MEETING NOTES

SOUTH CAROLINA ELECTRIC & GAS COMPANY
SALUDA HYDRO PROJECT RELICENSING
WATER QUALITY TECHNICAL WORKING COMMITTEE MEETING

SCE&G's Lake Murray Training Center
November 13, 2006

Final jms 11-20-06

ATTENDEES:

Bill Argentieri, SCE&G	Alan Stuart, Kleinschmidt Associates
Shane Boring, Kleinschmidt Associates	Jeni Summerlin, Kleinschmidt Associates
Amanda Hill, USFWS	Ron Ahle, SCDNR
Andy Sawyer, REMI	Jim Ruane, REMI
Reed Bull, Midlands Striper	Roy Parker, LMA

ACTION ITEMS:

- Provide TWC with locations of Jason Bettenger's temperature sensors

Ron Ahle

- Prepare brief work plan for fish kill years/variables to be analyzed in the W2 Model

Jim Ruane

DATE OF NEXT MEETING: **February 13, 2007 at 9:30 a.m.**
Located at the Lake Murray Training Center

MEETING NOTES:

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 Boring opened the meeting at approximately 9:30 AM and welcomed all meeting attendees. He noted that the purpose of today's meeting would be to review: (1) analyses of factors contributing to historical fish kills in Lake Murray, (2) turbine aeration studies and cone valve tests, and (3) summary of the draft W2 Model report.

Shane briefly reviewed action items from the previous meeting and noted that he had contacted John Grego about possible analysis of the temperature data from the Congaree, Broad and lower Saluda river's. He specifically noted that John has a graduate student who would like to use the temperature data as part of her thesis. Bill agreed to share the temperature data with John's Graduate student. Shane enquired as to whether or not Ron Ahle had been in contact with Jason Bettenger about the location of the temperature sensors. Ron indicated that he has not contacted Jason about the location of his temperature sensors, but would do so before the next Water Quality TWC meeting. Jim Ruane noted that he had a hand draft work plan for fish kills in Lake Murray, which include variables that will be analyzed in the W2 Model and would send out an electronic form to committee members as soon as possible. Reed Bull noted that he has compiled dates and relevant data for the Lake Murray striped bass fish kills.

Update on Analyses of Factors Contributing to Historical Fish Kills in Lake Murray
Jim Ruane and Andy Sawyer, Reservoir Environmental Management, Inc.

PowerPoint presentation may be viewed on the Saluda Hydro Relicensing Website.

Jim noted that the analyses of factors contributing to historical fish kills in Lake Murray is a major component of the work plan. He explained that drawdown rates will be examined, as well as sensitivity of striped bass habitat to unit 5 operations. Andy began discussing his presentation on fish kills in Lake Murray and noted that the model will include historical data from 1990-2005. He noted that the model is calibrated for 1992, 1996, 1997, which adjusts the model to represent each year. Jim noted that the adjustments basically make the model more robust to examine each year. Andy presented several graphs detailing Lake Murray surface elevation, average annual flow, cumulative inflow/outflow, forebay temperature and D/O profiles. These graphs were constructed to examine potential correlations of fish kills in Lake Murray. He also presented contour plots with the purpose of describing an array of temperatures and D/O readings throughout Lake Murray (Blacks Bridge to Lake Murray Dam) during summer months. Some committee members seem to

think that there may be a correlation between the low D/O levels in Lake Murray and the high amount of inflow from the Saluda River, which may correspond to the fish kills.
The group briefly discussed D/O levels in the forebay of Lake Murray. Ron mentioned that it may be beneficial to operate Unit 5 during high D/O months (winter), to preserve D/O in the water column; once striped bass habitat is reached, then switch units. He added that releasing colder water may also benefit the trout in the lower Saluda River (LSR). Jim noted that bottom releases in early months may be as critical as releases in later months. Alan noted that Jim is in the process of developing a work plan, which will eventually make recommendations to the committee.

Update on Turbine Aeration Studies and Cone Valve Tests
Jim Ruane

PowerPoint presentation may be viewed on the Saluda Hydro Relicensing Website.

Jim noted that SCE&G has installed hub baffles on Unit 5 to increase D/O in the tailrace. Turbine aeration tests for Units 2, 3, and 4, as well as the cone valve, were performed in the last week of September. Jim began his presentation by discussing the cone valve, which is used to cool condensers at the McMeekin Station. He explained that the cone valve is located just below the powerhouse in the Saluda tailrace and is used for energy dissipation (170 ft water pressure). He displayed a table that presented D/O levels for each unit with different scenarios. He then pointed out the amount of total D/O added by the cone valve. He noted that there was not a significant amount of change in total dissolved gas. He explained that most of the bubbles traveled along the bottom when first discarded in the tailrace; smaller bubbles remained on the bottom while traveling with the current due to buoyancy. Jim noted that if the cone valve was pointed down, it may increase aeration, because it would inject bubbles further into the water column. Reed inquired if there were any limitations on using the cone valve. Bill indicated that the use of the cone valve corresponds to SCDHEC regulation 316 (a), which addresses environmental impacts associated with thermal discharge. Bill explained that SCE&G has to have permission from SCDHEC before releasing any water out of the cone valve. Ron noted that he was concerned about the effect of the high pressure water from the cone valve may have on the banks, in that they may begin to erode.

Jim focused attention on the results of the turbine aeration testing. He explained that for Unit 1, there was a 3.0 mg/L improvement. He specifically noted that each of the Units are sensitive to tailwater elevation. The addition of the new hub baffles on Unit 5 did not prove to increase aeration as expected. He mentioned that Unit 4 was not as beneficial as Unit 1 in that there is about 20% less air flow going into Unit 4. Unit 3 had an even lower quality of aeration than Unit 4. Reed asked if there were any other options for improving turbine aeration for the LSR. Bill noted SCE&G

has a list of options that they are considering, but are first examining environmental targets before any decisions are made.

Summery of Draft W2 Model Report
Jim Ruane/Andy Sawyer

Jim informed committee members that a final draft of the W2 model will be sent out to committee members soon. He explained that one variable has changed in the model, First Order Sediment Oxygen Demand (SOD). There are two types of SOD's, First Order SOD and Zero SOD. The difference between the two is that, zero SOD does not oxidize as fast and is considered to be long term. He explained that First Order SOD has been built into the model and Zero SOD varies from year to year in the model. Draw downs may effect SOD in that it moves organic materials closer into the forebay. He noted that the W2 model is the same just more robust. He noted that a calibration report will be sent out at the end of the month.

Lake Murray Association Water Quality Assessment
Roy Parker, Lake Murray Association

Roy briefly reviewed sampling methods that were used in the Lake Murray Association (LMA) water quality assessment and noted that they recently received the results. He noted that for the month of September, there were elevated levels of phosphorous present. He specifically noted that the reference cove had elevated levels of phosphorous. He asked committee members what they thought could be done about these results. Alan noted that the group was headed into this direction at one point, but SCDHEC stated that they would not issue a TMDL for Lake Murray. Jim mentioned possible explanations for elevated phosphorus levels and specifically noted that in a low flow years, point source pollution can dominate. Jim encouraged LMA to continue collecting water quality samples, in that it may be beneficial for future reference In the discussion of point source pollution, Reed noted that he had talked to the City of Columbia/West Columbia about the historical fish kills in Lake Murray and he was informed that the City of Columbia/West Columbia had problems meeting their water quality standards in 2005.