Assessment of Available Transfer Capability and ATC Algorithms

1. General

In assessing the Available Transfer Capability ("ATC") of the SCE&G transmission system to fulfill new requests for transmission service, SCE&G will: (1) use a ten year planning horizon; (2) use the Network ATC methodology; and (3) calculate ATC values at the interfaces with each of the interconnected Transmission Providers for the purpose of posting these ATC values on SCE&G's Open Access Same-Time Information System (OASIS).

2. Definitions

The Definitions of

(1) Available Transfer Capability (ATC)

(2) Capacity Benefit Margin (CBM)

(3) Existing Transmission Commitments (ETC)

(4) Planning Horizon

(5) Scheduling/Operating Horizon

(6) Total Transfer Capability (TTC)

(7) Transmission Reliability Margin (TRM)

are contained in Attachment C of SCE&G's OATT.

3. Determination of ATC

3.1 General Steps

SCE&G's process for determining ATC consists of three steps: (1) the determination of TTC; (2) the determination of TRM; and (3) the determination of ETC (including CBM). ATC is then determined by subtracting TRM and ETC from TTC, using the following mathematical algorithms.

The formulae for calculating TTC is set forth in Section 4 below. The formulae for calculating TRM is set forth in Section 5 below. The formulae for calculating ETC is set forth in Section 6 below.

3.3 Scheduling/Operating Horizon

SCE&G uses the following mathematical formulas to calculate ATC in the Scheduling/Operating Horizon:

3.2.1 Firm ATC

Firm ATC = TTC – TRM – ETC

Where ETC = Native Load requirements + CBM + Existing Firm PTP and Network Service Reservations + Pending Firm PTP and Network Service.

For example, if

(i) TTC is 1500 MW

(ii) TRM is 250 MW

(iii) Native Load requirements are 300 MW

(iv) CBM is 0 MW

(v) Existing Firm PTP and Network Service Reservations is 100 MW

(vi) Pending Firm PTP and Network Service is 50 MW

Then, ETC equals 450 MW (300 + 100 + 50 MW).

And Firm ATC equals 800 MW (1500 – 250 – 450 MW).

3.3.2 Non-firm ATC

Non-firm ATC = TTC – TRM – ETC

Where ETC = Existing Firm PTP and Network Schedules + Pending Firm PTP and Network Schedules + Existing Non-firm PTP Schedules. (Note: Forecasted Native Load requirements and CBM are not included and therefore the transmission capacity preserved for these uses is made available to non-firm.)

For example, if

(i) TTC is 1500 MW

(ii) TRM is 250 MW

(iii) Existing Firm PTP and Network Service Schedules is 100 MW

(iv) Pending Firm PTP and Network Schedules is 50 MW

(v) Existing Non-firm PTP Schedules is 25 MW

Then, ETC equals 175 MW (100 + 50 + 25 MW).

And non–firm ATC equals 1075 MW (1500 – 250 – 175 MW)

3.4 Planning Horizon

SCE&G uses the following formulas to calculate ATC in the Planning Horizon:

3.4.1 Firm ATC

Firm ATC = TTC – TRM – ETC

Where ETC = Forecasted Native Load requirements + CBM + Existing Firm PTP and Network Service Reservations + Pending Firm PTP and Network Service Reservations.

For example, if

(i) TTC is 1500 MW

(ii) TRM is 250 MW

(iii) Native Load requirements are 300 MW

(iv) CBM is 0 MW

(v) Existing Firm PTP and Network Service Reservations is 100 MW

(vi) Pending Firm PTP and Network Service Reservations is 50 MW

Then, ETC equals 450 MW (300 + 100 + 50 MW).

And Firm ATC equals 800 MW (1500 – 250 – 450 MW).

3.4.2 Non-firm ATC

Non-firm ATC = TTC – TRM – ETC

Where ETC = Existing Firm PTP and Network Service Reservations + Pending Firm PTP and Network Service Reservations + Existing Non-firm PTP Reservations (Note: Forecast Native Load requirements and CBM are not included and therefore the transmission capacity preserved for these uses is made available to non-firm.)

For example, if

(i) TTC is 1500 MW

(ii) TRM is 250 MW

(iii) Existing Firm PTP and Network Service Schedules is 100 MW

(iv) Pending Firm PTP and Network Schedules is 50 MW

(v) Existing Non-firm PTP Schedules is 25 MW

Then, ETC equals 175 MW (100 + 50 + 25 MW).

And non–firm ATC equals 1075 MW (1500 – 250 – 175 MW).

4 Determination of TTC

The determination of TTC from and to each of SCE&G's neighboring interconnected systems is achieved using computer simulations of the interconnected systems network with the latest information on Bulk Electric System (BES) conditions, including transmission system topology, system demand, generation dispatch, current and projected transmission uses.

To simulate an electric power import transfer into the SCE&G system, generation connected to the exporting system is adjusted up and generation connected to the SCE&G system is adjusted down so as to create a generation excess in the exporting system and a generation deficiency in the SCE&G system, thereby automatically resulting in an electric power transfer from the exporting system into the SCE&G system. These differential adjustments in each system are increased until: (1) as a result of the simulated transfer, a transmission facility in any system, including all applicable System Operating Limits (SOLs), reaches its emergency rating; or (2) the transfer test level is achieved. Both of these potential limiting scenarios take into account the most critical single contingency (e.g., generating unit, transformer, transmission line, etc.) outage condition. In those cases where an equipment limit is reached with all facilities in service at a

transfer level below that of the single contingency outage condition, then that lower transfer level defines the transfer capability limit.

To determine the transfer capability in the opposite direction (e.g., exporting from SCE&G to an importing system), the generation excess is created in the SCE&G system and the generation deficiency is created in the importing system. The adjustments up and down to generation are made until the limiting scenario for those system conditions is determined.

Consistent with the dispatch methodology contained in the SERC Near-term Study Group Procedure Manual, the dispatch methodology used in SCE&G's TTC determinations for import TTC values reduces generation at certain SCE&G plants in order to represent a pessimistic, but realistic emergency import transfer scenario. Moreover, when determining export TTC values, SCE&G increases generation on the system according to economics.

Transfer capabilities correspond to the specific set of system conditions modeled in the simulation. Transfer capabilities can be significantly different for any other set of system conditions, such as a different customer demand level, a different network configuration, or a different generation dispatch. Each simulation represents a single "snapshot" of the operation of the interconnected systems based on the projections of many variables.

In real-time operation of interconnected electric systems, these variables are continuously changing. As a result, the electric power transfers that can be supported on the transmission systems can vary from one instant to the next. The actual transfer capability available at any particular time may differ from that calculated in simulation studies due to the fact that in the simulation studies only a limited set of operating conditions can be evaluated, whereas in real time, widely different conditions may exist. For this reason, the transfer capabilities derived from simulation studies should be viewed only as representative indicators of system capability.

5. Determination of TRM

5.1 Imports

Transmission capacity must remain available to allow for operator flexibility and to accommodate the natural responses of the integrated grid to instantaneous loss of facilities. SCE&G uses sensitivity studies of these natural responses and the VACAR Reserve Sharing Agreement to determine import TRM values. Databases used in the calculation of SCE&G's TRM values are power system models developed through NERC's Eastern Interconnection Reliability Assessment Group (ERAG) Multiregional Modeling Working Group (MMWG) process. SCE&G's TRM values are determined seasonally or more frequently as system conditions warrant, and the results are posted on the SCE&G OASIS.

Sensitivity studies of the natural responses of the integrated grid are used as a "proxy" to address uncertainties associated with items such as variations in generation dispatch, allowances for parallel path "loop flow" impacts, and allowances for simultaneous path interactions. Modeling of the VACAR Reserve Sharing Agreement is used to determine if additional transmission capacity, above the amount determined in the natural response sensitivity studies, should be preserved to accommodate the reserve sharing agreement.

SCE&G provides the following example of this calculation. The numbers in this example are for illustrative purpose only:

Natural response sensitivity studies determined the maximum response for each interface. An example is shown in the following table:

Sample Values

	Progress	**Duke**	**Santee**	**Southern**
Base Flow	148 out	136 out	375 out	263 in
Generator Sensitivity	**Interface Response (Δ MW)**			
VC Summer	**93**	**302**	73	**155**
AM Williams	55	98	**326**	120
Cope	76	80	152	102
Wateree #1	84	87	120	66
Largest Δ MW	93	302	326	155

The VACAR Reserve Sharing Agreement determines the required preservation of transfer capability for each interface. An example is shown in the following table:

Sample Values

	Progress	**Duke**	**Santee**	**Southern**
	368 MW	515 MW	196 MW	N/A

The higher of these two determinations is the amount of transmission capability preserved as import TRM on each interface.

In the foregoing example, TRM would equal:

	Progress	**Duke**	**Santee**	**Southern**
	368 MW	515 MW	326 MW	155 MW

5.2 Exports

The TRM values for SCE&G exports on each interface are set equal to the opposing Transmission Provider's TRM import value.

5.3 Wheel-throughs

The TRM values for SCE&G wheel-throughs are the greater of the import and export TRM values on the requested path.

6. Determination of ETC

6.1 Determination of Native Load Requirements

SCE&G will preserve transmission capacity needed to serve reasonably forecasted loads of Native Load Customers. SCE&G will use a ninety percentile demand forecast in the system models used to calculate TTC values, which will inherently preserve transmission capacity to serve native load growth.

6.2 Determination of CBM

For periods when LSEs (whose load is located on the SCE&G transmission system) have determined the need for CBM, SCE&G will preserve firm transmission transfer capability to accommodate these transfers.

Because of the low probability that all resources upon which dependency is projected would be available simultaneously, SCE&G will double the requested CBM amount and allocate that amount on SCE&G's four interfaces based on historical transfer patterns.

SCE&G will request, at least annually, that each LSE whose load is located on the SCE&G transmission system, or its designated agent, re-evaluate the need for and magnitude of CBM. SCE&G will annually re-affirm that the allocation methodology is consistent with recent transfer patterns. After completing this process, SCE&G will post the CBM determination results.

The following is for example purposes only:

SCE&G LSE Resource Reliability Criteria requires off system purchases during the summer months of 2009 totaling 150 MW. SCE&G will double that amount and allocate the total on its four interfaces as shown in the following table:

Sample Values

Progress	Duke	Santee	Southern	Total
75	75	75	75	300 MW

Once SCE&G LSE has signed agreements with a generation entity outside the SCE&G transmission system to purchase 150 MW, SCE&G will adjust the preserved capacity to reflect the specified agreements. For example, if SCE&G LSE enters into agreements to purchase 50 MW across the Progress interface and 100 MW across the Southern interface, the CBM amounts on each interface will be as shown in the following table:

Sample Values

Progress	Duke	Santee	Southern	Total
50	0	0	100	150 MW

6.3 Existing Firm Point-to-Point and Network Service Transmission Service

SCE&G will account for existing higher priority firm Point-to-Point Transmission Services by including this committed transmission capacity in its ETC determination and thereby subtracting it from capacity made available for firm and non-firm new uses. In the case when an existing firm transmission commitment is reserved but not scheduled, SCE&G will make the associated transmission capacity available for non-firm new uses.

Firm long-term Point-to-Point Transmission Service that qualifies for rollover rights is accounted for in ETC and typically represented as a base transfer in power system models used in TTC determinations.

6.4 Existing Non-firm Point-to-Point Transmission Service

SCE&G will account for existing higher priority non-firm Point-to-Point Transmission Services by including this committed transmission capacity in its ETC determination and thereby subtracting it from capacity made available for non-firm new uses.