SWRCB OTC EXPERT REVIEW PANEL: COMMENTS FROM INDIVIDUAL MEMBERS AFTER THE JULY 8, 2008 MEETING IN SACRAMENTO

Compiled by M. Foster, 31 July 2008. Note that these comments are not included in the Responses to Questions as they were not discussed by the rest of the panel.

Comment on using ETM to estimate impacts to all planktonic organisms.

Pete Raimondi: ETM methodology should in theory be robust. This means that with sufficient replication of species and life histories there should be relatively accurate estimation of overall ETM for other species.

Comments related to using entrainment-weighted flows versus just flows, especially for low capacity power plants.

Tim Hemig: The concept of "entrainment-weighted flows" for determining flow caps seems overly complicated and hard to enforce. I recommend against that concept and urge a simpler approach based on flow. Wouldn't natural variations result in the same effect over time?

John Steinbeck: For the peaker plants that now only operate ~10% of the time, the restriction on summer operations would severely affect their ability to operate during the period when demand is highest. For example, open coast larval concentrations in so Cal are an order of magnitude greater during the summer months compared to winter. The severe restrictions this would place on operations of certain plants would result in lawsuits, arguments that the numbers aren't appropriate for that site, problems with interannual variation, etc. Also the fairness issue since based on the current data almost no weighting would be applied to plants in bays and harbors north of Conception. In general, Track II compliance using entrainment-weighted flows may be difficult to implement due to the differences in seasonality across the state. Plants in southern California would be penalized due to the increased larval concentrations during the summer months relative to plants north of Point Conception. I think there are State regulations against regulations that would provide particular plants a competitive advantage relative to other plants.

Comment on the pros and cons of restricting flows to <10% of the permitted flow rate if a power plant is not generating electricity for two or more consecutive days.

Dave Bailey: This was not discussed at the meeting. However, in preparation for the meeting I did explore potential issues associated with such a requirement and following is a summary of those points the ERP and SWRCB may want to consider:

- Existing cooling water pumps generally have a range of flow within which they can operate. The electric motors need to be rated for inverted duty. If the existing motors are not, the motors may overheat and burn out if run continuously at slow speeds. Voltage spikes from a variable frequency drive (VFD) can cause damage to the motor insulation. A reactor on the incoming line or between the VFD and the motor may be necessary to prevent damage to the insulation.

- The existing circulating water pumps may experience uneven loading on the pump impellers at slow speeds which may cause excessive vibrations. The pump bearings and shaft may not be designed for these vibrations and could be damaged. The expected range of flow for an existing pump should be about 50% to 100% of capacity. Operating a single pump less than 50% capacity will likely require the pump to be refurbished or replaced with a design compatible with the expected operation.
- As a result of the above two bullets facilities may want to evaluate installation of an additional pumps and valves for a 10% of design flow operational mode.
- A minimum water pressure must be maintained in the existing condensers. If the pumps operate too slowly, the maximum pressure may not be enough to keep the waterbox full and may cause a vacuum in the top tubes of the condenser and the top of the outlet waterbox. The condenser (tubes and water boxes) may not be designed for vacuum pressures. If the condenser is not designed for the expected vacuum pressures, then a vacuum priming system may need to be installed on top of the condenser waterbox to flood the top of the box during start-up. Alternatively, a valve may need to be installed on the condenser discharge to maintain a back-pressure on the condenser tubes and outlet waterbox. Each cooling water system would need to be evaluated to determine if this would be an operational issue.
- Unbalanced pump operation is also a concern if there is more than one pump per Unit which is typical. This may require balancing of the flow through the two pumps. Flow balancing could be accomplished by installing a valve on the pump discharge of the full speed pump. This valve would allow the full speed pump to operate in an acceptable operating range (higher head) of the pump curve. Both pumps (full speed and lower speed VFD-controlled pumps) should have discharge valves installed to prevent reverse flow through a pump that is shutdown during one pump operation.

In summary, while generally feasible, reducing flow by 90% is not likely to be a simple matter and could result in a significant capital expense depending on the Unit. Such a requirement would require careful study and allowing time to develop a workable design and retrofit the intake. For the two baseloaded nuclear facilities in particular, a significant outage could be required to install new pumps.