GUIDELINES FOR GENERATOR INTERCONNECTION REQUESTS

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By SPP Generator Interconnections Department

REVISION HISTORY

DATE OR VERSION NUMBER	AUTHOR	CHANGE DESCRIPTION
1/29/2018	S. Purdy	Added default site control acreage for storage and conventional and revised format.

CONTENTS

GUIDELINES FOR GENERATOR INTERCONNECTION REQUESTS TO SPP'S TRANSMISSION SYSTEM

This guideline is primarily based on Federal Energy Regulatory Commission (FERC) Tariff Attachment V Generator Interconnection Procedures (GIP) and current SPP business process and practices for the administration of Generator Interconnection Request Queue Studies. The Southwest Power Pool (SPP) Generator Interconnection Request (GIR) process comprises two initial stages: 1) Submitting a GIR Request and 2) Study Agreement Submission and Acceptance.

Submitting a GIR only requires Appendix 1 and Attachment A to Appendix 1; and the Tariff defined $10,000 Application Deposit. Site Control, along with the Attestation for Demonstration of Site Control form, must be submitted only if the request is initiated under the optional Preliminary Interconnection System Impact Study (PISIS) phase or the mandatory Definitive Interconnection System Impact Study (DISIS) phase. Additional information may be requested once the study request has been reviewed and validated.

Study agreement submission and acceptance is the second stage of the SPP GIR process. When a GIR is officially validated, SPP will notify the Customer of the GI Study Queue Number (GEN-20YY-XXX) and issue an executable Study Agreement based on the Interconnection Study election in Appendix 1, including a call for further Study Deposits (and Security Deposits, where required) and other technical information needed by SPP GI Studies Engineering. Only study agreements issued by SPP under the GIR validation notification will be reviewed and validated.

The following information is provided to better clarify the Generator Interconnection process.

1 GENERATOR INTERCONNECTION REQUEST

1.1 APPLICATION

To make a GIR, the applicant shall complete the "Interconnection Request" (Appendix 1 and Attachment A to Appendix 1 of the GIP) and return it to SPP along with an application deposit of $10,000. Required information for a valid request, as stated by the procedure, is listed below. Blank fields can delay the review and validation and possibly result in withdrawal of the submitted application.

- Type of facility for which the service is requested
- Type of Interconnection Service requested
- Size (in MW) and location of the proposed plant
- Proposed method of interconnecting the plant to the SPP transmission system
- In-service date of the proposed plant
- Name, address, phone number and email of the Interconnection Customer's contact person
- Approximate location of the proposed Point of Interconnection (POI)
    - Examples of POI include substation name, transmission line section, and GPS coordinates
    - Google Earth snapshot
- Preliminary One-Line Diagram
- Interconnection Customer Data as set forth in Attachment A
- The specific interconnection queue the Interconnection Customer intends to enter. The choices are:
    - Interconnection Feasibility Cluster Study (FCS) queue
    - Preliminary Interconnection System Impact Study (PISIS) queue
    - Definitive Interconnection System Impact Study (DISIS) queue
- To enter the PISIS or DISIS queue, the Customer must provide evidence of ownership in or right to acquire the site of the proposed plant, referred to as site control.
    - To demonstrate full site control, the amount of land under control shall be sufficient to site the type of facility that is requested to interconnect.
        - For a wind-powered generating facility, the minimum accepted site control (without a wind turbine layout) is 30 acres/MW of wind generation
        - For a solar-powered generating facility, the minimum accepted site control (without a solar array layout) is 6 acres/MW of solar generation
        - For a storage generating facility, the minimum accepted site control (without a detailed layout) is 1 acre/MW of generation

        - For a conventional generating facility, the minimum accepted site control (without a detailed layout) is 40 acres
    - If the Customer provides a reasonable site layout demonstrating it can site the generating facility on less acreage, SPP may accept such demonstration as acceptable site control.
    - All site control submitted must be accompanied by an Attestation for Demonstration of Site Control form. This form must be completed by Interconnection Customer. You can find the document here: http://sppoasis.spp.org/documents/swpp/transmission/studies/AttestationStatementForSiteControl.pdf

When submitting the generator interconnection application and technical data for any new request, the request must be complete, whole, and independent of any previous GIR. Failure to submit complete information could result in the application request not being validated in time for the study window. At no time will SPP rebuild application or data requirements from previous GIRs on record.

Once received, SPP will review the completed application. The Customer's initial $10,000 shall be applied toward the study costs of the applicable study queue. The $10,000 application payment is above and beyond any actual study deposit or security deposit. This prepayment cost shall be wired to an account as designated by SPP or sent in with the initial GIR. Once the prepayment has been received and the request has been validated, SPP will assign the project a queue position. Following receipt and validation of the GIR, using Appendix 1 and Attachment A to GIP, SPP will send the appropriate study agreement (FCS, PISIS, or DISIS) to the Interconnection Customer for execution. Please note – "validation" of the application does not constitute a "compatible" model set for the performance of studies. All modeling files provided pursuant to any generator interconnection application is subject to a "compatibility" test with **PSS®E version 32 & 33** power flow software. Failure to provide a compatible model will result in a Cure Deficiency notice. Failure to resolve the deficiency will result in the GIR's withdrawal from the queue and loss of queue position.

1.2 INTERCONNECTION STUDY AGREEMENTS

1.2.1 FEASIBILITY CLUSTER STUDY (FCS)

Following receipt of the selected study agreement, the Interconnection Customer will have the **lesser of a) 15 days or b) the close of the Feasibility Queue Cluster Window** (Window Open/Close Dates discussed in Section 3) to return the study agreement along with the additional information listed below.

- FCS Agreement (Appendix 2 to GIP)
- Study Deposit of $10,000

1.2.2 PRELIMINARY INTERCONNECTION SYSTEM IMPACT STUDY QUEUE (PISIS)

Following receipt of the selected study agreement, the Interconnection Customer will have the **lesser of a) 30 days or b) the close of the PISIS Queue Cluster Window** (Window Open/Close

Dates discussed in Section 3) to return the study agreement along with the additional information listed below.

- PISIS Agreement (Appendix 3 to GIP)
- Deposit of:
    - $10,000 for generation less than or equal to 2 MW
    - $25,000 for generation greater than 2 MW and less than or equal to 20 MW
    - $40,000 for generation greater than 20 MW and less than 100 MW
    - $60,000 for generation greater than or equal to 100 MW and less than 800 MW
    - $90,000 for generation greater than or equal to 800 MW
- Technical Data Required as Applicable (Attachment A to Appendix 3)
    - One-line diagram
    - Facility data
    - Wind turbine PSS®E model in version 32 & 33 (if wind turbine)
    - Wind farm data required in Appendix 7 of the GIP
    - Solar inverter PSS®E model in version 32 & 33
    - Solar array data

1.2.3 DEFINITIVE INTERCONNECTION SYSTEM IMPACT STUDY QUEUE (DISIS)

Following receipt of the selected study agreement, the Interconnection Customer will have the **lesser of a) 30 days or b) the close of the DISIS Queue Cluster Window** (Window Open/Close Dates discussed in Section 3) to return the study agreement along with the additional information listed below.

- DISIS Agreement (Appendix 3A to GIP)
- Deposit of:
    - $15,000 for generation less than or equal to 2 MW
    - $25,000 for generation greater than 2 MW and less than or equal to 20 MW
    - $40,000 for generation greater than 20 MW and less than 75 MW
    - $80,000 for generation greater than or equal to 75 MW
- Technical Data Required as Applicable (Attachment A to Appendix 3A)
    - Definitive POI (cannot be changed)
    - Definitive plant size (MW) (cannot be changed)
    - Wind turbine PSS®E model in version 32 & 33 (if wind turbine)
    - Wind farm data required in Appendix 7 of the Large Generator Interconnection Procedure (GIP)

  - Solar inverter PSS®E model in version 32 & 33
  - Solar array data
- Security equal to $1000/MW of the plant size (refundable at commercial operation or if the Generator Interconnection Agreement (GIA) is not executed by Interconnection Customer)

All study deposit payments may be in the form of check or wire transfers and must be submitted concurrent with any required application or agreement. For a security payment, cash via check or wire transfer is acceptable, or a Letter of Credit that meets the SPP Credit Policy in Attachment X of the Tariff may also be submitted. Additionally, all GIRs must include both a current and completed IRS W-9 Form and an SPP Study Deposit Refund and Disposition Form. Links may be found below in Section 16. SPP bank wiring instructions can be found HERE.

Generator Interconnection Customers that wish to obtain transmission service must request transmission service in accordance with the terms of SPP's Open Access Transmission Tariff (OATT).

SPP's Interconnection Agreement and the Interconnection Procedure may be downloaded by visiting www.spp.org and navigating at the tool bar to "Engineering" > "Generation Interconnection" > and then selecting the specific hyperlinks to the Generator Interconnection Procedures (GIP) or other sections. Any questions regarding GIRs can be addressed to:

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1.3 OVERVIEW OF STUDY DEPOSIT AND SECURITY REQUIREMENTS

All initial applications for Generator Interconnection Requests are required to submit $10,000 along with the forms from Appendix 1 and Attachment A to Appendix 1. This deposit is above and beyond any additional cluster study deposit and security deposits and will be bundled with study deposits and is subject to being drawn upon for study costs.

Type of Deposit	Amount	Payment Requirement	Payment Form
Application Deposit (Required for initial request)	**$10,000**	Upon submission of Appendix 1	Check or Wire
Feasibility Study Deposit (This study phase is optional)	**$10,000**	Upon submission of Feasibility Study Agreement	Check or Wire
OR			
Preliminary (PISIS) Cluster Study Deposit (This study phase is optional)	**$10,000**	For generation less than or equal to 2MW	Check or Wire
	$25,000	For generation greater than 2MW and less than or equal to 20MW	Check or Wire
	$40,000	For generation greater than 20MW and less than or equal to 100MW	Check or Wire
	$60,000	For generation greater than 100MW and less than or equal to 800MW	Check or Wire
	$90,000	For generation greater than or equal to 800MW	Check or Wire
OR			
Definitive (DISIS) Cluster Study Deposit (This study phase is mandatory)	**$15,000**	For generation less than or equal to 2MW	Check or Wire
	$25,000	For generation greater than 2MW and less than or equal to 20MW	Check or Wire
	$40,000	For generation greater than 20MW and less than or equal to 75MW	Check or Wire
	$80,000	For generation greater than or equal to 75MW	Check or Wire
AND			
Facilities Study (This study phase is mandatory)	**--**	No Additional Study Deposits Required	--
AND			
DISIS Cluster Security Deposit*	**$1,000 p/MW**	Security Deposit equal to $1,000 per generation nameplate capacity of the plant	Check, Wire, or Letter of Credit
AND			
Facilities Study Security Deposit*	**$3,000 p/MW**	Security Deposit equal to $3,000 per generation nameplate capacity of the plant	Check, Wire, or Letter of Credit
*Security Deposits may be utilized to fund initial Network Upgrades and/or Shared-Network Upgrades. Any remaining deposits will be refundable after Commercial Operation; or if Interconnection Request is withdrawn or terminated prior to execution of the Facilities Study Agreement.			

Example: Interconnection Customer submits a Generator Interconnection Request for a power generation facility with a nameplate rating of 300MW. Here are the financial obligations:

To cover application and study deposits	Amount
Application Deposit	$10,000
Definitive (DISIS) Interconnection System impact Study Cluster	$80,000
Total Study Deposit (Check or Wire)	**$90,000**

To cover security deposits for DISIS cluster and Facilities Study	Amount
DISIS Security Deposit (equal to $1000 per MW studies)	$300,000
Facilities Study Security Deposit (equal to $3,000 per MW studied)	$900,000
Total Security Deposit (Check, Wire, or Letter of Credit)	**$1,200,000**

To complete the entire GIP, the Interconnection Customer must, at a minimum, complete the Application and Validation of the GIR; complete the DISIS Study Cluster; complete a Facilities Study conducted by the TO; and execute a GIA.

2 QUEUE PRIORITY

DISIS queue positions have queue priority over PISIS queue positions. PISIS queue positions have priority over FCS queue positions. All current study GIR queue positions within each study are equal to each other in queue priority.

Queue positions in the Interconnection Facilities Study (IFS) have higher priority than requests in the DISIS, PISIS, or FCS. When a GIR reaches the IFS queue, its priority is lower than GIRs that previously entered the IFS queue and its priority is higher than GIRs that enter the IFS queue in later cycles.

2.1 INITIAL QUEUE POSITION

When a GIR is submitted and validated, the request is given an Initial Queue Position. The Initial Queue Position is an identifier for the GIR but does not assign any priority to the request. This Initial Queue Position will be identified as GEN-20YY-XXX, where

- YY is the year the GIR was accepted
- XXX identifies the specific request within the year of submission

The GIR will keep its Initial Queue Position number throughout the FCS, PISIS, and DISIS phases of the GIP and beyond into the GIA stage.

2.2 INTERCONNECTION FACILITIES STUDY (IFS) QUEUE POSITION

When all GIR requirements to enter the IFS queue have been completed, the request will receive an Interconnection Queue Position. The Interconnection Queue Position assigns a queue priority of the

GIR relative to all other requests in the IFS queue. The Interconnection Queue Position has a higher priority than any request within the FCS, PISIS, or DISIS Queues.

This IFS Queue Position will be identified as IFS-20YY-00X-ZZZ, where

- YY-00X is the year and DISIS study in which the GIR was studied prior to entering the IFS Queue
- ZZZ identifies the specific request within the DISIS study

3 CLUSTERING OPEN SEASONS

The most up-to-date start and closing times for study windows (open seasons) are posted on the GI Webpage under the "GI Study Windows - Open and Close Dates" link on the right-hand side of the webpage.

There are two scheduled study windows: one for the open and close of the FCS and another for the PISIS or DISIS.

An FCS is conducted every 90 days with a study posted no later than 90 days after its commencement. The PISIS and DISIS are conducted every 180 days. The DISIS study will be posted 120 days after its commencement. The PISIS study will be posted 150 days after its commencement.

4 TYPES OF INTERCONNECTION SERVICE

4.1 ENERGY RESOURCE INTERCONNECTION SERVICE (ERIS)

ERIS allows the Interconnection Customer to connect the generating facility to the transmission system and be eligible to deliver the generating facility's output using the existing firm or non-firm capacity of the transmission system on an "as available" basis. ERIS does not in and of itself convey any right to deliver electricity to any specific Customer or Point of Delivery (POD).

ERIS is the default and required method of Interconnection Service for any GIR submission. When choosing ERIS, consider the analysis for this service will identify all significantly affected facilities identified as impacting the i) short-circuit/fault duty, ii) under- or over-voltage violations, iii) dynamic stability angular deviations, and/or iv) having a 20% or higher distribution factor on thermally overloaded transmission facilities under contingency or having a 3% or higher distribution factor on thermally overloaded transmission facilities for system intact conditions. This is discussed further in Section 7.2.

4.2 NETWORK RESOURCE INTERCONNECTION SERVICE (NRIS)

NRIS allows a Customer's generating facility to be designated as a Network Resource, up to the facility's full output, on the same basis as existing Network Resources interconnected to Transmission Provider's transmission system, and to be studied as a Network Resource on the

assumption that such a designation will occur. However, NRIS in and of itself does not convey any right to deliver electricity to any specific Customer or POD.

NRIS is an additional and optional method of interconnection service for any GIR submission. When choosing NRIS, consider the analysis for this service will identify all significantly affected facilities identified as impacting the i) short-circuit/fault duty, ii) under- or over-voltage violations, iii) dynamic stability angular deviations, and/or iv) having a 3.0% or higher distribution factor on thermally overloaded transmission facilities under a base case and/or contingency. Although NRIS may be requested, all ERIS upgrades are a subset of requirements for any NRIS request. This is discussed further in Section 7.2.

5 INTERCONNECTION FEASIBILITY CLUSTER STUDY (FCS)

The FCS assesses the practicality and costs involved to incorporate the generating unit or units into the SPP transmission system. The analysis is limited to a linear power flow analysis of the more probable contingencies within the Transmission Owner's (TO) control area and key adjacent areas. The FCS does not include full AC power flow analysis or stability studies. The generator will be modeled at the location and during the time period specified in the Feasibility Study Agreement.

A power flow analysis is conducted with all requests in the IFS and DISIS queue that were requested in the previous open season window. The results of load flow analysis include power flow magnitudes under probable contingency conditions. The results of the load flow study will be used to identify equipment overloads. If an equipment overload is determined to be impacted by the GIR, a cost allocation of the mitigation will be assigned to the GIR that will be shared by other requests in the study that also impact the facility. The study shall be conducted using PSS®MUST software.

SPP shall make reasonable efforts to complete the FCS within 90 calendar days after receipt of the executed Feasibility Study Agreement. After this study is completed, SPP will post the results of the FCS on the public SPP OASIS study page. Since this is a public site, the Customer's identity will be kept confidential.

6 PRELIMINARY INTERCONNECTION SYSTEM IMPACT STUDY (PISIS)

After completion of the FCS, SPP will send the Customer a PISIS agreement. The Customer shall have 30 calendar days to review, execute, and return the agreement to SPP. At this time, the Customer shall wire or send an additional prepayment for the PISIS. The remainder of the prepayment is refundable to the Customer at the end of the process based on difference of the prepayment and the Customer's cost responsibility of the study costs. If the agreement is not returned within 30 calendar days, the Customer's request shall be deemed withdrawn.

The PISIS consists of an AC power flow analysis and transient stability study analysis of the GIR. A power factor analysis will also be conducted for wind generating plants to determine whether such plants shall supply additional reactive power. SPP shall make reasonable efforts to complete the Impact Study within 150 calendar days after the close of the open season window. Studies may be performed by SPP personnel, TO personnel, or external contractors.

The following data will be required to begin the detailed Interconnection Study:

1) Synchronous machine data*
2) Exciter data and models*
3) Governor data and models*
4) Step-up transformer data (positive and zero sequence)
5) Line impedance to interconnection point (positive and zero sequence)
6) Power system stabilizer data (if installed)
7) Short circuit data

*All modeling data must be compatible with **PSS®E version 32 & 33**. It is incumbent upon the Interconnection Customer to ensure that all modeling files are compatible with **PSS®E version 32 & 33**, as a stand-alone model and the collective product models combined. Failure to provide **PSS®E version 32 & 33** compatible models will result in a Cure Deficiency and may require SPP to withdraw the request from the queue.

SPP shall make reasonable efforts to complete the Impact Study within 150 calendar days after the close of the window. After this study is completed, SPP will post the results of the Impact Study on the public SPP OASIS study page. Since this is a public site, the Customer's identity will be kept confidential.

7 DEFINITIVE INTERCONNECTION SYSTEM IMPACT STUDY (DISIS)

After completion of the PISIS, SPP will send to the Customer a DISIS agreement. The Customer shall have 30 calendar days to review, execute, and return the agreement to SPP. At this time, the Customer shall wire or send an additional prepayment for the DISIS. The remainder of the prepayment is refundable to the Customer at the end of the process based on difference of the prepayment and the Customer's cost responsibility of the study costs. If the agreement is not returned within 30 calendar days, the Customer's request shall be deemed withdrawn.

If the Interconnection Customer does not participate in the PISIS, the information for the DISIS must be provided no later than the close of the window for accepting GIRs (see Section 3).

The DISIS consists of an AC power flow analysis and transient stability study analysis of the GIR. A power factor analysis will also be conducted for wind generating plants to determine whether such plants shall supply additional reactive power. SPP shall make reasonable efforts to complete the Impact Study within 120 calendar days after receipt of the executed agreement. Studies may be performed by SPP personnel, TO personnel, or external contractors.

7.1 SYSTEM IMPACT STUDY DATA REQUIREMENTS

The following data will be required to begin the detailed Interconnection Study:

1) Synchronous machine data*
2) Exciter data and models*
3) Governor data and models*
4) Step-up transformer data (positive and zero sequence)
5) Line impedance to interconnection point (positive and zero sequence)
6) Power system stabilizer data (if installed)
7) Short circuit data

*All modeling data must be compatible with **PSS®E version 32 & 33**. It is incumbent upon the Interconnection Customer to ensure that all modeling files are compatible with **PSS®E version 32 & 33**, as a stand-alone model and the collective product models combined. Failure to provide **PSS®E version 32 & 33** compatible models will result in a Cure Deficiency and may require SPP to withdraw the request from the queue.

7.2 DEFINITIVE INTERCONNECTION SYSTEM IMPACT STUDY METHODOLOGY

A power flow and transient stability analysis is conducted under two scenarios: 1) Cluster Scenario – with all requests in the DISIS queue that were requested in the previous open season window and all higher queued GIRs; and 2) Stand Alone Scenario – with only GIRs that have advanced to the IFS.

The results of load flow analysis include power flow magnitudes and voltage levels under probable contingency conditions. The results of the load flow study will be used to identify equipment overloads. If an equipment overload is determined to be impacted by the GIR, a cost allocation of the mitigation will be assigned to the GIR that will be shared by other requests in the study that also impact the facility. The study shall be conducted using both PSS®MUST and the ACCC function of PSS®E.

A transient stability analysis will be performed to determine generator unit response due to a fault on the system and unit outages. The stability analysis will include new transmission reinforcements that were determined to be necessary by the power flow analysis. The transient stability analysis will determine:

1) Unit stability during faults
2) Voltage levels, frequency levels, and frequency deviation at the POI
3) Synchronous generator rotor oscillations and real and reactive power outputs

This information will be collected before the disturbance, at the time of the disturbance, at discrete time intervals during the disturbance, and after the removal of the disturbance from the system.

8 MODELING

8.1 REGIONAL GROUPINGS

The GIRs in each DISIS are aggregated into regional groups based on geographical and electrical impacts. These groupings of the GIRs are shown in Appendix C of each DISIS report.

To determine interconnection impacts, regional generation dispatch scenarios of the light load models as described below are developed to accommodate the regional groupings.

8.2 POWER FLOW

For ERIS, the wind generating plants are dispatched at 100% nameplate of maximum generation. The other wind generating plants in the remote groups are dispatched at 20% nameplate of maximum generation. The projects are dispatched as energy resources across the SPP footprint. The existing on-line generation is backed down across the SPP footprint on a load ratio basis in accordance with dispatch orders presented by individual TOs. This method of dispatching by regional groups allows for the identification of network constraints that are common to the regional groupings that could in turn have the mitigating upgrade cost allocated throughout the entire cluster.

All wind generators that request NRIS are dispatched in an additional analysis into the Balancing Authority of the interconnecting TO at 100% nameplate in the light load and summer and winter peak seasons.

Other sensitivity analyses are also performed with all GIRs in each group being dispatched at 100% nameplate.

Peaking and other thermal units are not dispatched in the light load season. To study peaking and other thermal units' impacts, the summer and winter peak seasonal models are used and peaking units are modeled at 100% of the nameplate rating. Each GIR was also modeled separately at 100% nameplate for certain analyses.

8.3 DYNAMIC STABILITY

For each regional group, all GIRs are studied at 100% nameplate output while the other groups are dispatched at 20% output for wind requests and 100% output for peaking and thermal requests. The online generation is scaled down on a load ratio basis for each TO area.

9 POWER FLOW ANALYSIS

For all power flow models developed, the ACCC function of PSS®E is used to simulate single-element, breaker-to-breaker, and multi-element outages in all power flow areas of the SPP footprint, as well as other power flow areas external to SPP. The standard SPP contingency and monitored files are used to determine which outages to simulate. Constraints are then identified as stated in Section 11.

10 DYNAMIC STABILITY ANALYSIS

For all stability models developed, a transient stability analysis will be performed to determine generator unit response due to a fault on the system and unit outages. The stability analysis will include new transmission reinforcements that were determined to be necessary by the power flow analysis.

The following types of outages will be simulated in the dynamic stability analysis:

- Single-phase and three-phase transmission line faults with and without reclosure.
- Single-phase and three-phase transformer faults without reclosure.
- Single-phase faults with breaker failure and delayed clearing.
- Prior outages – With one transmission element near the Point of Interconnection out of service, faults will be simulated to determine if generator curtailment is required.

The transient stability analysis will determine:

- Unit stability during faults
- Voltage levels, frequency levels, and frequency deviation at the POI
- Synchronous generator rotor oscillations, damping, and real and reactive power outputs
- For wind generators, a low voltage ride through analysis (LVRT) will be performed in accordance with FERC Order #661A
- This information will be collected before the disturbance, at the time of the disturbance, at discrete time intervals during the disturbance, and after the removal of the disturbance from the system

11 CONSTRAINT IDENTIFICATION

An impact analysis is performed using PSS®MUST to determine the distribution factor (DF) of each of the GIRs upon the constraint (overload). For ERIS, constraints are screened to determine which of the GIRs had at least a 20% DF upon the constraint for outage-based constraints and 3% DF for constraints for system-intact conditions. Constraints that measured these criteria from at least one GIR are considered for transmission reinforcement under ERIS. In addition, stability issues are considered for transmission reinforcement under ERIS. GIRs that have requested NRIS are additionally studied in the NRIS analysis to determine if any constraint measured at least a 3% DF. If so, these constraints are also considered for mitigation under NRIS.

Constraints that required transmission reinforcement are generally listed in each DISIS report in Appendix G for power flow upgrades. For stability upgrades, the reinforcements are discussed in the stability section of the DISIS report.

12 DETERMINATION OF COST ALLOCATION FOR NETWORK UPGRADES

Cost allocation of Network Upgrades for wind GIRs are determined using the light load model. Cost allocation of Network Upgrades of peaking units was determined using the summer peak model. A PSS®MUST sensitivity analysis is performed to determine the DF, a distribution factor with no contingency that each GIR had on each new upgrade. The impact each GIR had on each upgrade project was weighted by the size of each request. Finally the costs due by each request for a particular project are then determined by allocating the portion of each request's impact over the impact of all affecting requests.

For example, assume there are three GIRs: X, Y, and Z, that are responsible for the costs of Upgrade Project 1. Given that their respective power transfer distribution factors (PTDF) for the project have been determined, the cost allocation for GIR X for Upgrade Project 1 is found by the following set of steps and formulas:

1. Determine an Impact Factor on a given project for all responsible GI requests:

   *Request X Impact Factor on Upgrade Project 1 = PTDF (%)(X) * MW(X) = X1*

   *Request Y Impact Factor on Upgrade Project 1 = PTDF (%)(Y) * MW(Y) = Y1*

   *Request Z Impact Factor on Upgrade Project 1 = PTDF (%)(Z) * MW(Z) = Z1*

2. Determine each request's Allocation of Cost for that particular project:

$$Request\ X's Project\ 1\ Cost\ Allocation(\$) = \frac{Network\ Upgrade\ Project\ 1\ Cost\ (\$) \times X1}{X1 + Y1 + Z1}$$

3. Repeat previous for each responsible GIR for each Project.

The cost allocation of each needed Network Upgrade is determined by the size of each request and its impact on the given project. This allows for the most efficient and reasonable mechanism for sharing the costs of upgrades. Costs assigned to each GIR are generally listed in Appendix E of each DISIS report.

12.1 FACILITIES ANALYSIS

A Facility Study-grade cost estimate will be provided through the TO whose facilities will be impacted. The Facilities Analysis shall only consider the substation at the POI. Any other upgrades identified through the Impact Study will have a Facilities Analysis performed during the IFS portion of the process.

12.2 DEFINITIVE INTERCONNECTION SYSTEM IMPACT STUDY COMPLETION

SPP shall make reasonable efforts to complete the Impact Study within 120 calendar days after the close of the window. After this study is completed, SPP will post the results of the Impact Study on the public SPP OASIS study page. Since this is a public site, the Customer's identity will be kept confidential.

13 INTERCONNECTION FACILITIES STUDY (IFS)

Following receipt of the selected study agreement, the Interconnection Customer will have the **lesser of a) 30 days or b) the close of the DISIS Queue Cluster Window** (Window Open/Close Dates discussed in Section 3) to return the study agreement along with the additional information listed below.

Upon completion of the DISIS, SPP will send the Customer an Interconnection Facilities Study Agreement. The Customer shall have **30 calendar days** to review, execute, and return the agreement to SPP, together with the required technical data and security deposit listed below, otherwise the request will be deemed withdrawn.

- Facilities Study Agreement (Appendix 4 to GIP)
- Financial Security equal to $3,000/MW of the size of the GIR
- Technical Information (Attachment B to Appendix 4)

Upon completion of these steps, the GIR shall be issued an Interconnection Queue Position as discussed in Section 2. The GIR will then take priority over other GIRs that have not been issued an Interconnection Queue Position.

The IFS consists of two parts, a facility analysis and a short circuit analysis. The facility analysis consists of SPP or TO specifying and estimating the cost of equipment, engineering, procurement and construction cost needed to implement the Interconnection to the transmission system. These facilities will have detailed cost estimates.

A short circuit (i.e., fault current) analysis will be performed to determine the effect that the new generation will have on the system fault currents. The new fault current levels will be used to evaluate the impact of the new generation on the fault duty (i.e., fault current interrupting capability or rating) of existing equipment, such as circuit breakers and switches. The results of this analysis may identify which equipment would have to be replaced as a result of the new generation.

The deliverables of this study will be a Facility Study Report. SPP and the TO shall make reasonable efforts to complete the IFS within 90 calendar days. After this study is completed, SPP will post the results of the study on the public SPP OASIS study page. Since this is a public site, the Customer's identity will be kept confidential.

14 RE-STUDY

If a re-study of the Interconnection Customer's request for interconnection is required due to a higher queued project dropping out of the queue or a modification of a higher queued project, or more than one GIR moving forward into the IFS phase, SPP shall notify the Customer in writing. SPP shall make reasonable efforts to complete the re-study within 60 calendar days from the notice. Any cost of re-study shall be borne by the Interconnection Customer. The Customer shall be responsible for prepaying the cost of the re-study.

15 GENERATOR INTERCONNECTION AGREEMENT (GIA)

Upon completion of the IFS, SPP shall send the Customer, as soon as practical, a draft GIA to be executed by the Customer, SPP, and the TO. The agreement allows a physical interconnection of the generator to the SPP transmission grid. Other documents may also be required depending on individual circumstances.

SPP, the TO, and the Interconnection Customer shall negotiate concerning any disputed provisions of the Appendices to the draft GIA for not more than 60 calendar days after tender of the draft GIA. If the Customer determines that negotiations are at an impasse, it may request termination of negotiations at any time after tender of the GIA and request submission of the unexecuted GIA to FERC or initiate Dispute Resolution procedures. If the Customer requests termination of the negotiations, but within the 60 calendar days thereafter fails to request either the filing of the unexecuted GIA or initiate Dispute Resolution, it is deemed to have withdrawn its GIR. If the Customer has not executed the GIA, requested filing of an unexecuted GIA or initiated Dispute Resolution procedures within 60 calendar days of tender of completed draft of the GIA Appendices, it shall be deemed to have withdrawn its GIR, unless otherwise agreed by the Parties. The SPP shall provide to the Customer a final GIA within 15 business days after the completion of the negotiation process.

Within 15 business days after receipt of the final GIA, the Customer shall provide SPP reasonable evidence of continued site control or post a $250,000, non-refundable additional security which shall be applied toward future construction costs.

At the same time, the Customer shall provide reasonable evidence that one or more of the following milestones in the development of the facility, at the Customer's election, has been achieved:

- Execution of a contract for the supply or transportation of fuel to the facility;
- Execution of a contract for the supply of cooling water to the facility;
- Execution of a contract for the engineering for, procurement of major equipment for, or construction of the facility;

- Execution of a contract for the sale of electric energy or capacity from the facility;
- Statement signed by an officer or authorized agent of the Interconnection Customer attesting the generating facility is included in an applicable state resource plan;
- Other information that the Transmission Provider deems to be reasonable evidence that the generating facility will qualify as a Designated Resource; or
- Application for an air, water, or land use permit.

Within 30 days after the Effective Date of the GIA, the Customer is required to make an Initial Payment to the Transmission Provider in the amount of the greater of a) 20% of the cost of Network Upgrades and Interconnection Facilities or b) $4,000/MW of the size of the GIR.

Transmission service must be arranged for separately under the terms and conditions of SPP's OATT.

16 STUDY DEPOSIT DISPOSITION

It is the intended business practice of SPP to commence study deposit reconciliations no sooner than 90 days after it reaches a terminal point in the GIR. A terminal point is either reaching Commercial Operation, having been Withdrawn or Terminated. This includes cluster studies, re-study iterations of cluster studies, individual re-studies, interim studies, and facilities studies.

If a GIR within a clustered study drops out, resulting in a restudy of any other GIR, the reconciliation will not commence until 90 days after the subsequent re-study results have been posted.

Refer to SPP OATT, Attachment V (GIP), Section 4.2.5 and Section 8.4(c) for further tariff guidance on study cost allocation methodology.

SPP will provide refund payment via ACH transaction to the authorized project owner that submitted the Generator Interconnection application, unless an assignment of the project has been made between parties. **It is the responsibility of the Interconnection Customer to keep SPP informed of study deposit refund information, including changes in address, contacts, project ownership, banking, and routing information.**

The submittal of a current and completed IRS W-9 Form, along with the completed SPP Study Deposit Refund and Disposition Form in your GIR application set, is required. Failure to provide SPP with an IRS W-9 Form associated with the project deposits and the SPP Study Deposit Refund and Disposition Form could result in delays in setting up security accounts as well as issuance of any refunds.

To wire Study Deposits or Security Deposits to SPP, the SPP banking information form is HERE. Be sure to mark any wire transaction with project name or detail so that we can differentiate the funds from other projects.

For questions regarding study deposits, security deposits, refunds or remaining balances, contact Brad Finkbeiner, Sr. Engineering Analyst – Engineering Finance & Administration. Email: bfinkbeiner@spp.org or call (501) 688-1657.

17 GLOSSARY OF TERMS

Term	Definition
DF	Distribution Factor
DISIS	Definitive Interconnection System Impact Study
ERIS	Energy Resource Interconnection Service
FCS	Feasibility Cluster Study
FERC	Federal Energy Regulatory Commission
GIA	Generator Interconnection Agreement
GIP	Generator Interconnection Procedures
GIR	Generator Interconnection Request
IFS	Interconnection Facilities Study
IR	Interconnection Request
NRIS	Network Resource Interconnection Service
OATT	Open Access Transmission Tariff
PISIS	Preliminary Interconnection System Impact Study
POD	Point of Delivery
POI	Point of Interconnection
PTDF	Power Transfer Distribution Factor
SPP	Southwest Power Pool
TO	Transmission Owner