NORTHWEST POWER POOL AREA
ASSESSMENT OF RELIABILITY AND ADEQUACY
2009 SUMMER OPERATING CONDITIONS

March 13, 2009

INTRODUCTION

The Northwest Power Pool (Power Pool) area is comprised of all or major portions of the states of Washington; Oregon; Idaho; Wyoming; Montana; Nevada; and, Utah; a small portion of Northern California; and, the Canadian provinces of British Columbia and Alberta. The Power Pool in collaboration with it members has conducted an assessment of reliability in response to questions raised regarding the ability of the Power Pool to meet the load requirements during the summer 2009. Analyses indicate the Northwest area will be able to meet firm loads and required operating reserve (regulating reserve and contingency reserve) for the 2009 summer operations, assuming normal ambient temperature and normal weather conditions.

This assessment is valid for the Northwest Power Pool area as a whole; however, these overall results do not necessarily apply to all sub-areas (individual members, balancing authorities, states, and or provinces) when assessed separately.

In, 2007, Sacramento Municipal Utility District (SMUD) and Turlock Irrigation District (TID) joined the Power Pool; however, for purposes of the 2009 summer assessment, SMUD and TID have not been integrated into the process.

Report Details

- Demand and Energy

  The Northwest Power Pool 2008 coincidental summer peak of 54,190 MW occurred on August 14, 2008. The 2008 coincidental summer peak was 98.17% of the forecast; however, the coincidental peak occurred during below normal temperature conditions. Normalizing for temperature variance (50% probability), the 2008 coincidental peak would have been 55,000 or 99.64% of the forecast.

  The 2009 summer peak forecast for the Power Pool area, as one single entity, of 54,500 MW is based on normal weather, reflects the prevailing economic climate (down-turn), and has a 50% probability of not being exceeded. Extreme temperatures have the potential of increasing the coincidental peak by 3,500 MW. The Power Pool peak Area Load forecast includes approximately 200 MW of interruptible demand capability and load management. In addition, the load forecast incorporates any benefit (load reduction) associated with demand-side resources, not controlled by the individual utilities. Some of the entities within the Power Pool area have specific programs to manage peak issues during extreme conditions. Normally these programs are used to meet the entities operating reserve requirements and have no discernable impacts on the projected Power Pool area peak load.

  Under normal weather conditions, the Power Pool area does not anticipate dependence on imports from external areas during summer peak demand periods. However, if much lower than normal precipitation were to occur, it may be extremely advantageous to maximize the transfer capabilities from outside the Northwest Power Pool area to reduce reservoir drafts and aid reservoir filling.

- Resource Assessment

Approximately 60% of the Power Pool resource capability is from hydro generation. The remaining generation is produced from conventional thermal plants and miscellaneous resources, such as non-utility owned gas-fired cogeneration or wind.

Hydro Capability

Northwest power planning is done by sub-area. Idaho, Nevada, Wyoming, Utah, British Columbia and Alberta individually optimize their resources to their demand. The Coordinated System (Oregon, Washington and western Montana) coordinates the operation of its hydro resources to serve its demand. The Coordinated System hydro operation is based on critical water planning assumptions (currently the 1936-1937 water year). Critical water in the Coordinated System equates to approximately 11,000 average megawatts of firm energy load carrying capability, when reservoirs start full. Under Average water year conditions, the additional non-firm energy available is approximately 3,000 average megawatts.

The 2009 March final forecast for the January through July Volume Runoff (Columbia River flows) at The Dalles, Oregon is 86.2 Million acre-feet (Maf), or 80 % of the thirty (30) year average.

Last year, the Coordinated System hydro reservoirs refilled to approximately 90% of the Energy Content Curve by July 31, 2008.

April through July

This period is the refill season when reservoirs store spring runoff. The water fueling associated with hydro powered resources can be difficult to manage because there are several competing purposes including but not limited to: current electric power generation, future (winter) electric power generation, flood control, biological opinion requirements resulting from the Endangered Species Act, as well as, special river operations for recreation, irrigation, navigation, and the refilling of the reservoirs each year. Any time precipitation levels are below normal, balancing these interests becomes even more difficult.

With the competition for the water, power operations for the 2009 may be difficult. The goal is to manage all the competing requirements while refilling the reservoirs to the highest extent possible.

Sustainable Hydro Capability

Operators of the hydro facilities maximize the hydrology throughout the year while assuring all the competing purposes are evaluated. Although available capacity margin at time of peak can be calculated to be greater than 20%, this can be misleading. Since hydro can be limited due to conditions (either lack of water or imposed restrictions), the expected sustainable capacity must be determined before establishing a representative capacity margin. In other words, the firm energy load carrying capability (FELCC) is the amount of energy that the system may be called on to produce on a firm or guaranteed basis during actual operations. The FELCC is highly dependent upon the availability of water for hydro-electric generation.

The Power Pool has developed the expected sustainable capacity based on the aggregated information and estimates that the members have made with respect to their own hydro generation. Sustainable capacity is for periods at least greater than two-hours during daily peak

periods assuming various conditions. This aggregated information yielded a reduction for sustained capability of approximately 7,000 MW. This reduction is more relative to the Northwest in the winter; however, under summer extreme low water conditions, it impacts summer conditions.

Thermal Generation

No thermal plant or fuel problems are anticipated. To the extent that existing thermal resources are not scheduled for maintenance, thermal and other resources should be available as needed during the summer peak.

External Resources

No external resources to the Northwest Power Pool area are assumed for the summer.

- Integration of Variable Generation

Several states have enacted renewable portfolio standards which will require some Power Pool members by the mid 2010 decade to satisfy at least 20% of their load with energy generated from renewable resources. This may result in a significant increase in variable generation within the Power Pool area, creating new operational challenges which will have to be addressed in the future. Some of the safety net programs such as contingency reserve, and under frequency load shedding will be re-evaluated as for effectiveness.

The Power Pool area estimated installed wind generation capacity for December 2008 is approximately 5,700 MW. And, it is anticipated to increase by June 2009 to 6,400 MW. With the increasing variable generation, conventional operation of the existing hydro and thermal resources will be impacted.

The wind generation manufactures' standard operating temperature for wind turbines range from -10° C to + 40° C (14° F to 104° F). During the summer peaking period, the temperature in the areas where the majority of the wind turbines are located can well exceed 104°F, leaving no capability from the wind generation during those periods.

In addition, there is a risk of over-generation in the spring and fall. When both the wind and hydro generation are both in high generation mode, and given the environmental constraints on dissolved gases in the river, there are times when generation may exceed load plus the ability to export.

- Planning Margin

The Northwest Power Pool area does not have one explicit methodology for determining an adequacy margin. Bonneville Power Administration utilizes the Northwest Power and Conservation Council's resource adequacy standard, which establishes targets for both the energy and capacity adequacy metrics derived from a loss of load probability analysis. Others will utilize NERC's reserve margin approach.

Since no one method exists for the entire Northwest Power Pool area, we have elected to use the NERC's reserve margin analysis for the summer assessment. The 2009 Power Pool area generating capability is projected to be 84,000 MW, prior to adjusting for maintenance. In determining planning margin, one must further adjust both load and capability for a severe weather event. A severe weather event for the entire Power Pool area will add approximately

3,500 MW of load while at the same time under extreme water restrictions the sustained hydro generation would reduce the capability by 7,000 MW. In addition, under the severe weather, wind generation is expected to be minimal. The estimated operating reserve requirement is approximately 3,800 MW. Accounting for the severe weather event and the operating reserve yields a planning margin of approximately 18%, which is relatively the same as last year.

- Transmission Assessment

Constrained paths within the Power Pool area are known and operating studies modeling these constraints have been performed and operating procedures have been developed to assure safe and reliable operations.

Outage Coordination

The NWPP coordinated outage (transmission) system (COS) was designed to assure that outages could be coordinated among all stakeholders (operators, maintenance personnel, transmission users, and operations planners) in an open process. This process had to assure that proper operating studies were accomplished and transmission impacts and limits known, to fulfill a requirement from the 1996 west coast disturbances that the system be operated only under studied conditions. The WECC RC is involved in the outage coordination process and has direct access to the outage data base.

Monthly Coordination

The process requires NWPP members to designate significant facilities that if out of service by itself or in conjunction with another outage, will impact system capabilities. The significant facilities are defined and updated annually by the NWPP members. The scheduled outage of these critical facilities is posted on a common database. All utilities post proposed significant outages on WECC's Coordinated Outages System (COS). Outages are to be submitted to the COS at least 45 days ahead of the month they are proposed to occur so they can be viewed by interested entities. The involved entities then facilitate the NWPP coordination of all these outages. Entities can comment on the preliminary impacts and schedules may be adjusted to maximize reliability and minimize market impacts. If coincidental outages cause too severe of an impact, the requesting utilities work together to adjust schedules accordingly. A final outage plan is posted with estimated path capabilities 30 days prior to the month in which the outages will occur. Detailed operational transfer capability studies are then performed and the limits for each affected path are posted at least 15 days prior to the outage.

Emergency outages can be requested outside these schedule guidelines. Emergency outages are coordinated among adjacent utilities to minimize system exposure. Utilities can use the COS system to assure system topology is correct for next day studies. As transmission operators increase the amount of short term outages in addition to the significant outages" the WECC RC will be able to access to the WECC COS data base and use the final outage schedule in its real-time system analysis. This coordinated outage process has been very effective. The outage information is used by NWPP member utilities to perform system studies to maximize system reliability.

Semi-annual planning - Long-Range Significant Outage Planning (LRSOP)

The NWPP staff facilitates outage meetings every six months with each utility's outage coordinator to discuss proposed longer term outages. Utilities discuss anticipated outages needed for time critical construction and periods where transmission capacity may need to be maximized. The outages are posted on the WECC COS and on the individual companies' OASIS sites.

Specific responsibilities of LRSOP include:

- Share outage information with all parties affected by outages of significant equipment (i.e. equipment that affects the transfer capability of rated paths). Information is shared two times each year for a minimum of a six-month period. The first meeting each year coordinates outages for July through December. The second meeting coordinates outages for January through June.
- Review the outage schedules to assure that needed outages can be reliably accomplished with minimal impact on critical transmission use.
- Outage coordinators are to post the outages on the Coordinated Outages System within the applicable timeframes.

Northwest Operation and Planning Study Group

A recommendation of the 1996 west coast disturbances was the requirement to not operate in conditions that have not been studied. This requirement, lead to the formalization of a study and review process to determine seasonal operating transfer capability (OTC) also known as system operating limits (SOL) for critical paths in WECC. The NWPP entities had, through a cooperative working relationship, shared information prior to the formalization of the process. The initial focus for this effort was the California-Oregon Intertie (COI) because this path was involved in both 1996 disturbances. The seasonal study process was eventually expanded from the COI to all WECC paths listed in the WECC path rating catalog.

The WECC created the Operating Transfer Capability Policy Committee (OTCPC) and corresponding SOL study and review process. This process divided the WECC into regional study groups that are responsible to perform and approve seasonal studies on significant paths in their region to determine the maximum SOL ratings. The NWPP formalized the Northwest Operation and Planning Study Group (NOPSG), which is composed of the path operators and/or owners of critical NW transmission paths and any other interested NWPP members. NOPSG approved seasonal studies and SOLs are presented to the OTCPC for final approval. The SOLs approved by the OTCPC are then posted as the maximum path capacity for the given season.

The NOPSG charter and WECC OTCPC handbook are available on the NWPP website in the Operating Committee area.

Next Day Operating Studies

Additional path curtailments may be required depending upon current system conditions and outages. These curtailment studies are performed by the individual path operators based on the outage schedule developed through the COS process. According to the COS process, these studies are performed at least 15 days prior to the outage. Individual path operators and transmission owners may also perform updated next day studies to capture emergency outage requests and current system conditions such as generation dispatch to determine if the SOL studies and limits are still accurate. Based on these studies, additional SOL curtailments may be made by the path operators. The modified SOL's are posted on the individual transmission owners OASIS and the RC is notified.

The WECC RC also performs system studies to ensure interconnected system reliability. The WECC RC performs real-time system thermal studies to evaluate current operating conditions across the entire Interconnection. The WECC RC is in the process of incorporating real-time

voltage tools to complement the thermal analysis currently being performed. Transient stability analysis capability is planned in the future. When the WECC RC observes real-time reliability problems they contact the path operator to discuss the issue and work on a solution. The WECC RC will make a directive for action if there is an imminent reliability threat and the balancing authority does not eliminate the reliability issue within an appropriate time frame.

Voltage Stability

The WECC-1-CR System Performance Criteria, requirement WRS3 is used to plan adequate voltage stability margin in the Northwest Power Pool area as appropriate. Simulations are utilized to assure system performance is adequate and meets the required criteria.

- Contingency Reserve Sharing Procedure

As permitted by NERC and WECC criteria and standards, the Operating Committee of the NWPP has instituted a Reserve Sharing Program for contingency reserve. Those who participate in a reserve sharing group are better positioned to meet the NERC disturbance control standard because they have access to a deeper and more diverse pool of shared reserve resources. Also, an increase in efficiency is obtained since the shared reserve obligation for the group as a whole is less than the sum of each participant's reserve obligation computed separately.

By sharing contingency reserve, the participants are entitled to use not only their own "internal" reserve resources, but to call on other participants for assistance if internal reserve does not fully cover a contingency. The reserve sharing process for the NWPP has been automated. A manual backup process is in place if communication links are down or the computer system for reserve sharing is not functioning correctly.

The NWPP is designated as a reserve sharing group (RSG) as provided under WECC Operating Reliability Criteria. Each member of the RSG submits its contingency reserve obligation (CRO) and most severe single contingency (MSSC) to a central computer. The combined member CRO must be larger than the RSG MSSC. If not, then each member's CRO is proportionally increased until this requirement is met. When any RSG member loses generation they have the right to call upon reserves from the other RSG members as long as they have first committed their own CRO. A request for contingency reserve must be sent within four minutes after the generation loss and the received contingency reserve can only be held for 60 minutes. A request is sent via the member's energy management system to the central computer. The central computer then distributes the request proportionally among members within the RSG. Each member may be called to provide reserve up to its CRO. Critical transmission paths are monitored in this process to ensure SOL limits are not exceeded. If a transmission path SOL is exceeded the automated program redistributes the request among RSG members that are delivering reserve along non-congested paths. The WECC RC continuously monitors the adequacy of the RSG reserve obligation, MSSC, and the deployment of reserve. If a reserve request fails due to various reasons, backup procedures are in place to fully address the requirements.

- Reliability Coordinator

The Reliability Coordinator (RC) is responsible for monitoring, advising, and directing action when necessary, in order to preserve the reliability of transmission service between and within the interconnected systems of all balancing authorities within the Western Interconnection.

STRATEGIC UNDERTAKINGS

- Adequacy Response Team

  The Northwest has developed an Adequacy Response Process whereby a team addresses the area's ability to avoid a power emergency by promoting regional coordination and communications. Essential pieces of that effort include timely analyses of the power situation and communication of that information to all parties including but not limited to utility officials, elected officials and the general public.

- Emergency Response Team (ERT)

  In the fall of 2000, the area developed an Emergency Response Process to address immediate power emergencies. The ERT remains in place and would be utilized in the event of an immediate emergency. The ERT would work with all parties in pursuing options to resolve the emergency including but not limited to load curtailment and or imports of additional power from other areas outside of the Power Pool.

CONCLUSIONS

In view of the present overall power conditions, including the forecasted water condition, the area represented by the Power Pool is estimating that it will be able to meet firm loads including the required operating reserve. Should any resources be lost to the area beyond the contingency reserve requirement and or loads are greater than expected as a result of extreme weather, the Power Pool area may have to look to alternatives which may include emergency measures to meet obligations.