

**MEETING NOTES**

**SOUTH CAROLINA ELECTRIC & GAS COMPANY  
SALUDA HYDRO PROJECT RELICENSING  
Low Inflow Protocol Focus Group**

**Lake Murray Training Center  
August 19, 2008**

final ACG 10-31-08

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**ATTENDEES:**

Alan Stuart, Kleinschmidt Associates  
Alison Guth, Kleinschmidt Associates  
Scott Harder, SCDNR  
Bill Marshall, LSSRAC, SCDNR  
Ray Ammarell, SCE&G  
Jim Cumberland, SCCCL

Steve Bell, LW  
Bill Argentieri, SCE&G  
Dave Landis, LMA  
Tom Gitto, Midlands Striper Club  
Bret Hoffman, Kleinschmidt Associates

**DATE:** September 19, 2008

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**INTRODUCTIONS AND 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.*

The meeting was opened by Ray Ammarell, and it was noted that they would be reviewing comments from the August 5, 2008 LIP meeting. Ray also continued to note that he would like the group to provide input on the best LIP method to move forward with and how to evaluate the approach. When the floor was opened for discussions, Alan noted that the group needed to develop triggers for the LIP.

The group discussed when to implement the LIP and Ray explained that for a certain period of time the group may want to look at implementing a reduction in outflow adjusted based on an averaging period. Ray continued to explain that, in simulating project operation using actual net inflow from past years, the criteria that he used to identify potential LIP years was: if the reservoir dropped below 90 percent of its target lake level for more than 30 days, then that year became a candidate for the LIP.

The group discussed Gerrit Jobsis's suggestion of not subtracting evaporation in the determination of net inflows. It continued to be explained that Gerrit was concerned that the outflows were being penalized due to the large reservoir's evaporation potential. Dave Landis commented that creating the reservoir also creates the opportunity to control the outflows, of which there are benefits to the downstream concerns. Ray noted that that was valid because the reservoir does bank water that provides for the opportunity to regulate or maintain the flow downstream. Ray continued to explain that the USGS performed a study on reservoirs in South Carolina and found that overall reservoirs

boosted the low flow. The group discussed inflows, and conferred upon whether they should be calculated as gross inflow minus evaporation, gross inflow minus municipal withdrawals, or a combination of these. Bill Argentieri noted that if evaporation was not taken out of the equation, then they needed to set some sort of low lake level limit so that enough water was maintained in the reservoir to provide downstream flows. This is termed a “stop loss”. Steve Bell noted that when the lake drops one foot below the guide curve then the downstream flows should be reduced in order to let the lake return to the guide curve. Alan explained that Dick Christie had noted in one of the meetings that there was plenty of water in the lake, and there was no reason why the downstream flows should be compromised until a significant drop in lake level occurred.

Dave explained that people were going to ask if the river is healthy at a 180 cfs outflow for a low flow, and the higher downstream flows can be provided for most of the time. Furthermore, Dave noted that as in nature, the dynamics of the river are such that they adapt. Alan gave the example that there was recently a mussel survey in the LSR, and no mussels were found. Alan continued to note that they were unsure as to whether this was due to flow, water temperature, or low DO, but there were mussels in the Broad/Congaree. Bill Marshall added that the goal of setting minimum flow was to enhance and improve the aquatic habitat. Steve replied that he believes that the 700 cfs would meet all of the downstream needs, however if the outflows exceeded the inflows, then the lake habitat is being affected. Ray noted that based on what he has looked at, the 1,300 cfs flow request is during the high flow period of the year. Ray also explained that during normal years, one will find very few times where there are problems in the April/May timeframe.

Steve Bell questioned the group as to what was wrong with the 400 cfs level at all times during a LIP. He continued to note that if the Lake was dropping off of the guide curve than 700 cfs should not be provided. Jim Cumberland noted that the CCL and American Rivers believed that the 400 cfs level was the “floor”, however they would like to not have to reach the 400 cfs level.

The group discussed the inflow splitting method of the LIP. It was noted that at the last meeting the group discussed whether or not to subtract evaporation from inflows in order to determine whether or not an LIP should be implemented. It was reiterated that at the previous meeting, American Rivers had noted that they would like for evaporation not to be subtracted from inflows. Dave noted that there may be the need for a study to determine the economic impacts to the lake due to the balance of water. Alan noted that DNR typically does annual surveys in the reservoir in order to determine the general health of the reservoir. Furthermore, from a biological perspective, there are most likely not negative impacts of existing operations, relatively stable lake levels are typically what the reservoir needs.

Bret Hoffman presented information on the alternatives requested by Gerrit, which included the number of days spent in the LIP zones, based on the previous LIP proposal. Bret explained that they were trending towards the inflow splitting proposal, however, due to the fact that the initial LIP proposal is very cumbersome. The group noticed some items to be corrected in the information and moved on to discuss the Zone of Passage.

Bret presented information on the alternatives presented by Gerrit, the number of days spent in the zones, based on previous LIP proposal. Bill Argentieri explained that they are trying to move away from this first LIP proposal because it is very cumbersome, and move towards inflow splitting. The group noticed some items for questions, and moved to the LIP Pulse Flows for Zone of Passage (ZOP).

Alan discussed the ZOP with the group and explained that there was an IFIM study back in the early 80's and it was determined that Millrace Rapids was the most restrictive area for the passage of fish. Alan continued to explain that based on the criteria that was developed when DNR developed an instream flow policy, there was a certain depth and width that the striped bass needed in order to move upstream. It was further explained that the most recent IFIM confirmed this criteria. The group continued to discuss this issue, and it was noted that the driver for the 1,300 cfs was the criteria for fish passage through this area. It was shown that a higher pulse of water would provide good results due to less attenuation and use less water because it would be for a shorter period of time. Alan also pointed out that the interest was in more species than striped bass; the needs of striped bass were simply what the criteria was developed from.

The group discussed that as weather patterns change there may be a need to amend the LIP. Alan noted that it was important to have a set procedure, however to also have the flexibility to alter it if conditions change in the future. The group discussed 5 or 10 year increment review periods for this purpose.

Steve Bell began discussions on the LMHOC/LW proposal. He noted that he believed that SCE&G should have some flexibility in the 700 and 1300 cfs increments. Steve explained that the LMHOC proposal notes that when the lake level drops one foot below 358' then the downstream flows are cut back to 400 cfs, then as the lake rises more water is released downstream in the April/May time period.

The group continued to discuss the inflow splitting LIP proposal. Ray explained that the averaging period was a good method because it has the effect of smoothing out fluctuations in inflow. After lunch, Ray explained the inflow scaling and pointed out that scaled inflow accounts for the whole drainage area as it takes the sum of the three gages and adjusts it for the whole watershed. Ray also presented the group with evaporation values and municipal use values from Lake Murray. Ray showed that many times when evaporation and municipal withdrawals are subtracted from inflows, negative inflows are produced.

Ray then asked the group which approach to pursue: a reservoir driven LIP, or the inflow driven with "stop loss" reservoir limit. It was noted that an inflow driven LIP is what the group was leaning towards. Jim noted that he would check with Gerrit on the inflow driven LIP, and Scott Harder noted that he would check with Bud. The group also discussed a "stop loss" reservoir limit. Bill explained that the "stop loss" would be implemented when the LIP was in effect and the reservoir drops below 354'. Dave agreed that there was a point when lake level needed to be considered, however, he believed the 354 was too low.

The group discussed whether or not it was meaningful to look at upstream and downstream impacts for a certain number of days. Jim noted it was a good illustration, but it may not be meaningful. The group tabled the evaluation of upstream vs. downstream impacts. The group then discussed pulsing of flows in an LIP. Ray noted that during the 30 day period of April 15 to May 14 then:

- If inflows were  $\geq$  1,300 then outflows would be  $\geq$  1,300
- If inflows were  $\leq$  1,000 then outflows would = 700 with 2, 3,000 cfs pulses for 1.5 hours a day

- If inflows were < or equal to 700 than outflows would be 500 with 1, 3,000 cfs for 1.5 hours a day
- If inflows were < or equal to 400 than Outflows would equal 400 with no pulsing.

Bill A. asked what happened when inflows were between 1,300 and 1,000. Ray replied that 1,300 is still released, that way it is not affected by the little dips in inflow. Bill M. asked that if SCE&G was going to generate 10,000 cfs one evening for reserve, if they would get into averaging for the minimum flows, as that was not desirable. Ray responded that they wouldn't, but asked if a reserve call could count for a pulse of water in the LIP. Bill A. noted that the pulses were at dawn and/or dusk. Alan noted that if it overlaps a dawn or dusk pulse then SCE&G should receive credit for it.

Jim Cumberland asked Ray to run a 45 day average for comparison. The group decided that a 14 day, 20 day, and 45 day should be looked at. Scott noted he would like to see the plots of the lake level with that. Dave also suggested adding in a stop loss trigger for 1 foot below 358' for the 30 and 60 day periods. The group also noted that they would like to view the plots that showed what the outflow was versus the inflow.

The group adjourned and scheduled the next meeting date for September 19<sup>th</sup>.