

# TRANSMISSION AGENCY OF NORTHERN CALIFORNIA

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## **General Requirements for Interconnection July 2009**

**GENERAL REQUIREMENTS FOR INTERCONNECTION**

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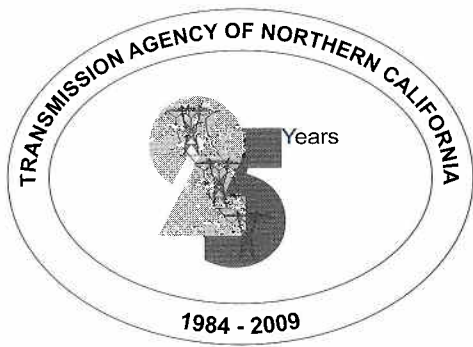
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## General Manager's Introduction

Greetings,

The Transmission Agency of Northern California ("TANC") welcomes your interest in our requirements for interconnecting with TANC's transmission facilities, and looks forward to working with you to facilitate interconnection under the process discussed within this document.

These general requirements are offered as guidelines to assist in interconnecting to TANC's facilities. TANC reserves the right to modify these requirements at any time to meet changing conditions.

James W. Beck  
General Manager

## **1. TANC TRANSMISSION FACILITIES**

Transmission Agency of Northern California ("TANC") is a joint exercise of powers agency organized under the provisions of California law governing the joint exercise of powers, being Chapter 5, Division 7, Title 1 of the Government Code of the State of California and a Joint Powers Agreement dated as of December 10, 1984. The Members of TANC include the City of Alameda ("Alameda"), the City of Biggs ("Biggs"), the City of Gridley ("Gridley"), the City of Healdsburg ("Healdsburg"), the City of Lodi ("Lodi"), the City of Lompoc ("Lompoc"), the Modesto Irrigation District ("Modesto"), the City of Palo Alto ("Palo Alto"), the City of Redding ("Redding"), the City of Roseville ("Roseville"), the Sacramento Municipal Utility District ("SMUD"), the City of Santa Clara ("Santa Clara"), the Turlock Irrigation District ("Turlock"), and the City of Ukiah ("Ukiah"). In addition, Plumas-Sierra Rural Electric Cooperative ("Plumas-Sierra") is an associate member.

TANC was established in 1984 to plan, design, and construct the California-Oregon Transmission Project ("COTP or Project"), a 340-mile long, 1,600-MW, 500-kV AC transmission line between Southern Oregon and Central California.

The COTP entitlements include TANC (86.8519%), the City of Redding California ("Redding"), (1.5856%), the Western Area Power Administration ("Western") (9.3750%), two California water districts (0.1250%), and Pacific Gas and Electric Company ("PG&E") (2.0625%). The COTP was placed into service on March 17, 1993, at a cost of approximately \$430 million.

The COTP created a third transmission path, or "intertie," between the electric systems of the Pacific Northwest and those in California. TANC's primary purpose is to provide electric transmission or other facilities, including real property and rights of way, for the use of its Members. Each Member pays for costs associated with the operation of the Agency and is entitled to an undivided interest in all rights and property of the Agency. TANC is the project manager of the COTP. As project manager, TANC is responsible for the overall direction, conduct, and coordination of all Project work and is authorized to proceed with general administrative support.

## 2. PURPOSE

The General Requirements for Interconnection is intended to be a guide for the prompt processing of interconnection requests. This document describes TANC's general requirements and the process for interconnection, addition or modification to TANC's transmission facilities. It provides an overview of funding, reliability, safety and security, environmental, land acquisition, technical and contractual requirements, as well as lists TANC points of contact and references.

This document sets forth the minimum requirements for interconnection with TANC's transmission facilities. There may be additional requirements by TANC depending upon the location and scope of the proposed interconnection. The steps outlined in the interconnection process may be further streamlined when TANC deems appropriate.

Interconnection is a separate but parallel process to other processes, including the transmission service request process set forth in TANC's Open Access Transmission Tariff ("Tariff"), the environmental review process outlined in the California Environmental Quality Act, Public Resources Code §21,000, CEQA *Implementing Procedures*, and TANC's land acquisition process. These processes may share steps in order to ensure an efficient interconnection. It is TANC's intent to make the separate processes as seamless as possible.

### 3. INTERCONNECTION PROCESS

Each request for interconnection is evaluated on a case-by-case basis and is subject to meeting reasonable needs of the requesting entity. The requesting entity may be an electric utility, a private power developer, or an independent power generator.

TANC assumes responsibilities to operate and maintain its interconnected facilities.

Direct interconnection to TANC's facilities does not involve nor guarantee transmission capacity on TANC's system. Transmission service requests must be made in accordance with TANC's Tariff. The Tariff is available on a regional Open Access Same-Time Information System ("OASIS"), which may be accessed via TANC's website at [www.tanc.us](http://www.tanc.us). Alternatively, the Tariff may be furnished by TANC to the entity requesting interconnection. Transmission service request review is a separate process from interconnection request review, though for efficiencies some steps are shared. Additional parallel processes include environmental review and land acquisition, which are discussed in more detail in this document.

There are eight general steps in the interconnection process. Within legal and technical parameters, the steps in this process may be modified by TANC on a case-by-case basis depending upon the specific circumstances of the requested interconnection.

#### **Step 1: Contact TANC and Submit Application**

Requesting entities are encouraged to discuss proposed projects with a TANC representative. Discussion, and subsequent review of the request by TANC, will help TANC determine what studies are necessary.

Generally, the requesting entity should be registered with the Western Electricity Coordinating Council (WECC) before requesting interconnection with TANC. After initial contact, TANC will provide – or make available through TANC's website at [www.tanc.us](http://www.tanc.us) – interconnection related information, including TANC's *General Requirements for Interconnection* (this document), the Application for Interconnection (see Appendix), the Tariff, if applicable, and other supporting safety, environmental, and operations information.

Formal requests for interconnection – using the application contained in the Appendix or through a similar written request – should be submitted at least 18 months in advance of when the equipment or construction specifications are to be issued for bid. Such lead time allows TANC to develop a proposed plan and designs and specifications for TANC-owned, operated and maintained facilities, as well as to review line taps owned by others.

TANC may take up to 60 days to process the interconnections request.

When submitting an interconnection request to TANC, the requesting entity should provide as much of the following information as possible to help expedite the design or review process. This information is also listed in summary form on the Application for Interconnection.

- A. Single-line diagram(s) showing the proposed interconnection, including any relaying and metering facilities.
- B. Drawing(s) indicating the physical arrangements of existing and proposed facilities.
- C. Geographic location of the proposed interconnection, including land ownership pattern, if available. If a tap, indicate adjacent structure numbers.
- D. Description of the proposed routing, approximate lengths and conductor size of transmission line additions or modifications, and dimensions and configurations of new structures.
- E. Description and ratings of any proposed breakers, switches, metering, associated communications, relaying and other related equipment.
- F. Description of transformer voltage and rating, winding connections, impedance if available, and proposed method of protection.
- G. Proposed construction schedule.
- H. Description of the generating resources or loads to be served by the interconnection and the proposed transmission path(s) and service arrangements between resources and associated loads, where applicable. The description should include the following:
  - (1) Power output or load requirements, including 10-year projections, by delivery points, or winter and summer peaks for loads served or generation supplied through the point of interconnection;
  - (2) Size, type and ratings of large equipment;
  - (3) Reliability and special operation requirements; and
  - (4) Impedance, frequency, voltage, reactive power and protective relaying characteristics of the interconnection resource or load.
- I. Appropriate revenue and telemetering equipment specifications. The data should include load control boundary metering, current and potential transformer ratios and register and contact initiator ratios with multipliers.
- J. Copies of relevant planning or operational studies.
- K. Copies of relevant environmental impact assessments, reports, or projections; or description or anticipated scope of environmental review.

The application for interconnection does not pertain to transmission service, which uses a separate application. Concurrent requests for transmission service will share certain steps where appropriate, but are conducted under separate TANC authorities. For transmission application information, see the Tariff.

If TANC denies the request for interconnection, a summary of reasons will be provided, and TANC will make every reasonable effort to support the requesting entity in revising the request, as applicable.

### **Step 2: System Impact Study**

TANC will conduct a system impact study. When the interconnection results from a transmission request, TANC will use the study process outlined in Attachment D to the Tariff. The study will assess the capability of the transmission system to support the requested interconnection, including any special studies necessary to evaluate the need to offset potential TANC control performance problems. The study will use the criteria and process detailed in

Sections 4 and 5 of TANC's Federal Energy Regulatory Commission Form 715 (available upon request) when the request occurs in the WECC area.

Within 60 days of receiving the requesting entity's application for interconnection, TANC will provide a System Impact Study Agreement in which the requesting entity agrees to advance funds for TANC to perform the study. The requesting entity must sign and return the agreement to TANC within 30 days or the request is mutually agreed to be withdrawn, the sole remedy is a re-submittal of an application.

TANC will make every effort to complete the system impact study within 60 days of agreement execution. The study will identify system constraints and redispatch options and any necessary additional direct assignment facilities and network upgrades.

Once the system impact study is complete, a report will be developed and provided to the requesting entity for review.

Within 60 days after receiving the results of the system impact study, an entity requesting both interconnection and transmission service may request in writing an Expedited Service Agreement. The Expedited Service Agreement provides for the requesting entity to compensate TANC in advance for all costs to be incurred by TANC following the system impact study. These costs may include identification of facility additions or upgrades, design, construction, environmental review, land acquisition, and energization. Rather than separate contractual agreements for facilities study, construction, transmission service, and interconnection, the Expedited Service Agreement provides for one contractual agreement incorporating the full interconnection process, from facilities study to operation and maintenance, including transmission service.

TANC will provide the requesting entity its best estimate of new facility costs and other charges, but the estimate is not binding and the requesting entity must agree in writing to compensate TANC in advance for all costs incurred in the interconnection and transmission service processes in order for this expedited process to occur. For further information, refer to Section 28 of the Tariff, or contact the TANC office.

### **Step 3: Facilities Study and Design**

A facilities study is necessary to determine upgrades or modifications needed at the point of interconnection. Within 60 days after TANC completes the system impact study, TANC will provide a Facilities Study Agreement in which the requesting entity agrees to advance funds for TANC to perform the study. The requesting entity must sign and return the agreements to TANC within 30 days or the request is mutually agreed to be withdrawn, the sole remedy is a re-submittal of an application.

TANC will make every effort to complete the facilities study within 60 days of agreement execution. The study will include estimates of the cost of facilities design and construction as well as the time required to complete design and construction.

Once the facilities study is complete, a report will be developed and provided to the requesting entity for review.

**Step 4: Environmental Review**

As a state agency, TANC conducts an environmental review of any action affecting TANC's transmission facilities. The environmental review process can range from a categorical exclusion to a comprehensive environmental impact report, including the required public process for such a report. The environmental review process is conducted simultaneously with other studies.

Requesting entities are required to advance funds for TANC to conduct the environmental review process. For further information, see Funding Requirements (Section 4).

The environmental review process uses input from the studies and construction planning processes. It may be concluded before or after completion of these technical studies, when applicable. Continuation of the interconnection process at any and every step is contingent upon favorable environmental review.

If the environmental review determines that the interconnection does not satisfy state environmental criteria, TANC will either deny the request or work with the requesting entity to revise aspects of the interconnection request to meet environmental criteria. Such revisions may occur at various steps during the process.

**Step 5: Land Acquisition**

Upon completion of the environmental process, negotiations for any necessary land rights begin. Negotiations should be complete and the land rights obtained prior to the start of construction. Requesting entities are required to advance funds for TANC to conduct the necessary land acquisition activities. For further information, see Funding Requirements (Section 4).

Unless otherwise agreed to by TANC and the requesting entity, TANC will perform all land acquisition activities.

**Step 6: Design and Construction**

Once the facilities study is complete, TANC will tender a Construction Agreement to the requesting entity. The requesting entity has 60 days to sign and return the agreements to TANC and provide advance payment. TANC cannot continue without funding in place.

Unless otherwise agreed to by TANC and the requesting entity, TANC will design the interconnection. For further information, see Technical Requirements (Section 9).

Also unless otherwise agreed to by TANC and the requesting entity, TANC will perform all construction. For further information, see Technical Requirements (Section 9).

**Step 7: Review and Testing, Interconnection Agreement, and Energize**

Once construction has been completed – and before energizing the new interconnection – TANC will review and test the new facilities. TANC will use prudent utility practice in review and testing.

Before energizing, TANC must also receive the appropriate as-built drawings, operating instructions and other relevant materials. For further information, see Technical Requirements (Section 9).

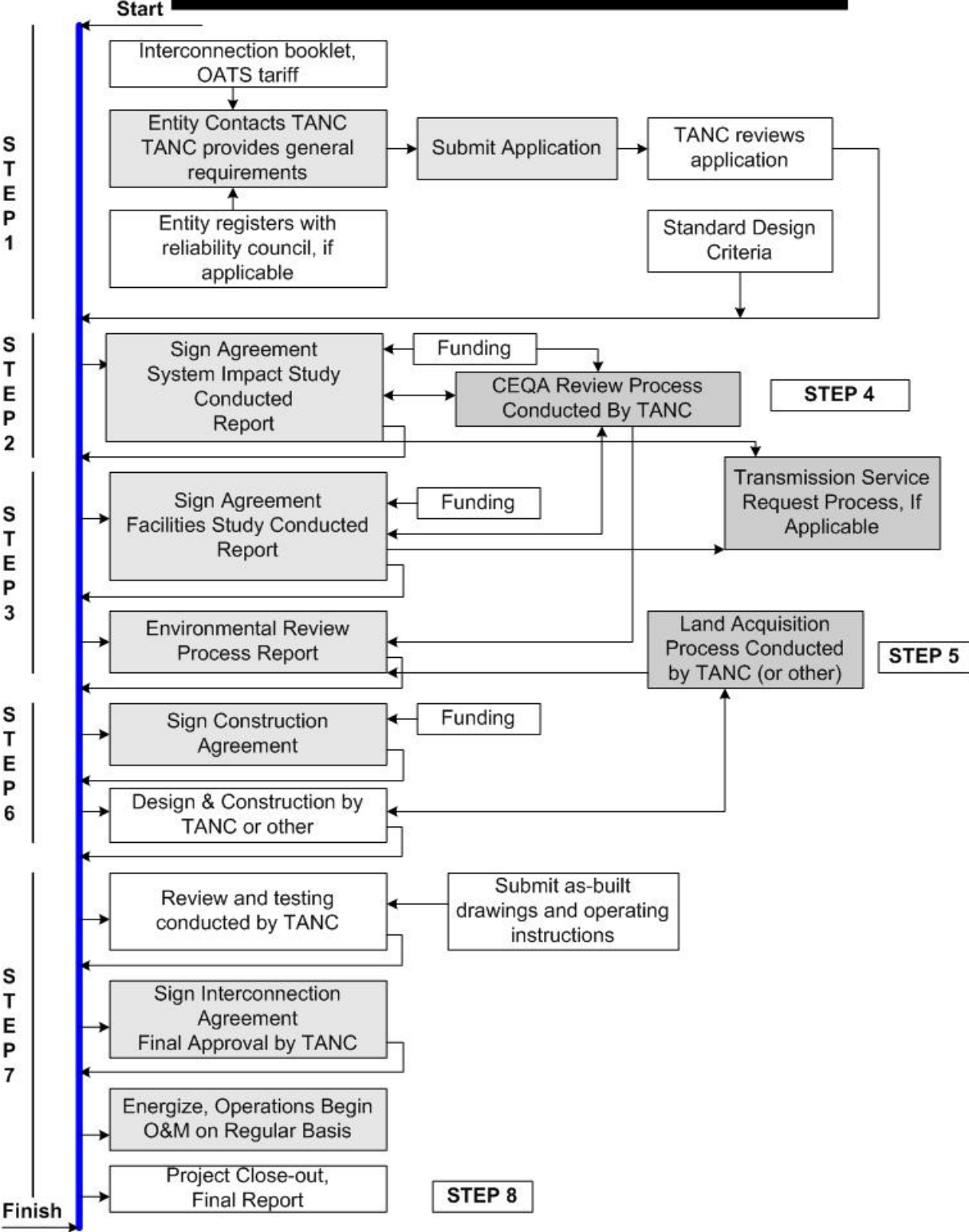
When the facilities are found to be in conformance with *TANC's Standard Design Criteria Safety Manual* and related requirements, TANC will tender an Interconnection Agreement to the requesting entity. The Interconnection Agreement – also termed mutual services, operations and maintenance, control/balancing authority area – provides for the long-term operation and maintenance of the interconnected facilities. The Interconnection Agreement generally includes sections on licensing, maintenance, operations, special instructions, and funding, as applicable. When to the benefit of TANC and the interconnecting entity, the Interconnection Agreement may be tendered at the same time as the earlier Construction Agreement.

The interconnected facilities may be energized following execution of the Interconnection Agreement. If TANC does not maintain direct control of the facilities, then TANC will maintain backup control of all facilities deemed to be vital to system stability. For further information, see Technical Requirements (Section 9).

**Step 8: Project Close-out**

TANC will develop a final report with a list of lessons learned to help facilitate future interconnections. TANC invites the interconnecting entity to join in developing a joint final report that benefits TANC and the entity.

# Interconnection Process Diagram



#### **4. FUNDING REQUIREMENTS**

All TANC costs associated with the interconnection request are the responsibility of the requesting entity. Advance funds are required before TANC performs any studies, design, land acquisition or construction. The contractual agreements will specify the amount of funds required to be advanced. Upon receipt by TANC, advance funds will be utilized by TANC to perform the work tasks. Periodic cost statements will be furnished as studies and work progress.

##### **Step 1: Application processing fee, if applicable**

Application processing fees apply only to transmission-related interconnection requests, as part of the transmission services request process.

The application processing fees and requirements for all transmission services-related requests are provided in the Tariff.

There is no application fee for non-transmission-related interconnections.

##### **Step 2: System impact study fee**

A System Impact Study Agreement will be executed between TANC and the requesting entity which will clearly specify TANC's estimate of the actual cost of the system impact study. The charge will not exceed the actual cost of the study. Requesting entities will not be assessed a charge for existing system studies when they are applicable, but the requesting entity will be responsible for charges associated with any modifications to existing planning studies that are reasonably necessary to evaluate the entity's request.

Funding is required after the System Impact Study Agreement is signed and before the system impact study is performed.

##### **Step 3: Facilities study fee**

A facilities study is necessary to evaluate the impact of the potential interconnection. Once a Facilities Study Agreement is executed between TANC and the requesting entity, the requesting entity will advance funds to TANC for performing the study. The facilities study fee is determined on a case-by-case basis.

##### **Step 4: Funding for environmental review**

Advance payment to TANC by the requesting entity is required to perform the necessary environmental review. Costs are based on historical expenses for similar interconnections, are specifically determined on a case-by-case basis by TANC, and will not exceed the actual costs of performing the review. Advance funding for environmental review may be secured contractually through the System Impact for Facilities Study Agreements, and/or through the Construction Agreement.

**Step 5: Funding for land acquisition**

Advance payment to TANC by the requesting entity is required for TANC to perform any land acquisition activities. Costs are based on historical or set expenses for similar projects, are specifically determined on a case-by-case basis by TANC, and will not exceed the actual costs for acquiring land. Advance funding for land acquisition may be secured contractually through the System Impact or Facilities Study Agreements, and/or through the Construction Agreement.

**Step 6: Funding for facilities design and construction**

The facilities study performed by TANC will include a good faith estimate of (1) the cost of direct assignment facilities to be charged to the requesting entity and (2) the requesting entity's appropriate share of the cost of any required network upgrades. The requesting entity will pay its share of the costs of new facilities for upgrades, including design, before TANC can begin or allow construction. When the facilities study is complete and presented to the requesting entity, the entity has 60 days to sign and return to TANC a Construction Agreement and provide the advance payment. If the construction of new facilities would require the expenditure of TANC funds, TANC reserves the right to halt construction until funds for construction are appropriated.

**Step 7: Funding for equipment replacement**

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

- A. Participate in the costs of the proposed project; and/or
- B. Allow ownership of replaced TANC equipment to be transferred to the requesting entity in exchange for transfer of ownership of the new equipment to TANC. The requesting entity would then receive a contract right for the incremental capacity in the new equipment.

**Step 8: Funding for facilities operations and maintenance**

The Interconnection Agreement or other agreement will set forth funding required by the interconnecting entity, if any, for long-term operations and maintenance associated with the interconnection.

**Step 9: Excess payments**

Any advance payment made by the requesting entity in excess of the actual costs incurred by TANC will be refunded, with interest.

## 5. RELIABILITY REQUIREMENTS

Interconnection to TANC's transmission facilities will be consistent with TANC's mission, Tariff (when applicable) and prudent utility practices. A proposed interconnection must not degrade the reliability or operating flexibility of the existing power system, and must meet the North American Electric Reliability Corporation's ("NERC") *Mandatory Reliability Standards*. The interconnection must comply with the WECC policies and procedures where the interconnection is geographically located within WECC's boundaries. When involving TANC-owned operated and maintained facilities, the interconnection must also comply with TANC's *Standard Design Criteria Safety Manual*, as it may exist or may be developed or adopted. Additionally, the interconnection must adhere to independent system operator reliability criteria in effect.

The interconnecting entity will be responsible for testing and reporting requirements in accordance with applicable NERC and WECC reliability standards for the bulk power system, as approved by the Federal Energy Regulatory Commission ("FERC"), or any similar standards of a successor organization to either NERC or WECC.

## 6. SAFETY AND SECURITY REQUIREMENTS

When making an interconnection to TANC's facilities, the requesting entity shall comply with applicable safety laws and building and construction codes. These include provisions of applicable state, or local safety, health and/or industrial regulations or codes.

Each generating site and/or interconnecting facility must be constructed in accordance with TANC's *Standard Design Criteria Safety Manual*, as it exists or may be developed or adopted. Safety-related standard design features include, but are not limited to:

- A. A ground grid that solidly grounds all metallic structures and other non-energized metallic equipment.
- B. Modifications to ground grids of existing substations (if necessary) to keep grid voltage rise within safe levels.
- C. Switch operating platforms for all disconnect switches, with ground conductors connected to the operating mechanisms.
- D. Disconnect switches (gang-operated) that are lockable in the open position by TANC.
- E. Fall protection features permanently installed on equipment.

The interconnecting entity must adhere to TANC's *Construction and Safety Procedures*, as they exist or may be developed or adopted. In the event that the requesting entity does not adhere to construction and safety procedures, TANC may issue an order to stop all or any part of the work until such time that the entity demonstrates compliance with the provision at issue. The entity cannot make a claim for compensation or damage resulting from such work stoppage.

Reporting of all security offenses and incidents occurring on property under the charge and control of TANC is required. Prompt and accurate reporting to the local law enforcement agency as well as the applicable dispatch center will aid in the protection of people and property.

## **7. ENVIRONMENTAL REQUIREMENTS**

TANC is required to assess the potential environmental impacts of any proposed interconnection in accordance with the California Environmental Quality Act (“CEQA”) of 1970 and other environmental regulations. Requesting entities are advised to consult with TANC as early as possible in the planning process to obtain guidance with respect to the appropriate level and scope of any studies or environmental information that TANC requires. The nature of the interconnection request will dictate the level of CEQA compliance required.

If the interconnection request does not involve integration of a new source of generation into TANC's transmission facilities, change the operation limits of existing generation, provide service to new discrete loads, or cause major system changes (new transmission greater than 10-miles or reconstructing existing transmission lines greater than 20-miles) and there are no adverse impacts identified, TANC may be able to prepare a categorical exclusion for the interconnection. This process can take up to six months to complete, depending on the scope of the interconnection. If the interconnection does involve any of the actions mentioned above, the environmental review process may take at least 18 months, depending on the scope of the interconnection. If TANC determines that an environmental assessment (“EA”) or an environmental impact report (“EIR”) is required, TANC may prepare the EA or EIR and, if necessary, use a contractor selected by TANC. If an EA is prepared, one result may be a determination that an EIR is necessary (in the case that significant impacts may occur or controversy is likely), thus extending the time to complete CEQA compliance.

TANC may participate in the environmental process of another state or Federal agency involved with a project to satisfy portions of its CEQA requirements. Environmental reviews and related studies conducted by other agencies cannot, however, be routinely adopted. They must meet the standards placed upon TANC.

The environmental process may be influenced by system impact or facilities studies. If the results of studies demonstrate a need for system additions to support the interconnection, the environmental studies must address the additions along with the interconnection. The applicable CEQA documents will be completed before TANC renders a final decision on the request for interconnection. TANC considers the environmental analysis contained in the CEQA documents in reaching its decisions for an interconnection.

When the requesting entity is the construction manager, the entity shall provide an environmental review of the proposed plan so that TANC can determine what further actions, if any, are needed to comply with the above requirements. A copy of environmental documents prepared by or for another state or Federal agency involved with the project should be furnished to TANC. Without such documents, TANC may not be able to proceed with the necessary review with subsequent delay to the requesting entity.

When the requesting entity will own equipment located in TANC's substation, switchyard or right-of-way, the requesting entity shall be financially responsible for all activities necessary to comply with the requirements of existing or subsequent applicable state environmental laws and regulations. Where specific environmental mitigation, as determined through the CEQA process,

is required as a result of construction activities, TANC is obligated to report annually on the status of such mitigation. The requesting entity shall provide TANC with periodic reports in sufficient detail as determined by TANC to permit TANC to compile and submit its site environmental annual report. Any consequences of a failure for TANC to submit the annual report that results from a failure of the requesting entity to provide TANC with the required periodic reports will be the responsibility of the requesting entity.

## **8. LAND ACQUISITION REQUIREMENTS**

Land acquisition is a process that can begin as soon as the Application for Interconnection is received – initiating research of property ownership – and continue through other interconnection process steps with appraisals, preparation of legal descriptions, and title search. The process may extend through the completion of construction. Typically, negotiations between TANC, the requesting entity, and /or affected landowners do not begin until the environmental record of decision or finding of no significant impact is complete, prior to construction.

If the interconnecting facilities are to be owned by TANC, than any new land rights necessary for the interconnection must be owned by TANC. TANC typically conducts all land acquisition activities, including appraisals, legal descriptions, title evidence, negotiation, title clearance, recordation, and payment. Projects may also require damage resolution with landowners following construction. All land rights must be acquired pursuant to state laws governing acquisition or real property, which is particularly important when state and institutional lands are affected by the interconnection.

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

## 9. TECHNICAL REQUIREMENTS

### A. System Planning

TANC will conduct or review studies needed to substantiate system impact, reliability and capability of the transmission facilities given the addition of the proposed interconnection. The studies will include, but not be limited to, power flow, and system stability and short circuit studies and must be coordinated with the requirements of the TANC Tariff. Sub synchronous resonance studies may also be required. It is the responsibility of the requesting entity to provide any specialized modeling data – compatible with formats required by FERC approved NERC and/or WECC reliability standards for the bulk power system, or any similar standards of a successor organization to either NERC or WECC – for either power flow or dynamic simulations. Evaluation of alternatives to the proposed interconnection, such as lower voltage construction, reactive support facilities, or upgraded facilities, may be requested or conducted. Power flow analysis will include 10-year load or resource growth projections and the planned facilities needed to satisfy such requirements. If the studies indicate that additions or upgrades to the existing transmission facilities are necessary, TANC will conduct or review facilities studies to determine the cost of additions or upgrades and the timeframe for implementing system additions or upgrades.

When TANC considers integrating a new resource into transmission facilities, additional studies within the system impact or facilities studies may also be required. Operational problems on TANC's facilities, either during normal or emergency conditions, may affect TANC's control performance; and under certain conditions, the interconnecting entity may have to relinquish unit load and voltage control to TANC's Balancing Authority. The power factor for both the generating units and loads shall be measured at the interconnection point. Special region-specific operational studies will evaluate the transmission system and reliability considerations.

Should replacement of existing equipment be required as a result of the interconnection, TANC will retain equivalent capacity and operational control as previously existed.

- ***Power Quality***

Unbalanced phase voltages and currents can affect protective relay coordination and cause high neutral currents and thermal overloading of transformers. To protect TANC and other utility equipment, the interconnected generator's or load's contribution at the point of interconnection shall not cause a voltage unbalance greater than 1-percent nor a current unbalance greater than 5-percent. Phase unbalance is the percent deviation of one phase from the average of all three phases.

Harmonics can cause telecommunication interference and thermal heating in transformers, disabling solid state equipment and creating resonant over voltages. To protect equipment from damage, harmonics must be managed and mitigated. The interconnected generator or load shall not create voltage and current harmonics on TANC's facilities that exceed the limits specified in IEEE Standard 519, *Recommended Practices and Requirements for Harmonic Control in Electric Power Systems*. Harmonic distortion is defined as the ratio of the root mean square value of the harmonic to the root mean square value of the fundamental voltage or current.

Single frequency and total harmonic distortion measurements may be conducted at the point of interconnection, generation or load site or other locations on TANC's facilities to determine whether the project is the source of excessive harmonics.

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

Voltage fluctuations may be noticeable as visual lighting variations (flicker) and can damage or disrupt the operation of electronic equipment. IEEE Standard 519 provides definitions and limits on acceptable levels of voltage fluctuation. All generators and loads connecting to TANC's transmission facilities shall comply with the limits set by this standard, and if they do not comply, may be disconnected from the TANC System until they are brought into compliance.

- **Generation**

Automatic synchronization shall be supervised by a synchronizing check relay IEEE Device 25. This assures that no synchronous generator is connected to the power system out of synchronization. To be connected to the TANC System, generators must meet all applicable American National Standards Institute (ANSI) and IEEE standards. The prime mover and generator should also be able to operate within the full range of voltage and frequency excursions that may exist on the transmission system without damage to them.

Voltage schedules are necessary for efficient and reliable electrical power transmission and for adequate service to loads. The voltage schedules establish hourly operating requirements and may be set for seasons, holidays, and days of the week and time of day. All interconnected synchronous generators are required to participate in voltage regulation by meeting voltage schedules.

TANC may require additional reactive capability or voltage regulation to integrate the generation. It is the generator owner's responsibility to provide such regulation and to mitigate any unacceptable reactive or voltage regulation problems created from integrating the generation. If additional reactive or voltage regulation to solve other problems in an area is required, TANC will negotiate with the generator owner for any additional capability beyond the minimum requirements stated above.

Synchronous generators are required to produce or absorb reactive power between 0.95 leading and 0.95 lagging power factor for steady state conditions to meet voltage schedules. Within California, TANC recommends the generating units conform to the California ISO's minimum specified power factor range (0.95 lag-producing VARs, and 0.95 lead-absorbing VARs). They are also required to produce or absorb reactive power up to the thermal capability of the generator during disturbances. The generator's voltage regulator is generally set to maintain constant voltage rather than constant power factor. The voltage regulator must be capable of maintaining the voltage at the generator terminal, without hunting, within 0.5-percent of any set-

point. The operating range of the regulator shall be at least plus or minus 5-percent of the rated voltage of the generator.

The excitation system of synchronous generators is required to be fast-responding; i.e., the voltage response time is 0.5 seconds or less. A power system stabilizer uses auxiliary stabilizing signals to control the excitation system to improve power system dynamic performance. A power system stabilizer is required with the excitation system for all interconnected synchronous generators 50-megavolt-ampere (MVA) and larger. However, it may be necessary to use a power system stabilizer on a smaller generator, depending on where the generator is interconnected to TANC's facilities.

A speed governor system is required on all synchronous generators. The governor regulates the output of the generator as a function of the system frequency. That function (called the governor's "droop" characteristic) must be coordinated with the governors of other resources, all located within the same control/balancing authority area, to assure proper system response to frequency variation. The speed governor system shall have a droop characteristic settable between 3 & 7-percent and typically set to 5-percent.

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

Induction generators or other generators – including wind turbines – without VAR control absorb VARs and therefore require reactive power support from the interconnected facilities. For generators larger than 40-kilowatts, TANC will require power factor correction. Power factor correction capacitors must be installed either by the owner of the generation or by TANC at the owner's expense. Switched capacitors supplied by the generation owner shall be switched on and off at the request of TANC. Owners of interconnected induction generators shall provide, at a minimum, sufficient reactive power capability to deliver the generator output at unity power factor at the point to interconnection.

Induction generators are usually not required to participate in voltage regulation; however, they must not adversely affect voltage schedules. Integration studies may be necessary to determine the reactive power capability necessary to ensure that these schedules are maintained.

Power system disturbances initiated by faults and forced equipment outages expose connected generators to oscillations in voltage and frequency. It is important that generators remain in service to help ensure that any dynamic or transient oscillations are stable and damped. Therefore, each generator must be capable of continuous operation at 0.95 to 1.05 per unit voltage and 59.5 to 60.5 Hertz and for even larger deviations for short periods of time. Nearly

all generators have inherent capability for off-nominal operation. Over/under voltage and over/under frequency relays are normally installed to protect the generators from extended off-nominal operation. To ensure that the interconnected generators do not trip prematurely, the time delays for these relays must be coordinated with TANC.

A Remedial Action Scheme (RAS) is a special protection system that automatically initiates one or more pre-planned corrective measures to restore acceptable power system performance following a disturbance. RAS application mitigates the impact of system disturbances and improves system reliability.

A typical disturbance, as it is considered in the planning and design of the electrical transmission facilities, is the sudden loss of one or more critical transmission lines or transformers. A widely applied corrective measure is to instantaneously drop a sufficient amount of generation on the sending end of the lost transmission facility. This is known as generator "dropping," and a participating generation facility may be disconnected from the transmission by the automatic RAS controller, in much the same way as by a transfer-trip scheme. A generation facility should therefore have full load-rejection capability as needed both for local line protection and RAS.

Whether a RAS shall be required depends on the overall location and size of the generator and load on the transmission system; the nature, consequences and expected frequency of disturbances; and the nature of potential alternative transmission reinforcements.

If RAS participation for a particular generation facility is required, the generator owner shall be responsible for all related costs.

All generators connected to TANC's facilities must meet the power quality standards set forth in Technical Requirements, Power Quality (Section 9). The generator owners must pay for any mitigation efforts necessary to meet those standards. Additionally, interconnecting generators in the WECC area may be obligated to comply with FERC approved NERC and/or WECC reliability standards for the bulk power system, or any similar standards of a successor organization to either NERC or WECC, when interconnected to TANC's facilities.

Generation integration may substantially increase fault current levels at nearby substations. Modifications to the ground grids of existing substations may be necessary to keep grid voltage rises within safe levels. The ground grid should be designed to ANSI/IEEE Standard 80-1986, *IEEE Guide for Safety in AC Substation Grounding*.

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

- ***Load***

Typically, all loads connected directly to TANC's facilities are to maintain a power factor between 0.95 lag and 0.95 lead as measured at the point where the load interconnects with TANC-owned equipment. If this power factor requirement is not met, TANC may, after giving notice to correct the condition, install power factor correction equipment at the interconnecting entity's expense. If TANC is required to pay for delivery system improvements associated with power factor correction on the systems of its transmission agents – that are attributable to conditions on the system of the interconnecting entity – the entity shall pay for the cost of such improvements.

TANC maintains transmission voltages at levels required for economic and reliable transmission of electricity. Regulation to keep voltage variations within limits acceptable to end-use customers is typically provided on distribution. Voltage regulation at transmission voltage levels is different from distribution voltage levels. Load owners are strongly urged to install their own voltage regulation equipment.

All loads connected to TANC's facilities must meet the power quality standards set forth in Technical Requirements, Power Quality (Section 9). The load owner is responsible for any mitigation efforts necessary to meet those standards, and is subject to disconnection of load if such efforts are not initiated as requested. TANC's system protection requirements are designed and intended to protect TANC's system only. Additional protective relays are typically needed to protect an interconnected load. It is the load owner's responsibility to install the proper protective relaying needed to protect the load facilities. TANC does not assume any responsibility for protection of the interconnected load. The load owner is solely responsible for protecting interconnect equipment so that faults, imbalances or other disturbances on the transmission system do not cause damage to the load facilities.

To meet the reliability requirements of the WECC system, under frequency and/or under voltage load shedding schemes may be required. Any load connected to TANC's facilities will be required to participate in under frequency and/or voltage load shedding if NERC and/or WECC determines such action is necessary to maintain system reliability.

If load shedding participation is required for a particular load facility, the load owner shall be responsible for all related costs.

A participating load may be disconnected from the transmission by the automatic RAS controller, in much the same way as by a transfer-trip scheme. The load owner should therefore have load-rejection capability as needed both for local line protection and RAS.

Whether RAS shall be required depends on the overall location and size of the load on the transmission system; the nature, consequences and expected frequency of disturbances; and the nature of potential alternative transmission reinforcements.

If RAS participation for a particular load is required, the load owner shall be responsible for all related costs.

### *B. Design*

TANC will provide for design, specification and construction of the proposed interconnection for TANC's facilities. Non-TANC design may be allowed on a case-by-case basis provided initial approval and subsequent review by TANC. For transmission line taps owned by others, prints of applicable facility drawings will be furnished by TANC upon request. All work performed by TANC, including revisions to existing TANC drawings, will be at the expense of the requesting entity.

Modifications to TANC's facilities to accommodate the proposed interconnection shall adhere to TANC's *Standard Design Criteria* and *System Design Guide for Tap Stations* as they exist or may be developed or adopted. Any variation from the Standard Design Criteria may be considered on a case-by-case basis. Copies of these documents are available upon request.

Drawings for facility additions must conform to TANC's *Drafting Standards*, as they exist or may be developed or adopted and be approved by TANC. The requesting entity must supply drawings on a magnetic medium or in an electronic file, compatible with TANC's requirements. The requesting entity must also reimburse TANC for drawing costs. Drawings become or remain the property of TANC. Copies of TANC's *Drafting Standards* will be furnished to the entity requesting the interconnection if the design is not produced by TANC. "As-built" drawings must be provided prior to operation of the Interconnection Agreement. Three complete sets of accurate substation drawings shall be provided to TANC for non-TANC-owned substations. These drawings shall include, but not be limited to, station plot plans, equipment layouts, single-line diagrams, control circuit schematics and wiring diagrams. Updated copies of these drawings shall be furnished to TANC within 60 days of any modification to non-TANC owned equipment or substations within TANC's facilities.

Power current breakers, disconnecting switches, and other equipment installed in TANC's facilities shall adhere to TANC numbering schemes. Breaker and switch operating numbers will be assigned by TANC. All switches to be operated by TANC will be secured with locks furnished by TANC. All switches to be operated by TANC shall be designed in accordance with TANC's *Standard Design Criteria*.

- ***Substations***

Generally, power circuit breakers must be installed at all interconnections. Typical specifications covering circuit breaker requirements are available from TANC upon request. A review of the surrounding area power system characteristics, including system stability studies, will be made for a final determination when the need for out-of-step switching capability is questionable.

Installation of equipment in substations must conform to TANC's requirements and must be approved by TANC. Oil-filled equipment, including bushings, shall not contain polychlorinated

biphenyls (PCB). In addition, oil-filled equipment shall be permanently labeled by the manufacturer as non-PCB. Certification shall be provided to TANC at or before the time of installation. Oil-filled equipment may require an oil spill containment system to comply with U.S. Environmental Protection Agency or state regulations. Any increased equipment costs due to these requirements will be borne by the entity requesting the equipment.

All interconnecting substations must have a ground grid that solidly grounds all metallic structures and other non-energized metallic equipment. This grid shall limit the ground potential gradients to such voltage and current levels that will not endanger the safety of people or damage equipment located in, or immediately adjacent to, the station under normal and fault conditions.

- ***Transmission Line Taps***

Proposed taps to TANC's facilities are subject to approval on a case-by-case basis. Additional taps can be placed on existing lines as long as N-1 outage criteria are not violated and all loads can be fed radially from either terminal, system intact.

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

Taps to lines of 138-kV, 115-kV and 69-kV must meet the following minimum criteria:

- (1) A line section protected by circuit breakers may have a mileage maximum for tap lines that are not protected by circuit breakers, determined on a case-by-case basis.
- (2) A proposed interconnection to a transmission line, whenever possible as determined by TANC, will be connected to the line at the high-side or low-side of an existing tap. Two or more connections at the high-side of an existing tap are considered multiple taps and may require sectionalizing circuit breakers. Connections at the low-side of an existing tap may require appropriate compensation to the owner of an existing transformer for use of the tap substation facilities by TANC or the interconnecting entity.
- (3) Interrupter switches or equivalent capable of interrupting load and charging current shall be installed in the line sectionalizing positions for all tap substations. These interrupters will be used to de-energize line sections without interruption of the tapped loads, if necessary. Line sectionalizing switches installed in transmission lines shall be furnished with grounding blades, and must have a visible air gap. TANC may assume ownership of the sectionalizing switches. If TANC does not assume ownership, however, TANC will still maintain operational control.

Taps to transmission lines of 230-kV and higher voltages will not normally be allowed since lines at these voltages levels require the highest reliability. If exceptions are made, approved taps to transmission lines of voltages 230-kV or higher must meet the following criteria:

- (1) Only one tap between sectionalizing circuit breakers will be allowed. The requesting entity, at its cost, will be responsible for adding necessary circuit breakers when the requested tap exceeds one connection between circuit breakers.

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

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

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

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

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

- ***System Protection***

Protective relaying requirements for each interconnection will be determined by TANC after receipt of a preliminary single-line drawing of the proposed interconnection and a single-line drawing and maps of the requesting entity's facilities or system in the area. The entity should provide recloser and fuse ratings, relaying data and line and transformer impedances. High-speed pilot, backup, breaker failure and out-of-step relaying are normal requirements for 230-kV voltage interconnections. Specialized relaying may be required to provide automatic load or generation shedding, or interconnected system separation. Relay systems must meet the requirements of FERC approved NERC and/or WECC Reliability Standards for the bulk power system, or any similar standards of successor organization to either NERC or WECC.

New design requirements for system control are included within the following Operations and Maintenance section.

*C. Operations and Maintenance*

Operations and dispatching authority of the circuit breakers, disconnects, interrupters and motor-operated disconnect switches that are an integral part of TANC's facilities shall remain with TANC. The appropriate control/balancing authority area will order switching and issue all clearances and hot-line orders on the transmission portion of the interconnection or substation. This will involve use of TANC's switching and clearance procedures, including use of TANC locks and tags. Issuance of clearances, hot-line orders, or general switching may be in the form of an intercompany clearance to a dispatching agent of the entity owning the facility rather than directly to a job supervisor. Switching on the equipment that is connected to and/or associated with TANC's facilities will be directed by the TANC Balancing Authority according to TANC's *Power System Switching Procedures* as they exist or may be developed or adopted.

The owner of installed equipment will be responsible for its proper operation and maintenance. Equipment must be operated and maintained in accordance with FERC approved NERC and/or WECC reliability standards for the bulk power system, or any similar standards of a successor organization to either NERC or WECC, manufacturer's recommendations, prudent utility practices and applicable environmental and safety standards. This may include fall protection requirements (design and maintenance). TANC may request additional equipment to assure a reliable interconnection and to safeguard the proper operating conditions of its power system. TANC may prefer to provide required operation and maintenance services when funds have been advanced to cover these costs through the Interconnection Agreement. Costs may include training on maintenance procedures for unfamiliar equipment.

The interconnecting entity will write Standard Operating Procedures in coordination with TANC for the interconnected facility.

Five sets of instructions and manufacturer's drawings shall be furnished to TANC for each piece of equipment that TANC operates.

System margins allow for operational flexibility in the areas of (1) power flow, for impedance concern; (2) fault duty, for reliability during switching and line fault tripping; (3) sub-synchronous resonance, affecting new equipment through ground paths on existing equipment; and (4) stability, relating to overloads or VAR support on existing system components.

If the interconnection uses system margin reliability in TANC's facilities other than at the specific interconnection, the entity shall:

- (1) Refund those components of margin used to the owners of the margin;
- (2) Rebuild facilities affected to add or replace the margin consumed; or
- (3) Meet other such requirements as agreed to by TANC and the entities.

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

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

Maintenance will normally be performed by and at the expense of the entity that owns the equipment or facility when the proposed interconnection involves a tap or substation sectionalizing one of TANC's transmission lines, in accordance with the Interconnection Agreement. TANC shall be notified and have the right to witness settings and testing of relays, meters and controls that could affect the integrity and security of TANC's facilities. TANC shall also have the right of entry to interconnected facilities for emergency or structures TANC deems necessary to maintain a reliable power system.

- ***System Control***

Supervisory control by TANC of line power circuit breakers, interrupters or motor-operated disconnects will be required on all interconnections where breaker, interrupter or disconnect switch operations can, solely in TANC's determination, directly affect the security of TANC's facilities, as they are included in the balancing authority/control area. The remote terminal units (RTU) for supervisory control and data acquisition (SCADA) shall be compatible with the SCADA system used within the TANC facility. Installation of the RTU at a new location or modification of an RTU at an existing facility will generally be performed by TANC, at the expense of requesting entity. TANC will perform the necessary expansion, including hardware and software changes, to the SCADA master station equipment at the requesting entity's expense for that portion attributed to the new interconnection. Transducers, interface hardware and appropriate communication channels compatible with existing SCADA system requirements shall be furnished by the requesting entity. Specifications for such equipment will be provided upon request. The requesting entity shall provide necessary auxiliary and control relays, hot-line indication, local-supervisory switches, hotline order lamp and all other equipment necessary to interface with TANC's supervisory control equipment.

Interconnections that establish additional or new control/balancing authority area boundaries require the requesting entity to furnish all necessary control/balancing authority area metering equipment before interconnection can be established. These requirements may include, but are not limited to:

- (1) Analog and/or digital telemetering at the point of interconnection;
- (2) Analog to digital conversion equipment and tone gear, as required, at both the point of interconnection and the control center associated with TANC's facilities;
- (3) Totalizing equipment at the point of interconnection or some intermediate point on the communications link. A multiport RTU may be substituted in some cases. If a multiport

RTU is used, a points list identifying alarms, events and telemetered quantities will be jointly developed between the requesting entity and TANC. The service agreement implementing the multiport RTU will include operating/dispatch jurisdiction, primary and backup service control protocol, SCADA tagging and control design, switching procedures and definitions of terms used by the system operators;

- (4) Communications links to the power system control centers associated with the facilities for both TANC and the other organization; and /or
- (5) Automatic generation control hardware and software changes or additions at the power system control centers.

TANC's telemetering, scheduling, and interconnection metering are performed on a megawatt or whole megawatt-hour basis; therefore, interconnection metering and totalizing equipment shall meet this criterion. In the load control area balancing authority, in which TANC facilities are located, a dynamic schedule to the appropriate automatic generation controller may be a consideration for radial tap lines to TANC's facilities whenever the load is supplied from a source outside the TANC Balancing Authority. Similarly, internal generating resources supplying loads outside TANC's load control area may require special equipment at the power system control centers associated with the facilities for both TANC and the other organization.

- ***Ownership and Maintenance***

Ownership of installed facilities is determined on a case-by-case basis. However, TANC generally retains operation and dispatching authority of those facilities that TANC does not own but considers to be an integral part of TANC's facilities.

The owner of equipment installed on TANC property is financially responsible for proper maintenance of the equipment in accordance with the manufacturer's recommendations and prudent utility practices. TANC reserves the right to perform all maintenance on equipment installed on TANC property.

TANC reserves the right to maintain backup control on all facilities that interconnect with TANC's transmission facilities and that may be vital to system stability and telemetry values.

Contractual agreements implementing interconnection by others to TANC's facilities will normally allow TANC or TANC's customers the right to connect to either the high-side or low-side bus of the substation in which TANC maintains ownership rights, at the incremental cost of the additions. Appropriate compensation for use of the tap substation facilities by TANC or its customer will be arranged if the low-side bus of the substation is being tapped. Embedded costs are not reimbursed.

TANC reserves the right to approve transmission system changes at the tap, substation, or interconnection that affect operation of TANC's facilities, including interconnecting with facilities of a third entity.

TANC will operate and perform routine maintenance on facilities located in its substations unless otherwise specified in the Interconnection Agreement. When the proposed replacement or

additions are at a TANC substation, contractual arrangements will include provisions for an advance of funds for the costs of labor and other expenses, including allocable overhead costs, associated with operation and routine maintenance work performed by TANC.

When an existing TANC transformer is replaced, maintenance costs attributed to the new transformer will be shared on the basis of the ratio of the capacity retained by TANC to the capacity of the new transformer. When an additional transformer is involved, maintenance costs attributed to the new transformer normally will be the responsibility of the equipment owner. Periodic advances of funds may be required to cover the estimated cost of operation and maintenance work to be performed by TANC on equipment owned by others, as set forth in the Interconnection Agreement. If TANC is required by reliability concerns to upgrade a facility or add an interconnection, the requesting entity shall fund its part of the power facilities changes.

TANC will perform maintenance on relaying and control equipment and other associated equipment for which TANC has operating responsibility, unless otherwise agreed.

Requirements for operations, maintenance, ownership and replacement of equipment associated with an interconnection facility will be specified in a new or amended contract (Interconnection Agreement) with the requesting entity.

#### *D. Communications and Metering*

- ***Communications***

At TANC's discretion, TANC or the requesting entity shall provide communications facilities sufficient to meet TANC's telephone, radio, system protection, remote meter reading and Energy Management System/SCADA requirements. Unless otherwise agreed to by TANC and the interconnecting entity, TANC shall design, furnish, and install all communications that are an integral part of TANC's facilities.

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

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

- ***Metering***

Current transformers used for revenue metering circuits must meet the accuracy standards, as specified under IEEE *Standard Requirements of Instrument Transformers*, ANSI/IEEE C57.13,

for an accuracy class of 0.3 percent at all burdens. The thermal current rating of current transformers shall exceed the maximum current capacity of the circuit involved by a factor of 1.5 to 2.0.

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

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

Revenue metering with mass memory storage shall be used if the estimated maximum demand is 500 kilovolt-amperes or greater, or if maximum simultaneous demand billing is contractually required. Such revenue metering shall be compatible with the metering policy established by TANC in the region where the revenue meter will be located.

On TANC-owned facilities, meters shall be installed on the primary side of the system.

## 10. CONTRACTUAL REQUIREMENTS

All arrangements for system studies, design and construction, ownership, operations, maintenance, and replacement of equipment must be set forth in written contractual agreements between TANC and the requesting entity prior to start of any work and at appropriate intervals thereafter. For further information, see Interconnections Process (Section 3).

All work related to interconnecting to TANC's facilities is subject to TANC's applicable *General Power Contract Provisions* as they exist in effect at the time of contract negotiations. These provisions will be furnished upon request.

When TANC determines that an interconnection is consistent with the requirements in this document and TANC's Tariff (if applicable), contractual agreements will be prepared by TANC and furnished to the requesting entity. TANC requires that interconnection to any facilities adhere to the requirements and specifications of the contractual agreements unless specifically waived by TANC.

Contractual agreements establish estimated costs, advance of funds, work to be performed, projected time frames and all other cost-and work-related items.

## **11. TANC POINTS OF CONTACT**

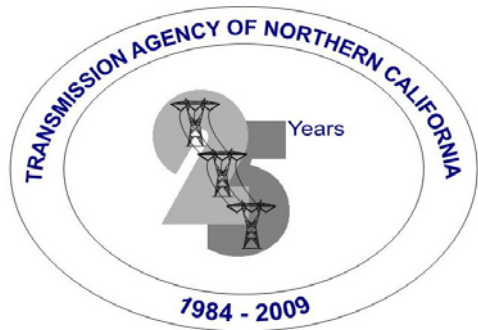
Questions or concerns regarding these requirements and related interconnections issues can be addressed to the following TANC Representatives:

<b>General Manager</b>	James W. Beck
<b>Assistant General Manager</b>	Bryan W. Griess

**12. REFERENCES**

**13. REVISION HISTORY**

<b>Version</b>	<b>Date</b>	<b>Action</b>
1	July 2009	Prepared TANC <i>General Requirements for Interconnection</i> to replace Western's <i>General Requirements for Interconnection</i> , which was previously adopted by the TANC Commission in November 2005 and in effect until its replacement.



# TRANSMISSION AGENCY OF NORTHERN CALIFORNIA

P.O. Box 15129, Sacramento, CA 95851-0129 (916) 852-1673

For TANC	
Date of receipt:	_____
By whom:	_____
Project Manager:	_____

## APPENDIX

### TRANSMISSION AGENCY OF NORTHERN CALIFORNIA APPLICATION FOR INTERCONNECTION

Thank you for your interest in interconnecting to Transmission Agency of Northern California (TANC) transmission facilities. This application should be used in conjunction with TANC's *General Requirements for Interconnection*. Please complete this application and return it to TANC to ensure the most expedient and thorough response. Completing this application for interconnection does not qualify the requesting entity, or otherwise pertain to, the receipt of transmission. Transmission service requires a separate application under TANC's Open Access Transmission Tariff.

1. Date of Application: \_\_\_\_\_
2. Proposed/Estimated Date of Interconnection: \_\_\_\_\_
3. Name of Contact: \_\_\_\_\_
4. Title of Contact: \_\_\_\_\_
5. Company/Organization Name: \_\_\_\_\_
6. Full Street Address (include State & Zip) \_\_\_\_\_
7. Telephone & Fax Numbers: \_\_\_\_\_
8. E-mail: \_\_\_\_\_
9. Name, Title, Company/Organization, Address, Phone, Fax & E-mail address of Authorized Interconnecting Contractor/Representative, if applicable: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

10. Type of Interconnection (mark all that apply):

- Transmission line tap(s)
- Substation breaker bay additions
- Additional delivery point(s) to existing customer(s)
- Generation tie-line(s)
- Other (please specify): \_\_\_\_\_

11. Description of Requested Interconnection (include as much of the following information as possible on attached sheets; mark all that apply):

- Single-line diagram(s) showing the proposed interconnection
- Drawing(s) indicating physical arrangements of existing and proposed facilities
- Geographic location of proposed interconnection and structure numbers, if available
- Description of proposed routing and dimensions and configurations of new structures and facilities
- Description and ratings of proposed transformers, circuit breakers, switches, metering, associated communications, and relaying and other equipment
- Description of generating resources or loads
- Proposed transmission path(s) and service arrangements between resources and associated loads, where applicable
- Appropriate revenue and telemetering equipment specifications
- Copies of relevant planning or operational studies
- Proposed construction schedule
- Copies of relevant environmental impact assessments, reports, or projections; or description of anticipated scope of environmental review

12. Name & Title of Applicant: \_\_\_\_\_

13. Signature of Applicant: \_\_\_\_\_ Date: \_\_\_\_\_

Please send the completed application for interconnection to the TANC office. A TANC representative will contact you when the application is received. Please allow up to 30 days for processing of the application once it is received by TANC. For further information, see TANC's *General Requirements for Interconnection*, available upon request or at TANC's website- [www.tanc.us](http://www.tanc.us).