MEETING NOTES

SOUTH CAROLINA ELECTRIC & GAS COMPANY
SALUDA HYDRO PROJECT RELICENSING
WATER QUALITY TWC

SCE&G Training Center
August 7, 2007

Final ACG 10-30-07

ATTENDEES:

Alan Stuart, Kleinschmidt Associates
Alison Guth, Kleinschmidt Associates
Bill Argentieri, SCE&G
Shane Boring, Kleinschmidt Associates
Richard Kidder, LMA
Roy Parker, LMA
Roger Hall, SCDHEC
Jim Cumberland, CCL
Ron Ahle, SCDNR
Reed Bull, Midlands Striper Club
Tom Bowles, SCE&G
Andy Miller, SCDHEC
Jim Ruane, REMI
Amanda Hill, USFWS
Gerrit Jobsis, AR

DATE: August 7, 2006

DATE OF NEXT MEETING: **November 6, 2007 at 9:30 a.m.**
Located at the Lake Murray Training Center
RCG Morning – TWC Afternoon

DISCUSSION

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.

Shane opened the meeting and noted the purpose of the meeting would be to provide an update on the water quality modeling on the effects of operations on fishery habitat. Jim Ruane and Andy Sawyer presented the outcomes of the modeling in presentation format, which can be viewed at the following address: http://www.saludahydrorelicense.com/water_quality.htm . Jim noted that per the groups discussions from the last meeting, they focused on the reservoir operations, pool level and Unit 5 preference in their modeling. After a brief review of the previous analyses and findings, Andy presented the group with the effects of winter pool levels at 350 and 354 and a summer pool at 358. Andy reviewed that preliminarily, high flows, especially during March-August, is the primary cause for fish kills. Andy further explained that higher flows cause the bottom of the lake

to warm, which in turn increases the rate of DO depletions. Nutrients are still the single dominant factor that aid in habitat depletion.

Andy explained that the following were the next steps chosen in the May meeting:

1. For selected years, finalize assessment (i.e., assess changes in releases) of operating guide for U5 preference for "first on, last off" operation using the hourly releases
2. For selected years, finalize assessment of maintaining summer pool levels at 358
3. For selected years, finalize assessment of the combination of maintaining summer pool levels at 358 with U5 preference for "first on, last off" operation using the hourly releases
4. Analyze additional years, especially a low flow year
5. Assess effects of minimum winter pool level, including effects on Little Saluda embayment, increased SOD, internal nutrient cycling, aquatic plants, sedimentation in coves

Andy provided the group with all the years that were modeled and noted that the model was proven very reliable. He explained that the error around the mean for temperature is below one degree (.73), and .99 for DO. He noted that the fish kill years that were modeled were '91, '98, and '05. Andy explained all of the items modeled with the group, which included chlorophyll a, nitrate, TP, pH, ISS and turbidity, alkalinity, TKN, TOC. He also noted that this would be further detailed in the report. Andy presented the group with the graphed differences in water quality between the 350' and 354' winter pool scenarios. It was shown that during certain years, especially the dry years, holding the pool level up showed no difference in habitat. However there were certain years that holding the pool level up was shown to have an effect on habitat, as well as colder releases.

Andy then presented the group with scenarios where the winter pool level was held up and Unit 5 was run first on. Reed Bull asked if there were problems with warmer temperatures downstream by running Unit 5 first. Jim Ruane noted that it depends on the flow, and they have performed some modeling to show this.

The group further discussed the habitat loss in the lake. During some years it was shown that the habitat completely disappears around the units. Several group members pressed for long term solutions to habitat issues in the lake, such as phosphorus improvements, and a push to get funding to solve upstream problems. Gerrit Jobsis noted that oxygenation may be an option. It was noted that any operational changes, however minor, may be an important benefit for lake fishery habitat.

The group continued to review results of modeled pool level management and the use of Unit 5 as first on. It was shown that over the years, the trends shown with the graph either depicted small improvements, or no improvements. The group also briefly discussed release temperatures in the lower Saluda under this operating scenario. It was shown that by changing back over to Unit 5 "last

on, first off" by September 1, you do not affect striped bass habitat, however you then allow for the colder releases into the Saluda. It was shown that by using the lower units after September 1 allowed the river temperatures to drop by about a degree and a half. It was explained that the minimum flow should go out of unit 5 until discharges reach a certain temperature.

The group discussed that rather than a date trigger to switch to the bottom units, that they should possibly use a release temperature trigger. Gerrit suggested that the group move the switch date from September 1 to August 1 and the group considered this option. Andy explained that he could run a scenario with a switch on August 1 to the lower units. Jim Ruane explained that he felt that it would be best to use release temperature as a trigger. He continued to note that a good trigger would be to switch to the lower units when Unit 5 releases reached 15 degrees at 500 cfs. Bill asked if a minimum flow greater than 500 cfs would be detrimental to striper habitat. Andy noted that he assumed that it would.

The group also discussed when to switch back to the scenario of Unit 5 "first on last off". Andy Sawyer noted that once tailwater temperatures were not an issue anymore, that they may be able to switch back in order to start conserving the cooler water for the next season. It was explained that this was likely to occur in the November timeframe.

The group reviewed the conclusions.

- Unit 5 preferential operations can improve striped bass habitat in some years.
- Maintaining the summer pool level at 358 increases striped bass habitat in some years.
- The combination of Unit 5 preferential operations and maintaining the summer pool level at 358 can further increase striped bass habitat in some years. It can also improve water quality in the releases.
- When the discharge temperature from Unit 5 reaches 15^{o} C, the minimum flow should be released through a bottom unit.
- Unit 5 operations after August or September do not effect striped bass habitat.

The group also reviewed the next steps. Jim noted that they will be summarizing the results into a report.

Tom Bowles briefly discussed his work with the hydroacoustic monitoring equipment on the Unit 5 tower to monitor blueback herring movements. It was noted that they would want to make sure the proposed "unit 5 first on, last off" scenario didn't result in an entrainment event. The group decided that this scenario was still worth pursuing on a trail basis, with a monitoring of blueback herring movements. It was noted that Jim and Andy would write up the proposed scenario and it would be

passed around to the TWC. The group also discussed having this as the presentation topic for the January Quarterly Public Meeting.

After lunch, the group reviewed concerns about raising the winter minimum pool elevations. It was explained that raising the min pool elevation could affect water quality and fish habitat. Jim explained that without the pool level decrease in the winter, organic matter could build up in the sediments and cause internal nutrient cycling.

Jim explained to the group that the Little Saluda River Embayment, located in the upper portion of the reservoir, posed a great impact to water quality. He noted that if the minimum pool elevation was raised, there will be less water exchange between the embayment and the main body of water. He noted that there also would be less scouring of organic and inorganic matter, leading to internal nutrient cycling.

Jim noted that they had researched this using both the W2 model and previous experience. It was noted that the Little Saluda River Embayment is exposed when the lake is at or below elevation 350'. The group discussed that many factors led to problems with the build up of nutrients, such as aquatic plants, watershed size, land uses, types of soil, etc. The recommendation made by Jim to the group based on the W2 model, was a pool elevation drop to 350 whenever the inflow at the Chappell's gage was greater than 200,000 ac-ft (100,00 dsf) late in the previous year. He noted that they had looked at a series of years, and out of a 15 year period, if the flows were higher than 200,000 ac-ft from Sept 1 to December 15, then they would have enough inflows to fill the lake the following year.

The group also discussed some of the concerns of increasing the winter minimum pool level from 350 to 354. These concerns included:

- Sediment accumulation coves
- Aquatic plants increasing around the lake
- Organic and nutrient accumulation in sediments
- Water quality and algae in the little Saluda river embayment could already be controlled by internal cycling and increasing the minimum winter pool to 354 could cause worse conditions

Gerrit asked Jim if he had any predictions on how frequently a winter drawdown to 350 would need to occur. Jim noted that if it was done two-thirds of the time there would be significant benefits to water quality. The group decided to charge Jim with the task of further researching at what frequency a drawdown was needed in order to see benefits to water quality. It was noted that Jim would send the conclusions to the group via Alison.

Shane briefly noted, in reference to the ongoing temperature study, that USC professor John Greigo had contacted him concerning the temperature study and how it could be related to striped bass movements. He noted that the USC student would be performing statistical analyses and he would provide the group with more information when available.

As the group closed the meeting, there was a review of homework items. It was noted that Jim, Andy and Jon Quebbeman would develop scenarios for little Saluda River Embayment, and an Operating Protocol for Unit 5. Ron also noted that he would email the group when he presented this information to other DNR personnel.

Alan also announced that there would be another round of DO testing at the end of September, and consequently some periods of low DO at that time. He explained that Unit 3 was successfully sealed and that SCE&G was going to try to seal the other units in the same manner. It was noted that the hub baffle size on unit 5 was also increased.

Group Adjourned