MEETING NOTES

SOUTH CAROLINA ELECTRIC & GAS COMPANY
Operations RCG Meeting

May 5, 2015

Final KDM 06-29-15

ATTENDEES:

Dick Christie (SCDNR)
Scott Harder (SCDNR)
Kelly Miller (Kleinschmidt)
Henry Mealing (Kleinschmidt)
Bret Hoffman (Kleinschmidt)
Randy Mahan (SCANA)
Gerrit Jobsis (American Rivers)
Bill Argentieri (SCE&G)
Ray Ammarell (SCE&G)
Bill Marshall (SCDNR)
Greg Mixon (SCDNR)
Bruce Halverson (Kleinschmidt)
Lorianne Riggin (SCDNR)

These notes serve to be a summary of the major points presented during the meeting and are not intended to be a transcript or analysis of the meeting.

After Henry opened the meeting with introductions, Bret gave the group a recap of the Operations Model development process. The PowerPoint presentation that Bret prepared is attached to the end of these notes.

Dick asked about power releases, and how this is translated in the model. Bret said that if, for example, 10,000 cfs is traveling through the system, 6,000 cfs would be routed through the powerhouse, and the remaining 4,000 cfs would go through the crest gates. Gerrit asked if power releases are considered the total amount of generation (cumulative), or any flows above the minimum flow. Bret said that everything up to 6,000 cfs is considered a power release.

Dick asked if operational rules can be tweaked in the model. Bruce said yes, the structure of the basic model is overridden with any scenario you enter. Bret mentioned that, since the last meeting, power demand was added to the model as a requirement.

Bruce ran the model using two scenarios; the hindcast, or historical, model scenario; and the future conditions model scenario. For the historical scenario, a two week period in 2005 was used to test the accuracy of the model. Bret showed the group graphs that contained observed and simulated results for this time period. Gerrit asked how the model is going to capture real-time conditions. Henry explained that project effects on downstream habitat are not determined by the model. The model is supposed to help us understand the mass balance of water going downstream; how much water the project can pass, and how that impacts the project's ability to stay within the constraints dictated by the license and study results.

The group expressed concerns over the historical model scenario results, specifically how the simulated results appeared to be boxed off, and didn't match the peaks of the observed flows.

Kleinschmidt

Gerrit asked if we will actually be able to see what is happening at the project by looking at the model. Will the model under-predict a flow event? Bruce said that he can set up a scenario that shows the exact spikes, by dictating to the model a certain action, such as lowering a gate. He explained that water allocation is one thing, but there are many decisions an operator can make, to allow more water to pass in a short amount of time versus less water over a longer amount of time. You can program a model to mimic operations for a particular day and time, but you can't program the model to make the decisions the operators will make in every case.

Gerrit stated they are interested in understanding how the project is actually operated to manage flood events, and he wants to make sure the model will look at operational rules. Bill A. explained that once inflow exceeds 6,000 cfs, operators begin lowering gates. When inflow reaches and surpasses 40,000 cfs, all gates are down.

Bruce explained that it is important to understand that models cannot predict exactly how a project will be run, because operators make decisions that may not follow the model rules for a particular flow event. For example, the gates are not operated dynamically; actual gate operations result in downstream spikes in flow, as gates are lowered in steps. However, the model can show how the project might be operated differently than it was in a particular situation, and thus offer alternative operational rules for future similar situations.

The group discussed the spikes in flow that are shown on the graphical results of the future scenario model run. Bruce said that rules that are programmed into the model need to function for a 30 year period of record, and random infrequent anomalies do not have a significant effect on the big picture. If the objective is to eliminate every anomaly like these spikes in flow, other factors will suffer, such as a reduction in simulated generation accuracy.

Gerrit asked if there was a way to run a scenario to determine how many years out of 30 a certain flow may be maintained during a particular month. Bruce said yes, you would run a scenario over the entire period of record, then calculate a percentage for how often the scenario could actually happen. Frequency and magnitude of the violation (when the scenario wouldn't work) can also be determined.

The group discussed the various parameters that will be considered. These include:

- Downstream Flows
    - State Water Plan/Minimum Flows
    - Fish and Wildlife/IFIM (STB/AMS spawning flows)
    - Navigation
    - Water Quality (including dissolved oxygen)
    - Peaking/High flows
    - Instantaneous Minimum Flows/Daily Average
    - Recreation
- Parr Fluctuations
- Monticello Fluctuations
- Low Inflow Protocol (Drought Plan)

Gerrit asked if a scenario could be run without the Fairfield Pumped Storage being factored in, to show how that development affects the project. It is more difficult to meet minimum flows if water

is being pumped up to Monticello. Henry said that the Fairfield Pumped Storage Development is not going away, so all scenarios need to account for it. Ray said that Parr passes inflow; the extra water moving through the project is what is used by Fairfield. Parr may be passing 500 cfs while 29,000 acre feet are pumped up and down at Fairfield. Big fluctuations are captured when more than 6,000 cfs is passing through the project, a gate is lowered, and Fairfield is operating.

Dick said that Article 39 in the current license discusses flood flows. It ensures that the downstream flows won't exceed those that wouldn't have existed in the absence of the project. SCE&G identified this flow as 40,000 cfs. Ray said SCE&G never operates Fairfield as to exceed 40,000 cfs. However, SCE&G does add to the inflow downstream between flows of 6,000 cfs and 40,000 cfs, when Fairfield generates.

Stakeholders identified a desire to cap off and smooth out fluctuations downstream of Parr. Bill M. asked if the dual flow analysis portion of the IFIM study will account for the fluctuations between the identified ceiling and floor flows. Henry could not promise that it would, but a minimum flow range may be implemented for different periods of time throughout the year. This would cause the Project to be operated differently than it currently is. Dick said that suitability curves for certain species will need to be consulted first, to then determine if flows or operational protocols need to be adjusted.

Scott asked if there was a way to release more water as part of a baseline, in the hours before a large inflow is expected, as a way to minimize the large spikes in flow. This could be a way to still get the generation needed from the project without dumping large amounts of water downstream at one time. Bret said this depends on the flexibility that operators need to keep the project running within compliance of the license. Currently, operators aren't concerned with a few spikes in flow caused by incrementally dropping gates. They are concerned with keeping the flow between 800 and 1,000 cfs.

The group discussed the importance of fluctuation and attenuation from a fish spawning perspective. Dick said he would look into how this might affect striped bass spawning downstream.

With this the meeting was adjourned. Action items are listed below.

ACTION ITEMS:

- Ray will talk to operators and investigate times when gates are lowered during mid-range flows.
- Ray and Bret will develop a baseline load demand and send to Scott for review in the next 4 months. Bruce will use this information for model run comparisons when alternative recommendations are submitted by the various RCG's and TWC's.
- Bruce will expand on the "HEC-DSS cheat sheet" that is included in the Operations Model Report.
- Dick will investigate striped bass spawning flows.