of IEEE Std. C37.113 for transmission line relay settings.

6.DD. Backup systems shall operate for failures on either side of the POI.

6.DD.1. Time and sensitivity coordination shall be maintained to prevent mis-operations.

6.EE. Customer and Evergy shall take all practical steps to ensure the Facility interconnection is configured to mitigate or reduce the possibility of a ferroresonance.

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6.EE.1. Customer shall be knowledgeable of conditions that increase the probability of ferroresonance and the procedures and equipment that can mitigate or reduce the possibility of creating these system conditions.

6.FF. Multiple remote-controllable line sectionalizing switches or circuit breakers with protective relays may be required at the Facility Interconnection.

6.4. End-Use Facilities

As a Distribution Service Provider within the SPP footprint that serves more than 100MW of load, Evergy is required to participate in the SPP UFLS Plan, available on the SPP website[xviii]. Evergy also maintains an MLS plan to help manage energy emergencies as required by Evergy and/or SPP.

6.GG. All general requirements of this section shall apply in addition to the specific requirements for the interconnection of new and, to the extent possible, modified existing end-use.

6.HH. Evergy shall have the right and ability to incorporate all or part of Customer's end-use Facility in Evergy's automatic UFLS protection plan as needed, based solely on the determination of Evergy.

6.II. Evergy shall have the right and ability to incorporate all or part of Customer's end-use Facility that are not part of the automatic UFLS protection plan as part of the MLS plan as needed, based solely on the determination of Evergy.

6.JJ. NERC-registered Distribution Providers must provide Evergy with a documented manual load shed plan.

6.KK. Transmission-to-distribution transformers capable of serving load greater than 14.0 MVA shall be controlled by a primary circuit switcher or circuit breaker with appropriate protective relaying.

6.4.1. Ride-Through Characteristics for End-Use Facilities

The Customer is not obligated to trip end-use Facilities in the event of a voltage or frequency disturbance. However, to the extent that a Customer implements supplemental schemes to protect Customer equipment, the protections shall adhere, at a minimum, to these ride-through requirements.

6.LL. Customers with voltage-sensitive end-use applications, especially Large Loads, shall design Facility protection to remain connected to Evergy's Transmission System for a minimum of five (5) voltage sags within a 90-second period.

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6.MM. The Customer shall design end-use protections for both voltage ride-through and frequency ride-through based upon the latest, approved SPP High Impact Large Load Ride-Through Requirements.

6.NN. When instantaneous end-use tripping based on RMS voltage or current values is used, a time window (a.k.a., filtering constant) of no less than 17 milliseconds [xvii] shall be applied to prevent tripping based on high-speed transient spikes or measurement error.

6.OO. When instantaneous end-use frequency tripping is used, a time window (a.k.a., filtering constant) of no less than 100 milliseconds [xvii] shall be applied to prevent tripping based on high-speed transient spikes or measurement error.

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7. Metering and Telecommunications

This section establishes broad and specific requirements for metering a Customer's Facility and communicate with devices needed to either protect and/or monitor power system quantities.

7.1. General

For interconnections in the state of Kansas, Customer may be required to take service for auxiliary use and/or station power from the local retail electric service provider.

7.A. Customer and Evergy shall coordinate to determine the appropriate SCADA detail required.

7.B. Supervisory remote control and electrical metering shall be provided using devices and communications paths specified by Evergy. Such equipment shall be proven operational before electrical operation begins.

7.C. Metered data shall be telemetered to a location designated by SPP and a location as designated by Evergy unless alternate satisfactory telemetered locations are agreed to by the Evergy and the Customer.

7.D. Evergy shall procure, install, and maintain all metering equipment required to measure energy exchanged between Customer and Evergy across the Facility interconnection, unless otherwise agreed to by Evergy.

7.E. For those Customers that are (or will be) a market participant, Customer shall install metering of sufficient quality to meet the requirements as defined by SPP OATT, Attachment G, Section 8.

7.F. In most cases, Energy shall be measured at delivery voltage.
7.F.1. Evergy shall have the right to locate its metering at a place other than the Facility interconnection and adjust for losses as appropriate.

7.G. The interconnecting Facility owner shall:
7.G.1. Ensure competent personnel are retained and capable of maintaining and/or repairing the telecommunication equipment and paths as necessary.
7.G.2. Provide equipment redundancy and telecommunications route redundancy to protect against certain kinds of failure and telecommunications path failure.
7.G.3. Ensure an adequate supply of spare components is maintained to quickly respond to telecommunications failures.

7.H. Where commercial, public telephone network facilities or services support important power system telecommunications, a backup strategy shall be developed by the interconnection Customer to protect against interruption of such services. The backup strategy may consider alternatives such as redundant services, self-

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healing services, multiple independent routes, carriers and combinations of independent facilities such as wireline and cellular, fiber and radio, etc.

7.I. Backup telecommunications system equipment such as an emergency standby generator with ample on-site fuel storage and reserve storage battery capacity shall be incorporated in critical telecommunications facilities.

7.2. Revenue Metering

For the purposes of this document, the term "revenue metering" refers to meters used for billing purposes and the associated current transformers and potential transformers (collectively known as "instrument transformers"), communications equipment, and wiring between these devices.

7.J. Use of capacitor-coupled voltage transformers (CCVTs) shall be considered unacceptable for revenue metering of an interconnection.

7.K. The basic configuration shall consist of directional revenue grade metering (import and export) at each point of interconnection with Evergy's Transmission System or Evergy's Distribution System.

7.K.1. For interconnections of a Generating Source, additional separate revenue metering for the gross output of the generation and for auxiliary retail loads may be required, depending on the generation capacity, telemetry requirements, applicable contractual provisions, and associated tariffs.

7.L. All generation and auxiliary retail load metering shall have the ability to connect to an Automated Meter Reading (AMR) system.

7.L.1. Before the purchase or fabrication of revenue metering equipment, four sets of each of the following information shall be submitted to Evergy for review and acceptance:

(1) Overall electrical single-line drawing, showing location of revenue metering equipment.

(2) Switchgear single-line drawing, showing location of revenue metering transformer compartment.

(3) Physical metering transformer compartment drawing, showing the layout of revenue metering current transformers and potential transformers.

(4) If the installation utilizes a stand-alone current transformer cabinet, the manufacturer's drawing, showing the catalog number and address at which, its use is intended.

(5) Estimated generation capacity and auxiliary retail loads.

7.M. Evergy shall install, calibrate, test, and maintain revenue quality metering in accordance with the latest approved version of the applicable ANSI Standard C12.

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7.N. Interconnections for wholesale service shall utilize revenue quality metering in accordance with the latest approved version of the applicable ANSI Standard C12 and Form B of the SPP Market Protocols.

7.N.1. All such data shall be telemetered to the Transmission Customer or Distribution Service Provider as applicable.

7.3. Metering and Telecommunications for Generation Facilities

7.O. All applicable General and Revenue Metering requirements listed in this section shall apply to interconnections of Generating Sources, in addition to the following.

7.P. Customer shall coordinate with Evergy to determine if Customer's connected Generating Source(s) require both normal and emergency paths for supervisory control, metering, or voice communications systems.

7.Q. Interconnections for wholesale service to Generating Sources shall utilize revenue quality metering in accordance with the latest approved version of the applicable ANSI Standard C12 and Form B of the SPP Market Protocols.

7.Q.1. All such data shall be telemetered to the Transmission Customer or Distribution Service Provider as applicable.

7.R. Customers seeking a new or, to the extent possible, modified existing interconnections of Generating Sources shall install power quality metering at the point of common coupling.

7.S. Customers seeking a new or, to the extent possible, modified interconnection of end-use for IBR Generating Sources shall:

7.S.1. Install high-speed, GPS timestamped measurement equipment on the distribution side of the transmission-to-distribution transformer(s).

7.S.2. Take high-speed, GPS timestamped voltage, current, and frequency measurements for all three phases.

7.S.3. Retain a minimum rolling 30 days-worth of high-speed, GPS timestamped measurement data in support of evaluating and addressing system events, power system modeling needs, or power quality issues.

7.S.4. When requested, provide all available voltage, current, and frequency measurements to Evergy.

7.T. Per SPP OATT Attachment V, Appendix 6, Article 8, Section 8.5, prior to synchronization of Generating Sources with a capacity greater than or equal to 20 MVA interconnected to Evergy's Transmission System, a phasor measurement unit (PMU) shall be installed.

7.T.1. Specifications and requirements shall meet or exceed those listed in Attachment V of the SPP OATT.

7.T.2. Insofar as they do not conflict with SPP requirements, PMUs shall meet or exceed the specifications listed in Attachment A of these Requirements.

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7.4. Metering and Telecommunications for End-Use Facilities

7.U. All applicable General and Revenue Metering requirements listed in this section shall apply to interconnections of end-use, in addition to the following.

7.V. Interconnections for wholesale service for Customer's end-use Facility shall utilize revenue quality metering in accordance with the latest approved version of the applicable ANSI Standard C12 and Form B of the SPP Market Protocols.

7.V.1. All such data shall be telemetered to the Transmission Customer or Distribution Service Provider as applicable.

7.W. Customer shall make available any appropriate supervisory data to Evergy as required. This may include, but is not limited to:

7.W.1. Status and output of power quality equipment such as a STATCOM.

7.W.2. Measurements from power quality monitoring equipment.

7.W.3. Any other existing measured/metered electrical quantities deemed necessary by Evergy to maintain the reliability of Evergy's Transmission System or Evergy's Distribution System.

7.X. Customers seeking a new or, to the extent possible, modified existing interconnections of end-use for Large Load shall install power quality metering at the point of common coupling.

7.Y. Customers seeking a new or, to the extent possible, modified interconnection of end-use for Large Load shall:

7.Y.1. Install high-speed, GPS timestamped measurement equipment on the distribution side of the transmission-to-distribution transformer(s).

7.Y.2. Take high-speed, GPS timestamped voltage, current, and frequency measurements for all three phases.

7.Y.3. Retain a minimum rolling 30 days-worth of high-speed, GPS timestamped measurement data in support of evaluating and addressing system events, power system modeling needs, or power quality issues.

7.Y.4. When requested, provide all available voltage, current, and frequency measurements to Evergy.

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8. Grounding and Safety Issues

This section establishes minimum grounding requirements and addresses baseline safety considerations.

8.A. All interconnecting Facilities shall strictly adhere to established Companies switching, tagging, and grounding procedures as required for the safety of people and equipment.

8.B. Any work carried out within a Facility shall be performed in accordance with all applicable laws, rules, and regulations, including those set forth by the Occupational Safety and Health Administration (OSHA), National Electric Safety Code (NESC), and good utility practice.

8.C. For new stations or substations, the interconnecting Facility ground grid shall adhere to Evergy's most recently approved substation grounding requirements, which includes the latest approved version of:

8.C.1. NESC Section 9.

8.C.2. IEEE Std. 80.

8.C.3. Where appropriate,

- **(1)** IEEE Std. 367.
- **(2)** IEEE Std. 487.
- **(3)** IEEE Std. 665.
- **(4)** IEEE Std. 837.

8.D. The ground grid shall limit the ground potential gradients to such voltage and current levels that will not endanger the safety of people or damage equipment that are within, or immediately adjacent to, the station under normal and fault conditions.

8.E. All transmission line structures shall be adequately bonded and grounded to control step and touch potential in compliance with the NESC and shall provide adequate lightning protection performance.

8.E.1. For new Transmission lines or generator tie lines, the interconnecting Facility shall adhere to Evergy's most recently approved transmission line shielding/grounding requirements.

8.F. Customer shall obtain ground resistance measurements using procedures specified in the latest approved version of IEEE Std. 81.

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8.G. Design requirements for system grounding that shall be addressed as appropriate for Customer's connection include:

8.G.1. A grounding study.

8.G.2. Compatibility with the existing Transmission System at the POI.

8.G.3. Interconnection grounding system to Evergy's grounding system(s).

8.G.4. Transmission line shielding provisions.

8.G.5. Arrester applications.

8.G.6. Cathodic protection.

8.H. Any electrical structure or equipment utilized for high voltage or extra-high voltage service shall be connected to an earth-ground grid that:

8.H.1. Measures no more than 1.0 ohms resistance to earth.

8.H.2. Such value shall be measured with equipment and techniques approved by Evergy.

8.H.3. Such value shall be certified by a measuring contractor qualified for this service.

8.H.4. The connectors and components of the grounding grid shall be adequate for the anticipated short-circuit current magnitude and duration.

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9. Insulation and Insulation Coordination

Insulation coordination must be done properly to ensure electric system reliability and personnel safety.

9.A. Equipment basic impulse levels (BIL), shielding, and surge protection shall be designed to meet the latest IEEE C62 standards and Evergy's standards.

9.B. Surge Protection shall be installed to ensure that damage resulting from transient disturbances is minimized to the extent practical and shall conform to NESC Section 19, Section 124A, and Section 171 as applicable.

9.C. Basic switching surge levels, surge arrester, conductor spacing, and gap application, substation and transmission line insulation strength, protection, and shielding shall be documented and submitted to Evergy for evaluation as part of the interconnection plan.

9.D. Interconnection facilities to be constructed in areas with salt spray contamination or other type of contamination shall be properly designed to meet or exceed the performance of facilities not in a contamination area regarding contamination caused outages.

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10. Voltage / Reactive Power / Power Factor Control

This section specifies the voltage control requirements to interconnect Customer's Facility with Evergy's Transmission System or Evergy's Distribution System.

The term "static reactive device" refers to shunt capacitor banks and shunt reactor banks.

The term "dynamic reactive device" is used to refer to STATCOMs, E-STATCOMs, and synchronous condensers.

10.1. General Voltage Control Requirements

10.A. New and, to the extent possible, modified existing interconnections of generation, Transmission, or end-use Facilities to Evergy's Transmission System shall, unless otherwise agreed by Evergy, utilize voltage control settings rather than power factor control and/or reactive power control.

10.2. Generating Source Control Voltage Control Requirements

While exact voltage control details are to be coordinated and agreed by Evergy and the Customer, an example of typical voltage control detail is provided in Table 3.

Additional voltage and reactive control requirements specific to IBR Plants are available and in Section 18 of these requirements.

10.B. Specific voltage control requirements for Generating Sources shall be developed by Evergy's Transmission Operations in cooperation with the Customer as part of the interconnection process. These voltage requirements shall:

10.B.1. Indicate the location where the Customer and Evergy Transmission Operations agree to measure voltage (i.e., the Point of Measurement, POM).

10.B.2. Indicate the target voltage at the POM.

10.B.3. Indicate a "voltage tolerance band" that specifies the voltage range in which the Generating Source is required to operate at the POM.

10.C. In some circumstances, indicate a "preferred voltage range" in which the Generating Source is anticipated, but not required, to operate. Both Evergy and Customer must agree if a preferred voltage range is established, and the preferred voltage range shall be more restrictive than the voltage tolerance band.

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Table 3: Typical Voltage Control Details

Generating Source Type	POM	Target Voltage [PU]	Tolerance Band – High [PU]	Tolerance Band – Low [PU]	Preferred Range – High [PU]	Preferred Range – Low [PU]
Synchronous	GSU high side at Point of Interconnection.	1.000	1.05	0.95	-	-
IBR and non-IBR Induction	Main power transformer high side at Point of Interconnection.	1.015	1.05	0.95	1.02	0.98

10.3. Transmission Voltage Control Requirements

10.D. Static reactive devices used to control Transmission system voltages shall, to the extent practical, limit steady state voltage fluctuations to 0.03 per-unit or less to limit potential flicker impacts.

10.E. Dynamic reactive devices used to control Transmission system voltages shall be capable of temporarily (i.e., up to 2.5 seconds) operating within the range of $0.00 \leq V < 1.20$ per unit.

10.F. Unless otherwise agreed by Evergy, the use of SVCs as static reactive devices and/or dynamic reactive devices shall not be allowed.

10.4. End-Use Voltage Control Requirements

10.G. For new interconnections of end-use, where studies indicate the addition of Customer's peak demand causes Evergy's Transmission System voltage at the POI to change the limit specified in General Requirement 2.T, the Customer shall ensure sufficient space is available within the Customer substation to accommodate the necessary amount of static reactive devices, as determined by Evergy, to return steady state voltage at the POI to within the required steady state voltage range listed in General Requirement 2.T.

10.G.1. Evergy shall seek to minimize the number of required static reactive devices. The typical maximum will be no more than four, but the limit shall be six unless otherwise agreed in writing.

10.H. For new interconnections of end-use, Customer shall install, or allow Evergy to install at Customer's expense, an appropriate dynamic reactive device, such as a synchronous condenser, if studies show available system strength is below acceptable levels based on Customer's peak demand requirements.

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10.I. For new interconnections of Large Load, the interconnection substation shall include:

10.I.1. Space sufficient to house the necessary number of static reactive devices (as determined by Evergy) based on the size of the Customer's peak demand requirements.

10.I.2. Space sufficient to house the necessary number of dynamic reactive devices (as determined by Evergy) based on the Customer's peak demand requirements and end-use type.

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11. Power Quality Impacts

For the purposes of these requirements, power quality impacts are observed from the perspective of Evergy's equipment and the impacts to Evergy and other customers. Any power quality issues that both affect and are caused by a single customer are solely the responsibility of that customer to mitigate. Evergy will work with individual customers to address power quality issues caused by a single customer that affect Evergy equipment and/or other customers.

11.1. General Power Quality Requirements

11.A. New and modified interconnections shall not adversely impact the power quality of the power system to which they interconnect.

11.B. Evergy shall have the right and ability to measure power quality performance metrics at Customers POI.

11.C. Customer shall be responsible for adding the equipment necessary to eliminate, or minimize, any adverse power quality impact identified by Evergy.

11.D. Evergy shall have the right and ability to measure and document the harmonics and present and power quality at the Facility Interconnection before and after such connection is made.

11.E. Evergy shall have the right and ability to install permanent harmonics and/or power quality measurement equipment at the Facility Interconnection.

11.F. Unless otherwise agreed in writing by Evergy and the Customer, end-use Customer shall be responsible for installing the necessary equipment and/or implementing the necessary operating procedures to meet power quality requirements, including monthly and daily power factor requirements (see the Adherence and Enforcement provisions at the end of this section).

11.2. Power Factor Requirements

11.G. Customer seeking new or modified interconnections of end-use equipment (i.e., load) shall ensure monthly average power factor at the POI does not exceed -0.98 (inductive/leading) and +0.995 (capacitive/lagging).

11.H. Customers seeking new or modified interconnections of end-use equipment (i.e., load) shall ensure daily average power factor at the POI does not exceed -0.97 (inductive/leading) and +0.99 (capacitive/lagging).

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11.3. Harmonics and Inter-Harmonics Requirements

11.I. Harmonic and inter-harmonic measurements shall follow the methodology specified in the latest approved revision of IEEE Standard 519.

11.J. Harmonic distortion levels at the POI shall meet the requirements contained in the latest approved revision of IEEE Standard 519.

11.K. Individual inter-harmonic currents shall be limited to 25% of the values in latest approved revision of IEEE Standard 519

11.K.1. The THD (Total Harmonic Distortion) and TDD (Total Demand Distortion) calculation shall include the inter-harmonic components.

11.L. Inter-harmonics shall be calculated in 10 Hz increments.

11.M. The current distortion levels specified in IEEE Standard 519 shall to not exceed more than 5% of the time based on a probability distribution calculated for a one-week period.

11.4. Voltage Harmonic Distortion Limits

11.N. Customers seeking a new or modified interconnection of generation, transmission, or end-use shall comply with recommended harmonic voltage limits specified in the latest approved version of IEEE Std. 519, Clause 5.1.

11.5. Current Harmonic Distortion Limits

11.O. Customers seeking a new or modified interconnection of an IBR Generating Source shall comply with the current distortion limits established in Table 17 and Table 18 of the latest approved version of IEEE Standard 2800.

11.P. Customers seeking a new or modified interconnection of a synchronous Generating Source, transmission, or end-use shall comply with the appropriate current distortion limits specified in the latest approved version of IEEE Std. 519, according to Table 4 and the nominal voltage to which Customer's Facility interconnects to Evergy's Transmission System.

Table 4: Applicable IEEE Std. 519 Clause Based on Nominal Operating Voltage

Nominal Interconnection Bus Voltage, V	Applicable IEEE Std. 519 Clause
$V \leq 69$kV	5.2
69kV $< V \leq 161$kV	5.3
$V > 161$kV	5.4

11.Q. Current distortion limits shall be independent of system voltage distortion.

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11.R. Current distortion limits shall not be exceeded, regardless of their impact to the harmonic distortion of system voltage unless the interconnecting Facility is used as a harmonic filter bank in agreement with Evergy.

11.6. Flicker Limits

11.S. For new, and to the extent possible, modified existing interconnections of end-use during both normal and emergency conditions, flicker emissions from Customer's Facility as measured at the POI shall be restricted to the lowest practical limit but must not exceed the flicker emission limits described in the latest approved version of IEEE 1453, Table 2.

11.T. For new, and to the extent possible, modified interconnections of end-use to Evergy's Transmission System, Customer shall restrict steady state voltage fluctuations at the POI to the nominal frequency value (i.e., 60 Hz) derived from the latest approved version of IEEE 1453, Figure 9, regardless of voltage class.

11.U. For new, and to the extent possible, modified exiting interconnections of end-use (i.e., load) that will or may impart rapid voltage fluctuations to Evergy's Transmission System, Customer shall meet or exceed the planning levels established in the latest approved version of IEEE 1453, Table 3.

11.V. If flicker measurements are required, flicker shall be measured at the POI (referenced as the Point of Common Coupling, or PCC in the IEEE Standard) according to the methods described in the latest approved version of IEEE Std. 1453, using an instrument that is compliant with International Electro Technical (IEC) 6100-4-15.

11.7. Phase Unbalance Limits

11.W. Phase voltage unbalance on Evergy's Transmission System shall be calculated using the methods described in the latest approved version of ANSI C84.1, Annex C.

11.X. New and, to the extent possible, modified existing interconnections of generation, transmission, or end-use to Evergy's Transmission System shall limit phase voltage unbalance to 1% or less and phase current unbalance to 5% or less when measured at the revenue meter.

11.Y. New and, to the extent possible, modified existing interconnections of generation, transmission, or end-use to Evergy's Distribution System shall limit phase voltage unbalance to as recommended by the latest approved version of ANSI C84.1, Annex C, Clause C2.A.

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11.8. Transmission Line Transposition Limits

11.Z. For new, and to the extent possible, modified existing transmission interconnections between two transmission stations/substations (i.e., Transmission lines), Customer shall include two transpositions at approximately 1/3 and 2/3 of the line length when one of the following length requirements are met:

11.Z.1. Operated at a nominal voltage of 69kV and line length is 60 miles or longer.

11.Z.2. Line is operated at a nominal voltage of 100kV or greater and 30 miles in length or longer.

11.9. System Frequency Limits

11.AA. Customer's equipment interconnected with Evergy's Transmission System or Evergy's Distribution System shall operate at a nominal frequency of 60 Hz.

11.BB. Customer's Generating Source(s) interconnected with Evergy's Transmission System or Evergy's Distribution System shall be designed for continuous operation within the limits of 59.5 Hz - 60.5 Hz.

11.10. Steady State Voltage Fluctuation Limits

11.CC. Customer's Facility shall operate such that the POI remains within the steady state voltage limits established in the latest approved version of Evergy's applicable Zonal Planning Criteria.

11.DD. Customer's system or equipment shall be operated in a manner such that RMS voltage fluctuations at the POI are limited to 0.03 per-unit or less.

11.11. Current Blocking/Momentary Cessation Requirements

11.EE. New and, to the extent possible, modified existing interconnections of IBR Generating Sources to Evergy's Transmission System or Evergy's Distribution System shall adhere to the requirements of the latest approved version of IEEE 2800 when purchasing equipment and designing equipment protection.

11.FF. The Customer shall, to the extent possible, take steps to eliminate or minimize the transmission system reliability impacts caused by equipment that may briefly enter current blocking mode (i.e., momentary cessation).

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11.12. Transient Over-Voltage Due to Switching Capacitor Banks

11.GG. Transient overvoltages caused by capacitor switching shall be limited to less than 130% of nominal zero-to-peak voltage and decay within one 60Hz cycle.

11.HH. Specialized switch types shall be used to mitigate capacitor switching transients.

11.HH.1. The services of a qualified consultant must be obtained by Customer to review the specific application and provide recommendation regarding control of these phenomena.

11.13. Adherence to and Enforcement of Power Quality Requirements

11.13.1. Adherence to Power Quality Requirements

Evergy is responsible for evaluating compliance to the power quality requirements (PQR) as defined above, as it applies to the Customer served from Evergy's Transmission System. A Customer that does not adhere to these PQR could create service issues for the Customer, other customers, and/or Evergy's Transmission System.
Examples of service issues include, but are not limited to, equipment damage, process disruption, communication issues, excessive voltage distortion on Evergy's Transmission System, or service complaints from other customers.

The evaluation of Customer's compliance with these PQR will be performed, as deemed appropriate, by Evergy. For planned facilities, or planned modifications to existing facilities or operations, an appropriate study ("Study") will model the interaction of the anticipated operations with Evergy's Transmission System. For existing end-use Facilities and operations, measured data, taken at the User's POI or other suitable location, will be the basis for determining adherence with these PQR. The data collected will be taken over the period(s) deemed necessary to characterize the impact of the load on the Evergy's Transmission System.

11.13.2. Probationary Period

If Study results (whether for planned facilities or actual operations) produce inconclusive results regarding the need for mitigation equipment or mitigation measures, Customer may be allowed a probationary period at the sole discretion of Evergy. The probationary period is not to exceed the period as determined by Evergy, during which field measurements can be made to evaluate adherence or during which alternate mitigation methods can be evaluated. If the probationary results show that the Customer is not in adherence with these power quality requirements, Evergy may proceed as provided below in Enforcement.

11.13.3. Enforcement of Power Quality Requirements

If Study results for planned facilities indicate that the Customer may (for planned Facilities) or will (for existing Facilities) not be compliant with these PQR, the Customer will be required to engineer, design, and install necessary mitigation equipment, at the Customer's expense, prior to interconnecting to Evergy's Transmission System.

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If Study results, or results of probationary operations, indicate that an existing Customer is not compliant with these PQR, Evergy will notify the Customer in writing. Evergy will specify a reasonable date for PQR compliance, which may be based on the severity and impact to other customers and/or Evergy's Transmission System, or on availability of necessary mitigation equipment. Evergy may require temporary corrections or mitigation efforts, until permanent corrections can be made to achieve PQR compliance. Temporary mitigation could be a reduction in operating levels, eliminating the operation of certain equipment, or discontinuation of service consistent with policies of any applicable state or federal regulatory agency.

If Customer does not achieve compliance to these PQR with a permanent solution within the reasonable timeframe as determined by Evergy, Evergy may determine and implement necessary mitigation corrections including, but not limited to, discontinuation of service consistent with policies of any applicable state or federal regulatory agency.

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12. Equipment Ratings

This section delineates the responsibility of determining and providing equipment ratings for modeling and study purposes.

12.A. The ratings of Customer's facilities connecting to Evergy's Transmission System shall be determined in accordance with SPP Planning Criteria and Customer's Facility Rating Methodology.

12.B. Unless otherwise agreed in writing, Customer shall be responsible for submitting equipment ratings of Customer-owned equipment to SPP for both modelling (i.e., MOD-032) and real-time operations purposes.

12.C. Evergy-owned Transmission facilities shall be rated according to the applicable Facility Rating Methodology posted on OASIS.

12.D. The ratings of Customer's facilities shall be provided to Evergy upon request.

Public

13. Synchronization of Facilities

This section establishes requirements and roles/responsibilities for synchronization of any Facility to Evergy's Transmission System or Evergy's Distribution System.

13.A. Synchronization to Evergy's Transmission System shall be accomplished with a three-phase breaker and suitable equipment capable of measuring:
13.A.1. Phase angle across the breaker.
13.A.2. Voltage on each side of the breaker.

13.B. Automatic synchronization of Facilities shall be supervised by a synchronizing check relay IEEE Device 25.

13.C. Customer is responsible for coordinating synchronization procedures with Evergy Transmission System Operations.

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14. Maintenance Coordination

This section establishes requirements and roles/responsibilities for maintenance coordination.

14.A. Maintenance activities associated with the POI of a Customers Facility interconnected with Evergy's Transmission System shall be coordinated with SPP and Evergy according to the SPP Reliability Coordinator Outage Coordination Methodology. More information is available on the SPP website[xix].

14.B. Customer shall otherwise coordinate maintenance activities with Evergy as defined in specific operating agreements.

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15. Managing Operational Issues

This section establishes baseline requirements for addressing operational issues for Facilities interconnected with Evergy's Transmission System.

15.A. Customer shall adhere to the requirements of the latest approved version of the SPP RC Outage Coordination Methodology for the Eastern Interconnect posted on the SPP website [xvi].

15.B. Customer shall have competent personnel available as needed to troubleshoot and address operational issues.

15.C. Customer shall respond to Evergy's requests during abnormal conditions (e.g., abnormal frequency and abnormal voltage).

15.D. Customer shall provide all available operating data upon request.

15.E. In the event of abnormal operating conditions, Customer shall, as quickly as possible, contact the appropriate Evergy Transmission Control Center to alert the transmission operations staff of the issue.

15.E.1. Customer and transmission operations staff must coordinate to determine the appropriate response to the appropriate response.

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16. Inspection Requirements

This section establishes expectations for inspection of Customer equipment by Evergy.

16.A. Evergy shall have the right, but does not assume the duty, to inspect, test, or check Customer's equipment in any way deemed appropriate to confirm operation and verify system protection characteristics.

16.A.1. Companies do not assume any responsibility regarding Customer's equipment or the inspection thereof.

16.B. Evergy shall retain the right to measure and document the harmonics present at the Facility Interconnection before and after making such a connection.

16.B.1. For those interconnections affecting one or more source(s) to Wolf Creek Nuclear Plant (listed in Section 18), pre- and post-interconnection harmonic measurements are mandatory.

16.C. For new interconnections of Generating Sources to Evergy's Transmission System, metering equipment shall be verified by Evergy or a designated agent.

16.D. For new or modified existing interconnections of Generating Sources to Evergy's Transmission System, only after all required inspection or testing is complete shall Generating Source be synchronized to Evergy's facilities.

Public

17. Communications Procedures

This section establishes that communications between Customer and Evergy are required and what actions to take in emergency telecommunications conditions.

17.1. General

17.A. Operational communications between the interconnected Facility and the applicable Evergy Transmission Control Center(s) shall be active and available under both normal and emergency conditions.

17.2. Emergency Conditions

Emergency telecommunications conditions may develop that affect the telecommunications equipment with or without directly affecting power transmission system facilities.

17.B. In the event of a failure of Interpersonal Communications (i.e., Primary Phone Lines), consistent with the latest approved version of NERC Reliability Standard COM-001, the interconnecting Facility owner shall:

17.B.1. Contact the Evergy Transmission Control Center and report the outage.

17.B.2. Provide the contact information for the Alternative Interpersonal Communications (Backup Phone Line).

Public

18. Supplemental Generator Interconnection Requirements

The requirements of this section shall be applied in addition to the applicable preceding requirements.

18.1. General Generator Interconnection Requirements

18.A. Generating Sources requesting Wholesale Service shall comply with the applicable version of Attachment V of the SPP OATT.

18.B. Generating Sources connecting to Evergy's Transmission System shall be configured to provide three-phase power to Evergy's Transmission System.

18.C. Generating Sources connected to Evergy's Transmission System shall maintain reactive power output as required by the Evergy Transmission Operator within the demonstrated reactive capability of the synchronous unit or IBR plant.

18.D. Evergy shall determine the acceptable minimum aggregate power factor at the POI.
18.D.1. Appropriate billings, payments, or adjustments to compensate Evergy shall be specified in the Generator Interconnection Agreement (GIA).

18.E. Evergy's functional relay requirements will be provided to the Customer during the detailed design phase of the project. The information for the specific project will indicate the protective functions for which the Customer is to provide relays and related equipment. Customer shall indicate the specific relay type(s) and range proposed for each function.

18.F. The Customer shall provide proposed instrumentation transformer (e.g., CTs and PTs) ratios, connections, and locations as related to the electrical one-line diagram.

18.G. Customer design documents (e.g., electrical prints, relay settings, etc.) shall be reviewed by Evergy in coordination with SPP. These must be of good engineering quality and include the following:
18.G.1. One-line diagram(s) showing the interconnections between the generator(s) and the Evergy system.
18.G.2. Three-line diagram(s) showing current and potential circuits for protective relays.
18.G.3. Relay tripping and control schematic diagram(s).
18.G.4. Relay setting file(s).
18.G.5. Instruction book(s) for relays.

18.H. Customer shall make Supervisory Control and Data Acquisition (SCADA) available to Evergy and is required to connect Generating Sources to Evergy's Transmission System or Evergy's Distribution System.

Public

18.I. Customer shall ensure competent personnel are always available to operate, maintain, and repair connected generating equipment when such equipment operates in parallel with Evergy's facilities.

18.J. Where the Customer installs PMU equipment, it shall be designed to the specifications as described in Attachment A.

18.K. New Generating Source interconnections to Evergy's Transmission System shall be utilize synchronous or IBR technology. Interconnections of non-IBR induction Generating Sources shall be unacceptable.

18.2. Synchronous Generator Requirements

18.L. All new and, if identified by studies, modified existing interconnections of synchronous Generating Sources with a nameplate MVA rating of 75MVA or greater shall have the power system stabilizer (PSS) functionality of the excitation system tuned and enabled for normal operations.

18.L.1. New or modified existing interconnection of a synchronous Generating Sources with a nameplate MVA rating of less than 75MVA shall tune and enable the PSS functionality of the excitation system if transient stability studies demonstrate a reliability need.

18.M. All new and modified existing interconnections of synchronous Generating Sources shall set governor droop and deadband according to NERC guidelines for the eastern interconnection, or as close as can be practically/safely achieved.

18.N. New and, to the extent possible, modified existing interconnections of synchronous Generating Sources shall:

18.N.1. Operate with the excitation control system in automatic voltage-control mode.

18.N.2. Be capable of either:

(1) Reliably, for a minimum of one hour, supplying reactive power (as measured at the generator terminals) within a range of at least +0.90 (lagging/capacitive) and at least -0.95 (leading/inductive) within the constraints of the machine's rated real-reactive operating characteristics.

(2) Provide the Evergy Transmission Operator and Transmission Planner with known operating limitations and technical justification regarding why operation at +0.90 / -0.95 power factor is not possible.

18.3. Inverter-Based Resource Requirements

Evergy considers the Reference Point of Applicability (RPA) to be the high side of the collector substation's main power transformer(s). Unless equipment limitations warrant otherwise, the RPA should also be the Point of Measurement (POM) at which the power park controller is set to measure and regulate voltage.

Public

18.3.1. General IBR Plant Requirements

18.O. IBR plants shall adhere to the requirements of IEEE Std. 2800.

18.O.1. Unless exempt by SPP requirements for GFM ESRs, IBR responses shall be prioritized as stated in Clause 4.7.

18.O.2. All IBR Generating Sources interconnecting with Evergy's Transmission System shall:

(1) Be designed to meet the voltage level, MW, and MVAR capacity as agreed in the Generator Interconnection Agreement.

(2) Follow the general requirements of Clause 4.4 for measurement accuracy.

(3) Follow the general requirements of Clause 4.5 for communication capability.

(4) Follow the general interconnection integrity requirements of Clause 4.11.

18.3.2. IBR Plant Control Capability

18.P. The IBR plant shall be capable of responding to external control inputs per Clause 4.6 and its sub-Clauses.

18.Q. Per Clause 4.6, the IBR shall cease operation with no intentional time delay when permit service control is disabled.

18.R. The following associations apply at the POI for both active and reactive power control:

18.R.1. Maximum active power continuous rating is limited to that defined in the interconnection agreement and shall be the 100% base value (i.e., 1.0 p.u.) for controls unless otherwise specified and agreed upon by Evergy.

18.R.2. The maximum reactive power for absorption or injection shall be the 100% base value (1.0 p.u.) for controls, unless otherwise specified and agreed upon by Evergy.

18.R.3. The maximum apparent power shall be the 100% base value (1.0 p.u.), unless otherwise specified and agreed upon by Evergy.

18.R.4. The apparent power rating and any limiters shall allow the plant to operate at the vector sum of the continuous rating and the required reactive power output for absorption or injection.

18.S. When an abnormal event exceeds ride-through requirements and the IBR trips, the inverter shall restart and resume power operation with no intentional delay following the enter service and return to service criteria being met.

18.T. The IBR plant shall not enter a mode that prevents autonomous return to service.

18.T.1. If the necessary power and voltage control setpoints are lost or unavailable, the IBR shall restart and resume power operation with the default or replacement values.

18.T.2. The IBR shall use the last valid setpoint prior to the trip.

18.T.3. If the IBR equipment cannot be designed or configured to use the last setpoint, then a default replacement value may be used.

Public

18.3.3. Enter and Return-to-Service Criteria

Customers seeking a new or, to the extent possible, modified interconnection of IBR Generating Sources shall follow Evergy's Enter Service criteria (shown in

18.U. Table 5) consistent with Table 3 of IEEE Std. 2800:

Table 5: Evergy's IBR Enter Service Criteria

Enter Service Criteria		Default Setting
Permit Service	When enabled	Enabled
Applicable Voltage	Minimum Value	≥ 0.917 p.u.
	Maximum Value	≤ 1.05 p.u.
Applicable Frequency	Minimum Value	≥ 0.9833 p.u. (59.0 Hz)
	Maximum Value	≤ 1.005 p.u. (60.3 Hz)

18.V. Once Enter Service criteria are met, the IBR plant shall not enter service until the system parameters are verified to remain within the Enter Service criteria for 5 seconds.

18.V.1. Upon confirmation of 5-second compliance with Enter Service criteria, the IBR plant shall immediately begin the return to service process.

18.V.2. IBR plants that have multiple enter, return, and restart timers shall notify the Evergy Transmission Planner (longtermplanning@evergy.com) of those timers and their settings for proper modeling and commissioning of the plant.

18.W. New and, to the extent possible, existing interconnections of IBR shall meet or exceed the following ramp rate requirements for Entering Service, Return to Service, and during manual or automatic set point changes:

$$Normal\ Ramp\ Rate = 10\ [^{MW}/_{minute}] = 166\ [^{kW}/_{second}] \quad \text{Eq. 1}$$

$$Time\ for\ full\ ramp\ to\ continuous\ rating = \frac{continuous\ rating}{normal\ ramp\ rate} \quad \text{Eq. 2}$$

$$p.u.\ Continuous\ Rating = \frac{normal\ ramp\ rate}{continuous\ rating} \quad \text{Eq. 3}$$

18.X. When restoring output after riding through an abnormal event (e.g., faults; events causing reduced active power output, gate blocking, or momentary cessation; etc.), the active power recovery shall be as fast as possible.

18.Y. New and, to the extent possible, interconnections of IBR Generating Sources shall be capable of the minimum restoration ramp rate of 1.0 p.u. of the continuous rating per second.

Public

18.Z. The Customer shall submit to the Evergy Transmission Planner the following:

18.Z.1. The maximum restoration ramp rate capability in per-unit of continuous rating per second.

18.Z.2. The restoration ramp rate setting in per-unit of continuous rating per second.

18.Z.3. If the maximum restoration ramp rate possible is not being used, a technical reason why this is not the case.

18.3.4. IBR Plant Harmonics

18.AA. Following energization of an IBR Generating Source, Customer shall provide Evergy with harmonic analysis such that harmonic injection impacts to nearby synchronous generating units can be assessed. The results of the analysis may result in stricter harmonic current requirements to meet continuous equivalent negative sequence current capability of any nearby synchronous generating units.

18.3.5. IBR Plant Reactive Power Requirements

18.BB. Devices used to provide reactive power compensation to meet reactive power capability requirements for an IBR plant (e.g., transformer tap changes, FACTS devices, mechanically switched devices, etc.) shall meet requirements in the latest approved version of IEEE Standard 2800, Clause 5.1.

18.CC. The IBR plant shall have the required reactive power capability as stated in the latest approved version of IEEE Standard 2800, Clause 5.1 with the minimum reactive capability (Q_{min}) defined at 0.95 power factor unless otherwise designated by Evergy.

18.DD. The leading and lagging minimum reactive power capability shall:

18.DD.1. Be deliverable to the POI across the entire range of active power output as depicted in Figure 6 and Figure 7 of the latest approved version of IEEE 2800.

18.DD.2. Include all active power conditions (injecting, absorbing, or idle).

18.EE. To the extent possible, the utilization of reactive power capability of an IBR plant when the primary energy source is unavailable shall be to regulate voltage at the POI as if the primary energy source were available.

18.FF. For new and, to the extent possible, modified existing interconnections of IBR Generating Sources, the required reactive power capability shall be available across the full range of transmission system voltages.

Public

18.GG. For new and, to the extent possible, modified existing interconnections of IBR Generating Sources, the IBR plant shall be capable of providing 0.98 power factor (injection and absorption) across the full operating range of transmission system voltages and provide the minimum reactive capability (injection and absorption) within the following voltage ranges:

18.GG.1. 0.95 p.u. through 1.04 p.u. while injecting.

18.GG.2. 0.97 p.u. through 1.05 p.u. while absorbing.

18.3.6. IBR Plant Frequency Response and Regulation

18.HH. New and, to the extent possible, modified existing interconnections of IBR Generating Sources shall:

18.HH.1. Adhere to the primary frequency response characteristics of the latest approved version of IEEE Standard 2800, Clause 6.

18.HH.2. Regulate output as a function of system frequency and desired MW output to maintain the nominal system frequency (i.e., 60 Hz).

18.HH.3. Be capable of achieving primary frequency response characteristics in compliance with the latest approved version of IEEE Standard 2800, Table 7. Default values from the table shall be target design values unless otherwise agreed by Evergy.

18.HH.4. Be capable of achieving dynamic performance in compliance with the latest approved version of IEEE Standard 2800, Table 8. Default values from the table shall be target design values unless otherwise agreed by Evergy.

18.HH.5. Frequency droop shall conform with or exceed SPP's minimum requirements.

18.HH.6. Always have primary frequency response (PFR) control functions enabled. PFR shall not be blocked or disabled without the permission of Evergy.

18.HH.7. Adhere to fast frequency response (FFR) according to the latest approved version of IEEE Standard 2800, Clause 6.2.

18.HH.8. Be capable of achieving FFR performance proportional to frequency deviation as specified in the latest approved version of IEEE Standard 2800, Subclause 6.2.2.1.

Public

18.3.7. IBR Plant Voltage and Reactive Power Control

18.II. New and, to the extent possible, modified existing interconnections of IBR Generating Sources shall:

18.II.1. Meet or exceed the voltage and reactive power control mode requirements of the latest approved version of IEEE Standard 2800, Clause 5.2 and the corresponding Table 5 of the Standard.

(1) Voltage droop shall be 0.01 (i.e., 1.0%).

(2) Voltage deadband shall be 0.0025 p.u.

(3) Reaction time shall conform with or exceed SPP's minimum requirement.

(4) Voltage step response time shall be tuned to meet a 1.0 second step response time, or the minimum time possible without exceeding an overshoot of 5.0% of setpoint or minimum damping ratio requirements specified in the latest approved version of IEEE Standard 2800. Unless otherwise agreed by Evergy, the step response time shall not be longer than 30 seconds.

(5) Damping shall conform with or exceed SPP's minimum requirement.

18.II.2. Design all standard reactive power control functions to measure and control the parameters at the RPA.

18.II.3. Unless otherwise specified and agreed upon by Evergy, utilize the POI as the RPA.

18.II.4. Unless otherwise specified and agreed upon by Evergy, operate in closed-loop automatic voltage control mode to monitor and regulate the voltage at the POI.

18.II.5. Operate in reactive current priority mode during both normal operations and abnormal operations, including high voltage and low voltage ride-through events.

18.II.6. Provide, and have available for use, all standard reactive power control functions such as voltage control, power factor control, and reactive power set point control.

18.II.7. Implement an alternative power factor control to use when the voltage control is temporarily out of service. Unless otherwise agreed by Evergy, the power factor setpoint shall be +0.98 (lagging/capacitive).

18.II.8. Meet or exceed the voltage control and dynamic response characteristics set forth by the latest approved version of IEEE Standard 2800, Subclause 5.2.2 and Table 5 of the Standard.

18.II.9. Provide all reactive power control modes specified in the latest approved version of IEEE Standard 2800.

Public

18.3.8. IBR Plants and Low Short Circuit Strength Conditions

18.JJ. New and, to the extent possible, modified existing interconnections of IBR Generating Sources shall:

18.JJ.1. Be capable of reliably operating without degradation of steady state or dynamic control response at a minimum short circuit ratio (SCR) of 2.5 or greater. Interconnections where SCR in interconnection studies (or otherwise demonstrated in transmission studies post-interconnection) is below 2.5 for system intact (a.k.a. strong system, base case, N-0, etc.) shall ensure control stability for weak systems and may consider installing additional equipment (e.g., synchronous condensers, E-STATCOMs, etc.) to boost performance.

18.JJ.2. Provide Evergy with studies and test results demonstrating the stability of the project has been verified, and that all performance requirements have been met, in the spectrum of expected short circuit conditions.

18.JJ.3. If possible, enable Grid-Forming mode to further support system strength and control stability.

18.3.9. Grid-Forming Inverter Technology

18.KK. Grid-Forming Generating Sources shall:

18.KK.1. Operate within the Ampere (i.e., current) capacity and energy limitations of the inverter(s).

18.KK.2. Maintain fault current limits within equipment ratings.

18.LL. Stand-alone BESS IBR plants shall operate the inverters of the BESS in Grid-Forming mode.

18.MM. Hybrid IBR plants with a BESS component shall install BESS inverters that, to the extent possible, are capable of operating in Grid-Forming mode. Operation in Grid-Forming mode is not mandatory unless required or directed by the SPP.

18.NN. When technically feasible and practical to do so, wind and solar shall operate inverters in Grid-Forming mode.

18.OO. Validation of grid forming shall be evaluated based on latest industry guidance. At the writing of these Requirements, it is established by a NERC White Paper[xx].

18.4. Non-IBR Induction Generating Source Requirements

18.PP. New, and to the extent possible, modified existing interconnections of non-IBR induction Generating Sources shall:

18.PP.1. Install sufficient static reactive devices to meet tolerance requirements.

18.PP.2. Install sufficient static reactive devices to meet preferred voltage range during normal and, to the extent possible, emergency operations.

18.PP.3. Evaluate the need for dynamic reactive devices to support the stability and reliability of Evergy's Transmission System.

Public

18.5. Transitional Switching of Generating Sources

Customer may be permitted to utilize approved methods of transitional switching for the purpose of making a synchronized transfer of Customer's load between Customer's Generating Source(s) and Evergy's facilities.

18.QQ. Such transitional switching shall require automatic synchronizing equipment and high-speed switching devices specifically designed to synchronize Customer's Generating Source(s) to Evergy for the sole purpose of "hot" transferring the Customer's load "On" or "Off" the Evergy's facilities.

18.RR. All Customer requests for transitional switching shall be approved by Evergy and accomplished in such a manner as not to exceed one half (0.5) second as the maximum time Customer's Generating Source(s) operates connected with Evergy's facilities.

18.SS. Customer shall be responsible for all costs associated with transitional switching.

Public

19. Supplemental End-Use Interconnection Requirements

The requirements of this section shall be applied in addition to the applicable preceding requirements. Customer must also review, complete, and return the data request outlined in Attachment C of these requirements as well as Attachment AQ of the SPP OATT.

19.1. Supplemental Requirements for All End-Use Customers

These requirements apply to any Customer seeking a new or modified interconnection of end-use.

19.A. Unless necessary to protect equipment, new, and to the extent possible, modified existing interconnections of end-use shall be capable of remaining connected to transmission system while steady state RMS voltage at the POI is within the range of 0.95 to 1.05 per-unit.

19.B. Customers seeking a new or, to the extent possible, modified interconnection of end-use shall not be permitted to interconnect behind the meter of an existing Generating Source.

19.2. Supplemental Requirements for Large Load End-Use Customers

These requirements apply only to Customers seeking a new or modified interconnection of Large Load end-use.

19.C. Customer shall provide Evergy with the data listed in Attachment C of this document and the completed data request form from SPP Business Practice 7850.

19.D. Upon loss of electric service, new, and to the extent possible, modified existing Large Load interconnections shall sequentially reconnect portions of the Facility:
19.D.1. In blocks of no more than 25 MW at a time.
19.D.2. With a delay of no less than 10 seconds between blocks.

19.E. Customer shall make sufficient information available to Evergy such that a ferroresonance (a.k.a. ferro-resonance) study can be performed. Such data includes a minimum of:
19.E.1. Transmission-to-Distribution transformer test report(s).
19.E.2. Transmission-to-Distribution transformer saturation data.
19.E.3. Transmission-to-Distribution transformer knee-point voltage.

19.F. Customer shall coordinate with Evergy Staff to site loads on an appropriate voltage class for the requested peak demand.

19.G. If the Large Load Customer's end-use is being altered (e.g., a data center changing from 100% file hosting to 50% file hosting and 50% AI training), the Customer shall inform Evergy as soon as possible but with no less than 90-days of prior knowledge to assess the potential impact of altering the end use.

Public

20. Supplemental Interconnection Requirements for Wolf Creek Nuclear Plant

To properly assess the impact of an interconnection to one of the 345kV sources ("sources") serving the Wolf Creek nuclear plant (WCNP) listed in Table 6, additional design and study requirements have been developed to ensure reliability to the nuclear plant. The supplemental requirements described in this section are necessary to ensure compliance with the latest revisions of North American Electric Reliability Corporation (NERC) Reliability Standards FAC-002 and NUC-001, and the Nuclear Plant Interface Requirements (NPIRS) between Evergy and WCNP.

Table 6: List of 345kV Sources Serving WCNP

345kV Source Name	345kV Source Type	Owner
Benton 345kV switchyard	Substation	Evergy Kansas Central
Blackberry 345kV switchyard	Switch Station	KAMO Electric Cooperative
LaCygne 345kV switchyard	Substation	Evergy Metro
Rose Hill 345kV switchyard	Substation	Evergy Kansas Central
Waverly 345kV switchyard	Switch Station	Evergy Kansas Central
Wolf Creek 345kV switchyard	Substation	Evergy Kansas Central
Waverly-LaCygne 345kV	Transmission Line	Evergy Kansas Central and Evergy Metro
Wolf Creek-Benton 345kV	Transmission Line	Evergy Kansas Central
Wolf Creek-Blackberry 345kV	Transmission Line	NextEra Energy Transmission Southwest
Wolf Creek-Rose Hill 345kV	Transmission Line	Evergy Kansas Central
Wolf Creek-Waverly 345kV	Transmission Line	Evergy Kansas Central

20.A. All supplemental studies shall:

20.A.1. Be performed at the expense of the Customer.

20.A.2. Be performed in coordination with Evergy, WCNP, and (as applicable) SPP Staff.

20.A.3. Include sufficient model topology external to the interconnecting Facility(ies) such that the perspective and of the utility can be fully evaluated and addressed.

20.A.4. Utilize (or be derived from) grid-level power system models of the Eastern Interconnection of North America chosen and/or approved by Evergy.

20.B. Positive sequence RMS dynamic stability studies shall:

20.B.1. Be performed with standard library models.

20.B.2. Comply with Evergy's unacceptable model requirements.

20.C. Any Project(s) necessary to mitigate needs identified by these supplemental studies shall be the sole responsibility of the Customer to mitigate.

Public

20.D. Any Project(s) that require modification to equipment owned by Evergy or WCNP shall be coordinated with Evergy and/or WCNP and be performed at the expense of Customer.

20.1. Supplemental Model Data

20.E. Customer shall submit transmission line and/or generator lead line data sufficient such that a model can be developed in EMT software. This data shall include:

20.E.1. Planned or actual route (in a format compatible with Google Earth).
20.E.2. Location(s) of any/all transpositions.
20.E.3. Design details for the dominant construction type(s), including:

- **(1)** Average pole height (ft.)
- **(2)** Average structure centerline distance from right-of-way centerline (ft.)
- **(3)** Size, stranding, callsign, and type for phase conductors (e.g., 1192 54/19 Grackle ACSR).
- **(4)** Number, separation (in.), and angle (°) of phase conductors per bundle.
- **(5)** Average sag of phase conductors (ft.)
- **(6)** Number of static/shield wires (typically 0, 1, or 2).
- **(7)** Size and type of each static conductor (e.g., 3/8 EHS, 64-mm OPGW, etc.)
- **(8)** Average sag of static/shield wires (ft.)
- **(9)** Physical X coordinates of all conductors (phase and static) with respect to the center of the structure centerline (ft.)
- **(10)** Physical Y coordinates of all conductors (phase and static) with respect to the ground (ft.)

20.F. For interconnections of an IBR wind or solar Generating Source, Customer shall submit a detailed plant model compatible with the latest version of the ASPEN software (i.e., *.olr format).

20.2. Radial Interconnections to a Source

20.G. Customers seeking a new radial interconnection to one of the sources listed in Table 6 shall be limited to one (1) plant. Evergy considers hybrid plants (e.g., solar PV plus battery storage) as a single plant so long as all technology types connect at the same substation and are managed by the same power park control function.

20.H. New radial interconnections to an existing radial interconnection to a source listed in Table 6 (i.e., daisy chains) shall be prohibited.

The purpose of the requirements in this section are to:

1) Limit the amount of generation near WCNP that is susceptible to total outage due to transmission line or generator lead line exposure.
2) Reduce the complexity of individual plant control schemes that may adversely interact with the control systems at WCNP.

Public

20.3. Series Compensation Device Requirements

20.I. The installation of series capacitors at interconnections to the sources listed in Table 6, or along a generator lead line interconnecting with one of the sources listed in Table 6, shall be prohibited. This includes Customer-owned Facilities operated at Transmission voltages (i.e., 60kV and above).

The purpose of the requirements in this section are to limit the potential for sub-synchronous resonance and sub-synchronous oscillation issues with WCNP.

20.4. Customer Substation Design Requirements

20.4.1. Redundancy Requirements

20.J. All equipment operated at Transmission voltages (i.e., 60kV and above), including main power transformers interconnected at transmission voltages and transmission bus protection relays, shall:

20.J.1. Include a main and backup in the protective relay scheme.

20.J.2. Have a redundant DC supply system.

20.4.2. Physical Security Considerations

20.K. New, and to the extent practical, modified existing interconnections to the sources listed in Table 6 shall follow Evergy's Tiered physical security measures based on the latest approved version of Evergy's physical security requirements.

20.5. Operational Considerations

20.L. The Customer Facility(ies) shall be designed to supply:

20.L.1. Target voltage at the Point(s) of Interconnection to align with the latest approved version of Evergy's operating procedure TSO-T-466.

20.L.2. A voltage schedule at the Point(s) of Interconnection within the limits prescribed in the latest approved version of Wolf Creek NPIR, NPIR-1.

20.6. List of Supplemental Studies

To thoroughly assess potential impacts to WCNP, supplemental simulations are required to observe and mitigate aspects that may not be addressed through traditional GI studies.

Public

Table 7: List of Supplemental Studies and Brief Description

Study	Applicable Interconnection Types	Description
Steady State and Short Circuit Grid Voltage Evaluation	Generation, Transmission, End-Use	Provide bus voltages plus three phase, line-to-ground, and Thevenin sequence impedance for a variety of system conditions with WCNP LOCA loads.
Positive Sequence RMS Stability Grid Voltage Evaluation	Generation, Transmission, End-Use	Provide bus dynamic channel plots for a variety of system conditions and fault types with WCNP LOCA loads.
Positive Sequence RMS Power System Oscillation Damping Impact Study	Generation, Transmission	Determine if power system oscillation damping is degraded with the installation of a new resource.
Harmonic Emission Assessment	Generation, End-Use	Determine the possible impacts to open-phase protection at WCNP caused by harmonic emissions from the new resource.
Phase Unbalance Assessment	Generation, Transmission, End-Use	Determine impacts to phase unbalance and ensure any new unbalances do not exceed 2% on the 345kV system.
Steady State Line Energization Study	Generation, Transmission	Determine voltage phase angle separation under various conditions to determine if new conditions exist where closing a source may be problematic.
EMT Line Energization and Arrester Sizing Assessment	Generation, Transmission	Ensure arresters at Wolf Creek are appropriately sized with the addition of the new resource
Out-of-Step Blocking Assessment	Generation, Transmission, End-Use	Relay settings at Wolf Creek must be evaluated to determine if changes to the Out-of-Step blocking protection is needed due to the changed normal system impedance.

Several studies may be required as determined by the type and size of interconnection and will be determined by Evergy on a case-by-case basis:

- Complex control interaction.
- Transient Overvoltage (TOV).
- Transient Recovery Voltage (TRV).
- Sub-Synchronous Oscillation (SSO).

Public

20.7. Wolf Creek Supplemental Study Disclaimer

These studies are supplemental to the generator interconnection studies performed by the Southwest Power Pool (SPP) and Associated Electric Cooperative, Inc (AECI). Results of these supplemental studies confer no rights to Customer regarding the SPP or AECI GIP, transmission interconnection process, and/or end-use interconnection process. These supplemental studies in no way allow the Customer to bypass or circumvent the SPP and/or AECI GIP, transmission interconnection process, and/or end-use interconnection process.

Any qualified change(s) identified by these supplemental studies may not necessarily be identified directly through the SPP or AECI interconnection studies.

20.M. Customer shall be responsible for:

20.M.1. The costs, implementation, and/or energization of all identified qualified changes along with, or prior to, commercial operation.

20.M.2. Coordinating any qualified changes identified in these supplemental studies with SPP and AECI.

20.M.3. Providing updated and validated model information regarding any qualified changes to Evergy, SPP, and/or AECI (as applicable).

Public

Attachment A - Phasor Measurement Unit Specifications

Scope

The purpose of this specification is to provide information about Evergy's requirements for Phasor Measurement Units (PMU) and associated hardware.

Electrical Hardware

The PMU shall meet or exceed the following criteria:

1. IEEE C37.118-2005 Protocol:
    a. Up to 60 Messages per Second.
    b. Level 1 at maximum message rate when phasor has the same frequency as phase A voltage.
    c. Frequency-based phasor compensation is enabled (PHCOMP = Y)
    d. The narrow- bandwidth filter is selected (PMAPP = N).
    e. Out-of-band interfering frequency (Fs) test, 10 Hz ≤ Fs ≤ (2 • NFREQ).
2. Current Range: 0.5 – 10 Amps secondary.
3. Frequency Range: ±5 Hz of nominal.
4. Voltage Range: 30 V-250 V.
5. Phase Angle Range: -179.99° to 180°.

The installation will have one Phasor Data Concentrator (PDC) that shall meet or exceed the following criteria:

1. Concentrate up to 120 IEEE C37.118-2005 or C37.118-2011 PMUs at rates up to 240 messages/second via 2 Ethernet and up to 26 RJ45 serial ports.
2. Configure up to ten independent output streams to provide data to Companies or the SPP.
3. Have continuous, local data storage up to 250 GB SDD in either COMTRADE or CSV formats.

The installation may need to include an Ethernet Gateway switch if one is not already present. The Ethernet Gateway switch shall meet or exceed the following criteria:

1. Deny-by-default firewall with Internet Protocol Security (IPsec) VPNs.
2. User-based access controls and detailed activity logs.
3. HTTPS web interface for secure setup and management.

The installation may need to include a GPS satellite-synchronized clock if one is not already present. The GPS satellite-synchronized clock shall meet or exceed the following criteria:

1. Demodulated IRIG-B outputs with ±100 nanosecond accuracy.
2. Six demodulated IRIG-B time-code outputs.

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Recommended and Proven Equipment

The following equipment has been proven and found to be acceptable by Evergy:

1. PMU: SEL-351A – Part Number 0351A1R2X3E54X1 – Key Code 7438
2. PDC: SEL-3573 Station Phasor Data Concentrator – Configuration Number 3573#JB8J
3. Ethernet Gateway: SEL-3620 Ethernet Security Gateway – Configuration Number 3620#0101
4. GSP Satellite-Synchronized Clock: SEL-2407 – Part Number 24070001B

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Attachment B – Equivalent IBR Plant Interconnection Model

Failure to submit this data may result in energization delays.

The purpose of this Attachment is to gather design data necessary to accurately model an equivalent inverter-based resource (IBR) plant in the Power System Simulator® for Engineers (PSS®E) software and Advanced Systems for Power Engineering (ASPEN) software. This data is required to maintain compliance with applicable NERC Reliability Standards.

If a design change occurs during construction that affects the data requested in this document, an update shall be sent to Evergy detailing the changes. It is also encouraged to review the SPP's modeling requirements in the latest approved version of Model Development Procedure Manual that is posed publicly on the SPP website.

This form is for data submission to Evergy only (longtermplanning@evergy.com). Evergy cannot and will not submit data to SPP on behalf of the Customer.

Equivalent Modeling for Grid Planning

For most applications in grid-level planning, a complete and detailed model of most types of IBR is not required. Battery energy storage (BES), solar photovoltaic (PV), and wind IBR plants can typically be reduced to one or two equivalent units while maintaining enough accuracy for grid-level planning studies.

An example one-line of an equivalent wind IBR plant is provided in Figure 1.

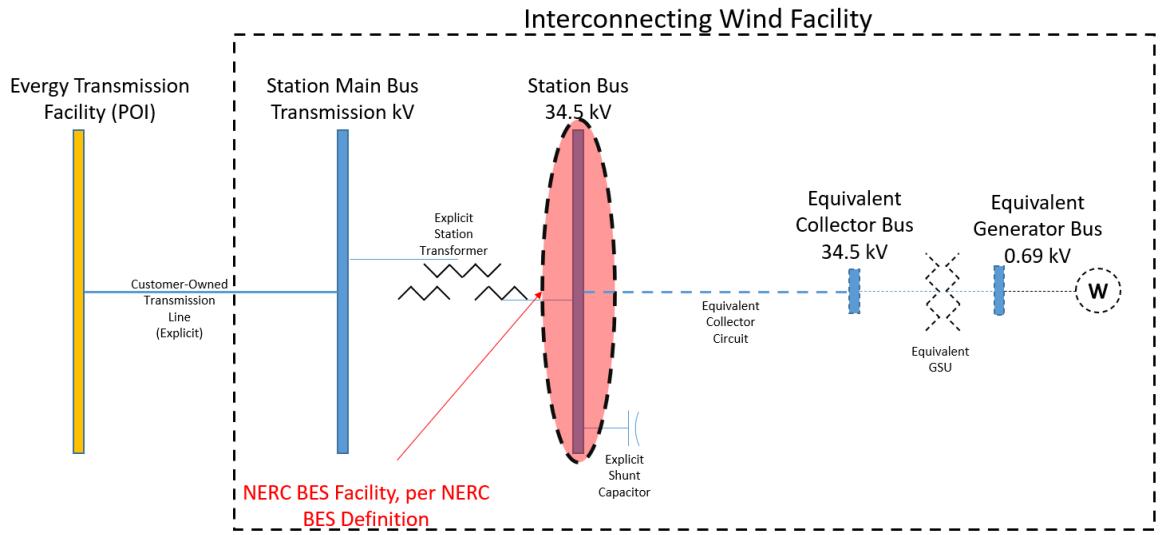

Figure 1: Example One-Line of an Equivalent Wind IBR Plant Model

Customer shall coordinate with Evergy (longtermplanning@evergy.com) to receive bus numbers.

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All major equipment operated at transmission voltage (i.e., 60kV or greater) shall be modeled explicitly. This includes transformers, shunt reactive devices, transmission lines, series reactive devices, HVDC equipment, or other major equipment normally included in grid-level transmission models.

All main power transformer(s) and shunt reactive devices located at the Customers collector substation shall be modeled explicitly, even if they operate below transmission voltages (e.g., 34.5kV).

Any explicitly modeled shunt reactive device that does not have the capability to be operated automatically and/or remotely by an operator shall be modeled as a fixed shunt.

Customer shall provide expected or metered MW/MVAR values for the total amount of station service or plant auxiliary load.

IBR plant models shall include at least one equivalent generator, generator step-up transformer (GSU), and collector circuit.

- Unless the collection system, generator technology, and number of generators are nearly identical, an equivalent generator, GSU, and collector circuit shall be required if the collection system is separated by one or more normally open breaker(s) at the collector substation. In the event all collector systems are approximately the same, they may be represented as a single set of equivalents.
- Major technology types (Type 3 wind, Type 4 wind, solar PV, and BES) shall be represented by independent equivalents.
- The least number of equivalent equipment that can accurately represent the behavior of the IBR plant shall be used.

Model Data Checklist

To accurately represent IBR plants, a complete set of positive sequence (*.raw), zero sequence (*.seq), dynamic stability (*.dyr), and EMT (*.pscx) models shall be provided.

Table 8 provides a checklist that identifies the necessary model information.

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Table 8: Model Data Checklist

Equipment	Positive Sequence	FAC-008 Ratings	Zero Sequence	Dynamics	GIC/GMD	EMT
Substation					X	
Generator lead line	X	X	X		X	X
Main power transformer(s)	X	X	X		X	X
Shunt reactive device(s)	X				X	
Station service and/or auxiliary load	X					
Equivalent collector circuit(s)	X		X			
Equivalent GSU(s)	X		X			
Equivalent generator(s) and controls	X		X	X		X
Detailed generators and controls						X

IBR Model Data

Customer shall provide model data necessary to compute geomagnetically induced current (GIC) studies. This includes:

- Substation grounding resistance (e.g., fall of potential) in ohms.
- Substation geographic latitude and longitude (°)
- Generator lead line per-phase DC resistance at 50°C in ohms per phase.
- Main power transformer:
    - Is auto-transformer (yes/no)?
    - Core construction is core-type or shell-type.
    - Winding code.
    - Primary (H) winding DC resistance adjusted to 85°C in ohms per phase.
    - Secondary (X) winding DC resistance adjusted to 85°C in ohms per phase.
    - Tertiary (Y) winding DC resistance adjusted to 85°C in ohms per phase.

Evergy requires all IBR plants to provide the following types of models for transient and dynamic stability assessments, consistent with the latest version of Evergy's Generating Plant Model Requirements (available upon request to DL-LongTermPlan-LARSS@evergy.com):

- Standard library models.
- User-written models.
- Electromagnetic transient models.

All transient and dynamic stability models shall be tuned, to the extent possible, to accurately reflect the expected or designed behavior of the IBR they represent.

Customer shall be responsible to ensure all transient and dynamic stability models (standard library, user-written, and EMT) provide similar response to one another for grid-level disturbances.

Evergy acknowledges that positive sequence phasor domain dynamic stability models are not capable of perfectly representing plant behavior. Further, Evergy acknowledges that standard library models may lack some capability to reflect plant behavior that is available in user-written

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and/or EMT models. While these limitations are understood, Evergy requires all IBR plants to include standard library models, tuned to the extent possible, to accurately reflect the plant behavior for grid-level simulations.

If Customer believes that standard library models cannot sufficiently represent aggregate plant behavior for grid-level planning simulations, the Customer shall submit a written technical justification that provides specific details why standard library models cannot be used. Technical justification shall provide specific information about what details in the standard library models are not available such that the OEM and Evergy may petition software vendors to make acceptable versions of standard library models available. The combination of OEM convenience and plant-focused study results do not constitute a valid technical justification for not using standard library models.

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Attachment C – End-Use Customer Profile Data

Failure to submit this data may result in energization delays.

This Attachment is intended to assist Evergy planning and engineering staff ("Staff") assess the reliability impacts of an interconnecting customer end-user Facility ("Load"). The data herein provides Staff with estimates sufficient to perform planning studies and develop worst-case scenarios by which minimum system reinforcements can be determined.

This information is considered non-public and is subject to any non-disclosure agreements in place between Evergy (or its operating companies and/or affiliates) and the Customer. Its sole purpose is to provide Staff with a means to develop planning assumptions for studies.

Data should be submitted to longtermplanning@evergy.com.

Data Request

If Customer fails to supply all data (or indicate that data is not applicable) staff will substitute worst case assumptions and/or sensitivities that may result in additional system reinforcements and project in-service delays.

Customer shall also provide data as required by Southwest Power Pool Business Practice #7850, specifically the "HILL additional data" section of the document (available on the SPP website).

Please indicate the type of end-use Facility being requested. If end-use type may change at a future date, please indicate ***ALL*** applicable types that are or may be applicable/incorporated. If one or more types are not available in the list, please select "Other" and list the uses.

☐Aluminum smelter	☐Oil extraction
☐Cement manufacturing	☐Paper mill (Kraft process)
☐Data center – AI training	☐Paper mill (thermos-mechanical process)
☐Data center – AI inference	☐Petro-chemical processing plant
☐Data center – crypto-mining	☐Pumping station (synchronous motors)
☐Data center – file hosting/storage	☐Pumping station (non-VFD induction motors)
☐Data center – computing services (e.g., AWS)	☐Pumping station (VFD-driven motors)
☐Electric arc furnace	☐Railroad/intermodal
☐Ladle Metallurgical Furnace	☐Semiconductor manufacturing
☐Lumber mill	☐Steel mill
☐Mining	☐Vehicle manufacturing
☐Natural gas (non-shale) extraction	☐Vehicle shredding
☐Natural gas (shale) extraction	

☐Other – please list all types that do/may apply

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Customer shall include detailed one-lines, usage type, and load ramp profiles, transmission source conditions under which the Facility may transition to backup power, and load profiles for each timeframe of 20 seconds, 1 hour, 1 day, and 1 month. For 20-second profiles, if multiple modes of normal operation exist, a 20-second profile for each mode of normal operation shall be provided.

Where a percent of the peak load value is requested, if the anticipated amount is less than 0.5%, it can be reported as 0.

#	Request	Units	Customer Response
1	What is the anticipated load factor? In other words, for a given year, what is the anticipated average hourly peak load value?	%	
2	What is the maximum requested peak load value?	MW	
3	How many load-serving transformers does Customer anticipate are needed to serve the peak load value?		
4	What percentage of the peak load is anticipated to be associated with each load-serving transformer?	%	
5	What is the anticipated monthly average power factor?		
6	What is the anticipated worst-case hourly inductive power factor?		
7	What percentage of the peak load value will be used to power uninterruptable power supplies (UPS)?	%	
8	What percentage of the peak load value will be used to run variable frequency or variable speed drives (VFD or VSD)?	%	
9	What percentage of the peak load value will be used run computer power supplies?	%	
10	What percentage of the peak load value will be used to power non-UPS battery charging (e.g., electric vehicles)?	%	
11	What percentage of the peak load value will be used to operate other power electronic equipment not already specified?	%	
12	What percentage of the peak load value will be used to drive synchronous motors?	%	
13	What percentage of the peak load value will be used to drive three-phase, direct-connected (not VFD-driven) constant torque induction motors for air conditioning, central cooling, and/or chillers?	%	
14	What percentage of the peak load value will be used to drive three-phase, direct-connected (not VFD-driven) induction motors whose torque is proportional to speed squared for commercial fans and air-handling systems?	%	

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#	Request	Units	Customer Response
15	What percentage of the peak load value will be used to drive three-phase, direct-connected (not VFD-driven) induction motors for water circulation pumps?	%	
16	What percentage of the peak load value will be used to drive direct-connected, **single**-phase air-conditioner motors?	%	
17	Does customer anticipate installing peak-shaving devices (e.g., roof-top solar, battery energy storage, etc.)? If "Yes", what type (e.g., solar) and percentage of the peak load value will be installed?	Yes/No	
18	Does Customer anticipate having co-generation onsite to help serve Load? If "Yes", additional information will be required.	Yes/No	
19	Will Customer install controllable demand-side management (cDSM)? If "Yes", what percentage of the peak load value will be cDSM?	Yes/No	
20	If Customer will (or may) use the interconnecting Facility for training artificial intelligence (AI), please provide the average demand during training (in percent of peak demand).	%	
21	If Customer will (or may) use the interconnecting Facility for training AI, please provide the average demand while not training (in percent of peak demand).	%	
22	If Customer will (or may) use the interconnecting Facility for training AI, what is the expected ramp time in milliseconds?	ms	
23	What is the expected harmonic spectrum that the interconnecting Facility will inject at the Point of Connection? Please provide the anticipated profile.		

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Rationale

This section is intended to provide Customer with background regarding why these questions are asked.

Why does Evergy need to know the customer Type(s)? This information helps Staff create a simulation model of the Load. Since different types of end-use load impacts the Transmission system differently, the composition of load will inherently drive the need for different projects.

For example, 25MW of induction motors driving petroleum pumps may require capacitor banks to mitigate low voltages caused by the motors. Conversely, 25MW of data center load training AI may require no capacitor banks but rather an E-STATCOM to offset rapid fluctuations in active power demand as well as harmonic injections created by the electronic power supplies.

Request #	Rationale
1	Load factor provides Staff with an understanding of how Customer's end-use Facility will operate. For instance, if a large peak load value is given, but is associated with low load factor (e.g., 25%), it may be possible to avoid large-scale construction projects in favor of operating agreements and/or smaller projects.
2	This MW value helps Staff determine the anticipated worst-case conditions to which the system must be planned.
3	This information allows Staff to how large the substation footprint may need to be.
4	This information allows Staff to assign different parameters to the various loads. This, in turn, allows Staff to perform more detailed studies in which specific end-use parameters can be assigned to specific transformers.
5	Average monthly power factor allows Staff to better understand the general characteristics of the end-use Facility. Typical utility practice is to assume Load is inductive (i.e., consumes reactive power). However, it is paramount to understand if Load may be capacitive (i.e., provide reactive power to the system). If Load is normally capacitive, certain types of equipment (e.g., capacitor banks) may be un-necessary.
6	Worst-case inductive (i.e., negative) hourly power factor allows Staff to understand the most severe reactive requirements of the Load so that Evergy may provide adequate reactive support.
7 – 11	This set of questions helps Staff gain perspective on the types of electronic end-use load that will be present. Different types of power electronics impact the transmission system in different ways. For example, heavily loaded VFDs may inject substantial harmonic currents and voltages onto Evergy's system. If Customer's load is composed of a large percentage of heavily loaded VFDs, power quality mitigations may be required.
12	Synchronous motors are uncommon, but if a significant amount of the peak load value is synchronous motors, Staff must evaluate the potential impacts to the System.
13	Three-phase air-conditioner or chiller motors have unique response characteristics and if a significant portion of customer load is composed of this type of motor, it will influence the overall response of the Facility.
14	Three-phase fan or air-handling motors have unique response characteristics and if a significant portion of customer load is composed of this type of motor, it will influence the overall response of the Facility.

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Request #	Rationale
15	Three-phase water circulation pump motors have unique response characteristics and if a significant portion of customer load is composed of this type of motor, it will influence the overall response of the Facility.
16	Large Load is typically composed of less than 0.5% of single-phase air conditioners. However, if a significant amount of the peak load value is composed of single-phase air conditioner compressor motors, there may be impacts to system-wide voltages during fault and/or emergency conditions.
17	Installation of peak-shaving generating devices, such as roof-top solar, are important to detailed planning studies. They may have both power quality and dynamic stability implications. Moreover, Staff must appropriately plan for the availability of such devices (e.g., Load is at peak demand at midnight, when the rooftop solar is outputting 0% of its nameplate capacity).
18	Co-generation is intended to encompass any controllable generating system that is expected to have a high availability (e.g., averages 2 weeks of annual downtime or less) AND will be used to actively offset Load while it is online. This type of generation may include (but is not limited to) gas generators, small modular nuclear reactors, etc. This generation actively impacts the Transmission system and further detail about the generation is required to appropriately represent it in simulations.
19	Understanding if controllable demand-side management (cDSM) will be present helps Staff determine if certain issues can be mitigated through operating agreements or if construction projects are needed.
20	This value provides Staff with an understanding of the high point of demand.
21	This value provides Staff with an understanding of how much demand may rapidly appear or disappear.
22	Time-varying loads are known to inject harmonics into the system. However, rapid and repetitive swings of large amounts of active power (i.e., MW) can cause additional issues, including (but not limited to) mechanical oscillations on Evergy's (or neighbors) generating units, inadvertent generator tripping due to frequency ride-through settings, system frequency oscillations, voltage fluctuations, and other power quality concerns. To help correctly identify and mitigate issues, Staff needs to know: 1. The MW amount by which the load is capable of swinging. 2. The periodicity of the swings. For example, the base load is 100MW and will have an anticipated +20MW swing. The cycling frequency is once every four seconds (0.25 Hz). This indicates that the load will cycle between 100MW and 120MW every four seconds (four seconds at 100MW, next four seconds at 120MW, next four seconds back to 100MW, etc.)
23	The harmonic spectrum is most important for Customer facilities that have the potential to inject a substantial amount of harmonic content into Evergy's system and may warrant corrective actions to maintain power quality (PQ) requirements of IEEE Std. 519 and/or IEEE Std. 1453. Customer end use that includes rapidly fluctuating demand and/or includes switching of power electronics should provide this information. Examples of this type of load: electric arc furnace; AI-training data center; robotic spot-welding for vehicle manufacturing; large VFD-driven motors; etc.

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Resources

[i] NERC Glossary of Terms - https://www.nerc.com/pa/stand/glossary%20of%20terms/glossary_of_terms.pdf

[ii] Evergy Kansas Central OASIS: https://www.oasis.oati.com/WR/index.html

[iii] Evergy Metro (Kansas or Missouri) OASIS: https://www.oasis.oati.com/KCPL/index.html

[iv] Evergy Missouri West OASIS: https://www.oasis.oati.com/MPS/index.html

[v] SPP Generator Interconnection (GI): https://spp.org/engineering/generator-interconnection/

[vi] Evergy distribution interconnection website: https://www.evergy.com/smart-energy/renewable-resources-link/private-solar-and-net-metering

[vii] SPP Integrated Transmission Plan (ITP) website: https://www.spp.org/engineering/transmission-planning/integrated-transmission-planning/

[viii] SPP Request Management System - SPP RMS

[ix] SPP Transmission Service Studies: https://opsportal.spp.org/Studies/Trans

[x] Evergy Economic Development website: Evergy Economic Development

[xi] SPP Delivery Point Addition (OATT Attachment AQ) OASIS Site: https://opsportal.spp.org/Studies/Delivery

[xii] Evergy's Electric Service Standards: https://ss.evergy.com/?_ga=2.124393866.1099434093.1741191530-1272694999.1741191529

[xiii] Evergy's OASIS Websites, see Resources i, ii, or iii.

[xiv] North American Electric Reliability Corporation (NERC) Reliability Standards: https://www.nerc.com/pa/Stand/Pages/ReliabilityStandards.aspx

[xv] Southwest Power Pool (SPP): https://spp.org/

[xvi] SPP Modeling (https://spp.org/engineering/modeling/) and Model Development Advisory Group (MDAG): https://spp.org/stakeholder-groups-list/advisory-groups/model-development-advisory-group/

[xvii] NERC Inverter-Based Resource Performance Guideline (p. 42, Bullets 5 and 8): https://www.nerc.com/comm/RSTC_Reliability_Guidelines/Inverter-Based_Resource_Performance_Guideline.pdf

[xviii] SPP UFLS Plan: https://www.spp.org/spp-documents-filings/?id=19615

[xix] SPP Outage Coordination Website: https://spp.org/markets-operations/outage-coordination/

[xx] NERC White Paper: Grid-Forming Functional Specifications for BPS-Connected Battery Energy Storage Systems: https://www.nerc.com/comm/RSTC_Reliability_Guidelines/White_Paper_GFM_Functional_Specification.pdf

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