A. TOs will provide PJM with any information related to concerns, operating procedures, or special conditions for each of the TO's systems that PJM should consider related to the analysis to be performed for the RTEP.

B. TOs will discuss the accuracy of PJM's load flow representation for each of the TO's systems including the impact of using the present representation for each of the TO's underlying systems.

C. TOs will identify system needs which are currently not identified by published transmission plans but could be included for consideration during the RTEP analysis.

D. TOs will provide the names, addresses, telephone numbers, FAX number, and email address for personnel identified to interact with PJM on matters dealing with the RTEP process.

E. TOs will provide a confidentiality statement regarding all information released to the TO by PJM during the course of the RTEP process.

F. TOs will provide information on new loads or changing loads that will impact the transmission plan.

I. PJM will include available information from neighboring TOs / Regional Transmission Operators, gained in the course of interregional planning activities, related to plans in other regions which may impact the PJM RTEP.

II. RTEP Analysis General Assumptions:

A. PJM System Models will be drawn from the PJM and applicable regional reliability council (Reliability*First* and SERC) central planning database which includes transmission plans consistent with the most recent FERC 715 Report and most recent Regional EIA-411 Reports.

B. LSE capacity models are to be based on the most recent Regional EIA-411 Reports.

C. GIC capacity plans will be modeled as described in Procedures III and IV.

D. When the PJM load in the RTEP model exceeds the sum of the available in-service generation plus generation with an executed ISA, PJM will model new generation to accommodate additional load growth by including queued generation that has received an Impact Study.

E. PJM Load Forecasts are to be based on the most recent LAS Report.

F. Power Flow models for world load, capacity, and topology will be based on the most recent Eastern Reliability Assessment Group (ERAG) power flow base cases.

G. Generation outage rates will be based on the most recent generator unavailability data available to PJM. Estimates, based on historical outage rates for similar in-service units, will be used for all generating units in the neighboring regions and for all future PJM units.

H. Firm sales to, and firm purchases from, regions external to PJM will be modeled consistent with the provisions for the ~~ERAG base~~ interchange schedule as outlined in section H.1.2 of Attachment H to this manual.

In addition to single contingencies, PJM planning criteria requires that the PJM system withstand certain common mode outages. These outages include line faults coupled with a stuck breaker, double circuit towerline outages, faulted circuit breakers and bus faults. PJM uses a procedure very similar to the generator deliverability procedure to study common mode outages. The list below highlights the other details of the common mode outage procedure that differ from the generator deliverability procedure.

In addition to the modeling of capacity resource requests, all existing energy resources and energy resource requests queued ahead of the unit under study are set at 0 MW but available to be turned on. The energy resource request under study is also set at 0 MW but available to be turned on. Energy resource requests queued after the unit under study are not modeled.

A 50/50 DC loading is used instead of an 80/20 DC loading, i.e., the expected availability of the selected units is close to but not less than 50%.

The offline resources can contribute as a Facility Loading Adder. However, only non-intermittent energy resources that exist or have an ISA can contribute as a Facility Loading Adder in such a manner that they back off the loading on the flowgate under study.

For all voltage levels, a 10% distribution factor is used instead of a 5% distribution factor to select the 50/50 generators.

Addendum 3: Transmission Service Study Procedures

For the evaluation of Transmission Service impacts during generation deliverability testing and common mode outage testing, different thresholds have been developed to allow contribution to impacted facilities due to the relative proximity of the source of the service in relation to the PJM footprint. During testing of transmission service seeking to import energy into PJM, in order to determine the contribution from the transmission service, PJM shall use a 3% distribution factor or 3% rating cutoff to select the service which shall be allowed to contribute to flowgates under study. During testing of transmission service seeking to export energy from PJM, in order to determine the contribution from the transmission service, PJM shall use a 3% distribution factor or 3% rating cutoff to select the service which shall be allowed to contribute to flowgates under study when that flowgate impacts a facility outside of PJM's footprint and shall maintain all thresholds for impacts to PJM facilities consistent with the requirements listed outside this addendum 3.

Impacts of the flow from transmission service reservations shall be compared to constraints identified in the capacity import limit procedure (Section G.11 PJM Capacity Import Limit Calculation Procedure). The total impacts of any transmission service, which impacts a constraint identified in the CIL study at greater than the thresholds identified above, shall have the full impact of the service added to the loading of the applicable facility in determining the final facility loading.

Import and export reservations which back off overloads will be ramped down to a percentage consistent with the peak historical usage in order to reduce the counterflow for confirmed service.

PJM shall also include import transfers to represent the capacity benefit margin (CBM) in the interchange, the distribution of the CBM shall be determined during initial base case testing, to preserve the total capability of the CBM along PJM's border.

C.8 Long-Term Deliverability Analysis

The purpose of the long-term deliverability analysis is to identify any reliability violations on the PJM system that may require an upgrade that requires more than a 5 year lead time to implement. The PJM RTEP long-term reliability review process examines generator deliverability, load deliverability and common mode outage analysis for years 6 through 15. The long-term analysis starts with the deliverability results from the near-term base case and extrapolates the thermal results using distribution factors and forecast load growth to each year in the long-term planning horizon. In addition, a long-term base case is developed from the near-term base case each planning cycle, a limited set of deliverability studies are performed on this long-term base case, and the deliverability thermal results are extrapolated in a similar manner as is done with the near-term base case in order to produce a second set of long-term results.

C.8.1 Base Case Development

PJM has a 24-month reliability planning cycle. At the beginning of the first year of the cycle, a near-term 5-year out base case and a long-term 8-year out base case are developed. At the beginning of the second year of the cycle, a new 5-year out base case and a long-term 7-year out base case are developed. The same general rules of construction described in section C.7.3 of this manual that are used to create the near-term base case are used to create the long-term base case. As a result, the long-term base case is similar to the near-term base case but accounts load growth, generation additions and deactivations, and transmission additions that are forecast to occur between years 5 through 8.

C.8.2 Analysis

The PJM RTEP long-term reliability review process examines generator deliverability, load deliverability and common mode outage analysis for years 6 through 15. The two categories of contingency events considered as part of the long-term studies are single and tower line contingencies. The reason for limiting the long-term review to only these two categories of contingency events is that these events are much more likely than other types of contingency events PJM studies to lead to long-lead-time upgrades.

The deliverability analysis performed on the near-term base case includes a full AC power flow analysis including generator deliverability, load deliverability and common mode outages. The deliverability analysis performed on the long-term base case considers these same tests except that in the load deliverability test, LDAs are selected only if their CETL/CETO ratio was less than 150% in a recent RTEP.

Since the objective of the long-term reliability analysis is to identify long-lead-time upgrades, the following types of overloads are not considered.

- overloads on transmission lines below 230 kV
- overloads on transformers
- overloads that are below the conductor rating of the circuit

Interchange

The PJM net interchange in the summer peak case is determined by the firm interchanges that are represented in the PJM OASIS system. That interchange, in the summer peak case, shall be represented as 100% of the confirmed firm import and export reservations~~, with the import and export reservations, which back off overloads, ramped down to a percentage consistent with the peak historical usage, to reduce the counterflow for confirmed service, for generation deliverability and common mode outage testing purposes. That ramping down of the export reservations shall not be allowed to decrease below the quantity of MWs which is associated with firm internal or external load commitments.~~ Reservations associated with individual generation units, or group of units at a facility, shall be used in representing the interchange. ~~PJM shall also include import transfers to represent the capacity benefit margin (CBM) in the interchange, the distribution of the CBM shall be determined during initial base case testing, to preserve the total capability of the CBM along PJM's border.~~ The interchange in light load cases follows the light load criteria as defined in the Light Load Reliability Analysis in section 2.3.10 of this manual.

Generator Reactive Capability

Annually, PJM updates the model for the generator reactive capability (GCAP) of each generator based on data used by PJM Operations, which includes default limits obtained from the most up to date d-curves as well as data provided by the Generator Owners.

Interconnection Projects With Interconnection Service Agreements (ISAs)

PJM includes queue projects with a signed ISA into the base case as well as verifying the accuracy of queue projects that have not yet signed an ISA. PJM also includes the interconnection, ratings and associated upgrades for each of these projects. Transmission Owners will verify the accuracy of the points of interconnection and the associated upgrades in their zones.

Real and Reactive Load

Each TO is responsible for modeling the active (real) and reactive load profile in its zone. PJM will scale the load in each zone to the targeted values reported in the latest annual PJM load forecast report.

Real loads will be scaled uniformly in each zone to meet the PJM 50/50 load forecast less any Demand Response (DR), Energy Efficiency (EE), or Behind the Meter (BTM) generation as necessary. Real loads will also be scaled uniformly within each zone for off-peak analysis. Reactive load in each area will be scaled at a constant power factor along with the real load for peak load analysis. For off-peak analysis including light-load, PJM will provide a case to the Transmission Owners, at their discretion, for updating their zonal reactive load profile.

Any deviation from the above method of load modeling method, associated with specific test procedures such as the PJM Load Deliverability Procedure or the PJM Light Load Reliability Test Procedure will be defined specifically in other sections of this manual.

PJM will coordinate with TOs on an individual basis to ensure that non-conforming loads are properly modeled and not uniformly scaled.

Voltage Schedules