

MEETING NOTES

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

**SCE&G Training Center
March 26, 2007**

Final ACG 5-7-07

ATTENDEES:

Alan Stuart, Kleinschmidt Associates
Alison Guth, Kleinschmidt Associates
Bill Argentieri, SCE&G
Dan Tufford, USC
Richard Kidder, LMA
Roger Hall, SCDHEC
Roy Parker, LMA
Shane Boring, Kleinschmidt Associates
Charles Floyd, LMHOC

Andy Sawyer, REMI
Reed Bull, Midlands Striper Club
Ron Ahle, SCDNR
Jim Ruane, REMI
Tom Bowles, SCE&G
Amy Bennett, SCDHEC
Randy Mahan, SCANA Services
Gerrit Jobsis, American Rivers

DATE: March 26, 2007

HOMEWORK ITEMS:

- Jim and Andy – Run model with new scenarios that take into account altered lake elevation drawdown data

DATE OF NEXT MEETING: Conference Call, May 22, 2007

INTRODUCTIONS AND DISCUSSION

Shane Boring opened the meeting and introduced Andy Sawyer and Jim Ruane with Reservoir Environmental Mgt., Inc. Shane noted that Jim and Andy would be presenting the group with information on the results of the W2 Water Quality Analysis to address Lake Murray fish kills and unit 5 operation.

Jim Ruane opened discussions by noting that they developed a workplan with two parts. The first part, Jim explained, has to do with variables pertaining to the effect of water quality on striped bass and blueback herring habitat. Jim added that Andy had a presentation that discussed most of these variables. Jim explained that the analysis on this is not complete, as they were waiting for direction from the TWC. Jim noted that the second part of the workplan analysis was regarding concerns about changing the minimum winter pool level. He pointed out that for general purposes the water levels go down to about 350 and the group would like to address levels higher than that.

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Andy then began a presentation focused on the fish kill analysis. Andy noted that they are in the process of determining what factors have an effect on fish kills and what factors do not. Andy noted that they would also consider water quality impacts that could occur in the tailrace during different scenarios. He explained that the main considerations have included annual flow regimes, pool level management, unit 5 operation, in-lake and release water quality, habitat for striped bass and blueback herring water quality, and meteorological data. He explained that there was an emphasis on the main branch of the lake.

The first set of information that Andy presented was pertaining to the analysis of historical data on fish kills. He explained that they set up a CE-Qual model for the years when a major striped bass fish kill occurred. He noted that they then ran the models in order to identify the causes that apparently contributed to the fish kills. He explained that the models were also used to explore ways to avoid fish kills in the future.

Andy explained that preliminary findings indicate that high flows, mainly during March through August, are the primary cause of fish kills. Andy pointed out that higher flows cause the bottom of the lake to warm up faster and increase the rate of DO depletion. He also explained that meteorological conditions can affect striped bass habitat. Andy showed that model results indicated that DO > 2.5 mg/l was preferential and that Unit 5 could be used in a manner to help preserve the colder bottom water and was predicted to improve DO and increase striped bass habitat. Ron Ahle noted that he was concerned that the running of Unit 5 to draw off the warmer water could have a harmful effect on the trout fishery downstream. Andy noted that the model depicted the temperature rise in the lower Saluda was slightly elevated, however not dramatically.

The group discussed whether or not there were patterns in which the fish kills occurred. Andy noted that there were no strong patterns depicted by the model. He noted that the strongest correlation was with flow, the years with higher flows in the March through June timeframe typically have more fish kills. Andy explained that in their examination of meteorological data they also looked at air temperatures as well as wind speeds. With air temperature, Andy explained that they performed a 7 day running average as well as a 14 day running average temperature. He noted that the same was done with wind speed.

Andy continued to explain the model calibration and noted that it was originally run for 3 years and the model SOD (Sediment Oxygen Demand) was adjusted in each of those three years to improve DO calibration. Andy also presented the group with the model forebay profiles and graphs depicting the model outputs with the data. The model shown to be was very accurate in representing the data. Andy explained that the model depicts what comes out of the dam, and there is a slight data variation because the data comes from the monitor directly downstream. Andy noted that their main calibration years were 1992, 1996 and 1997.

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Andy began to explain the model outputs. As the group viewed the animations of the lake, it was shown that in the years that the fish kills took place the preferential habitat completely leaves the lake. It was noted that the best match for Lake Murray was temperature less than 27 degrees and DO greater than 2.5 mg/l. Andy explained that now that they have calibrated the model, they can use this criteria as they go forward with their scenarios.

Bill Argentieri noted that since 2000, unit 5 has been operated last on-first off during the summer months. The group discussed that the model scenario now depicted that when unit 5 was run first it conserves the cooler bottom water. Andy noted that one thing that they noticed when running the scenarios where unit 5 was used to pull off the warmer water is that the lake took longer to turn over.

The group discussed scenarios in which to run unit 5. Alan Stuart suggested using unit 5 as first on from January until September 1 and then going to all bottom units. Ron Ahle noted that he believed that it should be tied to a temperature key rather than date. Gerrit Jobsis noted that they may be able to manipulate the temperatures some with the use of unit 5, however they are still going to have DO issues.

Andy further explained a few of the scenarios that he had run using the model. He explained that they looked at pool level management and it was shown that if you use unit 5 first on and then hold the pool level up slightly in the summer (358') you see a little further improvement in preferential habitat. Bill noted that they were experimenting with holding the water level up higher for longer in the summer to accommodate some of the requests of the stakeholders. He continued to explain that holding it higher in September could pose problems because of hurricane season.

Additionally, Andy showed a scenario that depicted the effect if nutrient loading reductions were made. The scenario showed a dramatic positive change in the volume of available habitat throughout the whole lake. Andy explained that the model considered reductions of total phosphorus to .06 in 96 Creek, Bush River, and the Little Saluda. The group realized that the nutrient loading into the Lake was a problem, but agreed to focus on what they could do with respect to project operations. Ron noted that he would be interested to see what unit operation scenario during what times of year would produce the best results for fish habitat.

After lunch, the group discussed what the next steps would be as far as the analysis of data. After much discussion, the group concluded that they suggested running the model with up to date pool level management strategies. Jim and Andy would run the model with two scenarios. The first will start with the lake elevation at 358' from May 1 through August 31, and take it down a foot a month from September 1 through December 31 until it is at 354'. From Jan 1 through April, Jim and Andy

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will figure the pool level to come up a foot a month, as well. The second scenario will start with the lake elevation at 358' from May 1 through August 31, and take it down two feet a month from September 1 through December 31 until it is at 350'. From Jan 1 through April, Jim and Andy will figure the pool level to come up two feet a month, as well. Andy recapped that they will run the altered pool level management scenarios through 6 years and have the outputs from the fish kill and non fish kill years. Jim also suggested that they run a low flow year and the group agreed. The group decided that they will initially run the pool level management scenarios and then decide whether or not to further research unit combinations. Alan asked the group if they felt comfortable with what model runs were being performed. The group replied that they were. Andy noted that all the information will all be summarized in the calibration report

After the modeling discussions, Shane gave a brief update on the ongoing Temperature Study in the lower Saluda and the Congaree. Shane presented the group with graphs in a PowerPoint (*attach website address here*) that depicted the temperature differences in the left and right banks of the river. It was noted that the mixing of water from the Saluda is shown to occur in-between 1-77 and the Congaree National Park.

The group concluded their meeting and it was noted that the next meeting would take place by conference call on May 22, 2007.