Truckee River Operation Model
General Discussion of Model Type

The Truckee River operation model that has been used for analysis of Truckee River operation conducted to evaluate the TROA for purposes of the TROA DEIS/EIR is an "accounting model". Accounting models use hydrologic data provided as input in conjunction with equations and accounting procedures that describe a project's configuration, physical characteristics and operation rules. A partial description of the Truckee River operation model's incorporation of such factors is as follows:

- Hydrologic Data: Hydrologic data input to the model are monthly inflows to each reservoir from the reservoir's upstream watershed when such inflow is not regulated or otherwise modified by any operation calculations conducted by the model. In most cases such monthly inflows are natural inflows. In a few cases, such as inflow to Lake Tahoe, the monthly inflows are natural inflows reduced by water use within the upstream basin. In the case of Lake Tahoe, the monthly inflow data reflect the impacts of water use within the Lake Tahoe basin that are associated with the allocations under SB 101-618.

- Project Configuration: The model reflects the relative locations of reservoirs (thereby reflecting which reservoirs discharge into which reservoirs) and relative locations of diversions from the river.

- Project Physical Characteristics: Project physical characteristics for reservoirs include such things as storage capacity of each reservoir, the relationships between reservoir elevation and reservoir surface area, between reservoir elevation and reservoir storage, between reservoir elevation and spillway discharge capacity, and between reservoir elevation and outlet capacity.

- Project Operation Rules (1): One type of the operation rules incorporated into the Truckee River operation model relates to factors such as flood control rules for operation of Truckee River reservoirs, water right requirements for operation of Truckee River reservoirs and diversions from the Truckee River, TROA rules and requirements for operation of Truckee River reservoirs and diversions, and TROA guidance (such as the "California Guidelines") for operation of Truckee River reservoirs and diversions. Included in these operation rules are procedures to select periods and amounts of water that should be exchanged between reservoirs and accounts.

- Project Operation Rules (2): A second type of the operation rules incorporated into the Truckee River operation model relates to factors such as when and how much water should be provided to support lower Truckee River fish habitat, when and how much water should be used to establish credit water storage in Truckee River reservoirs, and when and how much credit water should be released from Truckee River reservoirs to serve M&I water

demands or to provide dilution flows for water quality purposes. These rules must be within the framework of water rights and TROA, but must also be related to "good management" practices.

The reliability (or accuracy) of an accounting model is judged based upon the model's ability to reflect the impact of factors such as described above in its calculation of project operation. Such reliability is measured by reviewing "yes – no" answers to questions that should be asked about whether or not the model correctly incorporates such things as flood control rules, water rights, TROA provisions, etc. Basically these are not questions of "how close do the model results reflect historic operation?". The reason we do not ask "how well do the model results reflect historic operation?" is because we use the model to investigate project configuration, project rules and procedures that were not applicable during historic operation. (For example, even a "current conditions" analysis does not reflect historic operation because "current conditions" have different project configuration, operation rules, operation objectives, etc. than existed during historic operation periods. To use just one illustration, the criteria applied for calculating streamflow requirements associated with support of lower Truckee River fish habitat were developed during 2003 and have not been applied through any historic season of operation.)

This "measure of reliability" consideration (for the Truckee River operation model) differs from the measure of reliability or accuracy applied to hydrologic models that attempt to reflect "natural" processes. A hydrologic model attempts to calculate the streamflow pattern and magnitude associated with a particular seasonal pattern of precipitation, snowfall, snowmelt, temperature, etc. For a specified watershed, the "reliability" of a hydrologic model can be evaluated using observed patterns and magnitude of precipitation, snowfall and temperature to calculate snowmelt and streamflow and then, comparing such calculated streamflow to the streamflow observed during the season when the observed precipitation, snowfall and temperature occurred. Thus, historic events provide good controls for evaluation of a hydrologic model. As indicated in the previous paragraph, historic events do not provide controls for evaluation of an accounting model such as the Truckee River operation model.

Considerable effort has been made to review the computer coding in and the results of calculations made using the Truckee River operation model. This effort has identified (and led to correction of) several portions of the computer code that incorrectly incorporated water rights and TROA provisions. The operation results calculated for the TROA DEIS/EIR investigations have been carefully reviewed and the reviews indicate that the Truckee River model's results reflect those factors that have impact upon reservoir and river operation. Thus, it is concluded that the results can be used with confidence that they reflect the differences between operation impacts associated with TROA and operation impacts associated with each of the alternatives to TROA that were investigated.