Kacie Jensen

From: Alison Guth
Sent: Friday, December 23, 2005 11:33 AM
To: BARGENTIERI@scana.com; 'SUMMER, STEPHEN E'; Shane Boring; RMAHAN@scana.com; 'dengff@aol.com'; 'royparker38@earthlink.net'; 'dchristie@infoave.net'; 'Gina Kirkland'; 'millerca@dhec.sc.gov'; 'McKellarH@dnr.sc.gov'; 'marshallb@dnr.sc.gov'; 'bellsteve9339@bellsouth.net'; 'amanda_hill@fws.gov'; 'RESKKEENER@PBTCOMM.Net'; 'tbowles@scana.com'; 'bbull@sc.rr.com'; 'kayakduke@bellsouth.net'; 'PatrickM@scccl.org'; 'bill_hulslander@nps.gov'; 'Jeff_Duncan@nps.gov'; 'ahler@dnr.sc.gov'
Subject: Nov. 9th final meeting notes

Hello All:

Attached to this email is the final copy of the November 9th Water Quality RCG Meeting Notes. Thanks to all for your participation and comments. I hope everyone has a wonderful holiday weekend. ~ Alison

2005-11-09 draft Meeting Minut...

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MEETING NOTES

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

SCE&G Training Center
November 9, 2005

Draft 11-30-05 acg

ATTENDEES:

Alan Stuart, Kleinschmidt Associates
Alison Guth, Kleinschmidt Associates
Bill Argentieri, SCE&G
Steve Summer, SCANA Services
Shane Boring, Kleinschmidt Associates
Randy Mahan, SCANA Services
Donald Eng, Trout Unlimited
Roy Parker, LMA
Dick Christie, SCDNR
Gina Kirkland, SCDHEC
Andy Miller, SCDHEC
Hank McKellar, SCDNR
Bill Marshall, SCDNR & LSSRAC
Steve Bell, Lake Watch
Amanda Hill, USFWS
Bob Keener, LMA & LMSCA
Tom Bowles, SCE&G
Reed Bull, Midlands Striper Club
George Duke, LMHOC
Patrick Moore, SCCCL, Am. Rivers
Bill Hulslander, Congaree National Park
Jeff Duncan, National Park Service
Ron Ahle, SCDNR

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  Gina Kirkland
- Presentation: Status on impaired areas within Lake Murray
  Andy Miller
- Presentation: A Review of 25 years of Water Quality in Lake Murray
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- A Review of the Site-Specific Dissolved Oxygen Standard
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DATE OF NEXT MEETING: **December 7, 2005 at 9:00 a.m. (Combined Meeting with Fish and Wildlife Resource Group)**
Located at the Saluda Shoals Park Rivers Center

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.

INTRODUCTIONS

Alan opened the meeting and began introductions. Alan pointed out that in answer to many questions that had come up, the FERC Representative for the Saluda Hydro Project is Allan Creamer.

DISCUSSION

Alan began by commenting on the draft Operational Procedures and asked the group if everyone had received a copy. He then noted that some comments were received from Patrick Moore. Patrick then proceeded to read a list of the co-signing parties. Alan also noted that comments were received from Bill Marshall of the LSSRAC as well.

Alan then pointed out that one of the recommendations that has been tabled is the development of a procedures group. He noted that he believes that some of the NGOs are in the process of developing an internal group.

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The group then began to discuss what needed to be included into the mission statement. The following is some of the dialogue that went on between members of the group:

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Don Eng: "From fishing experience, the trout have been affected by the few days of low DO."

Gina Kirkland replied, "We were aware and concerned about that and we have issued them a letter and they have replied and a lot of the time there are reasons for the low DO."

Steve Summer pointed out, "A list of action items we first need to do is to look at the applicable standards for LM and the LSR….DO, metals, phosphorus, etc. In order to know where we are. Then look at the standards and see which of the standards are not being met currently. Then we need to focus on those areas and identify the mechinisms for improving those areas. I think we can also have a goal for improving WQ. I think we could spend months discussing whether the trout are happy or not, but if we can work on getting the standards met at least gives us something to shoot at."

Steve Summer added, "We did some electro-fishing on the river after the low DO, and there are still decent populations of fish."

Gina Kirkland noted, "The classifications we are talking about is Freshwater on lake, and right below the lake is Trout Put Grow and Take, and that class has a number assigned to it and a site specific standard. Meaning, that this is not a natural trout area. And three things important to trout are clarity, cold water and DO. And what we are trying to protect is the regular aquatic biology, as well as the Put Grow and Take, not a natural trout population."

Randy Mahan noted, "We also need to look at a goal of developing a common understanding of things. We are going to have these technical working committees that are getting into the nitty gritty of things, and I think it is really important that we all become educated in this process."

Jeff Duncan noted that he thought that it would be helpful if Gina gave a presentation on Standards and Classifications and 401 standards. He requested that part of it would include Gina and the Applicant's view of the 401 Water Quality Certification Process.

Patrick Moore pointed out that in discussions with Bill Argentieri it was noted that not all of the violations as seen on the USGS site are actually violations, some are just bad data. He noted that it might be good for Bill or Lee to go through the violations noting which ones were actually violations versus bad data or operational obligations.

Randy Mahan replied, " I don't know if we want to do that every time. Each week Ray puts out an update on operations with a link to the USGS Preliminary data and it gives you a snapshot as to what has been going on."

Alan Stuart noted, "SCE&G is required to prepare an annual operations report every year as a Settlement with the SCCCL, one thing that is a problem is that the monitor fouls quite frequently."

Steve Summer added, "USGS maintains two monitors on the LSR, one immediately below the dam and one upstream of the zoo. They will routinely go out and service the instrumentation, but during this time of the year the monitors tend to foul frequently. USGS will often contact me and I will go out and look at them. If he goes out and finds that that monitor is reading 2 or 3 mg/l below the norm then usually he will bring it up. If you are looking at the data and you see a lot of jumping around, it is usually fouling. Another issue is the location of the USGS monitor below the dam. There is a large rock that interrupts the flow. We've been doing testing in order to see whether there is a better place for it."

Gina Kirkland: "It is extremely hard to maintain a continuous DO meter."

George Duke noted, "I think we need to know what the reasonable expectations are. A population of fish below the dam would be a reasonable expectation."

Steve Summer replied, "You would think the standards would address that."

Gina Kirkland replied, "I can gear my presentation to do that. And the LSR could not be a location for a reproducing trout population. There is not location for them to lay eggs. Understand that if you do see a dead fish occasionally, I mean they do die. Overall the biological community is healthy in Lake Murray and the LSR."

Bob Keener noted, "A non-technical concern I have, on the DO sensors we have, should there be additional sensors, more than two? How expensive are they, and are there new sensors out that would not have the problems that those have now."

Randy Mahan replied, "The license requires that USGS has monitor data. That is one reason we prefer to have USGS to do that, because they are more likely to be believed and they do a great job."

Steve Summer explained, "USGS uses two different brands: Hydrolab and YSI. The Hydrolab has a stirrer which would get jammed with vegetation. YSI has been installed, and those have been having membrane problems. We have now been looking at a new portable unit that costs about 10,000 dollars. Right now USGS will not use any sensors that are not tested at their lab. This new sensor has not been tested at their testing facility yet, but may be tested in the future. They are working with us and we are trying to figure out the best location of a sensor."

Gina Kirkland, "If we wanted to make a suggestion that you do install more monitors would you have an objection."

Randy Mahan, "No we do not have an objection to the idea of putting more out there. If our operation is driven by science, then we should have the best data to govern our operations. The only problem, besides the money, is that if you do have a USGS station out there and we start getting different readings does that help the situation, or make the problem worse."

Jeff Duncan pointed out, "I think we have identified an issue here, the issue is that more DO meters are needed. USGS funds are tight."

Steve Summer responded, "We fund the USGS monitors they have now."

Steve Bell pointed out, "I think one of the goals should be to review the data on the current conditions of WQ on the lake. I think it is important to see what they are saying and why and then go back and see what we need to improve."

Alan Stuart noted, "If you go to the back of the ICD, there is a comprehensive report that addresses phosphorus issues etc. I am going to propose this as a HW assignment. One of the things I was going to propose is to have Jim Ruane come down and explain the W2 Model. He did his report on the nutrients on LM."

Gina Kirkland noted, "Jim even got DMR data off of discharges upstream."

Randy Mahan noted that he would be happy to put a straw man mission statement out there but I would be glad to give it a shot. He noted that he didn't want it to appear that SCE&G is doing this whole thing but if the group would like him to, then he would.

Steve Bell asked if the group could add to the draft to which Randy and Alan noted that they certainly could.

The group began to discuss the objective of the Water Quality RCG. Randy Mahan noted that the objective is to get to a license application and a desired outcome is a settlement agreement or an agreement that the issues that have come up will be addressed in a certain way. He noted that when the application is filed it will include these agreed upon items.

Gina Kirkland noted, "Our expectation is that at the point you apply for 401, that you can demonstrate how the WQ standards are going to be achieved. And this group is one of the ways that we can get to this point."

Ron Ahle, "I think what we would like to do is identify areas of potential problems and see if we can change any of the areas to remedy a problem that exists."

Gina Kirkland pointed out, "There may be problems that are beyond the scope of a licensing issue, that are outside SCE&G's control."

Randy Mahan noted that it needs to be what SCE&G can have a material and direct impact on.

BREAK

Alan Stuart noted that at the break, he was talking with Jeff, who noted that the group may want to come up with a work plan. He noted that a workplan will be an assignment for himself or SCE&G.

Alan then noted, "We have 2 presentations that people would like to see. Are there any other presentations you would like to see?"

Patrick Moore replied, "A presentation on the statutory articles, regulatory articles."

Alan Stuart pointed out, "We do have an ex FERC employee at our company maybe she could come down."

Jeff Duncan: "I think that there are current trends and interpretations that FERC uses right now."

Steve Bell: "I think FERC could come down in every group."

Alan Stuart pointed out, "I think we should have one big meeting."

Dick Christie noted, "Include a discussion of baseline in the FERC meeting."

Steve Bell suggested, "I think we should have a presentation on the trout growth study that was performed"

Jeff Duncan added, "I think it is important in terms of understanding the history of this, in terms of developing context."

George Duke pointed out, "We may want to do a joint meeting of WQ and Fisheries when we do the WQ presentations.

The group agreed and an all day educational combined meeting was set up.

LUNCH

After lunch the group discussed the straw man Mission Statement that the group drew up during lunch.

Randy Mahan read the mission and noted that one of the thoughts that went into the writing of the mission statement was that the quality of the water flowing into Lake Murray as that water quality/nutrients cannot be materially controlled by the operation of Saluda Hydro..

Gina Kirkland noted that she understands why you would want to make recommendations to things outside the impact of SCE&G to agencies, however we want to make sure that it discusses what we can do relevant to the project.

Patrick Moore read his version of the mission statement and the group discussed.

Jeff Duncan noted that Randy's version tended to be focused toward the LSR, and that there were also concerns further downstream.

Don Eng noted that the issues he was concerned about are those that SCE&G is having on the system.

Randy Mahan explained that the source of the problem needed to be dealt with, not to requiring SCE&G to treat the problems that are originated elsewhere. He noted that SCE&G was not a wastewater treatment plant. He noted that he feared that SCE&G was going to be required to put oxygenation in when it would better be treated at the point source.

Steve Bell asked, "Are we having problems because there are nutrients coming in from the outside or just because the lake is there and is causing a buildup?"

Alan Stuart: "In the W2 model you will get an understanding of this process. There are two wastewater discharge facilities that produce 70% of the nutrient input into Lake Murray."

Gina Kirkland added, "And do understand that the dept. is worrying about putting phosphorus controls in place, but it will take a while. All of that in terms of implementing it, etc., will take a while and then, once it is in place, it will be a while before we see results."

Randy Mahan noted that we should mull over and merge the two mission statements.

Gina Kirkland noted, "There is one other issue, if you have insufficient quantity of water then you are not going to have a healthy environment. I would like to see that the quantity of water also be included in the statement."

The group discussed that they would like to reach agreement in terms of a settlement as the goal of the group.

Randy Mahan noted he would like to amalgamate them and then send out from there.

The group decided that the next meeting will be on December 7th.

The agenda would include Gina's presentation on water quality standards and classifications for the lake and downstream. Jim Ruane will give a presentation on W2 model. Andy Miller will give an update on current water quality status on the lake in the river. And Jim will give a historical assessment of data that was collected for W2.

LEE'S PRESENTATION

Lee's Powerpoint Presentation of Saluda Hydro System Control can be viewed through the website as well as through the November 1st Operations meeting notes. The following is a summary of the questions posed during his presentation:

Jeff Duncan, "Do you have gas turbines."

Lee Xanthakos, "Yes, we have two kinds of gas turbines, one which shoots fuel in a jet type engine turbine, and a combined cycle turbine that contains a mechanism that captures the steam off the turbine."

Steve Bell: "How long does it take the Jasper facility to come online?"

Lee noted that it was a complicated question to answer because it could take from 1 hour to 8 hours depending on what was online at the time.

Steve Bell asked if VC Summer was either 1000 MW on or off, or was there an in between.

Lee noted that although they can run it lower, it is not beneficial to do so unless something is wrong, such as a pump is out or Lake Monticello's water is not cool enough.

Steve Bell: "So when it is not running at 1000 then you will have to use something else to make up that power."

Lee: "Yes, but out of 18 months I would guess it would only be out for about 6 hours."

In discussions on the operational requirements of Fairfield Pump Storage, Lee noted that it was a requirement that the Broad River could not already have a flows surpassing 40,000 cfs. Jeff Duncan asked, "How many times a year does the environmental factors such as too much flow happen."

Lee noted that it usually happens between 4 and 10 times a year.

Don Eng then asked, "Why is it when the broad is flooding, you open the gates at Saluda, and add more water."

Lee Xanthakos replied, "Well if the Broad River is flooding it is very likely that the Saluda is flooding also, and you do not want the Lake coming up to fast."

In a discussion on buying power Jeff Duncan noted that he did not understand how the power came in once it was purchased from another company.

Lee explained, "You create inadvertent flow. What happens is a marketer finds where you can buy the electricity and creates the lease for 1 hour for the amount of power. When the hour comes, the company you are buying from ramps up the generation while SCE&G ramps down its generation in order to create a hole and the electricity finds the path of least resistance to fill that hole."

Bob Keener asked, "What would happen if a storm came and the lake came up very fast."

Lee replied, "If there is a storm that is projected to come across our path we start to generate before the storm gets here."

Bill Argentieri added, "We have a flood forecasting model and it will help us develop scenarios based upon weather service data and we decide how much we need to generate in order to get the lake down."

Randy Mahan also explained, "When it comes to opening the spillway gates we have a agreement with the Public Service Commission that we not waste water unless it is a condition that is in the license, it is like shoveling coal in the trashcan, and if the public service commission decides we were not prudent with our generation, they will not let us recover some of our costs.

Andy Miller, "When are you in danger of a major rolling blackout."

Lee Xanthakos replied, "There are days when our systems are stressed such as when it is really hot or really cold and we have everything running, and everyone else has everything running, and a nuclear station trips. A blackout occurs when everyone is under-generating by a certain amount."

Jeff Duncan: "A rolling blackout is what happens on purpose."

Lee replied, "Yes when we know we can't buy power."

Ron Ahle asked, "Are there any plans to look at alternative energy generation, something that will come on quickly and reliable."

Lee replied, "We do have a group that is looking at those alternatives. But you have to think that it is not always sunny to use solar power and it is not always windy, and every single type of plant has its problem, if it is not the trout folks worrying about the trout then it is the bird folks worrying about the birds that are getting hurt in the wind generators."

Randy Mahan replied, "The main problem I see with alternative power is there always has to be something that will back them up if it is not sunny or windy."

Reed Bull asked, "What is the cheapest electrify you produce, nuclear?"

Randy Mahan replied, "Overall yes, in the amount of kilowatt hours, most of it comes out of VC Summer nuclear."

Ron Ahle added, "So if you built another nuclear power plant it would just be another 1000 base load."

Randy Mahan replied, "Yes, but you would still have to have reserves."

Meeting adjourned at 3:45.

Kacie Jensen

From: Alison Guth
Sent: Wednesday, December 21, 2005 2:00 PM
To: BARGENTIERI@scana.com; 'SUMMER, STEPHEN E'; Shane Boring; RMAHAN@scana.com; 'dengff@aol.com'; 'royparker38@earthlink.net'; 'dchristie@infoave.net'; 'Gina Kirkland'; 'millerca@dhec.sc.gov'; 'McKellarH@dnr.sc.gov'; 'marshallb@dnr.sc.gov'; 'bellsteve9339@bellsouth.net'; 'amanda_hill@fws.gov'; 'RESKKEENER@PBTCOMM.Net'; 'tbowles@scana.com'; 'bbull@sc.rr.com'; 'kayakduke@bellsouth.net'; 'PatrickM@scccl.org'; 'bill_hulslander@nps.gov'; 'Jeff_Duncan@nps.gov'; 'ahler@dnr.sc.gov'
Subject: Draft Nov. 9th Meeting notes

Good Afternoon All,

Comments on the November 9th Water Quality Meeting Notes were due back on December 16th. I would like to have these posted by the end of this week, so if you have any comments please forward them to my by the close of business tomorrow. Thanks for your time and thanks to all of you who have already provided comment. Happy Holidays, Alison

2005-11-09 draft Meeting Minut...

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Alan Stuart noted, "If you go to the back of the ICD, there is a comprehensive report that addresses phosphorus issues etc. I am going to propose this as a HW assignment. One of the things I was going to propose is to have Jim Ruane come down and explain the W2 Model. He did his report on the nutrients on LM."

Gina Kirkland noted, "Jim even got DMR data off of discharges upstream."

Randy Mahan noted that he would be happy to put a straw man out there but I would be glad to give it a shot. He noted that he didn't want it to appear that SCE&G is doing this whole thing but if the group would like him to, then he would.

Steve Bell asked if the group could add to the draft to which Randy and Alan noted that they certainly could.

The group began to discuss the objective of the Water Quality RCG. Randy Mahan noted that the objective is to get to a license application and a desired outcome is a settlement agreement or an agreement that the issues that have come up will be addressed in a certain way. He noted that when the application is filed it will include these agreed upon items.

Gina Kirkland noted, "Our expectation is that at the point you apply for 401, that you can demonstrate how the WQ standards are going to be achieved. And this group is one of the ways that we can get to this point."

Ron Ahle, "I think what we would like to do is identify areas of potential problems and see if we can change any of the areas to remedy a problems that exist."

Gina Kirkland pointed out, "There may be problems that are beyond the scope of a licensing issue, that are outside SCE&G's control."

Randy Mahan noted that it needs to be what SCE&G can have a material and direct impact on.

BREAK

Alan Stuart noted that at the break, he was talking with Jeff, and noted that the group may want to come up with a work plan. He noted that a workplan will be an assignment for himself or SCE&G.

Alan then noted, "We have 2 presentations that people would like to see. Are there any other presentations you would like to see?"

Patrick Moore replied, "A presentation on the statutory articles, regulatory articles."

Alan Stuart pointed out, "We do have an ex FERC employee at our company maybe she could come down."

Jeff Duncan: "I think that there are current trends and interpretations that FERC uses right now."

Steve Bell: "I think FERC could come down in every group."

Alan Stuart pointed out, "I think we should have one big meeting."

Dick Christie noted, "Include a discussion of baseline in the FERC meeting."

Steve Bell suggested, "I think we should have a presentation on the trout growth study that was performed"

Jeff Duncan added, "I think it is important in terms of understanding the history of this, in terms of developing context."

George Duke pointed out, "We may want to do a joint meeting of WQ and Fisheries when we do the WQ presentations.

The group agreed and an all day educational combined meeting was set up.

LUNCH

After lunch the group discussed the straw man Mission Statement that the group drew up during lunch.

Randy Mahan read the mission and noted that one of the thoughts that went into the writing of the mission statement was that the quality of the water flowing into Lake Murray as that water quality/nutrients cannot be materially controlled by the operation of Saluda Hydro..

Gina Kirkland noted that she understands why you would want to make recommendations to things outside the impact of SCE&G to agencies, however we want to make sure that it discusses what we can do relevant to the project.

Patrick Moore read his version of the mission statement and the group discussed.

Jeff Duncan noted that Randy's version tended to be focused toward the LSR, and that there were also concerns further downstream.

Don Eng noted that the issues he was concerned about are those that SCE&G is having on the system.

Randy Mahan explained that the source of the problem needed to be dealt with, not to requiring SCE&G to treat the problems that are originated elsewhere. He noted that SCE&G was not a wastewater treatment plant. He noted that he feared that SCE&G was going to be required to put oxygenation in when it would better be treated at the point source.

Steve Bell asked, "Are we having problems because there are nutrients coming in from the outside or just because the lake is there and is causing a buildup?"

Alan Stuart: "In the W2 model you will get an understanding of this process. There are two wastewater discharge facilities that produce 70% of the nutrient input into Lake Murray."

Gina Kirkland added, "And do understand that the dept. is worrying about putting phosphorus controls in place, but it will take a while. All of that in terms of implementing it, etc., will take a while and then, once it is in place, it will be a while before we see results."

Randy Mahan noted that we should mull over and merge the two mission statements.

Gina Kirkland noted, "There is one other issue, if you have insufficient quantity of water then you are not going to have a healthy environment. I would like to see that the quantity of water also be included in the statement."

The group discussed that they would like to reach agreement in terms of a settlement as the goal of the group.

Randy Mahan noted he would like to amalgamate them and then send out from there.

The group decided that the next meeting on December 7th.

The agenda would include Gina's presentation on water quality standards and classifications for the lake and downstream. Jim Ruane will give a presentation on W2 model. Andy Miller will give an update on current water quality status on the lake in the river. And Jim will give a historical assessment of data that was collected for W2.

LEE'S PRESENTATION

Lee's Powerpoint Presentation of Saluda Hydro System Control can be viewed through the website as well as through the November 1st Operations meeting notes. The following is a summary of the questions posed during his presentation:

Jeff Duncan, "Do you have gas turbines."

Lee Xanthakos, "Yes, we have two kinds of gas turbines, one which shoots fuel in a jet type engine turbine, and a combined cycle turbine that contains a mechanism that captures the steam off the turbine."

Steve Bell: "How long does it take the Jasper facility to come online?"

Lee noted that it was a complicated question to answer because it could take from 1 hour to 8 hours depending on what was online at the time.

Steve Bell asked if VC Summer was either 1000 MW on or off, or was there an in between.

Lee noted that although they can run it lower, it is not beneficial to do so unless something is wrong, such as a pump is out or Lake Monticello's water is not cool enough.

Steve Bell: "So when it is not running at 1000 then you will have to use something else to make up that power."

Lee: "Yes, but out of 18 months I would guess it would only be out for about 6 hours."

In discussions on the operational requirements of Fairfield Pump Storage, Lee noted that it was a requirement that the Broad could not already have a flows surpassing 40,000cfs. Jeff Duncan asked, "How many times a year does the environmental factors such as too much flow happen."

Lee noted that it usually happens between 4 and 10 times a year.

Don Eng then asked, "Why is it when the broad is flooding, you open the gates at Saluda, and add more water."

Lee Xanthakos replied, "Well if the broad is flooding it is very likely that the Saluda is flooding also, and you do not want the Lake coming up to fast."

In a discussion on buying power Jeff Duncan noted that he did not understand how the power came in once it was purchased from another company.

Lee explained, "You create inadvertent flow. What happens is a marketer finds where you can buy the electricity and creates the lease for 1 hour for the amount of power. When the hour comes, the company you are buying from ramps up the generation while SCE&G ramps down its generation in order to create a hole and the electricity finds the path of least resistance to fill that hole."

Bob Keener asked, "What would happen if a storm came and the lake came up very fast."

Lee replied, "If there is a storm that is projected to come across our path we start to generate before the storm gets here."

Bill Argentieri added, "We have a flood forecasting model and it will help us develop scenarios based upon weather service data and we decide how much we need to generate in order to get the lake down."

Randy Mahan also explained, "When it comes to opening the spillway gates we have a agreement with the NPSC that we not waste water unless it is a condition that is in the license, it is like shoveling coal in the trashcan, and if the public service commission decides we were not prudent with our generation, they will not let us recover some of our costs.

Andy Miller, "When are you in danger of a major rolling blackout."

Lee Xanthakos replied, "There are days when our systems are stressed as in it is really hot or really cold and we have everything running, and everyone else has everything running, and a nuclear station trips. A blackout occurs when everyone is under-generating by a certain amount."

Jeff Duncan: "A rolling blackout is what happens on purpose."

Lee replied, "Yes when we know we can't buy power."

Ron Ahle asked, "Are there any plans to look at alternative energy generation, something that will come on quickly and reliable."

Lee replied, "We do have a group that is looking at those alternatives. But you have to think that it is not always sunny to use solar power and it is not always windy, and every single type of plant has its problem, if it is not the trout folks worrying about the trout then it is the bird folks worrying about the birds that are getting hurt in the wind generators."

Randy Mahan replied, "The main problem I see with alternative power is there always has to be something that will back them up if it is not sunny or windy."

Reed Bull asked, "What is the cheapest electrify you produce, nuclear?"

Randy Mahan replied, "Overall yes, in the amount of kilowatt hours, most of it comes out of VC Summer nuclear."

Ron Ahle added, "So if you built another nuclear power plant it would just be another 1000 base load."

Randy Mahan replied, "Yes, but you would still have to have reserves."

Meeting adjourned at 3:45.

Cheryl Balitz

From: Alison Guth [mailto:Alison.Guth@KleinschmidtUSA.com]
Sent: Thursday, December 01, 2005 5:01 PM
To: ARGENTIERI, WILLIAM R; SUMMER, STEPHEN E; Alan Stuart; Shane Boring; MAHAN, RANDOLPH R;
'dengff@aol.com'; 'royparker38@earthlink.net'; 'Dick Christie'; 'Gina Kirkland';
'millerca@dhec.sc.gov';
'marshallb@dnr.sc.gov'; 'bellsteve9339@bellsouth.net'; 'Hank McKellar'; 'marshallb@dnr.sc.gov';
'bellsteve9339@bellsouth.net'; 'Amanda Hill'; 'RESKKEENER@PBTCOMM.Net'; BOWLES, THOMAS M;
'bbull@sc.rr.com'; 'kayakduke@bellsouth.net'; 'PatrickM@scccl.org'; 'bill_hulslander@nps.gov';
'Jeff_Duncan@NPS.gov'; 'ahler@dnr.sc.gov'
Subject: Draft November 9th Meeting Notes
Good Evening All,
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meeting notes to me before or after the combined RCG meeting next Wednesday. Thanks for your time, and as
always, feel free to email me with any questions. ~Alison
<<2005-11-09 draft Meeting Minutes - WQ.doc>>

Alison Guth
Licensing Coordinator
Kleinschmidt Associates
101 Trade Zone Drive
Suite 21A
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Kacie Jensen

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To: BARGENTIERI@scana.com; 'SUMMER, STEPHEN E'; Alan Stuart; Shane Boring; RMAHAN@scana.com; 'dengff@aol.com'; 'royparker38@earthlink.net'; 'Dick Christie'; 'Gina Kirkland'; 'millerca@dhec.sc.gov'; 'marshallb@dnr.sc.gov'; 'bellsteve9339@bellsouth.net'; 'Hank McKellar'; 'marshallb@dnr.sc.gov'; 'bellsteve9339@bellsouth.net'; 'Amanda Hill'; 'RESKKEENER@PBTCOMM.Net'; 'tbowles@scana.com'; 'bbull@sc.rr.com'; 'kayakduke@bellsouth.net'; 'PatrickM@scccl.org'; 'bill_hulslander@nps.gov'; 'Jeff_Duncan@NPS.gov'; 'ahler@dnr.sc.gov'
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MEETING NOTES

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

SCE&G Training Center
November 9, 2005

Draft 11-30-05 acg

ATTENDEES:

Alan Stuart, Kleinschmidt Associates
Alison Guth, Kleinschmidt Associates
Bill Argentieri, SCE&G
Steve Summer, SCANA Services
Shane Boring, Kleinschmidt Associates
Randy Mahan, SCANA Services
Donald Eng, Trout Unlimited
Roy Parker, LMA
Dick Christie, SCDNR
Gina Kirkland, SCDHEC
Andy Miller, SCDHEC
Hank McKellar, SCDNR
Bill Marshall, SCDNR & LSSRAC
Steve Bell, Lake Watch
Amanda Hill, USFWS
Bob Keener, LMA & LMSCA
Tom Bowles, SCE&G
Reed Bull, Midlands Striper Club
George Duke, LMHOC
Patrick Moore, SCCCL, Am. Rivers
Bill Hulslander, Congaree National Park
Jeff Duncan, National Park Service
Ron Ahle, SCDNR

DATE: November 9, 2005

HOMEWORK ITEMS:

- Go through list of study requests.
- Review the ICD and the water quality report at the back of the ICD.

AGENDA TOPICS FOR NEXT MEETING:

- Presentation: Water Quality Standards and Classifications of Lake Murray and the Lower Saluda River
  Gina Kirkland
- Presentation: Status on impaired areas within Lake Murray
  Andy Miller
- Presentation: A Review of 25 years of Water Quality in Lake Murray
  Jim Ruane - Reservoir Environmental Management

- A Review of the QUAL 2 -E Water Quality Model and its Application to Lake Murray
  Jim Ruane
- A Review of the Site-Specific Dissolved Oxygen Standard
  Alan Stuart/Shane Boring

DATE OF NEXT MEETING: **December 7, 2005 at 9:00 a.m. (Combined Meeting with Fish and Wildlife Resource Group)**
Located at the Saluda Shoals Park Rivers Center

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.

INTRODUCTIONS

Alan opened the meeting and began introductions. Alan pointed out that in answer to many questions that had come up, the FERC Representative for Saluda was Allan Creamer.

DISCUSSION

Alan began by commenting on the draft Operational Procedures and asked the group if everyone had received a copy. He then noted that some comments were received from Patrick Moore. Patrick then proceeded to read the co-signing parties. Alan also noted that comments were received comments from Bill Marshall of the LSSARC as well.

Alan then pointed out that one of the recommendations that has been tabled is the development of a procedures group. He noted that he does believe that some of the NGOs are in the processes of developing an internal group.

Patrick Moore pointed out, "Yes we have drafted a second set of comments and will develop an informal group."

Alan Stuart then asked, "Are there any questions in regard to the procedures. The revisions will be circulated after we receive Patrick's second set."

Alan then switched gears to discuss the development of a mission statement for the group. "One thing that we have done in the other RCGs is develop mission statements. Bill Cutler mentioned

three things necessary in achieving a mission statement I would like to first start to develop this mission statement."

The group then began to discuss what needed to be included into the mission statement. The following is some of the dialogue that went on between members of the group:

Gina Kirkland noted, "How about attain and maintain water quality standards and improve water quality be included."

Randy Mahan pointed out, "I think that the goal for the group is to address programs and operations that impact the resource goals. I think that we need to develop the goal for the resource and then the goal for the group."

Gina Kirkland explained, "There are some goals that are going to be beyond what SCE&G can accomplish."

Jeff Duncan noted that he believed it was important that the group become well versed with what the standards were.

Gina Kirkland: "My specific job at DHEC is a WQ standards coordinator and my job is to identify those standards, etc. If it would be beneficial I could bring copies of the WQ standards."

Don Eng asked, "Are we not going to put down anything specific like the oxygen level required for the trout?"

Alan Stuart noted, "I think that goes back to Attain and Maintain."

Don Eng replied, "I would like to see the standard raised."

Gina Kirkland pointed out, "I would tell you that is not something that I would pursue."

Jeff Duncan added, "That is a regulatory thing, first we have to make sure we are in attainment with the standard."

Amanda Hill: "I think that would be a specific issue."

Randy Mahan noted, "I don't think it is inappropriate to consider what the standards may be, to learn about understand, and make recommendations. On behalf of SCE&G we would not be applying to increase the standards, the first thing we would like to make sure what we do is to

support the current standard. The setting of standards is really a public policy issue and if the policy is you want to protect a trout fishery then you set the standards to support that trout fishery WQ standard setting is a public policy issue and that is one that is taken up with DHEC."

Dick Christie added, "It seems like one thing we need to focus on is going by the rules and learning the rules for water quality standards."

Alan Stuart pointed out that many were involved in the revisions of the WQ standards in 2004, it involved a rigorous process that has to go through much review and approval. It is not a simple thing to change a WQ standard.

Don Eng asked, "What happens when we get new information that says current WQ standards are not good enough."

Gina Kirkland replied, "WQ standards are revised every three years. A lot of stuff comes from the public and public presents information."

Bob Keener noted, "It seems to me the standard is more a floor, not a ceiling, and you should keep at that and not go below that. Things can happen that negatively impact on dissolved ox that may drive it down – I think we are trying to make these more infrequent."

Steve Bell: "I believe the scope of this committee should be limited to maintain regulations – I think that going above standards would be a goal we should try to do. I don't think we should limit ourselves."

Alan Stuart noted that one thing that everyone needs to keep in mind, it doesn't drop below that standard much but at a certain time of year. He continued to note that there was a misconception in the newspaper; they made it seem like it happens year round, and that is not true.

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Steve Summer responded, "We fund the USGS monitors they have now."

Steve Bell pointed out, "I think one of the goals should be to review the data on the current conditions of WQ on the lake. I think it is important to see what they are saying and why and then go back and see what we need to improve."

Alan Stuart noted, "If you go to the back of the ICD, there is a comprehensive report that addresses phosphorus issues etc. I am going to propose this as a HW assignment. One of the things I was going to propose is to have Jim Ruane come down and explain the W2 Model. He did his report on the nutrients on LM."

Gina Kirkland noted, "Jim even got DMR data off of discharges upstream."

Randy Mahan noted that he would be happy to put a straw man out there but I would be glad to give it a shot. He noted that he didn't want it to appear that SCE&G is doing this whole thing but if the group would like him to, then he would.

Steve Bell asked if the group could add to the draft to which Randy and Alan noted that they certainly could.

The group began to discuss the objective of the Water Quality RCG. Randy Mahan noted that the objective is to get to a license application and a desired outcome is a settlement agreement or an agreement that the issues that have come up will be addressed in a certain way. He noted that when the application is filed it will include these agreed upon items.

Gina Kirkland noted, "Our expectation is that at the point you apply for 401, that you can demonstrate how the WQ standards are going to be achieved. And this group is one of the ways that we can get to this point."

Ron Ahle, "I think what we would like to do is identify areas of potential problems and see if we can change any of the areas to remedy a problems that exist."

Gina Kirkland pointed out, "There may be problems that are beyond the scope of a licensing issue, that are outside SCE&G's control."

Randy Mahan noted that it needs to be what SCE&G can have a material and direct impact on.

BREAK

Alan Stuart noted that at the break, he was talking with Jeff, and noted that the group may want to come up with a work plan. He noted that a workplan will be an assignment for himself or SCE&G.

Alan then noted, "We have 2 presentations that people would like to see. Are there any other presentations you would like to see?"

Patrick Moore replied, "A presentation on the statutory articles, regulatory articles."

Alan Stuart pointed out, "We do have an ex FERC employee at our company maybe she could come down."

Jeff Duncan: "I think that there are current trends and interpretations that FERC uses right now."

Steve Bell: "I think FERC could come down in every group."

Alan Stuart pointed out, "I think we should have one big meeting."

Dick Christie noted, "Include a discussion of baseline in the FERC meeting."

Steve Bell suggested, "I think we should have a presentation on the trout growth study that was performed"

Jeff Duncan added, "I think it is important in terms of understanding the history of this, in terms of developing context."

George Duke pointed out, "We may want to do a joint meeting of WQ and Fisheries when we do the WQ presentations.

The group agreed and an all day educational combined meeting was set up.

LUNCH

After lunch the group discussed the straw man Mission Statement that the group drew up during lunch.

Randy Mahan read the mission and noted that one of the thoughts that went into the writing of the mission statement was that the quality of the water flowing into Lake Murray as that water quality/nutrients cannot be materially controlled by the operation of Saluda Hydro..

Gina Kirkland noted that she understands why you would want to make recommendations to things outside the impact of SCE&G to agencies, however we want to make sure that it discusses what we can do relevant to the project.

Patrick Moore read his version of the mission statement and the group discussed.

Jeff Duncan noted that Randy's version tended to be focused toward the LSR, and that there were also concerns further downstream.

Don Eng noted that the issues he was concerned about are those that SCE&G is having on the system.

Randy Mahan explained that the source of the problem needed to be dealt with, not to requiring SCE&G to treat the problems that are originated elsewhere. He noted that SCE&G was not a wastewater treatment plant. He noted that he feared that SCE&G was going to be required to put oxygenation in when it would better be treated at the point source.

Steve Bell asked, "Are we having problems because there are nutrients coming in from the outside or just because the lake is there and is causing a buildup?"

Alan Stuart: "In the W2 model you will get an understanding of this process. There are two wastewater discharge facilities that produce 70% of the nutrient input into Lake Murray."

Gina Kirkland added, "And do understand that the dept. is worrying about putting phosphorus controls in place, but it will take a while. All of that in terms of implementing it, etc., will take a while and then, once it is in place, it will be a while before we see results."

Randy Mahan noted that we should mull over and merge the two mission statements.

Gina Kirkland noted, "There is one other issue, if you have insufficient quantity of water then you are not going to have a healthy environment. I would like to see that the quantity of water also be included in the statement."

The group discussed that they would like to reach agreement in terms of a settlement as the goal of the group.

Randy Mahan noted he would like to amalgamate them and then send out from there.

The group decided that the next meeting on December 7th.

The agenda would include Gina's presentation on water quality standards and classifications for the lake and downstream. Jim Ruane will give a presentation on W2 model. Andy Miller will give an update on current water quality status on the lake in the river. And Jim will give a historical assessment of data that was collected for W2.

LEE'S PRESENTATION

Lee's Powerpoint Presentation of Saluda Hydro System Control can be viewed through the website as well as through the November 1st Operations meeting notes. The following is a summary of the questions posed during his presentation:

Jeff Duncan, "Do you have gas turbines."

Lee Xanthakos, "Yes, we have two kinds of gas turbines, one which shoots fuel in a jet type engine turbine, and a combined cycle turbine that contains a mechanism that captures the steam off the turbine."

Steve Bell: "How long does it take the Jasper facility to come online?"

Lee noted that it was a complicated question to answer because it could take from 1 hour to 8 hours depending on what was online at the time.

Steve Bell asked if VC Summer was either 1000 MW on or off, or was there an in between.

Lee noted that although they can run it lower, it is not beneficial to do so unless something is wrong, such as a pump is out or Lake Monticello's water is not cool enough.

Steve Bell: "So when it is not running at 1000 then you will have to use something else to make up that power."

Lee: "Yes, but out of 18 months I would guess it would only be out for about 6 hours."

In discussions on the operational requirements of Fairfield Pump Storage, Lee noted that it was a requirement that the Broad could not already have a flows surpassing 40,000cfs. Jeff Duncan asked, "How many times a year does the environmental factors such as too much flow happen."

Lee noted that it usually happens between 4 and 10 times a year.

Don Eng then asked, "Why is it when the broad is flooding, you open the gates at Saluda, and add more water."

Lee Xanthakos replied, "Well if the broad is flooding it is very likely that the Saluda is flooding also, and you do not want the Lake coming up to fast."

In a discussion on buying power Jeff Duncan noted that he did not understand how the power came in once it was purchased from another company.

Lee explained, "You create inadvertent flow. What happens is a marketer finds where you can buy the electricity and creates the lease for 1 hour for the amount of power. When the hour comes, the company you are buying from ramps up the generation while SCE&G ramps down its generation in order to create a hole and the electricity finds the path of least resistance to fill that hole."

Bob Keener asked, "What would happen if a storm came and the lake came up very fast."

Lee replied, "If there is a storm that is projected to come across our path we start to generate before the storm gets here."

Bill Argentieri added, "We have a flood forecasting model and it will help us develop scenarios based upon weather service data and we decide how much we need to generate in order to get the lake down."

Randy Mahan also explained, "When it comes to opening the spillway gates we have a agreement with the NPSC that we not waste water unless it is a condition that is in the license, it is like shoveling coal in the trashcan, and if the public service commission decides we were not prudent with our generation, they will not let us recover some of our costs.

Andy Miller, "When are you in danger of a major rolling blackout."

Lee Xanthakos replied, "There are days when our systems are stressed as in it is really hot or really cold and we have everything running, and everyone else has everything running, and a nuclear station trips. A blackout occurs when everyone is under-generating by a certain amount."

Jeff Duncan: "A rolling blackout is what happens on purpose."

Lee replied, "Yes when we know we can't buy power."

Ron Ahle asked, "Are there any plans to look at alternative energy generation, something that will come on quickly and reliable."

Lee replied, "We do have a group that is looking at those alternatives. But you have to think that it is not always sunny to use solar power and it is not always windy, and every single type of plant has its problem, if it is not the trout folks worrying about the trout then it is the bird folks worrying about the birds that are getting hurt in the wind generators."

Randy Mahan replied, "The main problem I see with alternative power is there always has to be something that will back them up if it is not sunny or windy."

Reed Bull asked, "What is the cheapest electrify you produce, nuclear?"

Randy Mahan replied, "Overall yes, in the amount of kilowatt hours, most of it comes out of VC Summer nuclear."

Ron Ahle added, "So if you built another nuclear power plant it would just be another 1000 base load."

Randy Mahan replied, "Yes, but you would still have to have reserves."

Meeting adjourned at 3:45.

Kacie Jensen

From: Alison Guth
Sent: Monday, November 07, 2005 2:04 PM
To: Alan Stuart; Alison Guth; 'millerca@dhec.sc.gov'; 'bill_hulslander@nps.gov'; 'marshallb@dnr.sc.gov'; 'network@scpronet.com'; 'camlittlejohn@yahoo.com'; 'cheetahtrk@yahoo.com'; 'cstow@sc.edu'; 'tufford@sc.edu'; 'dchristie@infoave.net'; 'tyle6544@bellsouth.net'; 'ediebold@riverbanks.org'; 'kayakduke@bellsouth.net'; 'gjobsis@americanrivers.org'; 'KIRKLAGL@dhec.sc.gov'; 'Jeff_Duncan@NPS.gov'; 'johned44@earthlink.net'; 'Elymay2@aol.com'; 'kakustafik@columbiasc.net'; 'Keith_Ganz_Sarto@hotmail.com'; 'Malcolml@mailbox.sc.edu'; 'Lucky8Lady@aol.com'; 'Norm@sc.rr.com'; 'PatrickM@scccl.org'; 'crafton@usit.net'; 'bbull@sc.rr.com'; 'rkidder@pbtcomm.net'; 'rlavisky@alltel.net'; 'RESKKEENER@PBTCOMM.Net'; 'ahler@dnr.sc.gov'; 'royparker38@earthlink.net'; Shane Boring; 'bellsteve9339@bellsouth.net'; 'ssummer@scana.com'; 'suzrhodes@juno.com'; 'Stonecypher@istreamconsulting.com'; 'mark_Leao@fws.gov'; 'Prescott.Brownell@noaa.gov'; 'Amanda_Hill@fws.gov'; BARGENTIERI@scana.com
Subject: WQ RCG Agenda

Good Afternoon All:

Attached to this email is the agenda for the Water Quality Resource Conservation Group. If you know that you will **not** be able to attend Wednesday's meeting, please let me know by tomorrow morning, if at all possible. This will allow me enough time to make any adjustments with the catering service. Thanks so much, and hope to see you all there.

Alison

Water Quality RCG Agenda.pdf (...

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Saluda Hydro Relicensing
Water Quality Resource Conservation Group

Meeting Agenda

November 9, 2005
9:30 AM
Lake Murray Training Center

- **9:35 to 9:45** Introductions
  - SCE&G and KA Staff
  - Resource Agency Representatives
  - NGO Representatives
  - Individuals
- **9:45 to 10:00** Purpose of Resource Groups
- **10:00 to 11:00** Discuss Water Quality RCG Procedures
- **11:00 to 11:45** Develop Water Quality RCG Mission Statement
- **11:45 to 12:45** Lunch
- **1:00 to 2:00** **Presentation – Saluda Hydro Operations – Lee Xanthakos SCANA Services**
- **2:00 to 2:30** Develop List of Homework Assignments
- **2:30 to 2:45** Develop an Agenda for Next Meeting
- **2:45 to 3:00** Set Next Meeting Date

  Adjourn

Saluda HYDRO RELICENSING

Kacie Jensen

From: Sally Knowles [KNOWLESC@dhec.sc.gov]
Sent: Friday, May 20, 2005 3:57 PM
To: Alison Guth
Subject: Re: March 21 Meeting Notes

Alison,

I made a change for clarification in the discussion of meeting the water quality standard in the discharge.

Sally

>>> Alison Guth <Alison.Guth@KleinschmidtUSA.com> 05/17/05 10:58 AM >>>

Good morning Folks,

Just a friendly reminder about the meeting notes from March 21. Please let me know if and what changes you may have to them by 5/20 so that I may finalize the document. Thanks so much and I look forward to hearing from everyone soon.

Alison Guth
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<<Water Quality Operation Report Meeting Notes 3-21-05 (Draft;ACG; 051605).doc>>

Saluda Hydro
Meeting Regarding the Preliminary Annual Report on Water Quality and Aeration Operations and Saluda Hydro Operation Guidelines

March 21, 2005

Attendees:

Gina Kirkland	SCDHEC	Ray Ammarell	SCE&G
Alan Stuart	Kleinschmidt	Randy Mahan	SCANA Services
Alison Guth	Kleinschmidt	Carlton Wood	USGS
Bill Argentieri	SCE&G	Brian McManus	Jones Day
Steve Summer	SCANA Services	Dick Christie	SCDNR
Mike Summer	SCE&G	Prescott Brownell	NOAA Fisheries
Tom Eppink	SCANA Services	Gerrit Jobsis	CCL/Am. Rivers
Sally Knowles	SCDHEC	Hal Beard	SCDNR
Richard Roos-Collins	NHI		

Action Items: Due Date:

- Prepare and distribute meeting notes from March 21 meeting
  Alison Guth *April 30, 2005*

- Incorporate revisions into the Annual Report on Water Quality and Aeration Operations and the 2005 Operation Guidelines
  Alan Stuart *April 4, 2005*

- Arrange for a tour of the operations facility at the Palmetto Building downtown, at the request of SCDHEC
  SCE&G and KA *June 2005*

- Acquire DO monitor testing criteria from Ted Cooney of USGS and distribute to SCDHEC
  Steve Summer *May 1, 2005*

- Send a schedule on hub baffle installation and the USGS monitoring plan to Gerrit Jobsis
  Alan Stuart *May 21, 2005*

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.

Alan opened the meeting at approximately 9:25 and stated that the purpose of the meeting was to review the 2004 Aeration Report based on operation guidelines, as well as to prepare the 2005 Operation Report. Alan mentioned that Jim Ruane did the final

analyses on the Annual Water Quality and Aeration Operations Report, and although he was unable to attend this meeting today, that he could be contacted with questions.

Review of the Preliminary Annual Report on Water Quality and Aeration Operations:

The group began to discuss the Annual Water Quality and Aeration Report. Gerrit mentioned that on the second page of the report, first paragraph, it discusses SCE&G's reserve obligations, he asked where he could get a copy of the regional VACAR contract in order to gain a better understanding of what it says. Bill noted that it was his understanding that it was a public document, and can be found as an appendix to the Interconnection Agreement with other utilities. The group discussed VACAR member responsibilities and it was explained that SCE&G was a part of the southeastern system. It was noted that SCE&G had to prioritize their needs first and then the needs of the system. Dick asked SCE&G why they could not use a different hydro unit to provide reserve capacity other than Saluda Hydro. SCE&G explained that the only other operating system they have like Saluda Hydro is Fairfield and it is not available at all times. Bill continued to explain that if a coal fired plant trips off there needs to be a system capable of meeting that type of demand.

Richard noted that in the annual report, it might be conducive to better understanding to place background considerations into their own subsection. SCE&G noted that this could be done very easily. He also asked, in reference to section 1.1 of the report, for what % of the time was the site D.O standard maintained. Gerrit noted that there were 4 occasions on which data indicates that the DO standard was not met, one of which was a 24 hour period were there appears to be low/no DO.

Gina questioned whether or not the USGS data used was entirely accurate and there was no fouling. SCE&G noted that they used USGS provisional data in their analyses. To which Carlton noted that provisional data was not QAQC'd by USGS. He mentioned that the meters were checked every two weeks; Steve added that he would occasionally find fouling and would consequently call USGS to inform them of his findings. Due to these fouling issues, Carlton informed the group that the Hydrolab meters were changed in November to YSI meters which do not require a stirrer, so he expects improvements in data accuracy. He continued to note that they are tested by the Hydrologic Instrumentation Facility (HIF). Gina then inquired as to if she could get the testing criteria. It was decided that Ted Cooney would be the best individual from which to get the criteria and Steve Summer mentioned that he would work on acquiring this data.

The group continued to discuss the accuracy of the meters, SCE&G noted that they go out frequently and spot check the DO, especially during the "DO crunch" period. When Carlton was there, they noted that they would compare their data with his. Carlton added that each unit typically had a variability of 0.2 mg/l in either direction. He continued to

note that this variability was increased when comparing two units. Both Alan and Steve noted that they have on different occasions observed significant differences between the readings of two different meters.

Carlton continued to state that USGS processed the DO data every 2 weeks, in an effort to turn provisional data into nearly-final data, applying corrections to the information on the internet. Subsequently, he noted that the real-time data may look different than data from two weeks before because it has been corrected. Sally questioned Carlton as to whether he typically saw data vary or if he excluded data. Carlton replied that they are not allowed to change individual unit values; however, they can delete them if there are significant departures from what the data would be. They can then apply the corrections to the whole period or part of the period.

The group began to confer on other options for obtaining the most accurate reading of DO. Carlton noted that since the DO typically varies across the stream, optimal data would be best achieved by sampling from the center of the river, however due to recreation constraints, USGS was typically not allowed to place a meter in such a location. He pointed out that monitoring could be enhanced if the platform could be lengthened to extend the gage further out into the channel.

Discussions turned to the lower Saluda River fishery. Hal noted in reference to the trout fishery, that comparatively speaking, the size and abundance of fish caught during last year's sampling efforts has decreased. However, he continued to note that it was not fair to say that the populations were decimated, decreased numbers could be due to anglers and factors other than water quality.

Tom pointed out, in reference to water quality, the Project was not the sole source for DO impact, what is coming into the Lake has a great impact on the water quality. Sally replied that SCDHEC does not expect the Project to bring the water quality of the river up if the river is naturally low. Gina noted that the release of water from the dam is not a natural phenomenon, releasing cold but low DO waters. She continued to state that subsequently, she believes SCE&G does have the responsibility to meet the standard. Sally suggested that perhaps SCE&G and SCDHEC should jointly develop an assessment methodology for determining standards attainment at hydro projects. The methodology should recognize that one excursion for a short duration does not necessarily indicate non compliance. SCE&G replied that they were willing to do whatever was reasonable to help the DO as long as they could maintain the Project for reserve capacity. However, they continued to state that they believe that water quality issues should also be addressed at their upstream sources, especially the Bush River area. Gina stated that DHEC will address point sources, but the buffer areas around the lake are SCE&G's responsibility. Randy replied that SCE&G only owned 1/3 of the lake, however have significantly promoted best management practices around the lake.

Deleted: but, should not be expected to maintain 100% compliance all of the time

Saluda Hydro
Meeting Regarding the Preliminary Annual Report on Water Quality and Aeration Operations and Saluda Hydro Operation Guidelines

March 21, 2005

Richard Roos-Collins mentioned that he would like to see the figures and tables in the report summarized in terms of exceedences and compliances. Steve replied that it will be done with the updated QAQC'd USGS data. Alan noted that in talking with Jim Ruane, Jim thought the performance was better at the flow outputs and the look up tables are representative of a conservative estimate.

Gerrit questioned as to why there was a need to release large flows for a short amount of time as opposed to lower flows over a longer period of time. SCE&G replied that many times they have very short notice as to how much the reservoirs above Lake Murray will release. Consequently, they must release what is necessary in the amount of time that they are given.

The group continued to discuss goals for 2005. Gerrit noted that he would like to see measures enacted that help to avoid extended periods of time with low DO and have an extended outlook to make estimates for more moderate flows. Randy noted that they would look into doing that however it was hard to predict all circumstances.

Richard noted that in sections 3.1 through 3.3 of the Preliminary annual report that he would like to see a brief summary of scale of the exceedance and how many days the minimum DO occurred, placing more emphasis on the frequency and the duration of the exceedances.

Sally inquired as to where the operation center was for the dam. Randy replied that it was in the Palmetto Building downtown. Sally mentioned that she would like a tour of that facility, and the others agreed.

The group then began to discuss hub baffles and the time frame for their installation. Mike Summer noted that there were a lot of things to consider when choosing an optimal time for installation, such as safety issues and the renting of plugs. Gerrit noted that it may be beneficial to reference the subsequent water quality study plan in the agreement for 2005. Gina mentioned that she would also like to see a growth study performed after the hub baffles were installed and running for a year. Gerrit requested a schedule on hub baffle installation as well as a schedule on the USGS monitoring plan.

Review of the Guidelines for Operation of the Saluda Project for Dissolved Oxygen Management in 2005:

After a short break for lunch, the group re-convened to discuss the 2005 Guidelines for Operation. Alan noted that as discussed previously he took out all of the references to refilling activities and added a point to conduct the monthly training of operators. Gerrit noted that it would be helpful if maximum flow training was incorporated in order to help promote more gradual flows to better meet water quality standards. Sally requested that hub baffle installation be added in as an action into the plan.

Saluda Hydro
Meeting Regarding the Preliminary Annual Report on Water Quality and Aeration Operations and Saluda Hydro Operation Guidelines

March 21, 2005

Mike began to explain how SCE&G was working through Kleinschmidt Associates to acquire the help of a consultant to work on installing the hub baffles which take several days to install. Gerrit mentioned that he would like some kind of commitment to get this done on SCE&G's part. Bill noted that SCE&G was trying to get Jim Carter to come in and work with the hub baffles. Sally requested that SCE&G send out a progress report on the hub baffle installation by June 1, 2005. Gerrit requested that if the installation of hub baffles is not possible then a change in operations needs to be considered. He also requested that new testing be performed and new look up tables be compiled after the hub baffles have been installed.

Richard requested that monthly technical meetings be arranged on the application of the look-up tables. The group concluded that these could be arranged on an as-needed basis. Sally noted that it would be helpful if the weekly operation reports included an explanation of any excursions that may have occurred, and that this item was recorded as an amendment to the plan on pg. 2 of the 2005 plan.

The group began discussing what flows could be expected during 2005. Steve noted that they could expect a minimum flow greater than 400 cfs, close to 500 cfs. While conversing on the 2005 plan, Gerrit requested that SCE&G track change the edits in the appendix of the 2005 plan. Bill concluded noting that the final revised draft needs to be out to the FERC by June 1, 2005 and the draft with new revisions would be back out by April 4, 2005.

The meeting adjourned at approximately 1:45.

Kacie Jensen

From: Alison Guth
Sent: Tuesday, May 17, 2005 10:59 AM
To: 'knowlesc@dhec.sc.gov'; 'gerritj@scccl.org'; Alan Stuart; 'Gina Kirkland'; 'Prescott Brownell'; BARGENTIERI@scana.com; 'rammarell@scana.com'; 'bjmcmanus@jonesday.com'; 'dchristie@infoave.net'; 'teppink@SCANA.com'; 'rrcollins@n-h-i.org'
Subject: March 21 Meeting Notes

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Water Quality Operation Report...

Saluda Hydro
Meeting Regarding the Preliminary Annual Report on Water Quality and Aeration Operations and Saluda Hydro Operation Guidelines

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Kacie Jensen

From: Alison Guth
Sent: Thursday, May 05, 2005 9:11 AM
To: 'knowlesc@dhec.sc.gov'
Subject: Notes from the March 21 Meeting

Good Morning Folks,

I Hope everyone is doing well. Attached to this email is a draft copy of the notes taken during the meeting held March 21st regarding the Preliminary Annual Report on Water Quality and Aeration Operations, as well as the Saluda Hydro Operation Guidelines. These are for your review, please let me know if they accurately reflect what you remember from the meeting. Please return comments and questions to me in track changes by May 18th if possible so that I may finalize the document. Thanks again for your interest and involvement in regards to this issue.

Alison Guth

Licensing Coordinator
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Suite 21A
West Columbia, SC 29170
P: (803) 822-3177
F: (803) 822-3183

Water Quality
Operation Report...

Saluda Hydro
Meeting Regarding the Preliminary Annual Report on Water Quality and Aeration Operations and Saluda Hydro Operation Guidelines

March 21, 2005

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From: Carlton D Wood [cdwood@usgs.gov]
Sent: Wednesday, May 04, 2005 3:33 PM
To: Alison Guth
Cc: Sarah W Ellisor; Theodore W Cooney; Carlton D Wood
Subject: Re:

Allison,

The only changes I see are on page 2 as follows:

Hydrologic Instrumentatation Facility (HIF)

"variability of **0.2** mg/L in either direction"

take care,

Carlton Wood
Hydrologic Technician
USGS/WRD
Columbia, SC
803-750-6166

Alison Guth
<Alison.Guth@KleinschmidtUSA.com>

05/04/2005 03:12 PM

To: Alan Stuart <Alan.Stuart@KleinschmidtUSA.com>, Gina Kirkland <KIRKLAGL@dhec.sc.gov>, 'Prescott.Brownell@noaa.gov', Hal Beard <BeardH@scdnr.state.sc.us>, '"bargentieri@SCANA.com"' <bargentieri@SCANA.com>, '"ssummer@scana.com"' <ssummer@scana.com>, '"msummer@scana.com"' <msummer@scana.com>, '"MAHAN, RANDOLPH R"' <RMAHAN@scana.com>, '"rammarell@scana.com"' <rammarell@scana.com>, '"bjmcmanus@jonesday.com"' <bjmcmanus@jonesday.com>, '"dchristie@infoave.net"' <dchristie@infoave.net>, '"teppink@SCANA.com"' <teppink@SCANA.com>, '"rrcollins@n-h-i.org"' <rrcollins@n-h-i.org>, '"gerritj@scccl.org"' <gerritj@scccl.org>, '"cdwood@USGS.gov"' <cdwood@USGS.gov>

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Subject:

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<<Water Quality Operation Report Meeting Notes 3-21-05 (Draft;ACG; 050305).doc>>

Saluda Hydro
Meeting Regarding the Preliminary Annual Report on Water Quality and Aeration Operations and Saluda Hydro Operation Guidelines

March 21, 2005

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Kacie Jensen

From: Jennifer Summerlin
Sent: Tuesday, December 12, 2006 3:43 PM
To: 'Tom Brooks'; Alan Stuart; 'Amanda Hill'; 'Andy Miller'; 'Bill Argentieri'; 'Daniel Tufford'; 'Gerrit Jobsis (American Rivers)'; 'Gina Kirkland'; 'Jim Glover'; 'Jim Ruane '; 'Larry Turner (turnerle@dhec.sc.gov)'; 'Randy Mahan'; 'Reed Bull (rbull@davisfloyd.com)'; 'Richard Kidder'; 'Ron Ahle'; 'Roy Parker'; Shane Boring
Subject: Saluda Relicensing: November 13th Water Quality TWC final meeting notes

All:

For your reference, attached are the November 13, 2006 Water Quality Technical Working Committee final meeting notes. As always, the notes will be posted on the Saluda Hydro Relicensing Website.

2006-11-13 _jms_ Final Water Q...

Thanks and Happy Holidays to everyone!

Jennifer Summerlin
Scientist Technician
Kleinschmidt Associates
101 Trade Zone Drive, Suite 21A
West Columbia, SC 29170
P:803.822.3177
F:803.822.3183

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

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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.

Kacie Jensen

From: Jennifer Summerlin
Sent: Wednesday, November 22, 2006 4:01 PM
To: 'Tom Brooks'; Alan Stuart; 'Amanda Hill'; 'Andy Miller'; 'Bill Argentieri'; 'Daniel Tufford'; 'Gerrit Jobsis (American Rivers)'; 'Gina Kirkland'; 'Jim Glover'; 'Jim Ruane '; 'Larry Turner (turnerle@dhec.sc.gov)'; 'Randy Mahan'; 'Reed Bull (rbull@davisfloyd.com)'; 'Richard Kidder'; 'Ron Ahle'; 'Roy Parker'; Shane Boring
Subject: Saluda Relicensing: November 13th Water Quality TWC meeting notes

All:

Attached for your review are the November 13, 2006 Water Quality Technical Working Committee meeting notes. Please note that the PowerPoint presentations have not been posted on the Saluda Hydro Relicensing Website; they will be posted early next week. Please have comments back to me by December 12, 2006.

2006-11-13 (jms) draft Water Q...

Thanks and have a great Thanksgiving!

Jennifer Summerlin
Scientist Technician
Kleinschmidt Associates
101 Trade Zone Drive, Suite 21A
West Columbia, SC 29170
P:803.822.3177
F:803.822.3183

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

draft 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

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SALUDA HYDRO PROJECT RELICENSING
WATER QUALITY TECHNICAL WORKING COMMITTEE MEETING

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draft jms 11-20-06

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Kacie Jensen

Subject: FW: Saluda Hydro Relicense: Water Quality Technical Working Committee
Location: Lake Murray Training Center

Start: Mon 11/13/2006 9:30 AM
End: Mon 11/13/2006 2:00 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

-----Original Appointment-----
From: Shane Boring
Sent: Monday, November 06, 2006 4:52 PM
To: Tom Bowles (tbowles@scana.com); Alan Stuart; Amanda Hill; Andy Miller; Bill Argentieri; Daniel Tufford; Gerrit Jobsis (American Rivers); Gina Kirkland; Jim Glover; Jim Ruane ; Larry Turner (turnerle@dhec.sc.gov); Randy Mahan; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Ron Ahle; Roy Parker; Shane Boring
Subject: Saluda Hydro Relicense: Water Quality Technical Working Committee
When: Monday, November 13, 2006 9:30 AM-2:00 PM (GMT-05:00) Eastern Time (US & Canada).
Where: Lake Murray Training Center

All:

Just a reminder that the next meeting of the Saluda Water Quality TWC will be Monday, November 13th at 9:30 Am at the Lake Murray Training Center. A tentative agenda for the meeting is attached. Please let me know if you plan to attend so that we can order the correct number of lunches.

Thanks
C. Shane Boring
Environmental Scientist
Kleinschmidt Associates
101 Trade Zone Dr., Suite-21A
West Columbia, SC 29170
Phone: (803)822-3177
Fax: (803)822-3183

Water Quality TWC Agenda 11-13...

Saluda Hydro Relicensing
Water Quality Technical Working Committee

Meeting Agenda

November 13, 2006
9:30 AM
Lake Murray Training Center

- **9:30 to 9:45** Welcome and Review of Action Items

- **9:45 to 10:45** Update on Analyses of Factors Contributing to Historical Fish Kills in Lake Murray
  Jim Ruane, Reservoir Environmental Management, Inc.

- **10:45 to 11:45** Update on Turbine Aeration Studies and Cone Valve Tests
  Jim Ruane, Reservoir Environmental Management, Inc.

- **11:45 to 12:30** Lunch

- **12:30 to 1:00** Summary of Draft W2 Model Report
  Jim Ruane/Andy Sawyer, Reservoir Environmental Management, Inc.

- **1:00** Adjourn

Saluda HYDRO RELICENSING

Kacie Jensen

From: Shane Boring
Sent: Monday, October 02, 2006 9:56 AM
To: Tom Bowles (tbowles@scana.com); Alan Stuart; Amanda Hill; Andy Miller; Bill Argentieri; Daniel Tufford; Gerrit Jobsis (American Rivers); Gina Kirkland; Jim Glover; Jim Ruane ; Larry Turner (turnerle@dhec.sc.gov); Randy Mahan; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Ron Ahle; Roy Parker; Shane Boring
Cc: Tom Stonecypher; Alison Guth; Bill Hulslander; Bill Marshall; Brett Bursey; Charlene Coleman; Charles Floyd; Dick Christie; Don Tyler; Donald Eng; Ed Diebold; George Duke; Hank McKellar; Jeff Duncan; Jennifer O'Rourke; John Davis (johned44@bellsouth.net); Joy Downs; Karen Kustafik; Keith Ganz-Sarto; Kim Westbury; Malcolm Leaphart; Mark Leao; Mike Sloan; Norman Ferris; Patrick Moore; Prescott Brownell; Ralph Crafton; Robert Keener (SKEENER@sc.rr.com); Steve Bell; Steve Summer; Suzanne Rhodes
Subject: Saluda Hydro Relicense: August 23rd Water Quality TWC - Final Meeting Notes

All:

Attached for your records are the final meeting notes from the August 23rd meeting of the Water Quality Technical Working Committee. Thanks to all who provided comments.

C. Shane Boring
Environmental Scientist
Kleinschmidt Associates
101 Trade Zone Dr., Suite-21A
West Columbia, SC 29170
Phone: (803)822-3177
Fax: (803)822-3183

2006-08-23 WQ TWC Meeting Note..

MEETING NOTES

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

SCE&G's Lake Murray Training Center, Irmo, SC
August 23, 2006

ATTENDEES:

Bill Argentieri, SCE&G
Alan Stuart, Kleinschmidt Associates
Alison Guth, Kleinschmidt Associates
John Grego, Univ. of SC
Shane Boring, Kleinschmidt Associates
Randy Mahan, SCANA Services
Roy Parker, Lake Murray Assoc.
Dan Tufford, Univ. of SC
Reed Bull, Midlands Striper Club
Ron Ahle, SCDNR
Jim Ruane, Reservoir Environmental Management, Inc.

ACTION ITEMS:

- Compile dates and relevant data for Lake Murray striped bass fish kills

Reed Bull

- 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

- Provide John Grego with copy of temperature study plan

Shane Boring

- Determine potential for temperature analysis as graduate student thesis topic

John Grego

DATE OF NEXT MEETING: **TBA**

MEETING NOTES:

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Shane Boring opened the meeting at approximately 9:30 am, reviewing the action items from last meeting. Specifically, it was noted that the fish kill memo that had been prepared by Ron Ahle and distributed at the March 23, 2006, TWC meeting had been passed on to Amanda Hill via e-mail. Shane also enquired as to whether or not Reed Bull had been able to gather any further information on striped bass fish kills in Lake Murray. Reed indicated that, while he was able to pull together any information on additional fish kills, he felt it was important to look at how the known kills relate to various environmental and operational variables (i.e., meteorological data, project operations, USGS gage data, reservoir level, etc.). Reed indicated that he would formalize the known fish kill dates and pass them on to Shane to ensure that they are analyzed as part of Jim Ruane's W2 analysis.

Roy Parker then gave a presentation highlighting the Lake Murray Association's cove water quality monitoring efforts (available on the Saluda Relicensing Website at http://www.saludahydrorelicense.com/documents/LMAWQ3.pdf).

Jim Ruane then provided an update on development of the CE-QUAL-W2 water quality model being developed for Lake Murray (available on the Saluda Relicensing Website at http://www.saludahydrorelicense.com/documents/MurrayWQandW2Presentation8-23-06.pdf). Gerrit Jobsis noted that Jim's presentation focused mainly on highlighting the model's capabilities and enquired as to whether there were plans to use the model to evaluate different operational alternatives that might help reduce impacts to striper habitat. Jim R. noted that most of the effort to date had been focused on calibrating the model, adding that various operational scenarios could be developed by the TWC and run once the calibration report is finalized.

Andy Miller enquired as to how Phosphorus (P) inputs associated with non-point sources are being accounted for in the model. Jim R. noted that the models assume that everything, both point and non-point, meets the standard as it enters the lake. Andy enquired as to whether P was sensitive to precipitation in the model. Jim replied that annual mean and median values had been uses for theses runs; thus effects associated with precipitation would not be detected. Jim noted the importance of evaluating Bush River in the model, adding that a significant load is being contributed due to the presence of the wastewater treatment plant. Gerrit reminded the group to be mindful of what can be accomplished in the context of relicensing, adding that many of these inputs (i.e. the wastewater treatment plant on Bush River) are upriver of the reservoir and may be beyond the influence of the relicensing process.

The group then discussed factors they would like to see evaluated once the model calibration is complete. Identified factors included:

- Reservoir Level
  - Rate of Drawdown
  - Drawdown Timing
- Project Operations
  - Unit 5 Operation
- Inflows
- Climatological Data
- Time periods preceding known fish kills

Shane then quickly reviewed the action items, noting that Reed Bull had been tasked with compiling years in which major fish kills were know to have occurred. Jim R. noted that it may not be necessary to run all years, as many of the years may have similar hydrologic characteristics and agreed to develop a brief "work plan" for determining which years are best to analyze.

Several group members enquired as to whether acoustic doppler data would be beneficial for understanding impacts of project withdrawal zones on the summer striped bass habitat. Jim R. noted that this has potential; however, the sensitivity analyses have not been run.

Shane Boring then provided a brief review of the status of the temperature study being conducted in the Lower Saluda and Congaree Rivers (available on the Saluda Relicensing Website at http://www.saludahydrorelicense.com/documents/LowerSaludaandCongareeRiversTemperatureStudy.pdf). Shane noted that the temperatures in the Broad and Congaree appear to diverge from those of the Saluda sometime in late-March/early-April. In addition, he noted that, due to the cold water influence of the Saluda, the west bank of the Congaree is noticeably colder than the east bank and that this effect appears to continues at least as far downstream as I-77 Bridge.

The group then discussed potential statistical analysis methods for the temperature data. Ron noted that it may be beneficial to evaluate relationships between temperature and the varying percentage of flow being contributed by the Broad and Saluda, adding that varying contributions over time undoubtedly results in a dynamic mixing zone. John Grego noted that there are a number of potential statistical methods for dealing with the data and added that he may have a graduate student interested in taking it on as a thesis topic. John agreed to discuss this with his student and report back to the group. Shane noted that he would provide John with a copy of the study plan.

Shane noted that Jason Bettenger with SCDNR has placed several additional TidBit temperature sensors in the Congaree as part of striped bass study, adding that some of his data may be beneficial for filling in gaps in our dataset. Ron Ahle indicated that he would discuss the TidBit locations with Jason and report back to the group. Citing the relevance of Jason's study to both the temperature

study and striped bass evaluations, Ron suggested that having Jason present a seminar on this work could also be beneficial.

The group briefly discussed how temperature swings may affect the fisheries and spawning. Specifically, Gerrit J. noted that shortnose sturgeon, striped bass, and other anadromous species are know to spawn at least as far upstream as approximately I-77 and may be coming as far upstream as the confluence. As such, Gerrit suggested collaborating with the Fish and Wildlife TWC's to evaluate potential impacts to fish spawning once the Water Quality TWC has compiled all of the data and determined the extent of the mixing zone.

The meeting adjourned at approximately 2:30pm.

Kacie Jensen

From: Shane Boring
Sent: Monday, September 11, 2006 3:46 PM
To: Tom Bowles (tbowles@scana.com); Alan Stuart; Amanda Hill; Andy Miller; Bill Argentieri; Daniel Tufford; Gerrit Jobsis (American Rivers); Gina Kirkland; Jim Glover; Jim Ruane ; Larry Turner (turnerle@dhec.sc.gov); Randy Mahan; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Ron Ahle; Roy Parker; Shane Boring
Cc: Tom Stonecypher; Alison Guth; Bill Hulslander; Bill Marshall; Brett Bursey; Charlene Coleman; Charles Floyd; Dick Christie; Don Tyler; Donald Eng; Ed Diebold; George Duke; Hank McKellar; Jeff Duncan; Jennifer O'Rourke; John Davis (johned44@bellsouth.net); Joy Downs; Karen Kustafik; Keith Ganz-Sarto; Kim Westbury; Malcolm Leaphart; Mark Leao; Mike Sloan; Norman Ferris; Patrick Moore; Prescott Brownell; Ralph Crafton; Robert Keener (SKEENER@sc.rr.com); Steve Bell; Steve Summer; Suzanne Rhodes
Subject: 2006-08-23 WQ TWC Meeting Notes (draft.doc;08302006.doc;csb).doc

2006-08-23 WQ TWC Meeting Note..

ello Folks:

Attached for your review are the draft meeting notes from the August 23rd Water Quality TWC meeting. Please note that the link to Jim Ruane's presentation is not yet functional; however, we will have this presentation posted as soon as possible. Please have any comments on the notes to me by September 25th. Thanks to all who contributed to the meeting.

Shane

C. Shane Boring
Environmental Scientist
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Roy Parker then gave a presentation highlighting the Lake Murray Association's cove water quality monitoring efforts (available on the Saluda Relicensing Website at http://www.saludahydrorelicense.com/documents/LMAWQ3.pdf).

Jim Ruane then provided an update on development of the CE-QUAL-W2 water quality model being developed for Lake Murray (available on the Saluda Relicensing Website at Water Quality Resource Conservation Group). Gerrit Jobsis noted that the Jim's presentation focused mainly on highlighting the model's capabilities and enquired as to whether there were plans to use the model to evaluate different operational alternatives that might help reduce impacts to striper habitat. Jim R. noted that most of the effort to date had been focused on calibrating the model, adding that various operational scenarios could be developed by the TWC and run once the calibration report is finalized.

Andy Miller enquired as to how Phosphorus (P) inputs associated with non-point sources are being accounted for in the model. Jim R. noted that the models assume that everything, both point and non-point, meets the standard as it enters the lake. Andy enquired as to whether P was sensitive to precipitation in the model. Jim replied that annual mean and median values had been uses for theses runs; thus effects associated with precipitation would not be detected. Jim noted the importance of evaluating Bush River in the model, adding that a significant load is being contributed due to the presence of the wastewater treatment plant. Gerrit reminded the group to be mindful of what can be accomplished in the context of relicensing, adding that many of these inputs (i.e. the wastewater treatment plant on Bush River) are upriver of the reservoir and may be beyond the influence of the relicensing process.

The group then discussed factors they would like to see evaluated once the model calibration is complete. Identified factors included:

- Reservoir Level
  - Rate of Drawdown
  - Drawdown Timing
- Project Operations
  - Unit 5 Operation
- Inflows
- Climatological Data
- Time periods preceding known fish kills

Shane then quickly reviewed the action items, noting that Reed Bull had been tasked with compiling years in which major fish kills were know to have occurred. Jim R. noted that it may not be necessary to run all years, as many of the years may have similar hydrologic characteristics and agreed to develop a brief "work plan" for determining which years are best to analyze.

Several group members enquired as to whether acoustic doppler data would be beneficial for understands impacts of project withdrawal zones on the summer striped bass habitat. Jim R. noted that this has potential; however, the sensitivity analyses have not been run.

Shane Boring then provided a brief review of the status of the temperature study being conducted in the Lower Saluda and Congaree Rivers (available on the Saluda Relicensing Website at http://www.saludahydrorelicense.com/documents/LowerSaludaandCongareeRiversTemperatureStudy.pdf). Shane noted that the temperatures in the Broad and Congaree appear to diverge from those if the Saluda sometime in late-March/early-April. In addition, he noted that, due to the cold water influence of the Saluda, the west bank of the Congaree is noticeably colder than the east bank and that this effect appears to continues at least as far downstream as I-77 Bridge.

The group then discussed potential statistical analysis methods for the temperature data. Ron noted that it may be beneficial to evaluate relationships between temperature and the varying percentage of flow being contributed by the Broad and Saluda, adding that varying contributions over time undoubtedly results in a dynamic mixing zone. John Grego noted that there are a number of potential statistical methods for dealing with the data and added that he may have a graduate student interested in taking it on as a thesis topic. John agreed to discuss this with his student and report back to the group. Shane noted that he would provide John with a copy of the study plan.

Shane noted that Jason Bettenger with SCDNR has placed several additional TidBit temperature sensors in the Congaree as part of striped bass study, adding that some of his data may be beneficial for filling in gaps in our dataset. Ron Ahle indicated that he would discuss the TidBit locations with Jason and report back to the group. Citing the relevance of Jason's study to both the temperature

study and striped bass evaluations, Ron suggested that having Jason present a seminar on this work could also be beneficial.

The group briefly discussed how temperature swings may affect the fisheries and spawning. Specifically, Gerrit J. noted that shortnose sturgeon, striped bass, and other anadromous species are know to spawn at least as far upstream as approximately I-77 and may be coming as far upstream as the confluence. As such, Gerrit suggested collaborating with the Fish and Wildlife TWC's to evaluate potential impacts to fish spawning once the Water Quality TWC has compiled all of the data and determined the extent of the mixing zone.

The meeting adjourned at approximately 2:30pm.

Kacie Jensen

From: Jennifer Summerlin
Sent: Wednesday, July 05, 2006 4:48 PM
To: 'Tom Brooks'; Alan Stuart; 'Amanda Hill'; 'Andy Miller'; 'Bill Argentieri'; 'Daniel Tufford'; 'Gerrit Jobsis (American Rivers)'; 'Gina Kirkland'; 'Jim Glover'; 'Jim Ruane '; 'Larry Turner (turnerle@dhec.sc.gov)'; 'Randy Mahan'; 'Reed Bull (rbull@davisfloyd.com)'; 'Richard Kidder'; 'Ron Ahle'; 'Roy Parker'; Shane Boring
Cc: Shane Boring
Subject: Saluda Relicensing: 6/23/2006 Water Quality TWC meeting notes

All:

Attached are the meeting notes for the May 23, 2006 Water Quality Technical Working Committee meeting. These notes have been finalized and posted on the Saluda Hydro Relicensing website.

2006-05-23 Water Quality TWC m...

Thank you,

Jennifer Summerlin
Research Technician
Kleinschmidt Associates
101 Trade Zone Drive
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West Columbia, SC 29170
P: (803) 822.3177
F: (803) 822.3183

Kacie Jensen

From: Jennifer Summerlin
Sent: Wednesday, July 05, 2006 5:35 PM
To: 'Tom Brooks'; Alan Stuart; 'Amanda Hill'; 'Andy Miller'; 'Bill Argentieri'; 'Daniel Tufford'; 'Gerrit Jobsis (American Rivers)'; 'Gina Kirkland'; 'Jim Glover'; 'Jim Ruane '; 'Larry Turner (turnerle@dhec.sc.gov)'; 'Randy Mahan'; 'Reed Bull (rbull@davisfloyd.com)'; 'Richard Kidder'; 'Ron Ahle'; 'Roy Parker'; Shane Boring
Cc: Shane Boring
Subject: Saluda Relicensing: 5-29-2006 Water Quality TWC meeting notes

All:

Please disregard the attachment in the previous email referring to the May 23, 2006 Water Quality TWC meeting notes. Attached below are the correct May 23rd Water Quality TWC meeting notes. These notes have been finalized and posted on the website. Thanks and sorry about the confusion!!

2006-05-23 Water Quality TWC m...

Jennifer Summerlin
Research Technician
Kleinschmidt Associates
101 Trade Zone Drive
Suite 21 A
West Columbia, SC 29170
P: (803) 822.3177
F: (803) 822.3183

MEETING NOTES

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

SCE&G Training Center
May 23, 2006

final jms 5-23-06

ATTENDEES:

Bill Argentieri, SCE&G
Shane Boring, Kleinschmidt Associates
Gerrit Jobsis, SCCCL & Am. Rivers
Tom Bowles, SCE&G
Amanda Hill, USFWS
Roy Parker, LMA
Alan Stuart, Kleinschmidt Associates
Jeni Summerlin, Kleinschmidt Associates
Reed Bull, Midlands Striper Club
Andy Miller, SCDHEC
Ron Ahle, SCDNR
Jim Ruane, REMI

ACTION ITEMS:

- Shane Boring – e-mail fish kills to Amanda Hill
- Reed Bull – make an excel table summarizing fish kill information
- Shane Boring – ensure the March 24 meeting notes include fish kill data
- Bill Argentieri – review unit 5 operation data

DATE OF NEXT MEETING: **August 23, 2006 at 9:30 a.m.**
Located at the Lake Murray Training Center

Kleinschmidt
Energy & Water Resource Consultants

MEETING NOTES

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

SCE&G Training Center
May 23, 2006

final jms 5-23-06

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. Shane B. briefly discussed the status of the action items listed in previous meeting notes. It was noted that the purpose of today's meeting would be to review: (1) the status of TMDL discussions, (2) the status of the temperature study on the lower Saluda and Congaree Rivers, (3) information pertaining to striped bass fish kills in Lake Murray, and (4) set a date and time for the next Water Quality Technical Working Committee (TWC) meeting.

Review Status of TMDL Discussions

Alan Stuart noted that Jim Ruane, Dan Tufford, Andy Miller, and himself met on May 3rd and developed a list of action items to be undertaken for the application of the W2 model to a TMDL. Jim Ruane noted that the W2 model will be finalized in July of this year. Jim R. noted that the W2 model will evaluate certain water quality parameters in Lake Murray, which will ultimately set a standard for the TMDL. He briefly discussed methods for monitoring phosphorus loads in reservoirs. Jim R. explained that phosphorus is mostly tied up in organic matter such as algae. He noted that clay also plays a key role in phosphorus transport which is an important component in how Lake Murray behaves. Jim R. further explained methods for monitoring phosphorus in the lake.

The group then began to discuss the 222 SCDHEC station and Jim R. noted that the bridge above Lake Murray forms an embankment and effects the width of that water, which may ultimately result in high levels of phosphorus in the Saluda River. He mentioned that the W2 model might be able to calculate the water flow under the bridge by using flux. During continuing discussion on the TMDL issue, Andy Miller noted that SCDHEC does not have the funding to perform a TMDL on Lake Murray at this time. Andy M. noted that if funding was available, then SCDHEC would like to examine both embankments on Lake Murray. Ron Ahle pointed out that water quality in the Saluda tailrace should also be considered in order to obtain necessary results. Alan S. noted that he would find out SCE&G position on this issue.

Discussions continued, highlighting briefly on the draw of water at different operations, including discussions about the draw from unit five. It was decided that it would be beneficial for Jim R. to run the W2 model for the years; 1990-1991, 1998-1999, and 2005 Bill Argentieri noted that 1998-1999 operation data for unit five will not be available. Gerrit Jobsis briefly described the overall plan which included upgrading calibration on the W2 in July, running a model for the major fish kill

years, and reviewing output of the analysis. The group discussed the development of various operation scenarios that could be applied to the W2 model after it's calibrated.

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Shane B. briefly discussed the status of the temperature impacts study in the lower Saluda and Congaree Rivers. Shane B. presented a map that displayed each temperature sampling location. Ron A. asked if the temperature probe located downstream of the I-77 bridge was placed below Columbia discharge. Shane B. noted that he would find out exactly where the Columbia discharge enters the Congaree River and will adjust the temperature probe if needed. Shane B. noted that the temperatures on the Saluda River are very different from temperatures on the Broad River. He pointed out that probes located on the left bank below the Gervais Street bridge are reading higher temperatures than those on the right bank. He noted that temperature impacts continue between the I-77 bridge and the Congaree National Park locations. However, midstream of the Congaree National Park, the water temperature readings are warmer. Shane B. noted that he has not compared the temperature data to water releases from the Saluda Hydro Dam**.** Shane then concluded his presentation and asked the group for any future needs.

Gerrit J. noted that Dr. John Gray, a statistician whom he worked with on compiling a statistical comparison of flows between the Congaree and Broad Rivers, may be willing to assist with the statistics of the temperature study. Bill A. questioned the types of parameters to be analyzed. Jim R. recommended plotting the data in a time series, using hourly averages to reduce the amount of data collected. Jim R. added that structural data analysis, from when a project is operating versus not operating, should also be included. Bill A. noted that the Saluda Operating Report is available and can be distributed. Jim R. also suggested adding flows to the analysis, frequency and duration should be included with the time series. Alan S. pointed out that a six month time series should be completed before the data is turned over to Dr. John Gray for analysis.

Striped Bass Fish Kills Discussions

Alan S. opened the discussion on fish kills by reviewing the two major kills in 1990-1991 and 2005. When asked for a summary of what will be included in the study, Alan S. explained that several variables will be examined, such as operation, dissolved oxygen, temperature, and instream flow data. He added that each of these variables will be examined for each year of fish kills, as well as each year before and after a fish kill. Reed Bull added that rainfall data should also be taken into account. Ron A. noted that the group should begin examining the time of year when Lake Murray begins to stratify. Alan noted that since operational data for unit five is not available, it would only be feasible to use the 2005 fish kill year.

Date/Location of Next Meeting

The group agreed to meet again on August 23, 2006, at the Lake Murray Training Center. It was noted and the group agreed that this meeting will be dedicated to discussing striped bass issues. Shane B. noted that he would have another presentation to update the group on the temperature study. Gerrit J. added that he would contact Dr. Gray about analyzing the temperature data. Roy Parker also noted that he would update the group on the Lake Murray Association water quality study.

Kacie Jensen

From: Jennifer Summerlin
Sent: Tuesday, June 13, 2006 1:22 PM
To: 'Tom Brooks'; Alan Stuart; 'Amanda Hill'; 'Andy Miller'; 'Bill Argentieri'; 'Daniel Tufford'; 'Gerrit Jobsis (American Rivers)'; 'Gina Kirkland'; 'Jim Glover'; 'Jim Ruane '; 'Larry Turner (turnerle@dhec.sc.gov)'; 'Randy Mahan'; 'Reed Bull (rbull@davisfloyd.com)'; 'Richard Kidder'; 'Ron Ahle'; 'Roy Parker'; Shane Boring
Cc: Shane Boring
Subject: Saluda Relicensing: May 23rd water quality meeting notes

Hello Folks!

Attached for your review are the May 23rd water quality meeting notes. Please have comments back to me by June 27th.

2006-05-23 Water Quality TWC m...

Thanks,

Jennifer Summerlin
Scientist Technician
Kleinschmidt Associates
101 Trade Zone Dr., Suite-21A
West Columbia, SC 29170
Phone: (803)822-3177
Fax: (803)822-3183

MEETING NOTES

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

SCE&G Training Center
May 23, 2006

draft jms 5-23-06

ATTENDEES:

Bill Argentieri, SCE&G
Shane Boring, Kleinschmidt Associates
Gerrit Jobsis, SCCCL & Am. Rivers
Tom Bowles, SCE&G
Amanda Hill, USFWS
Roy Parker, LMA
Alan Stuart, Kleinschmidt Associates
Jeni Summerlin, Kleinschmidt Associates
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Located at the Lake Murray Training Center

Kleinschmidt
Energy & Water Resource Consultants

MEETING NOTES

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

SCE&G Training Center
May 23, 2006

draft jms 5-23-06

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Kacie Jensen

From: Alison Guth
Sent: Thursday, June 08, 2006 3:09 PM
To: 'wharden@mindspring.com'; Tom Stonecypher; Alan Stuart; Alison Guth; Amanda Hill; Andy Miller; BARGENTIERI@scana.com; Bill Hulslander; Bill Marshall; Brett Bursey; Cam Littlejohn; Charlene Coleman; Charles Floyd; Craig Stow; Daniel Tufford; Dick Christie; Don Tyler; Donald Eng; Ed Diebold; George Duke; Gerrit Jobsis (American Rivers); Gina Kirkland; Hank McKellar; Jeff Duncan; Jennifer O'Rourke; Jim Glover; Jim Ruane ; John Davis (johned44 @bellsouth.net); Joy Downs; Karen Kustafik; Keith Ganz-Sarto; Kim Westbury; Larry Turner (turnerle@dhec.sc.gov); Malcolm Leaphart; Mark Leao; Mike Sloan; Norman Ferris; Patrick Moore; Prescott Brownell; Ralph Crafton; RMAHAN@scana.com; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Robert Keener (SKEENER@sc.rr.com); Ron Ahle; Roy Parker; Shane Boring; Steve Bell; Steve Summer; Suzanne Rhodes; Tom Bowles (tbowles@scana.com)
Subject: May 3rd WQ TWC Notes

Hello All,

Attached are the final meeting notes from the May 3rd Water Quality TWC meeting to discuss TMDLs. Thank you for all of your comments on this document. You will notice that there are additional comments in email format attached to the end of the notes. Feel free to email me with any question. Thanks, Alison.

2006-05-03 final Meeting Minut...

Alison Guth
Licensing Coordinator
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West Columbia, SC 29170
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F: (803) 822-3183

MEETING NOTES

SOUTH CAROLINA ELECTRIC & GAS COMPANY
SALUDA HYDRO PROJECT RELICENSING
WATER QUALITY TWC TMDL SUB-MEETING

Kleinschmidt Offices
May 3, 2006

6-8-06 final acg

ATTENDEES:

Alan Stuart, Kleinschmidt Associates
Alison Guth, Kleinschmidt Associates
Andy Miller, SCDHEC
Jim Ruane, REMI
Dan Tufford, USC
Wayne Harden, SCDHEC

DATE: May 3, 2006

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

DISCUSSION

During the March 24th Water Quality TWC meeting, the TWC members decided that the issues regarding TMDL would be better discussed during a small group session initially with Jim Ruane, Dan Tufford and Andy Miller as members. Prior to this meeting, and after email correspondence, the above listed individuals developed a list of agenda items to discuss and developed a meeting date. The agenda items are listed below:

1. The need for a TMDL on Lake Murray. Should it focus on the Western side of the impoundment?
2. The Sufficiency of a W2 model as a component of a TMDL
3. Is the current W2 a potential component (in principle) or would we need a new one focusing on the Western end?
4. What other models would be needed to supplement the in lake processes model?
5. What kind of extra monitoring would be needed?
6. What other data would be needed?
7. Current modeling objectives vs. TMDL objectives
8. Model documentation availability
9. Larger modeling issues and concerns
10. How to proceed.

Dan Tufford opened the meeting and expressed that he believed that Relicensing was a good forum to begin working towards a TMDL by doing the analysis phase, since all the appropriate individuals were already "at the table" so to speak. He noted that he felt that it could be performed within the framework of the relicensing to achieve an end product that could be usable to DHEC. Alan Stuart asked if Dan T. could further explain how the TMDL was related to the relicensing of the Project,

and what further information on this issue was needed in order for the FERC to perform the NEPA analysis. Dan T. replied that he believed that given the term of the license, the group needed to look ahead in regards to future compliance with water quality standards. Dan T. also noted stakeholders have made it clear to him that they had concerns on the upstream conditions and added that he would encourage SCE&G on a corporate level to consider those concerns. Jim Ruane replied that he believes that SCE&G does consider those concerns and that the current model (W2) could help with a TMDL down the road. He added that the data in the model can be built upon and added to. After continued discussion on this topic it was noted that although this issue may not be directly linked to the issuance of a new project license that it may have positive benefits for SCE&G. It was also noted that relicensing may be beneficial toward the future implementation of a TMDL in that it will provide a forum for documentation of discussion on this topic and how the W2 may be beneficial in the TMDL. Dan Tufford explained that the group should first move forward by looking at the current W2 model.

The group looked at the first agenda item and began to discuss areas of concern. Andy Miller noted that he was currently looking at the western stations and asked if it would be appropriate to model those points with the W2 model. Jim R. noted that there were slight roadblocks due to the lack of data at a couple of the points. He explained that the current W2 could be used to examine some of the points that were mentioned (specifically mentioning Station 222) and the more data could be collected if needed. The group noted that the two stations of concern that were currently listed were S-222 and S-309. Andy M. asked Jim R. if he believed there was enough data at these locations to calibrate a W2 model. Jim R. replied that he did not believe there was enough information, however he noted that he did believe that a Bathtub Model could be implemented. Jim R. further explained that the W2 could help in an understanding of the dynamics of the system before a simpler model was used. The group also decided to check on the amount of data available at station S-310. There was also discussion of the use of a watershed-scale model to address some of the issues that cannot be assessed with a model such as W2. Dan T. mentioned the WARMF model and that one of its strengths in this context is that it can use a W2 model as the reservoir component model. This would allow us to leverage Jim's work in Lake Murray and another W2 model for Lake Greenwood.

In discussions on a TMDL's focus on the western side of the Lake, Jim noted that in reference to the issue of the "oxygen crunch period" and its implications on striped bass and blueback herring, Bush River reductions would probably have the biggest improvements for striped bass. Jim R. continued to note that a western focus alone may not directly address the issues with the striped bass. Wayne Harden agreed that in order to address that issue a TMDL needs to include the upward sections of the Lake.

The group continued to discuss the sufficiency of a W2 model as a component of a TMDL. Jim R. noted that the W2 could be useful in order to look at what data was available now and to help define data needs, it was also a good way to understand what was happening at the Stations. Andy M. asked if Jim R. could further define the goals of the current W2 from a water quality standpoint. Jim R. replied that the goals were to 1) look at the effects of operational changes on water quality, 2) to look at the effects of the operation of unit 5 on striped bass habitat, 3) to look at Phosphorus loads with the hopes of DHEC implemented Phosphorus reductions, 4) a contribution that SCE&G can make after relicensing.

It was noted that whatever was done in regards to TMDLs would have to coincide with what was feasible at DHEC. Andy M. noted that there were tight and busy schedules at DHEC and he would have to discuss this more in depth internally.

Agenda item number 8 focuses on model documentation availability, and the group briefly discussed this topic. It was agreed at the last TWC meeting that a confidentiality non disclosure agreement of the draft W2 model and report would be prepared for Dan T. and Andy M. signature. After numerous revisions of the agreement, the matter was unresolved at the time of the meeting. Additional discussions were had regarding this matter. Alan indicated that all documentation would be made available after the W2 model and report was finalized based on the requested upgrades March 24, 2006 TWC meeting, thus eliminating the need for a confidentiality agreement.

Jim R. explained briefly what changes to the W2 model he was to incorporate and noted that the model would only be made available to the agencies until the license was complete. He pointed out that sharing the model to individuals other than the agencies without the signing of the agreement was a process risk. After much discussion on this topic it was noted that the written report would be finished in the next few months and would be shared with the group then.

The meeting began to come to a close and the group discussed how to proceed. Alan S. and Dan T. briefly discussed what extent SCE&G should/may want to play a role in the TMDL process. It was noted that there were many other concerns that SCE&G has to consider during relicensing. Alan S. noted that he would have further discussion with SCE&G as to the scale of their focus regarding this. Alan S. noted that there may be the opportunity for Dan T. to talk to SCE&G regarding this directly. Dan T. also mentioned that he would meet with the stakeholders that he is talking with in order to more clearly define what their objectives were in regards to water quality and its relation to relicensing. Jim R. reiterated that he would take the next few months to calibrate the model with the new work arounds and finalize the written report. He noted that he would be ready to prepare a package for DHEC if they would like. Andy Miller noted he would check to see if it was needed. Jim R. also briefly pointed out that DHEC may want to consider approaching NRCS about

modeling and that there may be federal assistance available. The group adjourned and noted that any future meetings would be scheduled after Homework Items were completed.

HOMEWORK ITEMS:

- Jim Ruane – Finish additional W2 model calibrations and to finalize written report
- Andy Miller – Check on what data is available at station S-310, as well as internal discussion with DHEC on what was feasible from a DHEC standpoint in regards to a TMDL, would a W2 package be needed, and if NRCS could provide modeling assistance.
- Alan Stuart – Discussions with SCE&G on what their vision was in regards to TMDL and relicensing and if there was an opportunity for discussions with Dan Tufford on this topic.
- Dan Tufford – Discussions with represented stakeholders on intentions to meet more clearly defined objectives. Preparation for possible discussion with SCE&G.

The following comments in email format were sent after the draft notes were issued and are included in the record:

-----Original Message-----
From: Alison Guth
Sent: Thursday, May 18, 2006 5:01 PM
To: Alan Stuart; 'Dan Tufford'; 'Jim Ruane'; 'Andy Miller'; 'wharden@mindspring.com'
Cc: Tom Stonecypher; Alan Stuart; Alison Guth; Amanda Hill; Andy Miller; Bill Argentieri; Bill Hulslander; Bill Marshall; Brett Bursey; Cam Littlejohn; Charlene Coleman; Charles Floyd; Craig Stow; Daniel Tufford; Dick Christie; Don Tyler; Donald Eng; Ed Diebold; George Duke; Gerrit Jobsis (American Rivers); Gina Kirkland; Hank McKellar; Jeff Duncan; Jennifer O'Rourke; Jim Glover; Jim Ruane ; John Davis (johned44@bellsouth.net); Joy Downs; Karen Kustafik; Keith Ganz-Sarto; Kim Westbury; Larry Turner (turnerle@dhec.sc.gov); Malcolm Leaphart; Mark Leao; Mike Sloan; Norman Ferris; Patrick Moore; Prescott Brownell; Ralph Crafton; Randy Mahan; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Robert Keener (SKEENER@sc.rr.com); Ron Ahle; Roy Parker; Shane Boring; Steve Bell; Steve Summer; Suzanne Rhodes; Tom Bowles (tbowles@scana.com)
Subject: Meeting Notes Comments - May 3rd

Hello all,

There has been several sets of changes made to the May 3rd meeting notes. As I have been doing in the past with such matters, I am sending out a copy with changes before they become final on May 26th. While reviewing the document please note that its primary purpose is to provide a general but accurate overview of the course of the meeting and the topics discussed there-in, and not delve too far into the minutia of "he said, she said". Please have any further comments on this document to me by the 26th. Thank you. Alison

-----Original Message-----
From: Dan Tufford [mailto:tufford@sc.edu]
Sent: Thursday, May 25, 2006 10:34 AM
To: Alison Guth
Cc: Alan Stuart; 'Jim Ruane'; 'Andy Miller'; 'wharden@mindspring.com'; Bill Argentieri; Randy Mahan
Subject: Re: Meeting Notes Comments - May 3rd

Hello Alison,

Of course these notes are full of "he said, she said" so the minutia you are referring to must be the comments of mine that you excised as if they had not been there in the first place. I strongly believe there is a need to set the record straight.

We were told during the May 3 meeting that SCE&G reacted negatively to my refusal to sign the agreement. I assume this means Randy and/or Bill. I have not had the opportunity to get to know either of them very well yet, but my impression from the meetings is that both are very reasonable people. So the only way they could react negatively is if they were given a distorted explanation of the facts of the situation.

The agreement I was asked to sign contained extensive language detailing stipulations and provisions that I knew nothing about and that had not come up in the meeting in which I agreed to sign a non-disclosure agreement. I asked to have the language removed and when that request was refused then I refused to sign the agreement.

No reasonable person would think negatively of me or anyone else for refusing to sign an agreement like that, especially after making a good faith attempt to get the extraneous language removed. Apparently KA considers this minutia. As reasonable people yourselves, I am sure you can undertand why I do not. That is the issue my comments were attempting to deal with.

If the agreement and the documentation were a minor point in the process I would not be that concerned that this issue be clarified. But as I predicted all along, the meeting was much less effective than it could have been due to the fact that I was still uncertain about the details that I wanted to see about the model.

I will be happy to work with you on the specific wording, but some language that sets the record straight needs to be in the minutes. If you take a stab at it I want to review it before the minutes are considered final.

Regards,
Daniel L. Tufford, Ph.D.
Research Assistant Professor
University of South Carolina
Department of Biological Sciences
Sumwalt 209A (office)
701 Sumter Street, Room 401 (mail)
Columbia, SC 29208

e-mail: tufford@sc.edu
web: http://www.biol.sc.edu/~tufford
Ph: 803.777.3292 Fx: 803.777.3292

-----Original Message-----
From: Alan Stuart
Sent: Thursday, May 25, 2006 10:39 PM
To: 'Dan Tufford'; Alison Guth
Cc: Alan Stuart; 'Jim Ruane'; 'Andy Miller'; 'wharden@mindspring.com'; Bill Argentieri; Randy Mahan
Subject: RE: Meeting Notes Comments - May 3rd

Dan,

I would like make a clarification. What I said at the meeting was that your initial refusal to sign the original agreement raised concerns by KA/REMI and SCE&G. I never inferred or said that SCE&G acted negatively to your refusal nor thought anything negatively about you. I did say I was personally struggling to understand if a state agency such as DHEC, who has authority in regulating TMDL's, had no problem signing the agreement as originally written then why was it unacceptable to you. Again, this was me speaking, not speaking on behalf of SCE&G. As you recall we had numerous subsequent discussions which were not all recorded as part of the summary. Further, I did not see where my statements above added any positive value to the summary so I did not see it necessary to include them as part of the record. Our goal was simple, to capture the meat of the disagreement(s) and resolution.

As I stated, I did not add to the minutes all of this extraneous language contained in my opening paragraph of this email because I saw it having little value to the summary. I believe the main points of the dialogue were: issues were taken on the original agreement, problems existed on the revised agreement, and ultimately the agreement was not signed by the parties prior to the meeting. Therefore, no resolution was reached on the matter of the releasing the parameterizations/calibrations on the draft W2 model. While it is unfortunate we could not reach agreement prior to the meeting on the agreement we obviously can still move forward. As you recall, I did state that the information would be released (July timeframe) when the W2 Model was finalized. This is what you are ultimately seeking and anyone reading the minutes can effectively understand that there were disagreements on the wording in the agreement (and revised agreement) but we did reach resolution on releasing the information. This in essence in my opinion is what's important and believe this to be a totally reasonable and pragmatic approach.

In my opinion, your added language will likely require clarifications/additions from other meeting attendees and will only serve to create a verbose lengthy transcript. This is not the point of the meeting summaries as stated in the operational procedures. They summaries are a courtesy service provided for those individuals not present at the meetings.
However, if you are steadfast in getting some of this specific material in some form of the record, may I suggest we just include this email in the record. I believe your email captures the message, theme, and spirit of what you want to convey.

Regards,
Alan

Senior Licensing Coordinator
Kleinschmidt Energy and Water Resources
101 Trade Zone Drive Suite 21A
West Columbia, SC 29170

-----Original Message-----
From: Dan Tufford [mailto:tufford@sc.edu]
Sent: Friday, May 26, 2006 10:58 AM
To: Alan Stuart
Cc: Alison Guth; 'Jim Ruane'; 'Andy Miller'; 'wharden@mindspring.com'; Bill Argentieri; Randy Mahan
Subject: Re: Meeting Notes Comments - May 3rd

Hello Alan,

Our recollection of this differs somewhat, but I appreciate your elaboration of why my edits to the meeting notes were altered. I fully understand how diffucult it is to distill the important material from long meetings into a coherent set of minutes. As I have stated before, I appreciate the work that KA does in this regard.

I am not sure what constitutes "the record" in these proceedings, but I
accept your suggestion that this e-mail exchange be included.

Regards,
Dan

-----Original Message-----
From: Jim Ruane [mailto:jimruane@comcast.net]
Sent: Thursday, June 08, 2006 9:02 AM
To: Dan Tufford; Alan Stuart; Alison Guth; 'Andy Miller'; wharden@mindspring.com
Cc: Bill Argentieri; Randy Mahan
Subject: Re: Meeting Notes Comments - May 3rd

I apologize for taking so long to respond to these emails, but would like to offer the following comments for the record.

Concerning Dan Tufford's comments about the agreement for release of certain information about the Lake Murray CE-QUAL-W2 water quality model, we think it's important to have such an agreement through out the duration of the relicensing process.

SCE&G wants water quality analyses and modeling to be conducted in an open process that allows stakeholders to effectively review what is being done to the extent practicable. However, due to the complexity of models and the need to support only one model for the main body of Lake Murray, an agreement is needed to provide understandings between reviewers and SCE&G's modelers. The agreement

is intended to protect SCE&G's investment in the model; to provide a means for incorporating modeling in an orderly process for relicensing; present a process for conflict resolution; and provide general information about the modeling process used by SCE&G's modelers.

As was promised at the TWC meeting on March 24, we modified an existing agreement that has been used before in South Carolina. We plan on using this agreement for the foreseeable future, probably through out the relicensing process, for most all stakeholders, subject to them being approved by SCE&G for getting the model or information regarding the calibration of the model.

It's anticipated that the agreement would be similar for all reviewers, so some reviewers may consider the agreement to be overly protective. However, for those who are interested in limiting their objectives to reviewing and commenting on the model or considering the model for future uses, the agreement is expected to be satisfactory. The agreement requires that all modeling supported by SCE&G be conducted by their consultant, and that competing models for simulating water quality for the same or similar purposes on Lake Murray will not be considered (i.e., models that would simulate operations and water quality for the main waterbody of Lake Murray). Reasonable requests for model calibration checks and model applications will be considered by SCE&G. SCE&G is interested in developing a good water quality model and allowing it to be used in the future for improving water quality in Lake Murray.

I thought we had a fruitful meeting on May 3. However, it was not possible to provide some of the information that Dan requested, especially considering that the upgraded model is being developed over the coming months. He had asked for detailed model information that will be revised during the course of the model upgrade. Also, the TMDLs being considered for Lake Murray that require modeling were not planned to be developed before the new upgraded model would be ready for use. Hence, we questioned the urgency for his request at this time.

When the upgraded model is developed, a draft calibration report will be prepared and issued to the TWC for their review. We are not planning to release additional detailed information to anyone unless they sign the agreement, and even then some information will be withheld to avert others from developing a similar model on Lake Murray.

This approach has been used successfully over the past two years, and we are optimistic that it will prove successful for relicensing of the Saluda Project.

Thanks, Jim

Richard J. Ruane, Reservoir Environmental Mgt., Inc.

900 Vine Street Suite 5
Chattanooga, TN 37403

Kacie Jensen

From: Alison Guth
Sent: Thursday, May 18, 2006 5:01 PM
To: Alan Stuart; 'Dan Tufford'; 'Jim Ruane'; 'Andy Miller'; 'wharden@mindspring.com'
Cc: Tom Stonecypher; Alan Stuart; Alison Guth; Amanda Hill; Andy Miller; BARGENTIERI@scana.com; Bill Hulslander; Bill Marshall; Brett Bursey; Cam Littlejohn; Charlene Coleman; Charles Floyd; Craig Stow; Daniel Tufford; Dick Christie; Don Tyler; Donald Eng; Ed Diebold; George Duke; Gerrit Jobsis (American Rivers); Gina Kirkland; Hank McKellar; Jeff Duncan; Jennifer O'Rourke; Jim Glover; Jim Ruane ; John Davis (johned44 @bellsouth.net); Joy Downs; Karen Kustafik; Keith Ganz-Sarto; Kim Westbury; Larry Turner (turnerle@dhec.sc.gov); Malcolm Leaphart; Mark Leao; Mike Sloan; Norman Ferris; Patrick Moore; Prescott Brownell; Ralph Crafton; RMAHAN@scana.com; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Robert Keener (SKEENER@sc.rr.com); Ron Ahle; Roy Parker; Shane Boring; Steve Bell; Steve Summer; Suzanne Rhodes; Tom Bowles (tbowles@scana.com)
Subject: Meeting Notes Comments - May 3rd

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2006-05-03 draft Meeting Minut...

Alison Guth
Licensing Coordinator
Kleinschmidt Associates
101 Trade Zone Drive
Suite 21A
West Columbia, SC 29170
P: (803) 822-3177
F: (803) 822-3183

MEETING NOTES

SOUTH CAROLINA ELECTRIC & GAS COMPANY
SALUDA HYDRO PROJECT RELICENSING
WATER QUALITY TWC TMDL SUB-MEETING

Kleinschmidt Offices
May 3, 2006

5-15-06 draft acg

ATTENDEES:

Alan Stuart, Kleinschmidt Associates
Alison Guth, Kleinschmidt Associates
Andy Miller, SCDHEC
Jim Ruane, REMI
Dan Tufford, USC
Wayne Harden, SCDHEC

DATE: May 3, 2006

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

DISCUSSION

During the March 24th Water Quality TWC meeting, the TWC members decided that the issues regarding TMDL would be better discussed during a small group session initially with Jim Ruane, Dan Tufford and Andy Miller as members. Prior to this meeting, and after email correspondence, the above listed individuals developed a list of agenda items to discuss and developed a meeting date. The agenda items are listed below:

1. The need for a TMDL on Lake Murray. Should it focus on the Western side of the impoundment?
2. The Sufficiency of a W2 model as a component of a TMDL
3. Is the current W2 a potential component (in principle) or would we need a new one focusing on the Western end?
4. What other models would be needed to supplement the in lake processes model?
5. What kind of extra monitoring would be needed?
6. What other data would be needed?
7. Current modeling objectives vs. TMDL objectives
8. Model documentation availability
9. Larger modeling issues and concerns
10. How to proceed.

Dan Tufford opened the meeting and expressed that he believed that Relicensing was a good forum to begin working towards a TMDL by doing the analysis phase, since all the appropriate individuals were already "at the table" so to speak. He noted that he felt that it could be performed within the framework of the relicensing to achieve an end product that could be usable to DHEC. Alan Stuart asked if Dan T. could further explain how the TMDL was related to the relicensing of the Project,

and what further information on this issue was needed in order for the FERC to perform the NEPA analysis. Dan T. replied that he believed that given the term of the license, the group needed to look ahead in regards to future compliance with water quality standards. Dan T. also noted stakeholders have made it clear to him that they had concerns on the upstream conditions and added that he would encourage SCE&G on a corporate level to consider those concerns. Jim Ruane replied that he believes that SCE&G does consider those concerns and that the current model (W2) could help with a TMDL down the road. He added that the data in the model can be built upon and added to. After continued discussion on this topic it was noted that although this issue may not be directly linked to the issuance of a new project license that it may have positive benefits for SCE&G. It was also noted that relicensing may be beneficial toward the future implementation of a TMDL in that it will provide a forum for documentation of discussion on this topic and how the W2 may be beneficial in the TMDL. Dan Tufford explained that the group should first move forward by looking at the current W2 model.

The group looked at the first agenda item and began to discuss areas of concern. Andy Miller noted that he was currently looking at the western stations and asked if it would be appropriate to model those points with the W2 model. Jim R. noted that there were slight roadblocks due to the lack of data at a couple of the points. He explained that the current W2 could be used to examine some of the points that were mentioned (specifically mentioning Station 222) and the more data could be collected if needed. The group noted that the two stations of concern that were currently listed were S-222 and S-309. Andy M. asked Jim R. if he believed there was enough data at these locations to calibrate a W2 model. Jim R. replied that he did not believe there was enough information, however he noted that he did believe that a Bathtub Model could be implemented. Jim R. further explained that the W2 could help in an understanding of the dynamics of the system before a simpler model was used. The group also decided to check on the amount of data available at station S-310. There was also discussion of the use of a watershed-scale model to address some of the issues that cannot be assessed with a model such as W2. Dan T. mentioned the WARMF model and that one of its strengths in this context is that it can use a W2 model as the reservoir component model. This would allow us to leverage Jim's work in Lake Murray and another W2 model for Lake Greenwood.

Deleted: ARMF

In discussions on a TMDL's focus on the western side of the Lake, Jim noted that in reference to the issue of the "oxygen crunch period" and its implications on striped bass and blueback herring, Bush River reductions would probably have the biggest improvements for striped bass. Jim R. continued to note that a western focus alone may not directly address the issues with the striped bass. Wayne Harden agreed that in order to address that issue a TMDL needs to include the upward sections of the Lake.

MEETING NOTES

SOUTH CAROLINA ELECTRIC & GAS COMPANY
SALUDA HYDRO PROJECT RELICENSING
WATER QUALITY TWC TMDL SUB-MEETING

Kleinschmidt Offices
May 3, 2006

5-15-06 draft acg

The group continued to discuss the sufficiency of a W2 model as a component of a TMDL. Jim R. noted that the W2 could be useful in order to look at what data was available now and to help define data needs, it was also a good way to understand what was happening at the Stations. Andy M. asked if Jim R. could further define the goals of the current W2 from a water quality standpoint. Jim R. replied that the goals were to 1) look at the effects of operational changes on water quality, 2) to look at the effects of the operation of unit 5 on striped bass habitat, 3) to look at Phosphorus loads with the hopes of DHEC implemented Phosphorus reductions, 4) a contribution that SCE&G can make after relicensing.

It was noted that whatever was done in regards to TMDLs would have to coincide with what was feasible at DHEC. Andy M. noted that there were tight and busy schedules at DHEC and he would have to discuss this more in depth internally.

Agenda item number 8 focuses on model documentation availability, and the group briefly discussed this topic. It was agreed at the last TWC meeting that a confidentiality non disclosure agreement of the draft W2 model and report would be prepared for Dan T. and Andy M. signature. After numerous revisions of the agreement, the matter was unresolved at the time of the meeting. Additional discussions were had regarding this matter. Alan indicated that all documentation would be made available after the W2 model and report was finalized based on the requested upgrades March 24, 2006 TWC meeting, thus eliminating the need for a confidentiality agreement.

Jim R. explained briefly what changes to the W2 model he was to incorporate and noted that the model would only be made available to the agencies until the license was complete. He pointed out that sharing the model to individuals other than the agencies without the signing of the agreement was a process risk. After much discussion on this topic it was noted that the written report would be finished in the next few months and would be shared with the group then.

The meeting began to come to a close and the group discussed how to proceed. Alan S. and Dan T. briefly discussed what extent SCE&G should/may want to play a role in the TMDL process. It was noted that there were many other concerns that SCE&G has to consider during relicensing. Alan S. noted that he would have further discussion with SCE&G as to the scale of their focus regarding this. Alan S. noted that there may be the opportunity for Dan T. to talk to SCE&G regarding this directly. Dan T. also mentioned that he would meet with the stakeholders that he is talking with in order to more clearly define what their objectives were in regards to water quality and its relation to relicensing. Jim R. reiterated that he would take the next few months to calibrate the model with the new work arounds and finalize the written report. He noted that he would be ready to prepare a package for DHEC if they would like. Andy Miller noted he would check to see if it was needed. Jim R. also briefly pointed out that DHEC may want to consider approaching NRCS about

Deleted: The documentation was supposed to have been available for review prior to this meeting.

Inserted: The documentation was supposed to have been available for review prior to this meeting. It was agreed at the last TWC meeting that

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modeling and that there may be federal assistance available. The group adjourned and noted that any future meetings would be scheduled after Homework Items were completed.

HOMEWORK ITEMS:

- Jim Ruane – Finish additional W2 model calibrations and to finalize written report
- Andy Miller – Check on what data is available at station S-310, as well as internal discussion with DHEC on what was feasible from a DHEC standpoint in regards to a TMDL, would a W2 package be needed, and if NRCS could provide modeling assistance.
- Alan Stuart – Discussions with SCE&G on what their vision was in regards to TMDL and relicensing and if there was an opportunity for discussions with Dan Tufford on this topic.
- Dan Tufford – Discussions with represented stakeholders on intentions to meet more clearly defined objectives. Preparation for possible discussion with SCE&G.

Kacie Jensen

From: Alison Guth
Sent: Monday, May 15, 2006 4:52 PM
To: Alan Stuart; 'Jim Ruane'; 'Andy Miller'; 'Dan Tufford'; 'wharden@mindspring.com'
Cc: Tom Stonecypher; Alan Stuart; Alison Guth; Amanda Hill; Andy Miller; BARGENTIERI@scana.com; Bill Hulslander; Bill Marshall; Brett Bursey; Cam Littlejohn; Charlene Coleman; Charles Floyd; Craig Stow; Daniel Tufford; Dick Christie; Don Tyler; Donald Eng; Ed Diebold; George Duke; Gerrit Jobsis (American Rivers); Gina Kirkland; Hank McKellar; Jeff Duncan; Jennifer O'Rourke; Jim Glover; Jim Ruane ; John Davis (johned44 @bellsouth.net); Joy Downs; Karen Kustafik; Keith Ganz-Sarto; Kim Westbury; Larry Turner (turnerle@dhec.sc.gov); Malcolm Leaphart; Mark Leao; Mike Sloan; Norman Ferris; Patrick Moore; Prescott Brownell; Ralph Crafton; RMAHAN@scana.com; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Robert Keener (SKEENER@sc.rr.com); Ron Ahle; Roy Parker; Shane Boring; Steve Bell; Steve Summer; Suzanne Rhodes; Tom Bowles (tbowles@scana.com)
Subject: Water Quality TMDL TWC Notes

Hello folks,

Attached are the meeting notes from the Water Quality TWC meeting to discuss the issue of TMDL. For those guys that attended the meeting, please send me any comments or changes by May 26th for finalization. Remember, those that did not attend the meeting may send me comments to be incorporated into a separate section of the notes. Thanks, Alison

2006-05-03 draft Meeting Minut...

Alison Guth
Licensing Coordinator
Kleinschmidt Associates
101 Trade Zone Drive
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West Columbia, SC 29170
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MEETING NOTES

SOUTH CAROLINA ELECTRIC & GAS COMPANY
SALUDA HYDRO PROJECT RELICENSING
WATER QUALITY TWC TMDL SUB-MEETING

Kleinschmidt Offices
May 3, 2006

5-15-06 draft acg

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- Dan Tufford – Discussions with represented stakeholders on intentions to meet more clearly defined objectives. Preparation for possible discussion with SCE&G.

Kacie Jensen

From: Alison Guth
Sent: Thursday, April 27, 2006 3:20 PM
To: Tom Brooks; Alan Stuart; Amanda Hill; Andy Miller; BARGENTIERI@scana.com; Daniel Tufford; Gerrit Jobsis (American Rivers); Gina Kirkland; Jim Glover; Jim Ruane ; Larry Turner (turnerle@dhec.sc.gov); RMAHAN@scana.com; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Ron Ahle; Roy Parker; Shane Boring
Cc: Tom Stonecypher; Alison Guth; Bill Hulslander; Bill Marshall; Brett Bursey; Cam Littlejohn; Charlene Coleman; Charles Floyd; Craig Stow; Dick Christie; Don Tyler; Donald Eng; Ed Diebold; George Duke; Hank McKellar; Jeff Duncan; Jennifer O'Rourke; John Davis (johned44@bellsouth.net); Joy Downs; Karen Kustafik; Keith Ganz-Sarto; Kim Westbury; Malcolm Leaphart; Mark Leao; Mike Sloan; Norman Ferris; Patrick Moore; Prescott Brownell; Ralph Crafton; Robert Keener (SKEENER@sc.rr.com); Steve Bell; Steve Summer; Suzanne Rhodes; Tom Bowles (tbowles@scana.com)
Subject: Final Notes

Hello All,

Attached are the final meeting notes from the WQ TWC meeting on 3-24-06. Thanks to all for your comments. Alison

2006-3-24 final Meeting Minute...

Alison Guth
Licensing Coordinator
Kleinschmidt Associates
101 Trade Zone Drive
Suite 21A
West Columbia, SC 29170
P: (803) 822-3177
F: (803) 822-3183

Kacie Jensen

From: C. Andy Miller [MILLERCA@dhec.sc.gov]
Sent: Thursday, April 13, 2006 5:27 PM
To: jimruane@comcast.net; tufford@sc.edu
Cc: Alan Stuart; Alison Guth
Subject: Re: W2 meeting

I think we're ok with Dan's language. Our FOI folks had me insert a change from notifying SCEG of FOI requests from 48 hours to 3 business days. How would that be? I've attached the change.

As for the May 3rd meeting. We've got 9:30 for the time. How about location? I'm happy to host here. Plenty of parking and central location I think. If that's a problem DHEC folks can go where needed.

AM

Andy Miller
Watershed Manager-Saluda/Santee
SCDHEC
Bureau of Water
(803)-898-4031

www.scdhec.gov/water/shed/home.html
millerca@dhec.sc.gov

>>> Dan Tufford <tufford@sc.edu> 4/13/2006 9:03 AM >>>
I made a couple of small changes to the agreement so it reflects my understanding of the purpose for our receiving this material.

Regards,
Dan

jimruane@comcast.net wrote:

> Hi Dan
>
> I am out all this week, except I may make it back to the office on
> Friday afternoon. I am leading a training session all this week, so I

> am covered up day and night etc.
>
> Thanks, Jim
>
>
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> From: Dan Tufford <tufford@sc.edu>
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> > Any time May 3 is fine with me. Andy, what is the earliest you can
> > begin? We should plan on 4-5 hours.
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> afternoon and
> > > I drive over to Columbia in the morning, there's a likely
> chance that I
> > > could be a little late depending on traffic etc.
> > >
> > > Thanks, Jim
> > > > > Richard J. Ruane, Reservoir Environmental Mgt., Inc.
> > > 900 Vine Street Suite 5
> > > Chattanooga, TN 37403
> > > 423-265-5820; cell: 423-605-5820; Fax: 423-266-5217; jim@chatt.net
> > >
> > >
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> > > From: C. Andy Miller
> > > To: jimruane@comcast.net ;
> > > tufford@sc.edu

> > > Cc: Alan.Stuart@KleinschmidtUSA.com
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> > >
> > >
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> > > >
> > > > millerca@dhec.sc.gov
> > > >
> > > >
> > > > >>> Dan Tufford 4/3/2006 1:17 PM >>>
> > > > Hello All,
> &g! t; > >

> > > > Thanks for sending the agreement, unfortunately it is
> > > unsatisfactory in
> > > > its current form. The first paragraph states that the
> > > protocol is only
> > > > for the temporary model review, but the rest of the text goes
> > > well
> > > > beyond that scope. We need to reword it so the provisions of the
> > > > protocol cover only issues that are of concern at this stage.
> > > >
> > > > During the TWC meeting there were two concerns raised about
> > > releasing
> > > > the report: 1) confidentiality and 2) that discussions about the
> > > > technical aspects of the model would include the developers. The
> > > > agreement as it is written covers many more issues and will,
> > > in fact,
> > > > constrain the very discussion it is intended to facilitate.
> > > >
> > > &! gt; > If there is a sound reason for me to accept that the
> > > disclaimer in the
> > > > first paragraph is sufficient let me know what it is. For now
> > > I believe
> > > > the text should only cover what we talked about during the
> > > meeting, in
> > > > whatever detail is needed to protect REMI and SCE&G. I will
> > > be glad to
> > > > discuss my concerns in more detail if necessary.
> > > >
> > > > The model meeting with Ruane, Miller, an SCDHEC modeler, and
> > > me still
> > > > needs to be firmed up. The two possible dates we agreed to in
> > > the TWC
> > > > meeting were April 25 and 26. I may have a conflict on April
> > > 25 so if
> > > > April 26 is still OK for others can we make that our definite
> > > date?
> > > >
> > > > Getting the model documentation well in advance of that
> > > meeting is
> > > > essential for! the meeting to be productive.
> > > >
> > > > Regards,
> > > > Daniel L. Tufford, Ph.D.

> > > > Research Assistant Professor
> > > > University of South Carolina
> > > > Department of Biological Sciences
> > > > Sumwalt 209A (office)
> > > > 701 Sumter Street, Room 401 (mail)
> > > > Columbia, SC 29208
> > > > e-mail: tufford@sc.edu
> > > > web: http://www.biol.sc.edu/~tufford
> > > > Ph: 803.777.3292 Fx: 803.777.3292
> > > >
> > > >
> > > > Alison Guth wrote:
> > > >
> > > > > Andy and Dan
> > > > >
> > > > > I have attached a copy of Jim Ruane's agreement for the W2
> > > Model.
> > > > > Please sign and send back to me. Thanks, Alison
> > > > >
> > > > > <>
> &! gt; > > >
> > > > > Alison Guth
> > > & gt; > Licensing Coordinator
> > > > > Kleinschmidt Associates
> > > > > 101 Trade Zone Drive
> > > > > Suite 21A
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TECHNICAL REVIEWS OF THE LAKE MURRAY CE-QUAL-W2 WATER QUALITY MODEL

Protocol Agreement for Technical Reviews

Revision 2: 4/13/06

Approach for Technical Reviews under the QA/QC Program

This agreement was developed to allow Andy Miller (SCDHEC, and others from SCDHEC if necessary) and Dan Tufford (USC) temporary access to the draft Lake Murray W2 model report. This temporary access is being provided by SCE&G to meet the technical needs of Water Quality TWC for planning future modeling efforts. This temporary access does not constitute any part of an agreement for Section 401 certification or other relicensing processes. Rather, the intent of this release is to enable technical review of the current calibration of the model. This protocol does not limit any future agreement that might be reached concerning long-term access to or ownership of the model. This protocol outlines only the process that will be followed during this temporary technical model review. This protocol must be agreed to by Andy Miller, other SCDHEC staff, and Dan Tufford, prior to their temporary access to the draft model report.

During their review, Miller and Tufford should bear in mind the modeling objectives for which this model was developed. The model for which access is being provided was developed with these objectives:

1. to predict temperature and DO in the forebay and discharges from Lake Murray;
2. to predict effects of hydro operations on reservoir and release temperature and DO;
3. to predict the effects of phosphorus reductions in selected watersheds on algal levels and DO in the forebay of the reservoir and its discharges.

The scope for these predictions is for planning and policy level considerations, e.g., to examine the cause/effect relationships between operations or inflow loadings and the resulting temperature and DO in the reservoir and its releases. These predictions are intended to be helpful in exploring alternative management strategies for improving water quality in the reservoir and its releases.

Agreements Regarding Release of the Draft Model Report for Lake Murray

The model developers welcome discussion regarding the model and are available to assist reviewers. This model review is envisioned as an opportunity for enhanced cooperation and teamwork with stakeholders. To this end, the following agreements are necessary to provide structure for the reviews.

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Deleted: in order to review the current model that will be upgraded during the FERC relicensing process for the Saluda Project.

Deleted: stakeholders

Deleted: that will be upgraded

Deleted: stakeholders

Deleted: To help meet the needs of the stakeholders and SCE&G, this protocol for temporary model access was developed with the following specific objectives:¶
<#>to provide an opportunity for technical experts to review the draft model report;¶
<#>to provide a mechanism for interaction between the stakeholders, SCE&G, and the REMI modelers to answer questions, provide feedback, and utilize results of the exchange to improve the quality of the model upgrades by REMI;¶
<#>to protect SCE&G's investment in the draft model report and the relicensing process;¶
<#>to protect the modeling consultants' proprietary information;¶
<#>to enable SCDHEC, USEPA and SCDNR to respond to potential FOIA requests and record-keeping requirements.¶
¶

Deleted: technical reviewers

Deleted: This provision for release of the draft model report is subject to the expectations and agreements below. ¶
¶
Background Considerations about the CE-QUAL-W2 Water Quality Model Developed for Lake Murray ¶
¶
Site-specific models like that developed for Lake Murray are intended for specific, limited uses, and by their nature, they are intended for use by Andy Sawyer and Jim Ruane, both working under Reservoir Environmental Management, Inc (REMI). Model calibration involved an intensive reconciliation process that is fully understood primarily by the model developers. The challenge to the r ... [1]

Deleted: is

1. Interpretation of results of model calibrations and model runs should involve Ruane and/or Sawyer. The expectation is that consensus on interpretation will be reached between the reviewer and Ruane or Sawyer, and that this consensus will be based on technical reasoning using the literature and experience from other projects, considerations for robustness, sensitivity analyses, etc.
2. Reviewer comments, if provided, should be relevant to the stated objectives for the models, and should be based on sound, proven principles that are consistent with the models being used, the available data, literature, and the objectives for the models.
3. Miller and Tufford agree not to release the draft model report, inputs, or results to other organizations or individuals without express written permission by SCE&G. FOIA requests can be an exception but SCE&G must be notified within Three business days of such a request. The model report and inputs and other information provided should be treated as proprietary SCE&G property. However, it is Miller and Tufford's responsibility that any copy that is printed or copied onto other media by the agencies for FOIA or internal purposes must also clearly indicate that it is "SCE&G Proprietary Property".
4. Conflicts, if any, arising from this model review are expected to be resolved via sincere attempts at technical consensus in a spirit of constructiveness and cooperation with model developers Ruane and Sawyer. It is expected that all avenues to reconcile conflicts will be exhausted before commenting to others outside the reviewers and Ruane and Sawyer. If consensus cannot be reached, both parties agree to include comments and responses by the other party with any comments released unilaterally.

I agree and promise to abide with this agreement.

_____ _____

Signed Name Date

_____

Organization

Questions or comments? Contact:

Jim Ruane
Reservoir Environmental Management, Inc.
jimruane@comcast.net
423-265-5820

Deleted: <#>It is understood that during the relicensing process calibration is the responsibility of SCE&G and their consultants, and any agency suggestions for calibration arising from their review should be directed to the model developers, Sawyer and Ruane, for further discussion. For QA/QC reasons, simulations of alternatives related to the relicensing effort will be performed by the REMI model leader who is intimately familiar with the model calibration and model limitations. It is understood that the reviewers will not possess the models to develop independent calibrations or simulations of alternatives, but that they will discuss and, if needed, request that these be made by Ruane or Sawyer.¶

Formatted: Bullets and Numbering

Inserted: <#>during the relicensing process

Deleted: Considering the stage of model development for Lake Murray and that the CE-QUAL-W2 model was selected over two years ago, reviewer comments regarding selection of the models being used or comparing this model to other models would not be useful in this review process.

Deleted: The stakeholders

Comment: Inserted By Andy Miller

Deleted: 48 hours

Deleted: the stakeholder

Deleted: <#>Some technical revisions will be made to the CE-QUAL-W2 source code to develop the upgraded calibrations. This version of CE-QUAL-W2 will not be released outside of the REMI team, KA, and SCE&G. Although the full source code will not be provided to the stakeholders as part of this review, relevant code excerpts will be provided to show how alterations were implemented. These revisions have been discussed in model review meetings and will have been reviewed by Tom Cole or Merlynn Bender. The Cole/Bender review information will be provided to the stakeholders upon receipt. ¶

This provision for release of the draft model report is subject to the expectations and agreements below.

Background Considerations about the CE-QUAL-W2 Water Quality Model Developed for Lake Murray

Site-specific models like that developed for Lake Murray are intended for specific, limited uses, and by their nature, they are intended for use by Andy Sawyer and Jim Ruane, both working under Reservoir Environmental Management, Inc (REMI). Model calibration involved an intensive reconciliation process that is fully understood primarily by the model developers. The challenge to the model developer is to develop the best possible model to meet the intended objectives considering the available data and other pertinent information, the model being used, and settings for the coefficients, rates, and processes in the model. In the process of developing the best possible model, many decisions are made by the model developers that have implications for model calibration choices and, therefore, applications. It is technically important, therefore, that simulations to explore alternatives for the relicensing study be performed by the model developers and not by someone with little or no knowledge of the reconciliation process described above.

Running and reviewing these models takes a lot of time, and the initial learning curve is steep, especially if the reviewers are not familiar with CE-QUAL-W2. Reviewers should expect difficulties, especially at first. It will take a significant time commitment by the stakeholders. It will be difficult for technical reviewers to review the model and become as familiar with it as are the model developers. However, Sawyer and Ruane will be available to assist the stakeholders in their reviews and it is recommended that the reviewers take advantage of this service.

SCE&G and their consultants view the models themselves as being the most useful avenue for "conflict reconciliation" between model developers and reviewers. With this background in mind, the following expectations and agreements are provided as guidelines for this process.

SCE&G, Stakeholder, KA, and REMI Expectations

The stakeholders expect the opportunity to review the draft modeling report and to discuss how the model was developed. They want to use this information for developing plans for future modeling of water quality associated with Lake Murray.

SCE&G, KA, and REMI expect the reviews to increase stakeholder awareness of the capabilities and limitations of the model and lead to realistic expectations of what the model can and cannot do. They want the technical reviews to help build confidence in the integrity of the model and planned upgrades by the agencies and other stakeholders who look to the agencies for their approval. They want the models to be useful for the modeling objectives stated above, with due consideration to the caveats and qualifications provided by the modelers. They want stakeholders to understand that models cannot

perfectly represent actual conditions in waterways, but that models are the best way to predict effects of operational and certain other changes to support decisions that need to be made regarding the Saluda Project. They have strived to do the best they can based on the data and model that was used, and they want the upgraded calibrated model to be the best tool available for the stated objectives.

Kacie Jensen

From: Dan Tufford [tufford@sc.edu]
Sent: Thursday, April 13, 2006 9:04 AM
To: jimruane@comcast.net
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20060413 tech reviews of model...

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> > > > Bureau of Water
> > > > (803)-898-4031
> > > >
> > > > www.scdhec.gov/water/shed/home.html
> > >
> > > >
> > > > millerca@dhec.sc.gov
> > > >
> > > >
> > > > >>> Dan Tufford 4/3/2006 1:17 PM >>>
> > > > Hello All,
> > &g! t; > >
> > > > Thanks for sending the agreement, unfortunately it is
> > unsatisfactory in
> > > > its current form. The first paragraph states that the
> > protocol is only
> > > > for the temporary model review, but the rest of the text goes

> > > well
> > > > beyond that scope. We need to reword it so the provisions of the
> > > > protocol cover only issues that are of concern at this stage.
> > > >
> > > > During the TWC meeting there were two concerns raised about
> > releasing
> > > > the report: 1) confidentiality and 2) that discussions about the
> > > > technical aspects of the model would include the developers. The
> > > > agreement as it is written covers many more issues and will,
> > in fact,
> > > > constrain the very discussion it is intended to facilitate.
> > > >
> > &! gt; > If there is a sound reason for me to accept that the
> > > disclaimer in the
> > > > first paragraph is sufficient let me know what it is. For now
> > > I believe
> > > > the text should only cover what we talked about during the
> > > meeting, in
> > > > whatever detail is needed to protect REMI and SCE&G. I will
> > > be glad to
> > > > discuss my concerns in more detail if necessary.
> > > >
> > > > The model meeting with Ruane, Miller, an SCDHEC modeler, and
> > > me still
> > > > needs to be firmed up. The two possible dates we agreed to in
> > > the TWC
> > > > meeting were April 25 and 26. I may have a conflict on April
> > > 25 so if
> > > > April 26 is still OK for others can we make that our definite
> > > date?
> > > >
> > > > Getting the model documentation well in advance of that
> > > meeting is
> > > > essential for! the meeting to be productive.
> > > >
> > > > Regards,
> > > > Daniel L. Tufford, Ph.D.
> > > > Research Assistant Professor
> > > > University of South Carolina
> > > > Department of Biological Sciences
> > > > Sumwalt 209A (office)
> > > > 701 Sumter Street, Room 401 (mail)
> > > > Columbia, SC 29208
> > > > e-mail: tufford@sc.edu
> > > > web: http://www.biol.sc.edu/~tufford
> > > > Ph: 803.777.3292 Fx: 803.777.3292
> > > >
> > > >
> > > > Alison Guth wrote:
> > > >
> > > > > Andy and Dan
> > > > >
> > > > > I have attached a copy of Jim Ruane's agreement for the W2
> > > Model.
> > > > > Please sign and send back to me. Thanks, Alison
> > > > >
> > > > > <>
> > &! gt; > > >
> > > > > Alison Guth
> > > & gt; > Licensing Coordinator
> > > > > Kleinschmidt Associates
> > > > > 101 Trade Zone Drive
> > > > > Suite 21A
> > > > > West Columbia, SC 29170
> > > > > P: (803) 822-3177
> > > > > F: (803) 822-3183
> > >

> > --
> > Daniel L. Tufford, Ph.D.
> > Research Assistant Professor
> > University of South Carolina
> > Department of Biological Sciences
> > Sumwalt 209A (office)
> > 701 Sumter Street, Room 401 (mail)
> > Columbia, SC 29208
> > e-mail: tufford@sc.edu
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> > Ph: 803.777.3292 Fx: 803.777.3292

TECHNICAL REVIEWS OF THE LAKE MURRAY CE-QUAL-W2 WATER QUALITY MODEL

Protocol Agreement for Technical Reviews

Revision 2: 4/13/06

Approach for Technical Reviews under the QA/QC Program

This agreement was developed to allow Andy Miller (SCDHEC, and others from SCDHEC if necessary) and Dan Tufford (USC) temporary access to the draft Lake Murray W2 model report. This temporary access is being provided by SCE&G to meet the technical needs of Water Quality TWC for planning future modeling efforts. This temporary access does not constitute any part of an agreement for Section 401 certification or other relicensing processes. Rather, the intent of this release is to enable technical review of the current calibration of the model. This protocol does not limit any future agreement that might be reached concerning long-term access to or ownership of the model. This protocol outlines only the process that will be followed during this temporary technical model review. This protocol must be agreed to by Andy Miller, other SCDHEC staff, and Dan Tufford, prior to their temporary access to the draft model report.

During their review, Miller and Tufford should bear in mind the modeling objectives for which this model was developed. The model for which access is being provided was developed with these objectives:

1. to predict temperature and DO in the forebay and discharges from Lake Murray;
2. to predict effects of hydro operations on reservoir and release temperature and DO;
3. to predict the effects of phosphorus reductions in selected watersheds on algal levels and DO in the forebay of the reservoir and its discharges.

The scope for these predictions is for planning and policy level considerations, e.g., to examine the cause/effect relationships between operations or inflow loadings and the resulting temperature and DO in the reservoir and its releases. These predictions are intended to be helpful in exploring alternative management strategies for improving water quality in the reservoir and its releases.

Agreements Regarding Release of the Draft Model Report for Lake Murray

The model developers welcome discussion regarding the model and are available to assist reviewers. This model review is envisioned as an opportunity for enhanced cooperation and teamwork with stakeholders. To this end, the following agreements are necessary to provide structure for the reviews.

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Deleted: stakeholders

Deleted: in order to review the current model that will be upgraded during the FERC relicensing process for the Saluda Project.

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Deleted: To help meet the needs of the stakeholders and SCE&G, this protocol for temporary model access was developed with the following specific objectives:¶
<#>to provide an opportunity for technical experts to review the draft model report;¶
<#>to provide a mechanism for interaction between the stakeholders, SCE&G, and the REMI modelers to answer questions, provide feedback, and utilize results of the exchange to improve the quality of the model upgrades by REMI;¶
<#>to protect SCE&G's investment in the draft model report and the relicensing process;¶
<#>to protect the modeling consultants' proprietary information;¶
<#>to enable SCDHEC, USEPA and SCDNR to respond to potential FOIA requests and record-keeping requirements.¶
¶

Deleted: technical reviewers

Deleted: This provision for release of the draft model report is subject to the expectations and agreements below. ¶
¶
Background Considerations about the CE-QUAL-W2 Water Quality Model Developed for Lake Murray ¶
¶ ... [1]

Deleted: Running and reviewing these models takes a lot of time, and the ... [2]

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SCE&G and their consultants view ... [3]

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Deleted: to be useful for the modeling objectives stated above, with due ... [4]

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1. Interpretation of results of model calibrations and model runs should involve Ruane and/or Sawyer. The expectation is that consensus on interpretation will be reached between the reviewer and Ruane or Sawyer, and that this consensus will be based on technical reasoning using the literature and experience from other projects, considerations for robustness, sensitivity analyses, etc.
2. Reviewer comments, if provided, should be relevant to the stated objectives for the models, and should be based on sound, proven principles that are consistent with the models being used, the available data, literature, and the objectives for the models.
3. Miller and Tufford agree not to release the draft model report, inputs, or results to other organizations or individuals without express written permission by SCE&G. FOIA requests can be an exception but SCE&G must be notified within 48 hours of such a request. The model report and inputs and other information provided should be treated as proprietary SCE&G property. However, it is Miller and Tufford's responsibility that any copy that is printed or copied onto other media by the agencies for FOIA or internal purposes must also clearly indicate that it is "SCE&G Proprietary Property".
4. Conflicts, if any, arising from this model review are expected to be resolved via sincere attempts at technical consensus in a spirit of constructiveness and cooperation with model developers Ruane and Sawyer. It is expected that all avenues to reconcile conflicts will be exhausted before commenting to others outside the reviewers and Ruane and Sawyer. If consensus cannot be reached, both parties agree to include comments and responses by the other party with any comments released unilaterally.

I agree and promise to abide with this agreement.

_____ _____

Signed Name Date

_____

Organization

Questions or comments? Contact:

Jim Ruane
Reservoir Environmental Management, Inc.
jimruane@comcast.net
423-265-5820

Deleted: <#>It is understood that during the relicensing process calibration is the responsibility of SCE&G and their consultants, and any agency suggestions for calibration arising from their review should be directed to the model developers, Sawyer and Ruane, for further discussion. For QA/QC reasons, simulations of alternatives related to the relicensing effort will be performed by the REMI model leader who is intimately familiar with the model calibration and model limitations. It is understood that the reviewers will not possess the models to develop independent calibrations or simulations of alternatives, but that they will discuss and, if needed, request that these be made by Ruane or Sawyer.¶

Formatted: Bullets and Numbering

Inserted: <#>during the relicensing process

Deleted: Considering the stage of model development for Lake Murray and that the CE-QUAL-W2 model was selected over two years ago, reviewer comments regarding selection of the models being used or comparing this model to other models would not be useful in this review process.

Deleted: The stakeholders

Deleted: the stakeholder

Deleted: <#>Some technical revisions will be made to the CE-QUAL-W2 source code to develop the upgraded calibrations. This version of CE-QUAL-W2 will not be released outside of the REMI team, KA, and SCE&G. Although the full source code will not be provided to the stakeholders as part of this review, relevant code excerpts will be provided to show how alterations were implemented. These revisions have been discussed in model review meetings and will have been reviewed by Tom Cole or Merlynn Bender. The Cole/Bender review information will be provided to the stakeholders upon receipt. ¶

Page 1: [1] Deleted **None** **4/13/2006 8:59 AM**

This provision for release of the draft model report is subject to the expectations and agreements below.

Background Considerations about the CE-QUAL-W2 Water Quality Model Developed for Lake Murray

Site-specific models like that developed for Lake Murray are intended for specific, limited uses, and by their nature, they are intended for use by Andy Sawyer and Jim Ruane, both working under Reservoir Environmental Management, Inc (REMI). Model calibration involved an intensive reconciliation process that is fully understood primarily by the model developers. The challenge to the model developer is to develop the best possible model to meet the intended objectives considering the available data and other pertinent information, the model being used, and settings for the coefficients, rates, and processes in the model. In the process of developing the best possible model, many decisions are made by the model developers that have implications for model calibration choices and, therefore, applications. It is technically important, therefore, that simulations to explore alternatives for the relicensing study be performed by the model developers and not by someone with little or no knowledge of the reconciliation process described above.

Page 1: [2] Deleted **None** **4/13/2006 8:59 AM**

Running and reviewing these models takes a lot of time, and the initial learning curve is steep, especially if the reviewers are not familiar with CE-QUAL-W2. Reviewers should expect difficulties, especially at first. It will take a significant time commitment by the stakeholders. It will be difficult for technical reviewers to review the model and become as familiar with it as are the model developers. However, Sawyer and Ruane will be available to assist the stakeholders in their reviews and it is recommended that the reviewers take advantage of this service.

Page 1: [3] Deleted **None** **4/13/2006 8:59 AM**

SCE&G and their consultants view the models themselves as being the most useful avenue for "conflict reconciliation" between model developers and reviewers. With this background in mind, the following expectations and agreements are provided as guidelines for this process.

SCE&G, Stakeholder, KA, and REMI Expectations

The stakeholders expect the opportunity to review the draft modeling report and to discuss how the model was developed. They want to use this information for developing plans for future modeling of water quality associated with Lake Murray.

SCE&G, KA, and REMI expect the reviews to increase stakeholder awareness of the capabilities and limitations of the model and lead to realistic expectations of what the model can and cannot do. They want the technical reviews to help build confidence in

the integrity of the model and planned upgrades by the agencies and other stakeholders who look to the agencies for their approval. They want the model

Page 1: [4] Deleted	None	4/13/2006 8:59 AM

to be useful for the modeling objectives stated above, with due consideration to the caveats and qualifications provided by the modelers. They want stakeholders to understand that models cannot perfectly represent actual conditions in waterways, but that models are the best way to predict effects of operational and certain other changes to support decisions that need to be made regarding the Saluda Project. They have strived to do the best they can based on the data and model that was used, and they want the upgraded calibrated model to be the best tool available for the stated objectives.

Kacie Jensen

From: Alison Guth
Sent: Wednesday, April 12, 2006 5:41 PM
To: BARGENTIERI@scana.com; 'SUMMER, STEPHEN E'; 'Dan Tufford'; 'Richard Kidder'; 'Andy Miller'; 'bbull@sc.rr.com'; 'ahler@dnr.sc.gov'; 'Jim Ruane'; 'Tom Bowles (tbowles@scana.com)'; 'Gina Kirkland'; Alan Stuart
Cc: Tom Stonecypher; Alan Stuart; Alison Guth; Amanda Hill; Andy Miller; BARGENTIERI@scana.com; Bill Hulslander; Bill Marshall; Brett Bursey; Cam Littlejohn; Charlene Coleman; Charles Floyd; Craig Stow; Daniel Tufford; Dick Christie; Don Tyler; Donald Eng; Ed Diebold; George Duke; Gerrit Jobsis (American Rivers); Gina Kirkland; Hank McKellar; Jeff Duncan; Jennifer O'Rourke; Jim Glover; Jim Ruane ; John Davis (johned44 @bellsouth.net); Joy Downs; Karen Kustafik; Keith Ganz-Sarto; Kim Westbury; Larry Turner (turnerle@dhec.sc.gov); Malcolm Leaphart; Mark Leao; Mike Sloan; Norman Ferris; Patrick Moore; Prescott Brownell; Ralph Crafton; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Robert Keener (SKEENER@sc.rr.com); Ron Ahle; Roy Parker; Shane Boring; Steve Bell; Steve Summer; Suzanne Rhodes; Tom Bowles (tbowles@scana.com)
Subject: March 24 WQ TWC notes

Good Afternoon,

Attached are the draft Water Quality TWC meeting notes from March 24th. Please provide comments back to me by April 26th. Remember, attendees may make changes to the notes themselves, while others may submit comments to be included in a separate section of the document. Thanks and take care, Alison

2006-3-24 draft Meeting Minute...

Alison Guth
Licensing Coordinator
Kleinschmidt Associates
101 Trade Zone Drive
Suite 21A
West Columbia, SC 29170
P: (803) 822-3177
F: (803) 822-3183

MEETING NOTES

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

SCE&G Training Center
March 24, 2006

Draft ACG 4-12-06

ATTENDEES:

Alan Stuart, Kleinschmidt Associates
Alison Guth, Kleinschmidt Associates
Bill Argentieri, SCE&G
Steve Summer, SCANA Services
Dan Tufford, USC
Richard Kidder, LMA
Andy Miller, SCDHEC
Reed Bull, Midlands Striper Club
Ron Ahle, SCDNR
Jim Ruane, REMI
Tom Bowles, SCE&G
Gina Kirkland, SCDHEC

DATE: March 24, 2006

HOMEWORK ITEMS:

- Ron Ahle – to acquire size/length distributions of striped bass in die-offs
- Reed Bull – to research anecdotal data regarding the 1996 fish kill
- Bill Argentieri – Review record of July 2005 reports to acquire information on how often and why unit 5 was run.
- Dan Tufford, Andy Miller, Jim Ruane – convene meeting to discuss the suitability of the information that this available and what information is needed in regards to performing a TMDL

DATE OF NEXT MEETING: **May 23, 2006 at 9:30 a.m.**
Located at the Lake Murray Training Center

INTRODUCTIONS AND DISCUSSION

Alan opened the meeting and noted that Ron Ahle would first be discussing striped bass die offs on Lake Murray. Ron distributed a memorandum on this issue (will be posted to web 4-13-06) to the group and began discussions. The group discussed the history of the striped bass die offs and Ron Ahle noted that evidence shows that fish kills have occurred less frequently, shorter in duration, and later in the season since unit 5 has been operated "last on, first off". He also noted that drawdowns can suspend nutrients in the water that also seem to worsen fish kills. Ron asked what happens at the oxygen gage when unit 5 is turned on. Jim Ruane replied that it typically stays the same with a few fluctuations, Jim also noted that wet years and dry years will also effect the oxygen in the lake. Alan asked Ron if it was possible to acquire size-length distributions of the fish that had died off.

Ron agreed and noted that they had good data for 1991. Reed Bull also noted that he would research anecdotal data regarding the 1996 fish kill.

Alan began to give a presentation on Acoustic Doppler Technology (will be posted to web 4-13-06). The group discussed performing an acoustic doppler study to determine what area of the lake unit 5 pulls water from. The group noted that any doppler studies should be run in the June time frame to avoid fish kills. Ron Ahle noted that one of the questions of interest would be how much water is being taken from the thermocline. Steve Summer also noted that another question to be answered would be how a unit will impact critical habitat as well as the entrainment issue. Jim Ruane added that the W2 model will show how the unit impacts critical habitat. Tom Bowles noted that the fish start to congregate around Unit 5 usually in the 3rd or 4th week of August.

In a discussion on how this study would be performed, Gina Kirkland suggested that a wet year, a dry year and a normal year be studied. There was also a recommendation of studying it on a February, Summer, and Fall time frame. Ron Ahle noted that during testing, Unit 5 should be run along with the other units, as it would under typical operations of the plant. The group concluded that although the study will not be performed this year due to the repair work on the units, that they would start to draft a study plan. The group also noted that they would coordinate with the Fish and Wildlife TWCs and DNR to discuss fish entrainment issues and coordinate the studies.

During continuing discussion on a the doppler study, it was noted that unit 5 was used a number of times in June and July. Bill Argentieri noted that he would look into this and also send out a reminder email that Unit 5 is last on, first off, starting July 1st. Steve Summer noted that he believes this was due in part to the large amount of rainfall coming into the basin.

After lunch the group began to discuss the topic of TMDL. Alan noted that if a TMDL was performed that it may run concurrent to Relicensing, however it should not hold up the process by being directly tied to Relicensing. Andy Miller explained that although they would be happy for SCE&G to perform the studies, that he does not believe that it should be required of SCE&G. Gina further noted that as long as the TMDL was scientifically defensible, SCE&G may want to consider it for potential mitigation. Randy Mahan agreed that although a TMDL may be beneficial, that there was only a limited amount of things that SCE&G could do about the issue. He also expressed concern about the length of time in which it would take for the benefits of a TMDL to exhibit themselves, and the possibilities that SCE&G may be required to put in oxygen injection in during that time period. Gina agreed that that is a factor that SCE&G would have to consider. Gina explained that the department has taken on several TMDL's in the past and they can take a considerable amount of time to accomplish. She explained that part of the reason for this is because concerns vary by areas and the dischargers also have concerns that lengthen the process. The group agreed that a TMDL would be beneficial, however there was no decision made on whether it would

be performed concurrently with Relicensing, or in the future by SCDHEC. Dan Tufford proposed that Andy Miller and Jim Ruane join him in determining the suitability of the information that is available and what else may be needed and subsequently to make a proposal to the group on a TMDL. Jim Ruane noted that there has been several improvements that could be made to the W2 model since it was first run. Randy and Bill noted that Jim should add in the additional work arounds, including refractory organic data. It was decided that Jim Ruane, Dan Tufford, and Andy Miller would meet at the end of April, while the entire TWC would meet again on May 23 in the Lake Murray Training Center. At the request of Dan Tufford and Andy Miller, Jim Ruane noted he would send a provisional copy of the W2 model to them for review. He noted that he would first send them a "gentlemen's agreement" to be signed before they received the W2 that specified that the draft should not be circulated.

Before the adjournment of the meeting Richard Kidder briefly described the water quality monitoring program being undertaken by LMA. He noted that there would be a focus on the water quality in coves especially. Rich continued to explain that there would be fecal coliform and phosphorus testing. He also mentioned that there would be testing performed around commercial arenas in order to develop data that will be helpful to SCE&G on multi-slip dock issues. Rich noted that they would begin the testing in May and continue until October.

Kacie Jensen

From: Shane Boring
Sent: Thursday, April 06, 2006 5:26 PM
To: Shane Boring; 'Tom Brooks'; Alan Stuart; 'Amanda Hill'; 'Andy Miller'; BARGENTIERI@scana.com; 'Daniel Tufford'; 'Gerrit Jobsis (American Rivers)'; 'Gina Kirkland'; 'Jim Glover'; 'Jim Ruane '; 'Larry Turner (turnerle@dhec.sc.gov)'; RMAHAN@scana.com; 'Reed Bull (rbull@davisfloyd.com)'; 'Richard Kidder'; 'Ron Ahle'; 'Roy Parker'; Shane Boring
Cc: Cheryl Balitz; 'Tom Stonecypher'; Alison Guth; 'Bill Hulslander'; 'Bill Marshall'; 'Brett Bursey'; 'Cam Littlejohn'; 'Charlene Coleman'; 'Charles Floyd'; 'Craig Stow'; 'Dick Christie'; 'Don Tyler'; 'Donald Eng'; 'Ed Diebold'; 'George Duke'; 'Hank McKellar'; 'Jeff Duncan'; 'Jennifer O'Rourke'; 'John Davis (johned44@bellsouth.net)'; 'Joy Downs'; 'Karen Kustafik'; 'Keith Ganz-Sarto'; 'Kim Westbury'; 'Malcolm Leaphart'; 'Mark Leao'; 'Mike Sloan'; 'Norman Ferris'; 'Patrick Moore'; 'Prescott Brownell'; 'Ralph Crafton'; 'Robert Keener (SKEENER@sc.rr.com)'; 'Steve Bell'; 'Steve Summer'; 'Suzanne Rhodes'; 'Tom Bowles (tbowles@scana.com)'
Subject: RE: Saluda Hydro Relicense: March 6 Water Quality TWC Final Meeting Notes (Temperature Study Conference Call)

All:

The below referenced notes had the date incorrectly reported in the document header; therefore, an updated version is attached. The website has been likewise updated. Thanks.

C. Shane Boring
Environmental Scientist
Kleinschmidt Associates
101 Trade Zone Dr., Suite-21A
West Columbia, SC 29170
Phone: (803)822-3177
Fax: (803)822-3183

2006-03-06
)-TWC Meeting Note

-----Original Message-----
From: Shane Boring
Sent: Tuesday, April 04, 2006 3:17 PM
To: Tom Brooks; Alan Stuart; Amanda Hill; Andy Miller; Bill Argentieri; Daniel Tufford; Gerrit Jobsis (American Rivers); Gina Kirkland; Jim Glover; Jim Ruane ; Larry Turner (turnerle@dhec.sc.gov); Randy Mahan; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Ron Ahle; Roy Parker; Shane Boring
Cc: Cheryl Balitz; Tom Stonecypher; Alison Guth; Bill Hulslander; Bill Marshall; Brett Bursey; Cam Littlejohn; Charlene Coleman; Charles Floyd; Craig Stow; Dick Christie; Don Tyler; Donald Eng; Ed Diebold; George Duke; Hank McKellar; Jeff Duncan; Jennifer O'Rourke; John Davis (johned44@bellsouth.net); Joy Downs; Karen Kustafik; Keith Ganz-Sarto; Kim Westbury; Malcolm Leaphart; Mark Leao; Mike Sloan; Norman Ferris; Patrick Moore; Prescott Brownell; Ralph Crafton; Robert Keener (SKEENER@sc.rr.com); Steve Bell; Steve Summer; Suzanne Rhodes; Tom Bowles (tbowles@scana.com)
Subject: Saluda Hydro Relicense: March 6 Water Quality TWC Final Meeting Notes (Temperature Study Conference Call)

All:

Attached for your records are the final meeting notes from the March 6 Water Quality TWC conference call to discuss the temperature study in the Lower Saluda and Congaree Rivers. Thanks to all who provided input.

C. Shane Boring
Environmental Scientist

Kleinschmidt Associates
101 Trade Zone Dr., Suite-21A
West Columbia, SC 29170
Phone: (803)822-3177
Fax: (803)822-3183

<< File: 2006-03-06 WQ TWC Meeting Notes (Temp study; final).pdf >>

Cheryl, Could you please post these to the Saluda Relicensing website.

-----Original Message-----
From: Shane Boring
Sent: Wednesday, March 01, 2006 3:14 PM
To: Shane Boring; Alan Stuart; 'millerca@dhec.sc.gov'; 'tufford@sc.edu'; 'gjobsis@americanrivers.org'; 'KIRKLAGL@dhec.sc.gov'; 'ahler@dnr.sc.gov'; 'royparker38@earthlink.net'; 'Amanda_Hill@fws.gov'; 'tbowles@scana.com'; 'bbull@sc.rr.com'; 'Jim Ruane'; 'rkidder@pbtcomm.net'
Cc: Alison Guth; 'bill_hulslander@nps.gov'; 'marshallb@dnr.sc.gov'; 'dchristie@infoave.net'; 'kayakduke@bellsouth.net'; 'Jeff_Duncan@NPS.gov'; 'Malcolml@mailbox.sc.edu'; 'Norm@sc.rr.com'; 'PatrickM@scccl.org'; 'RESKKEENER@PBTCOMM.Net'; 'bellsteve9339@bellsouth.net'; 'ssummer@scana.com'; 'J. Charles Floyd'; 'bargentieri@scana.com'; 'dianlog8@aol.com'; 'MAHAN, RANDOLPH R'; 'elymay2@aol.com'; 'network@scpronet.com'; 'camlittlejohn@yahoo.com'; 'Cheetahtrk@yahoo.com'; 'cstow@sc.edu'; 'tyle6544@bellsouth.net'; 'Dengff@aol.com'; 'ediebold@riverbanks.org'; 'mckellarh@sc.dnr.gov'; 'johned44@earthlink.net'; 'kuststafik@columbiasc.net'; 'keith_ganz_sarto@hotmail.com'; 'k.westbury@saludacounty.sc.gov'; 'mark_leao@fws.org'; 'rkelly1@sc.rr.com'; 'luck8lady@aol.com'; 'Prescott Brownell (prescott.brownell@NOAA.gov)'; 'Crafton@usit.net'; 'suzrhodes@juno.com'; 'stonecypher@instreamconsulting.com'
Subject: Draft Saluda Hydro Temperature Impacts Study Plan

All:

Attached for your review is the draft study plan for the temperature study discussed last week in the water quality TWC meeting. TWC members may provide comments directly to me via e-mail or at the conference call scheduled for 2:00 PM on Monday, March 6; Water Quality RCG members who are not member of the TWC have been copied for informational purposes. Thank you all for your input on the plan and continued interest in the Saluda Hydro Relicensing.

FYI -- the map included as figure 1 does not include the level of detail that I would like see for the basin; however, it should be fine for review purposes. I am working to find a better GID dataset and will update the map for the final study plan.

C. Shane Boring
Environmental Scientist
Kleinschmidt Associates
101 Trade Zone Dr., Suite-21A
West Columbia, SC 29170
Phone: (803)822-3177
Fax: (803)822-3183

<< File: Saluda Temp Regime Study Plan (Draft;02282006).doc >> << File: Saluda_temperature_Figure1.pdf >>

MEETING NOTES

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

Via Conference Call
March 6, 2006

final csb 04032006

ATTENDEES:

Bill Argentieri, SCE&G
Reed Bull, Midlands Striper Club
Alison Guth, Kleinschmidt
Shane Boring, Kleinschmidt*
Gerrit Jobsis, SCCCL & Am. Rivers
Tom Bowles, SCE&G
Dan Tufford, USC
Richard Kidder, LMA
Ron Ahle, SCDNR

*Facilitator

ACTION ITEMS:

- Incorporate agreed-to changes to study plan and distribute as final.
  Shane Boring

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 opened the meeting at approximately 2:00 pm, noting that its primary purpose would be to review the draft temperature study plan (attached), which was distributed to the TWC via e-mail on March 1st. The group then discussed needed changes to the plan, which are summarized below.

Sampling Locations

The group agreed that, in addition to the locations indicated in the draft study plan, Tidbit temperature loggers should be placed at the following locations:

- at the USGS gage below the dam to verify data recorded by the USGS Gage;
- on the Broad, at the head structure to the Columbia Canal; and
- in the Congaree between I-77 and the upstream extent of Congaree National Park.

Ron noted that an additional sampling location in the Broad is needed to ensure that data is available for the Broad should the sensor at the head of the Columbia Canal fail. Bill A. proposed, and the group agreed, that temperature data from the USGS gage below Parr Hydro (02160991) could be used for this purpose.

Gerrit noted that the sensors located in the vicinity of the I-77 bridge should be placed upstream of the Columbia wastewater treatment plant to avoid influence from the facility. It was similarly noted that the most downstream sensor (near the downstream extent of Congaree NP and the confluence with the Wateree) should be located far enough upstream to avoid backwater effects of the Wateree. It was also noted that the site added between I-77 and Congaree NP should be sufficient distance (approx. ½ mile) to avoid influence by the Eastman Kodak (Viridian) Plant. Gerrit also suggested placing a sensor adjacent to the USGS gage at Congaree NP (02169625) to examine correlations between stage and temperature. The group agreed that this location could be used that the upstream location for Congaree NP.

It was also noted that the USGS gage at Riverbanks Zoo should be added to the map.

Study Reporting / Data Availability

Gerrit requested a meeting of the TWC following each 6-month update report and that the data collected to date be shared with the TWC following each 6-month period. The group agreed and Shane agreed to incorporate these changes into the study plan.

Study Implementation

Several attendees enquired as to when the study would begin. Bill A. noted the purchase order would likely be issued by the end of the month, at which time the study will begin.

The meeting was closed the meeting at approximately 2:30 PM. Shane noted that he would incorporate the agreed-to changes into an updated study plan and distribute it along with the draft meeting notes.

Saluda Hydroelectric Project (FERC No. 516)

Study Plan: Effects of Releases from the Saluda Hydroelectric Project Dam on the Temperature Regime of the Lower Saluda and Congaree Rivers

Water Quality Technical Working Committee
DRAFT February 28, 2006

I. Study Objective

The study objective is to characterize the effects of water releases from the Saluda Hydroelectric Project Dam on the temperature regime of the Lower Saluda River (LSR) and Congaree River, including downstream extent of temperature alteration, timing and duration of temperature alteration, and mixing characteristics.

II. Geographic and Temporal Scope

Temperature investigations will focus on the LSR from downstream of Saluda Hydro Dam to its confluence with the Broad River; the Congaree River from its origin at the confluence of the Saluda and Broad rivers to its terminus at the confluence with the Wateree River; and the lower Broad River from the Alston USGS gage (#02161000) to its terminus at the confluence with the Saluda (Figure 1).

The study is scheduled to begin in March 2006 and will continue through October 2007.

III. Methodology

Water temperature data will be acquired at 15 minute intervals (or lowest time duration above 15 minute intervals allowable by the instrumentation) from 8 locations in the study area, as determined in consultation with the resource agencies (Figure 1). Specifically, the USGS gages at Alston (#02161000) and below Lake Murray (# 02168504 and #02169000) will be used to characterize the temperature regime in the lower Broad and the lower Saluda rivers, respectively. In addition, paired temperature probes (StowAway® TidbiT™) will be deployed along the north and south riverbank at the following locations to provide temperature data for the remainder of the study area:

- the LSR upstream of the confluence with the Broad (possible in the vicinity of Riverbanks Zoo);
- the Congaree River in the vicinity of the USGS gage adjacent to downtown Columbia (#2169500);
- the Congaree River in the vicinity of the Interstate-77 bridge;
- the Congaree River at the upstream extent of the Congaree National Park;
- the Congaree River midway of the Congaree National Park; and
- the Congaree River near the downstream extent of the Congaree National Park (near the confluence with the Wateree).

Temperature data will be compared by location using appropriate statistical methods to determine timing, duration, magnitude, and spatial extent of temperature alterations.

IV. Schedule and Required Conditions

The study is scheduled to begin in March 2006 and will continue through October 2007.

A brief report summarizing the study's status will be issued at 6-month intervals, with a final report upon completion of the study period. Study methodology, timing, and duration may be adjusted based on consultation with the resource agencies.

V. Use of Study Results

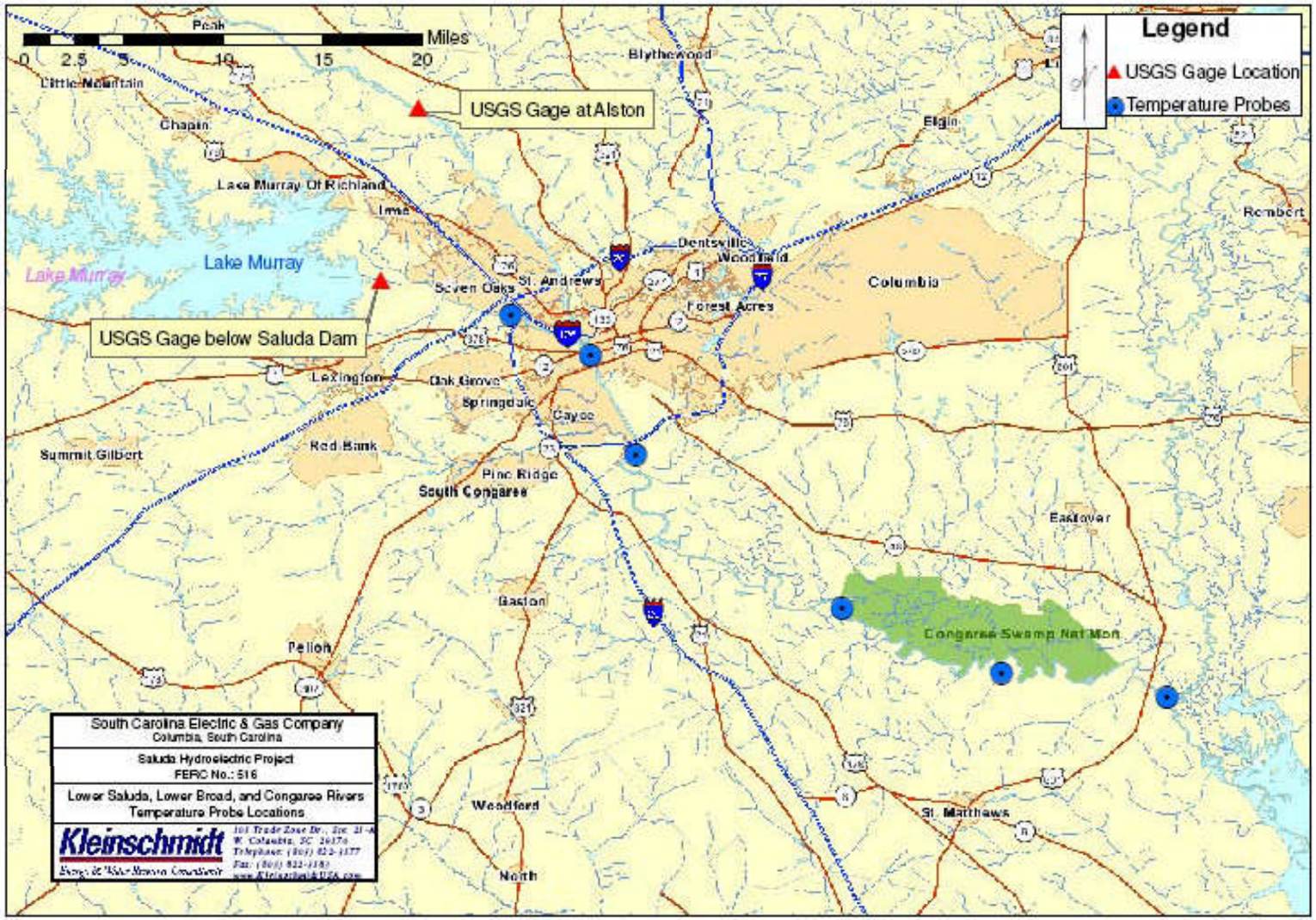
Study results will be used as an information resource during discussion of relicensing issues with the SCDNR, USFWS, Water Quality RCG and TWC, and other relicensing stakeholders.

VI. Study Participants

NAME	ORGANIZATION	PHONE	E-MAIL
Water Quality Technical Working Committee			
Gina Kirkland	SCDHEC	(803) 898-4250	KIRKLAGL@dhec.sc.gov
Gerrit Jobsis	American Rivers	(803)771-7114 x 22	gjobsis@americanrivers.org
Reed Bull	Midlands Striper Cl.	(803)256-4121	bbull@sc.rr.com
Ron Ahle	SCDNR	(803)743-2728	ahler@scdnr.gov
Roy Parker	LMA	(803)808-7188	royparker38@earthlink.net
Dan Tufford	USC Dept. of Biol.	(803)777-3292	tufford@sc.edu
Tom Bowles	SCE&G	(803)217-9615	tbowles@scana.com
Andy Miller	SCDHEC	(803)898-4031	millerca@dhec.sc.gov
Alan Stuart	Kleinschmidt	(803)822-3177	Alan.stuart@kleinschmidtusa.com
Richard Kidder	LMA	(803)892-6539	rkidder@pbtcomm.net
Jim Ruane	REMI	(423)266-5217	jimruane@comcast.net
Amanda Hill	USFWS	(843)727-4707, x303	Amanda_hill@fws.gov
Shane Boring	Kleinschmidt	(803)822-3177	shane.boring@kleinschmidtusa.com
Applicant Contacts			
Stephen E. Summer	SCANA Services	(803)217-7357	ssummer@scana.com
William Argentieri	SCE&G	(803)217-9162	bargentieri@scana.com
Randy Mahan	SCANA Services	(803)217-9538	rmahan@scana.com

VII. List of Attachments

Figure 1: Temperature Probe Locations in the Lower Saluda, Congaree and Lower Broad River


Miles
0 2.5 5 10 15 20
Legend
USGS Gage Location
Temperature Probes
USGS Gage at Alston
USGS Gage below Saluda Dam
Lake Murray
Lake Murray Of Richland
Columbia
Blythewood
Elgin
Chapin
Little Mountain
Irmo
Seven Oaks
St. Andrews
Dentsville
Woodfield
Forest Acres
Rembert
Lexington
Oak Grove
Springdale
Cayce
Red Bank
Summit
Gilbert
Pine Ridge
South Congaree
Eastover
Congaree Swamp Nat Mon
Gaston
Pelion
Woodford
North
St. Matthews
South Carolina Electric & Gas Company
Columbia, South Carolina
Saluda Hydroelectric Project
FERC No.: 516
Lower Saluda, Lower Broad, and Congaree Rivers
Temperature Probe Locations
Kleinschmidt

Kacie Jensen

From: Shane Boring
Sent: Tuesday, April 04, 2006 3:17 PM
To: Tom Brooks; Alan Stuart; Amanda Hill; Andy Miller; BARGENTIERI@scana.com; Daniel Tufford; Gerrit Jobsis (American Rivers); Gina Kirkland; Jim Glover; Jim Ruane ; Larry Turner (turnerle@dhec.sc.gov); RMAHAN@scana.com; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Ron Ahle; Roy Parker; Shane Boring
Cc: Cheryl Balitz; Tom Stonecypher; Alison Guth; Bill Hulslander; Bill Marshall; Brett Bursey; Cam Littlejohn; Charlene Coleman; Charles Floyd; Craig Stow; Dick Christie; Don Tyler; Donald Eng; Ed Diebold; George Duke; Hank McKellar; Jeff Duncan; Jennifer O'Rourke; John Davis (johned44@bellsouth.net); Joy Downs; Karen Kustafik; Keith Ganz-Sarto; Kim Westbury; Malcolm Leaphart; Mark Leao; Mike Sloan; Norman Ferris; Patrick Moore; Prescott Brownell; Ralph Crafton; Robert Keener (SKEENER@sc.rr.com); Steve Bell; Steve Summer; Suzanne Rhodes; Tom Bowles (tbowles@scana.com)
Subject: Saluda Hydro Relicense: March 6 Water Quality TWC Final Meeting Notes (Temperature Study Conference Call)

All:

Attached for your records are the final meeting notes from the March 6 Water Quality TWC conference call to discuss the temperature study in the Lower Saluda and Congaree Rivers. Thanks to all who provided input.

C. Shane Boring
Environmental Scientist
Kleinschmidt Associates
101 Trade Zone Dr., Suite-21A
West Columbia, SC 29170
Phone: (803)822-3177
Fax: (803)822-3183

2006-03-06 WQ TWC Meeting Note..

Cheryl, Could you please post these to the Saluda Relicensing website.

-----Original Message-----
From: Shane Boring
Sent: Wednesday, March 01, 2006 3:14 PM
To: Shane Boring; Alan Stuart; 'millerca@dhec.sc.gov'; 'tufford@sc.edu'; 'gjobsis@americanrivers.org'; 'KIRKLAGL@dhec.sc.gov'; 'ahler@dnr.sc.gov'; 'royparker38@earthlink.net'; 'Amanda_Hill@fws.gov'; 'tbowles@scana.com'; 'bbull@sc.rr.com'; 'Jim Ruane'; 'rkidder@pbtcomm.net'
Cc: Alison Guth; 'bill_hulslander@nps.gov'; 'marshallb@dnr.sc.gov'; 'dchristie@infoave.net'; 'kayakduke@bellsouth.net'; 'Jeff_Duncan@NPS.gov'; 'Malcolml@mailbox.sc.edu'; 'Norm@sc.rr.com'; 'PatrickM@scccl.org'; 'RESKKEENER@PBTCOMM.Net'; 'bellsteve9339@bellsouth.net'; 'ssummer@scana.com'; 'J. Charles Floyd'; 'bargentieri@scana.com'; 'dianlog8@aol.com'; 'MAHAN, RANDOLPH R'; 'elymay2@aol.com'; 'network@scpronet.com'; 'camlittlejohn@yahoo.com'; 'Cheetahtrk@yahoo.com'; 'cstow@sc.edu'; 'tyle6544@bellsouth.net'; 'Dengff@aol.com'; 'ediebold@riverbanks.org'; 'mckellarh@sc.dnr.gov'; 'johned44@earthlink.net'; 'kuststafik@columbiasc.net'; 'keith_ganz_sarto@hotmail.com'; 'k.westbury@saludacounty.sc.gov'; 'mark_leao@fws.org'; 'rkelly1@sc.rr.com'; 'luck8lady@aol.com'; 'Prescott Brownell (prescott.brownell@NOAA.gov)'; 'Crafton@usit.net'; 'suzrhodes@juno.com'; 'stonecypher@instreamconsulting.com'
Subject: Draft Saluda Hydro Temperature Impacts Study Plan

All:

Attached for your review is the draft study plan for the temperature study discussed last week in the water quality TWC meeting. TWC members may provide comments directly to me via e-mail or at the conference call scheduled for 2:00 PM on Monday, March 6; Water Quality RCG members who are not member of the TWC have been copied for informational purposes. Thank you all for your input on the plan and continued interest in the

Saluda Hydro Relicensing.

FYI -- the map included as figure 1 does not include the level of detail that I would like see for the basin; however, it should be fine for review purposes. I am working to find a better GID dataset and will update the map for the final study plan.

C. Shane Boring
Environmental Scientist
Kleinschmidt Associates
101 Trade Zone Dr., Suite-21A
West Columbia, SC 29170
Phone: (803)822-3177
Fax: (803)822-3183

<< File: Saluda Temp Regime Study Plan (Draft;02282006).doc >> << File: Saluda_temperature_Figure1.pdf >>

MEETING NOTES

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

Via Conference Call
February 6, 2006

final csb 04032006

ATTENDEES:

Bill Argentieri, SCE&G
Reed Bull, Midlands Striper Club
Alison Guth, Kleinschmidt
Shane Boring, Kleinschmidt*
Gerrit Jobsis, SCCCL & Am. Rivers
Tom Bowles, SCE&G
Dan Tufford, USC
Richard Kidder, LMA
Ron Ahle, SCDNR

*Facilitator

ACTION ITEMS:

- Incorporate agreed-to changes to study plan and distribute as final.
  Shane Boring

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 opened the meeting at approximately 2:00 pm, noting that its primary purpose would be to review the draft temperature study plan (attached), which was distributed to the TWC via e-mail on March 1st. The group then discussed needed changes to the plan, which are summarized below.

Sampling Locations

The group agreed that, in addition to the locations indicated in the draft study plan, Tidbit temperature loggers should be placed at the following locations:

- at the USGS gage below the dam to verify data recorded by the USGS Gage;
- on the Broad, at the head structure to the Columbia Canal; and
- in the Congaree between I-77 and the upstream extent of Congaree National Park.

Ron noted that an additional sampling location in the Broad is needed to ensure that data is available for the Broad should the sensor at the head of the Columbia Canal fail. Bill A. proposed, and the group agreed, that temperature data from the USGS gage below Parr Hydro (02160991) could be used for this purpose.

Gerrit noted that the sensors located in the vicinity of the I-77 bridge should be placed upstream of the Columbia wastewater treatment plant to avoid influence from the facility. It was similarly noted that the most downstream sensor (near the downstream extent of Congaree NP and the confluence with the Wateree) should be located far enough upstream to avoid backwater effects of the Wateree. It was also noted that the site added between I-77 and Congaree NP should be sufficient distance (approx. ½ mile) to avoid influence by the Eastman Kodak (Viridian) Plant. Gerrit also suggested placing a sensor adjacent to the USGS gage at Congaree NP (02169625) to examine correlations between stage and temperature. The group agreed that this location could be used that the upstream location for Congaree NP.

It was also noted that the USGS gage at Riverbanks Zoo should be added to the map.

Study Reporting / Data Availability

Gerrit requested a meeting of the TWC following each 6-month update report and that the data collected to date be shared with the TWC following each 6-month period. The group agreed and Shane agreed to incorporate these changes into the study plan.

Study Implementation

Several attendees enquired as to when the study would begin. Bill A. noted the purchase order would likely be issued by the end of the month, at which time the study will begin.

The meeting was closed the meeting at approximately 2:30 PM. Shane noted that he would incorporate the agreed-to changes into an updated study plan and distribute it along with the draft meeting notes.

Saluda Hydroelectric Project (FERC No. 516)

Study Plan: Effects of Releases from the Saluda Hydroelectric Project Dam on the Temperature Regime of the Lower Saluda and Congaree Rivers

Water Quality Technical Working Committee
DRAFT February 28, 2006

I. Study Objective

The study objective is to characterize the effects of water releases from the Saluda Hydroelectric Project Dam on the temperature regime of the Lower Saluda River (LSR) and Congaree River, including downstream extent of temperature alteration, timing and duration of temperature alteration, and mixing characteristics.

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Temperature investigations will focus on the LSR from downstream of Saluda Hydro Dam to its confluence with the Broad River; the Congaree River from its origin at the confluence of the Saluda and Broad rivers to its terminus at the confluence with the Wateree River; and the lower Broad River from the Alston USGS gage (#02161000) to its terminus at the confluence with the Saluda (Figure 1).

The study is scheduled to begin in March 2006 and will continue through October 2007.

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Water temperature data will be acquired at 15 minute intervals (or lowest time duration above 15 minute intervals allowable by the instrumentation) from 8 locations in the study area, as determined in consultation with the resource agencies (Figure 1). Specifically, the USGS gages at Alston (#02161000) and below Lake Murray (# 02168504 and #02169000) will be used to characterize the temperature regime in the lower Broad and the lower Saluda rivers, respectively. In addition, paired temperature probes (StowAway® TidbiT™) will be deployed along the north and south riverbank at the following locations to provide temperature data for the remainder of the study area:

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Temperature data will be compared by location using appropriate statistical methods to determine timing, duration, magnitude, and spatial extent of temperature alterations.

IV. Schedule and Required Conditions

The study is scheduled to begin in March 2006 and will continue through October 2007.

A brief report summarizing the study's status will be issued at 6-month intervals, with a final report upon completion of the study period. Study methodology, timing, and duration may be adjusted based on consultation with the resource agencies.

V. Use of Study Results

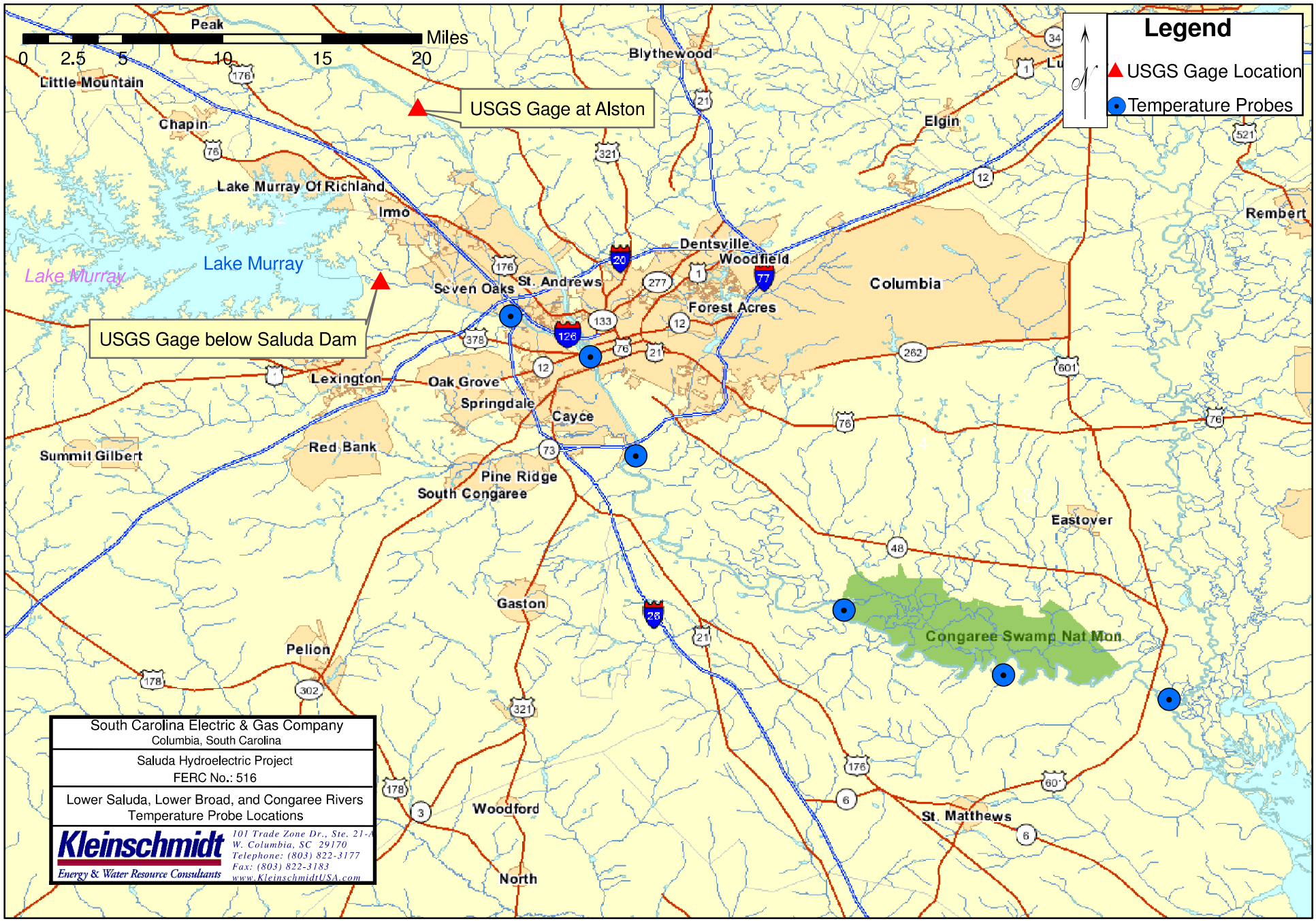
Study results will be used as an information resource during discussion of relicensing issues with the SCDNR, USFWS, Water Quality RCG and TWC, and other relicensing stakeholders.

VI. Study Participants

NAME	ORGANIZATION	PHONE	E-MAIL
Water Quality Technical Working Committee			
Gina Kirkland	SCDHEC	(803) 898-4250	KIRKLAGL@dhec.sc.gov
Gerrit Jobsis	American Rivers	(803)771-7114 x 22	gjobsis@americanrivers.org
Reed Bull	Midlands Striper Cl.	(803)256-4121	bbull@sc.rr.com
Ron Ahle	SCDNR	(803)743-2728	ahler@scdnr.gov
Roy Parker	LMA	(803)808-7188	royparker38@earthlink.net
Dan Tufford	USC Dept. of Biol.	(803)777-3292	tufford@sc.edu
Tom Bowles	SCE&G	(803)217-9615	tbowles@scana.com
Andy Miller	SCDHEC	(803)898-4031	millerca@dhec.sc.gov
Alan Stuart	Kleinschmidt	(803)822-3177	Alan.stuart@kleinschmidtusa.com
Richard Kidder	LMA	(803)892-6539	rkidder@pbtcomm.net
Jim Ruane	REMI	(423)266-5217	jimruane@comcast.net
Amanda Hill	USFWS	(843)727-4707, x303	Amanda_hill@fws.gov
Shane Boring	Kleinschmidt	(803)822-3177	shane.boring@kleinschmidtusa.com
Applicant Contacts			
Stephen E. Summer	SCANA Services	(803)217-7357	ssummer@scana.com
William Argentieri	SCE&G	(803)217-9162	bargentieri@scana.com
Randy Mahan	SCANA Services	(803)217-9538	rmahan@scana.com

VII. List of Attachments

Figure 1: Temperature Probe Locations in the Lower Saluda, Congaree and Lower Broad River


Legend
USGS Gage Location
Temperature Probes
USGS Gage at Alston
USGS Gage below Saluda Dam
Miles
0 2.5 5 10 15 20
Lake Murray
Lake Murray Of Richland
Congaree Swamp Nat Mon
Peak
Little Mountain
Chapin
Irmo
Blythewood
Elgin
Rembert
Dentsville
Woodfield
Columbia
Forest Acres
Seven Oaks
St. Andrews
Lexington
Oak Grove
Springdale
Cayce
Red Bank
Summit Gilbert
Pine Ridge
South Congaree
Eastover
Gaston
Pelion
Woodford
North
St. Matthews
South Carolina Electric & Gas Company
Columbia, South Carolina
Saluda Hydroelectric Project
FERC No.: 516
Lower Saluda, Lower Broad, and Congaree Rivers
Temperature Probe Locations
Kleinschmidt
Energy & Water Resource Consultants
101 Trade Zone Dr., Ste. 21-A
W. Columbia, SC 29170
Telephone: (803) 822-3177
Fax: (803) 822-3183
www.KleinschmidtUSA.com

Kacie Jensen

From: Shane Boring
Sent: Tuesday, March 21, 2006 2:14 PM
To: Tom Stonecypher; Alan Stuart; Alison Guth; Amanda Hill; Andy Miller; BARGENTIERI@scana.com; Bill Hulslander; Bill Marshall; Brett Bursey; Cam Littlejohn; Charlene Coleman; Charles Floyd; Craig Stow; Daniel Tufford; Dick Christie; Don Tyler; Donald Eng; Ed Diebold; George Duke; Gerrit Jobsis (American Rivers); Gina Kirkland; Hank McKellar; Jeff Duncan; Jennifer O'Rourke; Jim Glover; Jim Ruane ; John Davis (johned44 @bellsouth.net); Joy Downs; Karen Kustafik; Keith Ganz-Sarto; Kim Westbury; Larry Turner (turnerle@dhec.sc.gov); Malcolm Leaphart; Mark Leao; Mike Sloan; Norman Ferris; Patrick Moore; Prescott Brownell; Ralph Crafton; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Robert Keener (SKEENER@sc.rr.com); Ron Ahle; Roy Parker; Shane Boring; Steve Bell; Steve Summer; Suzanne Rhodes; Tom Bowles (tbowles@scana.com)
Subject: Saluda Relicense: Feb 21 Water Quality RCG and TWC Meetings -- Final Meeting Notes

2006-02-21 WQ RCG Meeting Note...

All:

Attached for your records are the final meeting notes from the February 21st Water Quality RCG and Technical Working Committee meetings. They will also be posted to the relicensing website. Thanks to those who provided comments.

C. Shane Boring
Environmental Scientist
Kleinschmidt Associates
101 Trade Zone Dr., Suite-21A
West Columbia, SC 29170
Phone: (803)822-3177
Fax: (803)822-3183

2006-02-21 WQ RCG Meeting Notes FINAL.pdf

MEETING NOTES

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

SCE&G Training Center
February 21, 2006

Final csb 03/21/2006

ATTENDEES:

Alan Stuart, Kleinschmidt**
Alison Guth, Kleinschmidt
Amanda Hill, USF&WS**
Andy Miller, SCDHEC**
Bill Argentieri, SCE&G
Dan Tufford, USC**
Dick Christie, SCDNR
George Duke, LMHC
Gerrit Jobsis, SCCCL & Am. Rivers**
Gina Kirkland, SC DHEC**
Jennifer Summerlin, Kleinschmidt
Reed Bull, Midlands Striper Club**
Richard Kidder, LMA**
Ron Ahle, SCDNR**
Roy Parker, LMA**
Shane Boring, Kleinschmidt*,**
Tom Bowles, SCE&G**

*Facilitator
**Water Quality TWC member

ACTION ITEMS:

- Provide historical information pertaining to the fish kills on Lake Murray

Ron Ahle

- Obtain stocking rates of striped bass in Lake Murray

Ron Ahle

- Provide data on water chemistry profiles on Lake Murray

Tom Bowles

- Make arrangements for Jim Ruane to present information on TMDL and acoustic Doppler methods.

Alan Stuart

- Provide more information about the status of cove water quality study plan

Lake Murray Association

- Prepare a study plan on the effects of project operations on temperature in the Lower Saluda River (LSR)

Shane Boring

DATE OF NEXT MEETING: **March 6, 2006 at 2:00 p.m.**
Conference call

March 24, 2006 at 9:30 a.m.
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.

Shortly after the water quality RCG meeting, the group agreed to proceed with the Water Quality Technical Working Committee meeting. Shane Boring opened the meeting at approximately 2:30 PM, noting that the purpose of the meeting was to begin evaluating and prioritizing the study requests assigned to the Water Quality TWC.

Cove water quality

Roy Parker noted that Lake Murray Association (LMA) is currently preparing a study plan to examine cove water quality, which has potential to assist with addressing this issue. Roy Parker noted that they have selected cove types, but have not selected specific locations. Roy also explained that they will be monitoring coves that are planned to be developed in the future and monitor after development has occurred. He added that septic system drain fields systems and marinas located around these coves are among the LMA's main concerns. He also explained they want to examine phosphorus and fecal coliform. Dick Christie suggested to LMA that a simulation model, such as those used for land use planning, should be considered. Dick noted that he was familiar with these guidelines and would help LMA figure out what is needed. Alan Stuart suggested that LMA's study plan include timing and location of proposed sampling, as well as the parameters to be sampled, to ensure that LMA and SCE&G do not duplicate efforts. Tom Bowles noted that SCE&G samples twice a year, March and September, to obtain a representation of the best and worst water conditions. Tom noted that his sample locations include Shull Island, Hollow Creek, the forebay near the intake towers, Bear Creek, Camping Creek, the Little Saluda River and Turner's Cove. LMA noted they would have more information in about two weeks and would forward information to the group as it becomes available. Roy noted that he would like to send the study plan to Gina Kirkland and then on to the Water Quality TWC following her review.

Effects of project operations on dissolved oxygen (DO) in Lake Murray and the LSR

The group briefly discussed the issue of periodic low dissolved oxygen levels in the forebay. Gina Kirkland noted that she would like to see Lake Murray at its normal (water) level before any DO study is conducted. Several group members expressed a need to further understand the impact of project operations on DO in the forebay and how it may be impacting the striped bass population. Ron noted that it would be important to look at the conditions present for each of the significant fish kills to date, such as operations, weather, and stocking rates. Ron agreed to provide the group with information on historic fish kills in the lake. The group decided that a acoustic Doppler study may

be appropriate to evaluate the impact of operations on striped bass habitat during the late summer/early fall "crunch" period; Alan suggested setting up a date and time for Jim Ruane or other staff to come in and discuss this issue.

Briefly, the group discussed the unit upgrade study and specifically it was noted that hub baffle tests were performed on units one and five. It was also noted that units two through four could not be tested due to seal failure. A report is being prepared on the unit one and five testing, and the seals on units two through four will be repaired by July and tested this fall.

Gerrit Jobsis noted that data regarding current DO conditions below Saluda Hydro are needed to provide an adequate baseline for relicensing studies. He added that data showing the percentage of time the new site-specific DO standard is being met would be particularly useful. Alan Stuart noted that the result of the hub baffle effectiveness study (see discussion above) will likely provide much of the information referenced by Gerrit. He added that the hub baffles were installed to increase aeration potential of the turbines and to help ensure that the standard is being met. Bill Argentieri noted that if any modifications to operations or equipment (i.e. auto-venting turbine runners, etc) are needed to improve DO conditions, SCE&G would like to ensure that they provide generation as well. Gina Kirkland noted these modifications should be installed and in place by the application deadline. Bill noted that any such modification would certainly be included as an enhancement in the license application, but it is unlikely that they could be installed before the license application is filed.

While the group agreed that DO conditions in the lake and LSR are of extreme importance to relicensing, it was determined that the remainder of the meeting should focus on the proposed temperature study in the LSR and Congaree as it would need to be implemented as soon as possible to capture temperature dynamics associated with the onset of spring.

Effects of project operations on temperature in the Lower Saluda(LSR) and Congaree Rivers

Amanda Hill noted temperature profiles in the LSR and Congaree are high priority for USFWS. Ron Ahle noted there needs to be some baseline data established, which will help measure success for future studies. After a brief discussion, the group agreed that a temperature study on the LSR and Congaree was appropriate.

The group then discussed areas in the LSR and Congaree where water temperature should be measured[1]. It was suggested, and the group agreed, that the USGS gages at Alston and below Saluda Hydro could be used to provide data for the Broad and Saluda, respectively, and that paired

[1] Locations were discussed during the March 6, 2006 Water Quality TWC conference call. Final TidbiT placement locations will be as identified in the final study plan and 3/6/06 conference call minutes.

Tidbit temperature sensors (left and right bank) should be deployed downstream at 10 mile intervals thereafter. The group agreed that gathering data at 15 minute intervals would be adequate if the instrumentation will allow. After some discussion, it was determined that TidbiTs should be deployed at the following locations[2]:

- The Saluda upstream of the confluence with the Broad;
- the Congaree in the vicinity of the USGS gage near Gervais St. Bridge;
- the Congaree near the I-77 bridge;
- the Congaree near the upstream extent of the Congaree National Park;
- the Congaree near the downstream extent of the Congaree National Park; and
- the Congaree midway of the Congaree National Park.

The group then requested a brief report summarizing the study status be issued at 6-month intervals during the study period, with a final report upon completion. Shane Boring agreed to have a study plan draft and distributed for review within approximately one week.

Shane Boring closed the meeting at approximately 4:00 PM, noting that the next meeting would be via conference call on March 6th at 2:00pm to review the water temperature study plan. The group also agreed that the next face-to-face meeting will be on March 24, 2006, and the group agreed to wait until that time to discuss the TMDL issue. Alan noted that he will attempt to have Jim Ruane present at the March 24th meeting to participate in the TMDL discussion. Roy Parker noted LMA would have more information about their study plan for the March 24 meeting.

[2] Locations were discussed during the March 6, 2006 Water Quality TWC conference call. Final TidbiT placement locations will be as identified in the final study plan and 3/6/06 conference call minutes.

MEETING NOTES

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

SCE&G Training Center
February 21, 2006

Final-CSB-03/21/2006

ATTENDEES:

Alan Stuart, Kleinschmidt Associates
Alison Guth, Kleinschmidt Associates
Amanda Hill, USF&WS
Andy Miller, SC DHEC
Bill Argentieri, SCE&G
Bob Seibels, Riverbanks Zoo
Dan Tufford, USC
Dick Christie, SCDNR
Donald Eng, Trout Unlimited
George Duke, LMHOC
Gerrit Jobsis, SCCCL & Am. Rivers
Gina Kirkland, SC DHEC
Jennifer Summerlin, Kleinschmidt Associates
Joy Downs, Lake Murray Association
Randy Mahan, SCANA Services
Reed Bull, Midlands Striper Club
Richard Kidder, Lake Murray Association
Ron Ahle, SCDNR
Roy Parker, Lake Murray Association
Shane Boring,* Kleinschmidt Associates
Steve Bell, Lake Watch
Steve Summers, SCE&G
Tom Bowles, SCE&G
Tom Eppink, SCANA

**facilitator*

ACTION ITEMS:

- Provide info on historical distributions of freshwater aquatic mussels in the LSR
  Shane Boring
- Provide info regarding temperature impacts on mussels (Weiss Bypass publications)
  Gerrit Jobsis
- Provide location of SCE&G's seven water quality sample sites
  Tom Bowles
- Obtain historical information on stripped bass fish kills in Lake Murray
  Ron Ahle
- Provide summary of SCE&G water quality data, including monthly and intake monitoring
  Steve Summer
- Provide information on LMA cove water quality studies
  Roy Parker
- Incorporate additional tasks identified in 02/21/06 Water Quality RCG meeting into list of study requests/tasks to be addressed by the Water Quality TWC and distribute for review
  Shane Boring

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.

Alan Stuart opened the meeting at approximately 9:00 am, and meeting attendees introduced themselves. Alan then reviewed the protocol being used to distribute draft RCG meeting notes, noting that comments would be solicited from RCG members in attendance, but that the notes would be also distributed to all members of the RCG for informational purposes. .Dick Christie asked that meeting agendas to be sent out at least one business week before the meeting. Alan noted that the primary purpose of today's meeting would be to form the Technical Working Committees for the Water Quality RCG and that Shane Boring would be taking over facilitation for the remainder of the meeting.

Mission Statement

Shane reviewed the following mission statement for the Water Quality RCG, noting that it had been finalized and placed on the Saluda Relicensing website:

> *The Mission of the Water Quality Resource Conservation Group (WQRCG) is to develop water quality related recommendations to be included in the Saluda Hydroelectric Project FERC license application. The goal will be to achieve or exceed levels of compliance for State water quality standards for Lake Murray and the lower Saluda River. A means to work towards that goal is to identify data needs and to gather or develop that data necessary to ensure that water quality standards are currently being met and that they will be maintained in the future. A primary measure of success in achieving the mission and goals will be a published WQRCG Protection, Mitigation, and Enhancement (PM&E) Agreement.*

Formation of Technical Working Committee (TWC)

Shane proposed that a single Water Quality TWC be formed due to the interdependent nature of the issues and the fact that many of the same personnel are likely to be involved. The group agreed that a single TWC would be acceptable.

Review of Relevant Study Requests

Shane reminded the group that, at the initial RCG meeting, a document was distributed that summarizes the study request received in response to issuance of the Initial Consultation Document (ICD). He added that one of the primary purposes of today's meeting would be to review the water-quality-related study requests (see attached handout from the meeting[1]) and to determine which requests should be handled by the Water Quality TWC. He added that an additional goal of the meeting would be to formalize any other requests/comments not covered in the study requests received thus far. Comments and discussion regarding the study requests to be handled by the Water Quality TWC are summarized below:

Downstream Impacts of Coldwater Releases

Amanda Hill noted that USFWS, National Park Service, and others would like to know how far downstream in the Congaree mixing occurs at different flows and at different operations. Alan Stuart explained that, with the variable influence of the Broad, the scenarios are unlimited. Amanda noted the major concern is how seasonal water temperatures in the Broad and Saluda effect habitat down stream in the Congaree and in the Congaree National Park. Ron Ahle noted the need for understanding how the different flows and temperatures effect migration of diadromous fish. The group agreed that this study request was deserving of further discussion and that the Water Quality TWC would be the appropriate venue for such discussions.

TMDLs

Shane asked Andy Miller if he would give a quick synopsis of TMDLs. Andy noted that TMDLs are wired into the Clean Water Act and that every water body listed as impaired is required to have a TMDL implemented at some point. Andy added that impaired waterbodies are those listed on the 303-D list, which is issued by SCDHEC. Dan Tufford noted that there are a number of parameters for which a waterbody can be considered impaired, and often each of these parameters may have its own TMDL. He added, as an example, that portions of the Lake Murray watershed are considered impaired for phosphorous, while the LSR is considered impaired for DO.

Randy Mahan noted that, while TMDLs obviously have great utility in regulating NPDES discharges, it was unclear to him how SCE&G could implement a TMDL for Lake Murray without having the regulatory authority to do so. Tom Eppink added that, while they recognize the utility of TMDLs for improving water quality, SCE&G may be limited in what they can do in terms of a TMDL as part of the relicensing process. Steve Bell noted, and the

[1] Issues outlined in handout to be addressed by the Water Quality TWC unless otherwise noted.

majority of the group voiced support for, the need for a TMDL to be implemented for all of Lake Murray. Dan Tufford noted that it might be helpful to view TMDL development as a 2 phase process: 1) the study phase, in which studies are preformed in support of developing an appropriate TMDL for the water body 2) the implementation phase. He added that while SCE&G may not have the regulatory authority to implement a TMDL, they have the potential to contribute significantly to studies done to develop an effective TMDL. Shane noted that TMDLs are an issue that obviously deserves consideration at a more technical level and proposed that the issue be deferred to the Water Quality TWC for further discussion. The group agreed.

Effects of Project Operations on Summer Habitat for Striped Bass

Ron Ahle noted there was a problem with low DO in late summer and early fall in Lake Murray, often resulting in suitable habitat being limited to the area in front of the Unit 5 intake. Gerrit Jobsis noted a need to evaluate different operational scenarios and how they relate to this habitat "crunch" and ultimately to fish kills in the lake. He also noted the need to look at how water quality varies across years, particularly in the area in front of the forebay. Steve Summer noted that the magnitude of the habitat "crunch" varies from year to year, regardless of whether you use unit five, due to evaporation and flow regime. Steve suggested an acoustic Doppler profile study on the towers to characterize the interface between suitable habitat and the unit intakes under various scenarios. The group agreed that this issue should be handled in the water quality TWC.

Potential DO and Temperature Effects on Freshwater Mussels

Shane noted, and the group agreed, that the effects of DO and water temperature on mussel populations should be addresses in the TWC. Alan noted that the water quality standards are formulated to protect aquatic invertebrates, including mussels. Gerrit noted there is some debate because mussels are typically located in the interstitial area (between the water column and the substrate), which often has lower DO than the water column. Shane noted that before water quality effects can be evaluated, we first need to know what mussel species, if any, historically occurred in the Saluda Hydro vicinity and their current status (i.e., are they extant). Shane agreed to gather information regarding historical occurrence of mussels in the area.

Cove Water Quality In Lake Murray

Roy Parker noted the Lake Murray Association (LMA) is in the process of implementing a cove water quality monitoring program, which they hope to have their program up and running by May. Roy explained they have picked the types of coves they want to sample, but have not yet picked specific locations. He added that they would like to sample all quadrants of the lake. Tom Bowles noted SCE&G has seven sites where they take samples and will provide these locations to LMA. Several group members expressed the need for a comparative evaluation of water quality in coves before and after marinas are installed.

Sediment Regime and Transport Studies

Gerrit proposed, and the group agreed, that the sediment regime and sediment transport studies should be discussed in the F&W TWCs, namely the Instream Flow and Aquatic Habitat TWC.

Impacts of Power Boats and Jet Skis on Drinking Water Quality

The group briefly discussed the League of Women Voter's request for a study to evaluate the impacts of jet skis and power boats on drinking water quality. Several meeting attendees noted that they were unsure of exactly what is being requesting and the project nexus. Gerrit noted that some individuals pump drinking water directly from the lake to their homes, and he assumed that is what is being referred to in the request. Randy Mahan noted that SCE&G does not permit individual water withdrawals as part of its current lake use permitting process, nor does SCE&G have the regulatory authority to regulate watercraft usage on the lake. The group agreed that the Water Quality TWC is the appropriate venue for further discussion of this issue.

Status of Existing Water Quality Data and Identification of Data Gaps

Dick Christie, Gerrit, and others noted that data from SCE&G's existing studies needs to be shared with the TWC in order to provide an idea of baseline conditions for relicensing studies. Group members noted specifically a need for information related to SCE&G's monthly water quality monitoring, monitoring conducted at the five turbine intakes, and results of the hub baffle effectiveness testing. Alan Stuart noted that Jim Ruane is nearing completion of the draft report on the hub baffle effectiveness nesting, which was conducted in fall 2005, and will distribute it to the TWC when it is received. Dan Tufford enquired as to when the technical documentation would be available for the W2 model performed by Jim Ruane for Lake Murray. Alan noted that it will be available as soon as it is finalized,

which is scheduled for late late-March/early-April. The group agrees that water quality data needs could be further refined in the TWC.

Water Quality TWC Membership

After a short break, the group began to assign members to the TWC and agreed that the members should have technical expertise. The following people volunteered and were assigned to the water quality TWC:

Gina Kirkland
Alan Stuart
Jim Ruane
Gerrit Jobsis
Reed Bull
Richard Kidder
Roy Parker
Dan Tufford
Tom Bowles
Amanda Hill
Ron Ahle
Andy Miller
Shane Boring

Dates and Agenda of Upcoming RCG and TWC Meetings

THE RCG meeting was closed at approximately 2:00 pm and the group agreed to use the remainder of the afternoon to convene the first Water Quality TWC meeting (notes prepared separately). No date was set for the next Water Quality RCG meeting as the group determined it best that the TWC meet a few times and then propose a date to the RCG for its next meeting.

10/10/05 ACG

Water Quality

Study Requests:

- **Temperature Analysis – Downstream Effects[2]:** This request entails providing an analysis of the effects of the temperature of discharges from the Saluda Dam on downstream habitats including: (1) An analysis that determines the travel distance downstream to effectuate completion of temperature mixing in the Congaree River; (2) an evaluation of the affects to species and habitats within the downstream Congaree National Park; (3) an evaluation of the affects to upstream migrating diadromous fish.

  Requested by: USFWS

- **Water Quality Studies:** Request of studies in order to assess the effects of Project operations on water quality, and consequently the aquatic habitat in the lake and river segments. Suggested studies include those to determine the effectiveness of newly installed hub baffles, TMDL's in Lake Murray, effects of project operations on summer habitat for striped bass including mitigative measures for fish kills, effects of operations on water temperature as affecting the spawning and recruitment of diadromous and riverine fish in the Saluda and Congaree rivers, and the effects of D.O. and water temperature on mussel populations in the LSR and Congaree. SCDNR recommends that water quality models be developed to identify any relationships between point and non-point pollutants and operations. The Lake Murray Association (LMA) and Lake Murray Homeowners Coalition (LMHC) specifically request information to be collected on cove water quality. The League of Women Voters suggests that water quality studies also include a facet on the impacts of power boats and jet skis on drinking water quality.

  Requested by: CCL/American Rivers, American Whitewater, City of Columbia Parks and Recreation, SCDNR, LMA, LMHC, League of Women Voters, LSSRAC, National Marine Fisheries Service, S.C. Parks Rec and Tourism, SC Council Trout Unlimited, USFWS

- **Sediment Regimen and Sediment Transport Studies:** A request has been made that a study be performed on the sediment regimen in the Project area as well as the Project effects on the sediment regimen of the lower Saluda River. Should include such things as sediment composition, bedload movement, gravel deposition, sediment storage behind dams, and bedload changes below the dam; and project effects on downstream geomorphometry, sediment availability and streambank erosion, and the possible addition of gravel to mitigate

[2] Not included as part of meeting handout; however, this study request was discussed in the meeting and thus is included in the meeting notes.

for project impacts. Also, the effects of the Project operations on habitat requirements for spawning fishes.

Requested by: CCL/American Rivers, USFWS

Information Needs:

- **Aquatic Habitat Decline Model**: In order to understand the reasons and contributing factors of seasonal habitat decline associated with the combination of increasing water temperature and decreasing dissolved oxygen. Thus resulting in a decrease in available cool-water habitat for some species. This model would be developed to better understand the causative factors that result in habitat declines, and to evaluate scenarios that could reduce or eliminate this problem.

  Requested by: SCDNR

- Request information that will help to a) forecast striped bass habitat reductions with new operational protocol implemented, and b) help develop an operational protocol to minimize impacts on striped bass habitat. ***SCDNR***

- Temperature profiles, on at least a monthly basis, at the unit intakes in the reservoir (specifically June-September) to have a better understanding of the relationship between project operations and water temperature and dissolved oxygen as they pertain to our management programs. ***SCDNR***

- We recommend that trends in water quality data associated with Lake Murray and the Lower Saluda River be reviewed and summarized. Special attention should be given to the stations and parameters that did not meet State standards or are declining. ***SCDNR***

- Marina water quality monitoring records in order to understand the degree of water quality impacts related to large multi-slip docking facilities. ***Lake Murray Homeowners Coalition***

- An updated report on the status of dissolved oxygen concentrations in the lower Saluda River and the efficacy of existing enhancement measures. **USFWS**

  Requests for Potential Mitigation: None

Kacie Jensen

From: Shane Boring
Sent: Monday, March 13, 2006 2:48 PM
To: 'tbowles@scana.com'; 'Gerrit Jobsis (gjobsis@americanrivers.org)'; 'Ron Ahle (ahler@dnr.sc.gov)'; 'Richard Kidder'; 'Reed Bull'; 'Daniel Tufford'; 'Reed Bull'
Cc: BARGENTIERI@scana.com; Alison Guth; Alan Stuart; RMAHAN@scana.com; 'Steve Summer'; Tom Stonecypher; Alan Stuart; Alison Guth; Amanda Hill; Andy Miller; Bill Hulslander; Bill Marshall; Brett Bursey; Cam Littlejohn; Charlene Coleman; Charles Floyd; Craig Stow; Dick Christie; Don Tyler; Donald Eng; Ed Diebold; George Duke; Gina Kirkland; Hank McKellar; Jeff Duncan; John Davis; Joy Downs; Karen Kustafik; Keith Ganz-Sarto; Kim Westbury; Malcolm Leaphart; Mark Leao; Mike Sloan; Norman Ferris; Patrick Moore; Prescott Brownell; Ralph Crafton; Robert Keener; Ron Ahle; Roy Parker; Shane Boring; Steve Bell; Suzanne Rhodes
Subject: Saluda Hydro Relicense Water Quality TWC: Temperature Study Meeting notes and final study plan

Hello Folks:

Attached for you review are the draft notes from last Monday's conference call of the Water Quality TWC to discuss the draft Temperature Study Plan. For those Water Quality TWC members in attendance, please provide comments on the notes by Monday, March 27. All other Water Quality TWC and RCG members have been copied for informational purposes, so please accept my apologies if you received duplicate e-mails.

In addition, the study plan has been updated based on comments received on the conference. The final study plan is also attached and will be posted to the website.

Finally, a quick update. The instruments (Tidbits) were ordered last week and are expected to arrive mid-week. The purchase order is expected to be in place by Friday, and we plan to start deploying the instruments the first of next week.

Thank you all for your input on the study plan.

Shane

C. Shane Boring
Environmental Scientist
Kleinschmidt Associates
101 Trade Zone Dr., Suite-21A
West Columbia, SC 29170
Phone: (803)822-3177
Fax: (803)822-3183


2006-03-06 Draft Meeting Notes...


Saluda Temp Regime Study Plan ..

MEETING NOTES

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

Via Conference Call
February 6, 2006

Draft csb 03132006

ATTENDEES:

Bill Argentieri, SCE&G
Reed Bull, Midlands Striper Club
Alison Guth, Kleinschmidt
Shane Boring, Kleinschmidt*
Gerrit Jobsis, SCCCL & Am. Rivers
Tom Bowles, SCE&G
Dan Tufford, USC
Richard Kidder, LMA
Ron Ahle, SCDNR

*Facilitator

ACTION ITEMS:

- Incorporate agreed-to changes to study plan and distribute as final.
  Shane Boring

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 opened the meeting at approximately 2:00 pm, noting that its primary purpose would be to review the draft temperature study plan (attached), which was distributed to the TWC via e-mail on March 1st. The group then discussed needed changes to the plan, which are summarized below.

Sampling Locations

The group agreed that, in addition to the locations indicated in the draft study plan, Tidbit temperature loggers should be placed at the following locations:

- at the USGS gage below the dam to verify data recorded by the USGS Gage;
- on the Broad, at the head structure to the Columbia Canal; and
- in the Congaree between I-77 and the upstream extent of Congaree National Park.

Ron noted that an additional sampling location in the Broad is needed to ensure that data is available for the Broad should the sensor at the head of the Columbia Canal fail. Bill A. proposed, and the group agreed, that temperature data from the USGS gage below Parr Hydro (02160991) could be used for this purpose.

Gerrit noted that the sensors located in the vicinity of the I-77 bridge should be placed upstream of the Columbia wastewater treatment plant to avoid influence from the facility. It was similarly noted that the most downstream sensor (near the downstream extent of Congaree NP and the confluence with the Wateree) should be located far enough upstream to avoid backwater effects of the Wateree. It was also noted that the site added between I-77 and Congaree NP should be sufficient distance (approx. ½ mile) to avoid influence by the Eastman Kodak (Viridian) Plant. Gerrit also suggested placing a sensor adjacent to the USGS gage at Congaree NP (02169625) to examine correlations between stage and temperature. The group agreed that this location could be used that the upstream location for Congaree NP.

It was also noted that the USGS gage at Riverbanks Zoo should be added to the map.

Study Reporting / Data Availability

Gerrit requested a meeting of the TWC following each 6-month update report and that the data collected to date be shared with the TWC following each 6-month period. The group agreed and Shane agreed to incorporate these changes into the study plan.

Study Implementation

Several attendees enquired as to when the study would begin. Bill A. noted the purchase order would likely be issued by the end of the month, at which time the study will begin.

The meeting was closed the meeting at approximately 2:30 PM. Shane noted that he would incorporate the agreed-to changes into an updated study plan and distribute it along with the draft meeting notes.

Saluda Hydroelectric Project (FERC No. 516)

Study Plan: Effects of Releases from the Saluda Hydroelectric Project Dam on the Temperature Regime of the Lower Saluda and Congaree Rivers

Water Quality Technical Working Committee
DRAFT February 28, 2006

I. Study Objective

The study objective is to characterize the effects of water releases from the Saluda Hydroelectric Project Dam on the temperature regime of the Lower Saluda River (LSR) and Congaree River, including downstream extent of temperature alteration, timing and duration of temperature alteration, and mixing characteristics.

II. Geographic and Temporal Scope

Temperature investigations will focus on the LSR from downstream of Saluda Hydro Dam to its confluence with the Broad River; the Congaree River from its origin at the confluence of the Saluda and Broad rivers to its terminus at the confluence with the Wateree River; and the lower Broad River from the Alston USGS gage (#02161000) to its terminus at the confluence with the Saluda (Figure 1).

The study is scheduled to begin in March 2006 and will continue through October 2007.

III. Methodology

Water temperature data will be acquired at 15 minute intervals (or lowest time duration above 15 minute intervals allowable by the instrumentation) from 8 locations in the study area, as determined in consultation with the resource agencies (Figure 1). Specifically, the USGS gages at Alston (#02161000) and below Lake Murray (# 02168504 and #02169000) will be used to characterize the temperature regime in the lower Broad and the lower Saluda rivers, respectively. In addition, paired temperature probes (StowAway® TidbiT™) will be deployed along the north and south riverbank at the following locations to provide temperature data for the remainder of the study area:

- the LSR upstream of the confluence with the Broad (possible in the vicinity of Riverbanks Zoo);
- the Congaree River in the vicinity of the USGS gage adjacent to downtown Columbia (#2169500);
- the Congaree River in the vicinity of the Interstate-77 bridge;
- the Congaree River at the upstream extent of the Congaree National Park;
- the Congaree River midway of the Congaree National Park; and
- the Congaree River near the downstream extent of the Congaree National Park (near the confluence with the Wateree).

Temperature data will be compared by location using appropriate statistical methods to determine timing, duration, magnitude, and spatial extent of temperature alterations.

IV. Schedule and Required Conditions

The study is scheduled to begin in March 2006 and will continue through October 2007.

A brief report summarizing the study's status will be issued at 6-month intervals, with a final report upon completion of the study period. Study methodology, timing, and duration may be adjusted based on consultation with the resource agencies.

V. Use of Study Results

Study results will be used as an information resource during discussion of relicensing issues with the SCDNR, USFWS, Water Quality RCG and TWC, and other relicensing stakeholders.

VI. Study Participants

NAME	ORGANIZATION	PHONE	E-MAIL
Water Quality Technical Working Committee			
Gina Kirkland	SCDHEC	(803) 898-4250	KIRKLAGL@dhec.sc.gov
Gerrit Jobsis	American Rivers	(803)771-7114 x 22	gjobsis@americanrivers.org
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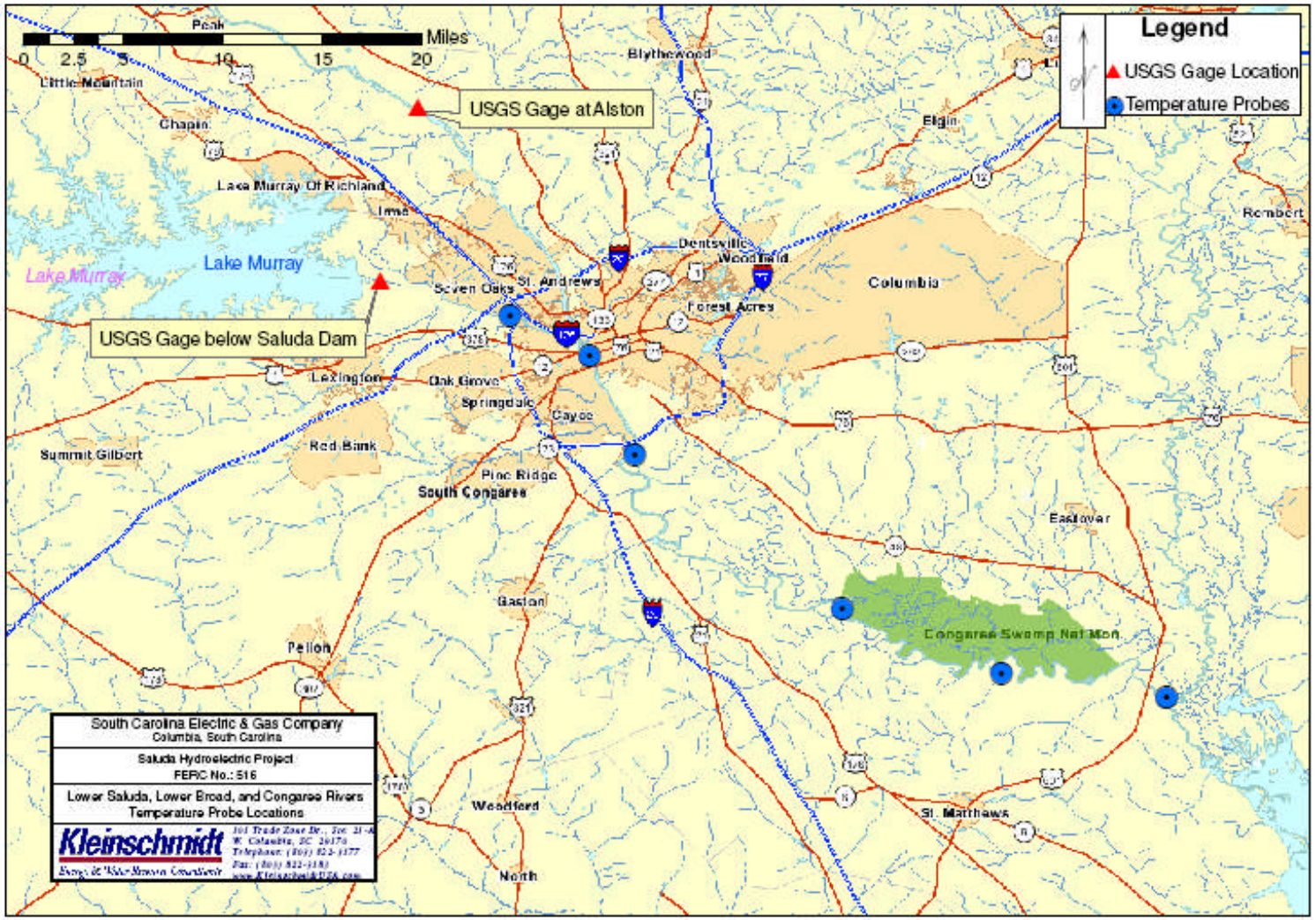
William Argentieri	SCE&G	(803)217-9162	bargentieri@scana.com
Randy Mahan	SCANA Services	(803)217-9538	rmahan@scana.com

VII. List of Attachments

Figure 1: Temperature Probe Locations in the Lower Saluda, Congaree and Lower Broad River


Miles
0 2.5 5 10 15 20
Legend
USGS Gage Location
Temperature Probes
USGS Gage at Alston
USGS Gage below Saluda Dam
Lake Murray
Lake Murray
Columbia
Blythewood
Elgin
Chapin
Irmo
Dentsville
Woodfield
Forest Acres
St. Andrews
Seven Oaks
Lexington
Oak Grove
Springdale
Cayce
Red Bank
Summit
Gilbert
Pine Ridge
South Congaree
Eastover
Gaston
Congaree Swamp Nat Mon
Pelion
Westfield
St. Matthews
North
Rembert
South Carolina Electric & Gas Company
Columbia, South Carolina
Saluda Hydroelectric Project
FERC No.: 516
Lower Saluda, Lower Broad, and Congaree Rivers
Temperature Probe Locations
Kleinschmidt

Saluda Hydroelectric Project (FERC No. 516)

Study Plan: Effects of Releases from the Saluda Hydroelectric Project Dam on the Temperature Regime of the Lower Saluda and Congaree Rivers

Water Quality Technical Working Committee
March 13, 2006

I. Study Objective

The study objective is to characterize the effects of water releases from the Saluda Hydroelectric Project Dam on the temperature regime of the Lower Saluda River (LSR) and Congaree River, including downstream extent of temperature alteration, timing and duration of temperature alteration, and mixing characteristics.

II. Geographic and Temporal Scope

Temperature investigations will focus on the LSR from downstream of Saluda Hydro Dam to its confluence with the Broad River; the Congaree River from its origin at the confluence of the Saluda and Broad rivers to its terminus at the confluence with the Wateree River; and the lower Broad River from the Broad River near Jenkinsville USGS gage (#02160991) to its terminus at the confluence with the Saluda (Figure 1).

The study is scheduled to begin in March 2006 and will continue through October 2007.

III. Methodology

Water temperature data will be collected from 11 locations in the study area, as determined in consultation with the resource agencies and interested stakeholders, using a combination of existing USGS gages and deployed instrumentation (Figure 1). Specifically, temperature data will be acquired from the following USGS gages with temperature capabilities: Broad River near Jenkinsville (#02160991), Saluda River below Lake Murray Dam (# 02168504), Saluda River near Columbia (#02169000). In addition, paired temperature probes (StowAway® TidbiT™) will be deployed along the north and south riverbank at the following locations to provide temperature data for the remainder of the study area:

- LSR upstream of the confluence with the Broad;
- Broad River near the Columbia Canal headgates;
- Congaree River in the vicinity of the USGS gage adjacent to downtown Columbia (#2169500);
- Congaree River in the vicinity of the Interstate-77 bridge (upstream of the Columbia Wastewater Treatment Plant);
- Congaree River between I-77 and above Viridian (formerly Eastman Kodak);
- Congaree River at the upstream extent of the Congaree National Park (NP), near the Congaree River at Congaree NP USGS gage (# 02169625);
- Congaree River midway of the Congaree National Park; and
- Congaree River near the downstream extent of the Congaree National Park, upstream of the Highway 601 Bridge and the influence of the Wateree River.

A single temperature probe will also be deployed adjacent to the USGS gage below Lake Murray Dam (# 02168504) to verify data collected by the gage. Probes will acquire data at 15 minute intervals or at the lowest time duration above 15 minute allowable by the instrumentation. Data will be compared by

location using appropriate statistical methods to determine timing, duration, magnitude, and spatial extent of temperature alterations.

IV. Schedule and Required Conditions

The study is scheduled to begin in March 2006 and will continue through October 2007. A brief report summarizing the study's status will be issued at 6-month intervals. All data collected will be provided in electronic format to agencies and interested stakeholders. Review meetings of the Water Quality Technical Working Committee will be held within approximately 30-days after each interim report is issued. Study methodology, timing, and duration may be adjusted based on consultation with the resource agencies and interested stakeholders. A final report with detailed analysis on the effects of Saluda Dam operations on water temperature will be issued upon completion of the study period.

V. Use of Study Results

Study results will be used as an information resource during discussion of relicensing issues with the SCDNR, USFWS, Water Quality RCG and TWC, and other relicensing stakeholders.

VI. Study Participants

NAME	ORGANIZATION	PHONE	E-MAIL
Water Quality Technical Working Committee			
Gina Kirkland	SCDHEC	(803) 898-4250	KIRKLAGL@dhec.sc.gov
Gerrit Jobsis	Am. Rivers/CCL	(803)771-7114 x 22	gjobsis@americanrivers.org
Reed Bull	Midlands Striper Cl.	(803)256-4121	bbull@sc.rr.com
Ron Ahle	SCDNR	(803)743-2728	ahler@scdnr.gov
Roy Parker	LMA	(803)808-7188	royparker38@earthlink.net
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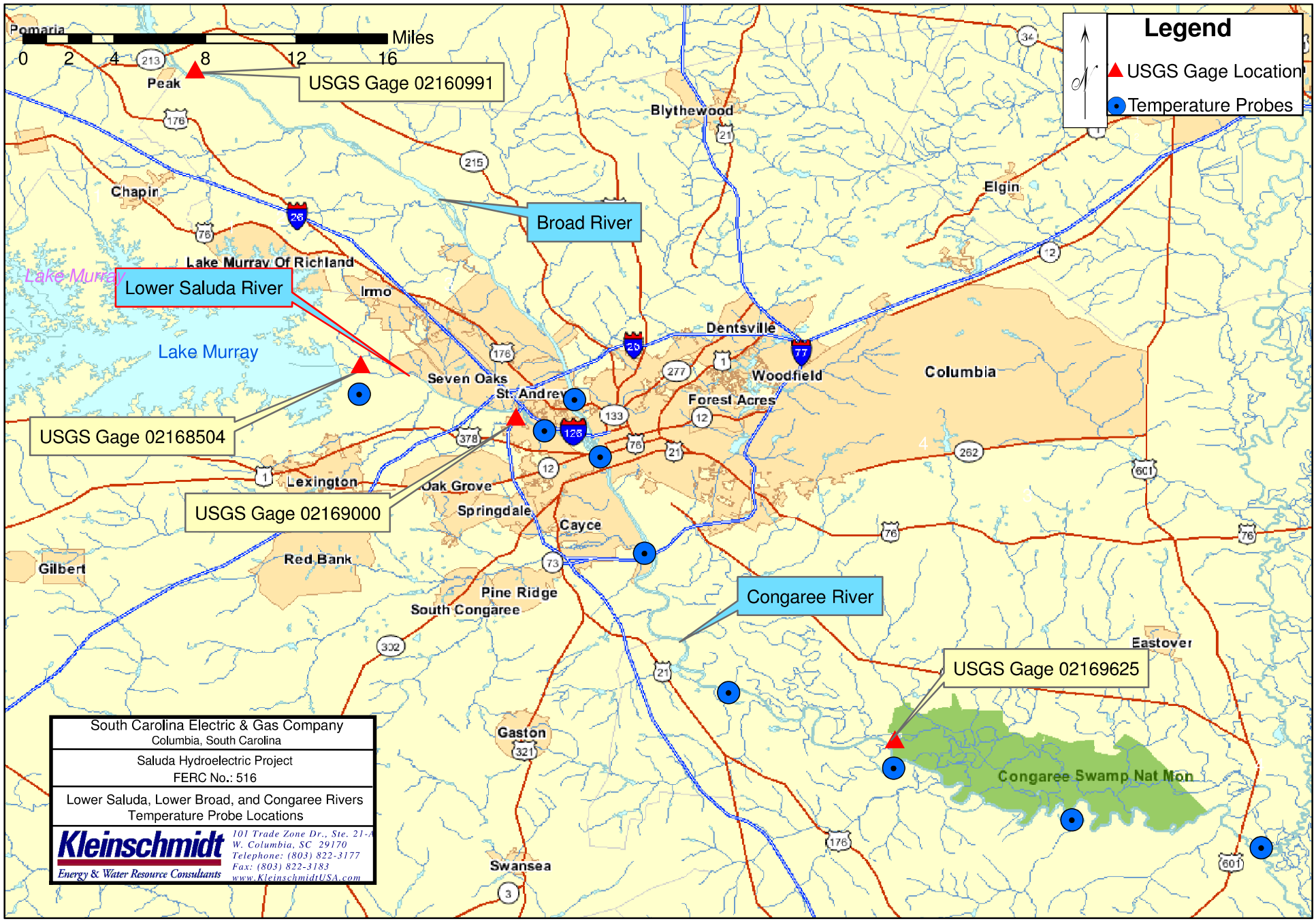
Richard Kidder	LMA	(803)892-6539	rkidder@pbtcomm.net
Jim Ruane	REMI	(423)266-5217	jimruane@comcast.net
Amanda Hill	USFWS	(843)727-4707, x303	Amanda_hill@fws.gov
Shane Boring	Kleinschmidt	(803)822-3177	shane.boring@kleinschmidtusa.com
Applicant Contacts			
Stephen E. Summer	SCANA Services	(803)217-7357	ssummer@scana.com
William Argentieri	SCE&G	(803)217-9162	bargentieri@scana.com
Randy Mahan	SCANA Services	(803)217-9538	rmahan@scana.com

VII. List of Attachments

Figure 1: Temperature Probe Locations in the Lower Saluda, Congaree and Lower Broad Rivers


Legend
USGS Gage Location
Temperature Probes
Miles
0 2 4 8 12 16
USGS Gage 02160991
Broad River
Lower Saluda River
USGS Gage 02168504
USGS Gage 02169000
Congaree River
USGS Gage 02169625
Lake Murray
Lake Murray
Congaree Swamp Nat Mon
Pomaria
Peak
Chapin
Lake Murray Of Richland
Irmo
Blythewood
Elgin
Dentsville
Columbia
Woodfield
Forest Acres
Seven Oaks
St. Andrews
Lexington
Oak Grove
Springdale
Cayce
Red Bank
Gilbert
Pine Ridge
South Congaree
Gaston
Swansea
Eastover
South Carolina Electric & Gas Company
Columbia, South Carolina
Saluda Hydroelectric Project
FERC No.: 516
Lower Saluda, Lower Broad, and Congaree Rivers
Temperature Probe Locations
Kleinschmidt
Energy & Water Resource Consultants
101 Trade Zone Dr., Ste. 21-A
W. Columbia, SC 29170
Telephone: (803) 822-3177
Fax: (803) 822-3183
www.KleinschmidtUSA.com

Kacie Jensen

From: BOWLES, THOMAS M [TBOWLES@scana.com]
Sent: Wednesday, March 08, 2006 8:34 AM
To: BARGENTIERI@scana.com; Shane Boring
Cc: Amanda Hill; Andy Miller; Daniel Tufford; Gerrit Jobsis (American Rivers); Gina Kirkland; Reed Bull; Richard Kidder; Ron Ahle; Alan Stuart; Alison Guth; Jennifer Summerlin; Dick Christie
Subject: RE: Saluda Relicense: Feb 21 Water Quality Technical Working Committee Meeting Notes

Shane,

I have made comments on page 3 regarding SCE&G lake sampling.

Tom

MEETING NOTES

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

SCE&G Training Center
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Draft jms/csb 03072006

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Comment: Change to September

Comment: You may want to add: Forebay near towers, Bear Creek, Camping Creek, and Little Saluda River

Comment: Change to Turners Cove

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Subject: RE: Saluda Relicense: Feb 21 Water Quality Technical Working Committee Meeting Notes

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Bill

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Sent: Tuesday, March 07, 2006 4:16 PM
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Cc: ARGENTIERI, WILLIAM R; Jennifer Summerlin; MAHAN, RANDOLPH R; SUMMER, STEPHEN E; 'johned44@bellsouth.net'; 'rbull@davisfloyd.com'; Alison Guth; Dick Christie; Tom Stonecypher; Alan Stuart; Alison Guth; Amanda Hill; Andy Miller; Bill Hulslander; Bill Marshall; Brett Bursey; Cam Littlejohn; Charlene Coleman; Charles Floyd; Craig Stow; Daniel Tufford; Dick Christie; Don Tyler; Donald Eng; Ed Diebold; George Duke; Gerrit Jobsis (American Rivers); Gina Kirkland; Hank McKellar; Jeff Duncan; John Davis; Joy Downs; Karen Kustafik; Keith Ganz-Sarto; Kim Westbury; Malcolm Leaphart; Mark Leao; Mike Sloan; Norman Ferris; Patrick Moore; Prescott Brownell; Ralph Crafton; Reed Bull; Richard Kidder; Robert Keener; Ron Ahle; Roy Parker; Shane Boring; Steve Bell; SUMMER, STEPHEN E; Suzanne Rhodes
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101 Trade Zone Dr., Suite-21A
West Columbia, SC 29170
Phone: (803)822-3177
Fax: (803)822-3183

<<2006-02-21 Draft Meeting Notes WQ-TWC.doc>>

MEETING NOTES

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

SCE&G Training Center
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Draft jms/csb 03072006

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2006-02-21 Draft Meeting Notes...

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While the group agreed that DO conditions in the lake and LSR are of extreme importance to relicensing, it was determined that the remainder of the meeting should focus on the proposed temperature study in the LSR and Congaree as it would need to be implemented as soon as possible to capture temperature dynamics associated with the onset of spring.

Effects of project operations on temperature in the Lower Saluda(LSR) and Congaree Rivers

Amanda Hill noted temperature profiles in the LSR and Congaree are high priority for USFWS. Ron Ahle noted there needs to be some baseline data established, which will help measure success for future studies. After a brief discussion, the group agreed that a temperature study on the LSR and Congaree was appropriate.

The group then discussed areas in the LSR and Congaree where water temperature should be measured[1]. It was suggested, and the group agreed, that the USGS gages at Alston and below Saluda Hydro could be used to provide data for the Broad and Saluda, respectively, and that paired Tidbit temperature sensors (left and right bank) should be deployed downstream at 10 mile intervals

[1] Sampling locations were further refined during the March 6, 2006 review of the study plan (see conference call meeting notes).

thereafter. The group agreed that gathering data at 15 minute intervals would be adequate if the instrumentation will allow. After some discussion, it was determined that TidbiTs should be deployed at the following locations[2]:

- The Saluda upstream of the confluence with the Broad;
- the Congaree in the vicinity of the USGS gage near Gervais St. Bridge;
- the Congaree near the I-77 bridge;
- the Congaree near the upstream extent of the Congaree National Park;
- the Congaree near the downstream extent of the Congaree National Park; and
- the Congaree midway of the Congaree National Park.

The group then requested a brief report summarizing the study status be issued at 6-month intervals during the study period, with a final report upon completion. Shane Boring agreed to have a study plan draft and distributed for review within approximately one week.

Shane Boring closed the meeting at approximately 4:00 PM, noting that the next meeting would be via conference call on march 6th at 2:00pm to review the water temperature study plan. The group also agreed that the next face-to-face meeting will be on March 24' 2006, and the group agreed to wait until that time to discuss the TMDL issue. Alan noted that he will attempt to have Jim Ruane present at the March 24th meeting to participate in the TMDL discussion. Roy Parker noted LMA would have more information about their study plan for the March 24 meeting.

[2] Locations w

Kacie Jensen

From: Shane Boring
Sent: Monday, March 06, 2006 5:32 PM
To: 'Bob Seibels'; 'tbowles@scana.com'; Tom Stonecypher; Alan Stuart; Alison Guth; Amanda Hill; Andy Miller; Bill Hulslander; Bill Marshall; Brett Bursey; Cam Littlejohn; Charlene Coleman; Charles Floyd; Craig Stow; Daniel Tufford; Dick Christie; Don Tyler; Donald Eng; Ed Diebold; George Duke; Gerrit Jobsis (American Rivers); Gina Kirkland; Hank McKellar; Jeff Duncan; John Davis; Joy Downs; Karen Kustafik; Keith Ganz-Sarto; Kim Westbury; Malcolm Leaphart; Mark Leao; Mike Sloan; Norman Ferris; Patrick Moore; Prescott Brownell; Ralph Crafton; Reed Bull; Richard Kidder; Robert Keener; Ron Ahle; Roy Parker; Shane Boring; Steve Bell; Steve Summer; Suzanne Rhodes
Cc: BARGENTIERI@scana.com; 'Tom Eppink'; RMAHAN@scana.com; Jennifer Summerlin
Subject: Feb 21 Water Quality RCG meeting notes


2006-02-21 Draft WQ RCG meetin...


Water Quality Study Requests.d...

Dear Saluda Water Quality RCG Members:

Draft notes from the February 21, 2006, Water Quality RCG meeting are attached for your review. For those who attended, please provide any comments that you may have to me via e-mail by Thursday March 15th. Thanks for your continued participation in the Saluda relicensing process.

C. Shane Boring
Environmental Scientist
Kleinschmidt Associates
101 Trade Zone Dr., Suite-21A
West Columbia, SC 29170
Phone: (803)822-3177
Fax: (803)822-3183

MEETING NOTES

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

SCE&G Training Center
February 21, 2006

Draft-JMS-02/28/06

ATTENDEES:

Bill Argentieri, SCE&G
Alison Guth, Kleinschmidt Associates
Shane Boring,* Kleinschmidt Associates
Randy Mahan, SCANA Services
Gerrit Jobsis, SCCCL & Am. Rivers
Dick Christie, SCDNR
George Duke, LMHOC
Joy Downs, Lake Murray Association
Tom Eppink, SCANA
Ron Ahle, SCDNR
Reed Bull, Midlands Striper Club
Dan Tufford, USC
Alan Stuart, Kleinschmidt Associates
Steve Bell, Lake Watch
Jennifer Summerlin, Kleinschmidt Associates
Bob Seibels, Riverbanks Zoo
Donald Eng, Trout Unlimited
Tom Bowles, SCE&G
Roy Parker, Lake Murray Association
Richard Kidder, Lake Murray Association
Andy Miller, SC DHEC
Amanda Hill, USF&WS
Gina Kirkland, SC DHEC
Steve Summers, SCE&G

**facilitator*

ACTION ITEMS:

- Provide info on historical distributions of freshwater aquatic mussels in the LSR
  Shane Boring
- Provide info regarding temperature impacts on mussels (Weiss Bypass publications)
  Gerrit Jobsis
- Provide location of SCE&G's seven water quality sample sites
  Tom Bowles
- Obtain historical information on stripped bass fish kills in Lake Murray
  Ron Ahle
- Provide summary of SCE&G water quality data, including monthly and intake monitoring
  Steve Summer
- Provide information on LMA cove water quality studies
  Roy Parker
- Incorporate additional tasks identified in 02/21/06 Water Quality RCG meeting into list of study requests/tasks to be addressed by the Water Quality TWC and distribute for review
  Shane Boring

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.

Alan Stuart opened the meeting at approximately 9:00 am, and meeting attendees introduced themselves. Alan then reviewed the protocol being used to distribute draft RCG meeting notes, noting that comments would be solicited from RCG members in attendance, but that the notes would be also distributed to all member of the RCG for informational purposes. .Dick Christie asked that meeting agendas to be sent out at least one business week before the meeting. Alan noted that the primary purpose of today's meeting would be to form the Technical Working Committees for the Water Quality RCG and that Shane Boring would be taking over facilitation for the remainder of the meeting.

Mission Statement

Shane reviewed the following mission statement for the Water Quality RCG, noting that it had been finalized and placed on the Saluda Relicensing website:

> *The Mission of the Water Quality Resource Conservation Group (WQRCG) is to develop water quality related recommendations to be included in the Saluda Hydroelectric Project FERC license application. The goal will be to achieve or exceed levels of compliance for State water quality standards for Lake Murray and the lower Saluda River. A means to work towards that goal is to identify data needs and to gather or develop that data necessary to ensure that water quality standards are currently being met and that they will be maintained in the future. A primary measure of success in achieving the mission and goals will be a published WQRCG Protection, Mitigation, and Enhancement (PM&E) Agreement.*

Formation of Technical Working Committee (TWC)

Shane proposed that a single Water Quality TWC be formed due to the interdependent nature of the issues and the fact that many of the same personnel are likely to be involved. The group agreed that a single TWC would be acceptable.

Review of Relevant Study Requests

Shane reminded the group that, at the initial RCG meeting, a document was distributed that summarizes the study request received in response to issuance of the Initial Consultation Document (ICD). He added that

one of the primary purposes of today's meeting would be to review the water-quality-related study requests (see attached handout from the meeting[1]) and to determine which requests should be handled by the Water Quality TWC. He added that an additional goal of the meeting would be to formalize any other requests/comments not covered in the study requests received thus far. Comments and discussion regarding the study requests to be handled by the Water Quality TWC are summarized below:

Downstream Impacts of Coldwater Releases

Amanda Hill noted that USFWS, National Park Service, and others would like to know how far downstream in the Congaree mixing occurs at different flows and at different operations. Alan Stuart explained that, with the variable influence of the Broad, the scenarios are unlimited. Amanda noted the major concern is how seasonal water temperatures in the Broad and Congaree effect habitat down stream in the Saluda and in the Congaree National Park. Ron Ahle noted the need for understanding how the different flows and temperatures effect migration of diadromous fish. The group agreed that this study request was deserving of further discussion and that the Water Quality TWC would be the appropriate venue for such discussions.

TMDLs

Shane asked Andy Miller if he would give a quick synopsis of TMDLs. Andy noted that TMDLs are wired into the Clean Water Act and that every water body listed as impaired is required to have a TMDL implemented at some point. Andy added that impaired waterbodies are those listed on the 303-D list, which is issued by SCDHEC. Dan Tufford noted that there a number of parameters for which a waterbody can be considered impaired, and often each of these parameters may have its own TMDL. He added, as an example, that portions of the Lake Murray watershed are considered impaired for phosphorous, while the LSR is considered impaired for DO.

Randy Mahan noted that, while TMDLs obviously have great utility in regulating NPDES discharges, it was unclear to him how SCE&G could implement a TMDL for Lake Murray without having the regulatory authority to do so. Tom Eppink added that, while they recognize the utility of TMDLs for improving water quality, SCE&G may be limited in what they can do in terms of a TMDL as part of the relicensing process. Steve Bell noted, and the majority of the group voiced support for, the need for a TMDL to be implemented for all of Lake Murray. Dan Tufford noted that it might be helpful to view TMDL development as a 2 phase process: 1) the study phase, in which studies are preformed in support of developing

[1] Issues outlined in handout to be addressed by the Water Quality TWC unless otherwise noted.

an appropriate TMDL for the water body 2) the implementation phase. He added that while SCE&G may not have the regulatory authority to implement a TMDL, they have the potential to contribute significantly to studies done to develop an effective TMDL. Shane noted that TMDLs are an issue that obviously deserves consideration at a more technical level and proposed that the issue be deferred to the Water Quality TWC for further discussion. The group agreed.

Effects of Project Operations on Summer Habitat for Striped Bass

Ron Ahle noted there was a problem with low DO in late summer and early fall in Lake Murray, often resulting in suitable habitat being limited to the area in front of the Unit 5 intake. Gerrit Jobsis noted a need to evaluate different operational scenarios and how they relate to this habitat "crunch" and ultimately to fish kills in the lake. He also noted the need to look at how water quality varies across years, particularly in the area in front of the forebay. Steve Summer noted that the magnitude of the habitat "crunch" varies from year to year, regardless of whether you use unit five, due to evaporation and flow regime. Steve suggested an acoustic Doppler profile study on the towers to characterize the interface between suitable habitat and the unit intakes under various scenarios. The group agreed that this issue should be handled in the water quality TWC.

Potential DO and Temperature Effects on Freshwater Mussels

Shane noted, and the group agreed, that the effects of DO and water temperature on mussel populations should be addresses in the TWC. Alan noted that the water quality standards are formulated to protect aquatic invertebrates, including mussels. Gerrit noted there is some debate because mussels are typically located in the interstitial area (between the water column and the substrate), which often has lower DO than the water column. Shane noted that before water quality effects can be evaluated, we first need to know what mussel species, if any, historically occurred in the Saluda Hydro vicinity and their current status (i.e., are they extant). Shane agreed to gather information regarding historical occurrence of mussels in the area.

Cove Water Quality In Lake Murray

Roy parker noted the Lake Murray Association (LMA) is in the process of implementing a cove water quality monitoring program, which they hope to have their program up and running by May. Roy explained they have picked the types of coves they want to sample, but have not yet picked specific locations. He added that they would like to sample all quadrants of the lake. Tom Bowles noted SCE&G has seven sites where they take samples

and will provide these locations to LMA. Several group members expressed the need for a comparative evaluation of water quality in coves before and after marinas are installed.

Sediment Regime and Transport Studies

Gerrit proposed, and the group agreed, that the sediment regime and sediment transport studies should be discussed in the F&W TWCs, namely the Instream Flow and Aquatic Habitat TWC.

Impacts of Power Boats and Jet Skis on Drinking Water Quality

The group briefly discussed the League of Women Voter's request for a study to evaluate the impacts of jet skis and power boats on drinking water quality. Several meeting attendees noted that they were unsure of exactly what is being requesting and the project nexus. Gerrit noted that some individuals pump drinking water directly from the lake to their homes, and he assumed that is what is being referred to in the request. Randy Mahan noted that SCE&G does not permit individual water withdrawals as part of its current lake use permitting process, nor does SCE&G have the regulatory authority to regulate watercraft usage on the lake. The group agreed that the Water Quality TWC is the appropriate venue for further discussion of this issue.

Status of Existing Water Quality Data and Identification of Data Gaps

Dick Christie, Gerrit, and others noted that data from SCE&G's existing studies needs to be shared with the TWC in order to provide an idea of baseline conditions for relicensing studies. Group members noted specifically a need for information related to SCE&G's monthly water quality monitoring, monitoring conducted at the five turbine intakes, and results of the hub baffle effectiveness testing. Alan Stuart noted that Jim Ruane is nearing completion of the draft report on the hub baffle effectiveness nesting, which was conducted in fall 2005, and will distribute it to the TWC when it is received. The group agrees that water quality data needs could be further refined in the TWC.

Water Quality TWC Membership

After a short break, the group began to assign members to the TWC and agreed that the members should have technical expertise. The following people volunteered and were assigned to the water quality TWC:

Gina Kirkland	Alan Stuart
Jim Ruane	Gerrit Jobsis
Reed Bull	Richard Kidder
Roy Parker	Dan Tufford
Tom Bowles	Amanda Hill
Ron Ahle	Andy Miller

Dates and Agenda of Upcoming RCG and TWC Meetings

THE RCG meeting was closed at approximately 2:00 pm and the group agreed to use the remainder of the afternoon to convene the first Water Quality TWC meeting (notes prepared separately). No date was set for the next Water Quality RCG meeting as the group determined it best that the TWC meet a few times and then propose a date to the RCG for its next meeting.

Saluda Hydro Project Relicensing
Public/Agency Information and Study Requests to be Addressed in the Resource Conservation Groups

10/10/05 ACG

Water Quality

Study Requests:

- **Temperature Analysis – Downstream Effects[1]:** This request entails providing an analysis of the effects of the temperature of discharges from the Saluda Dam on downstream habitats including: (1) An analysis that determines the travel distance downstream to effectuate completion of temperature mixing in the Congaree River; (2) an evaluation of the affects to species and habitats within the downstream Congaree National Park; (3) an evaluation of the affects to upstream migrating diadromous fish.

  Requested by: USFWS

- **Water Quality Studies:** Request of studies in order to assess the effects of Project operations on water quality, and consequently the aquatic habitat in the lake and river segments. Suggested studies include those to determine the effectiveness of newly installed hub baffles, TMDL's in Lake Murray, effects of project operations on summer habitat for striped bass including mitigative measures for fish kills, effects of operations on water temperature as affecting the spawning and recruitment of diadromous and riverine fish in the Saluda and Congaree rivers, and the effects of D.O. and water temperature on mussel populations in the LSR and Congaree. SCDNR recommends that water quality models be developed to identify any relationships between point and non-point pollutants and operations. The Lake Murray Association (LMA) and Lake Murray Homeowners Coalition (LMHC) specifically request information to be collected on cove water quality. The League of Women Voters suggests that water quality studies also include a facet on the impacts of power boats and jet skis on drinking water quality.

  Requested by: CCL/American Rivers, American Whitewater, City of Columbia Parks and Recreation, SCDNR, LMA, LMHC, League of Women Voters, LSSRAC, National Marine Fisheries Service, S.C. Parks Rec and Tourism, SC Council Trout Unlimited, USFWS

- **Sediment Regimen and Sediment Transport Studies:** A request has been made that a study be performed on the sediment regimen in the Project area as well as the Project effects on the sediment regimen of the lower Saluda River.

[1] Not included as part of meeting handout; however, this study request was discussed in the meeting and thus is included in the meeting notes.

10/10/05 ACG

Should include such things as sediment composition, bedload movement, gravel deposition, sediment storage behind dams, and bedload changes below the dam; and project effects on downstream geomorphometry, sediment availability and streambank erosion, and the possible addition of gravel to mitigate for project impacts. Also, the effects of the Project operations on habitat requirements for spawning fishes.

Requested by: CCL/American Rivers, USFWS

Information Needs:

- **Aquatic Habitat Decline Model**: In order to understand the reasons and contributing factors of seasonal habitat decline associated with the combination of increasing water temperature and decreasing dissolved oxygen. Thus resulting in a decrease in available cool-water habitat for some species. This model would be developed to better understand the causative factors that result in habitat declines, and to evaluate scenarios that could reduce or eliminate this problem.

  Requested by: SCDNR

- Request information that will help to a) forecast striped bass habitat reductions with new operational protocol implemented, and b) help develop an operational protocol to minimize impacts on striped bass habitat. ***SCDNR***

- Temperature profiles, on at least a monthly basis, at the unit intakes in the reservoir (specifically June-September) to have a better understanding of the relationship between project operations and water temperature and dissolved oxygen as they pertain to our management programs. ***SCDNR***

- We recommend that trends in water quality data associated with Lake Murray and the Lower Saluda River be reviewed and summarized. Special attention should be given to the stations and parameters that did not meet State standards or are declining. ***SCDNR***

- Marina water quality monitoring records in order to understand the degree of water quality impacts related to large multi-slip docking facilities. ***Lake Murray Homeowners Coalition***

- An updated report on the status of dissolved oxygen concentrations in the lower Saluda River and the efficacy of existing enhancement measures. **USFWS**

Requests for Potential Mitigation: None

Water Quality Resource Conservation Group
Mission Statement

The Mission of the Water Quality Resource Conservation Group (WQRCG) is to develop water quality related recommendations to be included in the Saluda Hydroelectric Project FERC license application. The goal will be to achieve or exceed levels of compliance for State water quality standards for Lake Murray and the lower Saluda River. A means to work towards that goal is to identify data needs and to gather or develop that data necessary to ensure that water quality standards are currently being met and that they will be maintained in the future. A primary measure of success in achieving the mission and goals will be a published WQRCG Protection, Mitigation, and Enhancement (PM&E) Agreement.

Deleted: compliance or beyond

Deleted: is, through full and open good-faith cooperation,

Deleted: data relevant to all Lake Murray and lower Saluda River (LSR) water-quality related

Deleted: stakeholders' interests/issues, to understand those interests/issues and that data, and to consider all such interests/issues and

Deleted: relevant to and materially impacting upon Lake Murray and LSR water-quality (including quantity where quantity is a material issue relative to quality). The goal of the Water Quality Resource Conservation Group as it embarks upon the mission is to develop consensus-based recommendations for inclusion in the FERC license application and consideration by FERC as it drafts license conditions, relative to actions responsive to those interests/issues, which reasonably can be taken or fostered by SCE&G as licensee, and are reasonably designed and likely to achieve water quality standards compliance and may achieve beyond compliance. One

Kacie Jensen

From: Alison Guth
Sent: Thursday, January 05, 2006 5:06 PM
To: Alan Stuart; Alison Guth; 'millerca@dhec.sc.gov'; 'bill_hulslander@nps.gov'; 'marshallb@dnr.sc.gov'; 'network@scpronet.com'; 'camlittlejohn@yahoo.com'; 'cheetahtrk@yahoo.com'; 'cstow@sc.edu'; 'tufford@sc.edu'; 'dchristie@infoave.net'; 'tyle6544@bellsouth.net'; 'ediebold@riverbanks.org'; 'kayakduke@bellsouth.net'; 'gjobsis@americanrivers.org'; 'KIRKLAGL@dhec.sc.gov'; 'Jeff_Duncan@NPS.gov'; 'johned44@earthlink.net'; 'Elymay2@aol.com'; 'kakustafik@columbiasc.net'; 'Keith_Ganz_Sarto@hotmail.com'; 'Malcolml@mailbox.sc.edu'; 'Lucky8Lady@aol.com'; 'Norm@sc.rr.com'; 'PatrickM@scccl.org'; 'crafton@usit.net'; 'bbull@sc.rr.com'; 'rkidder@pbtcomm.net'; 'RESKKEENER@PBTCOMM.Net'; 'ahler@dnr.sc.gov'; 'royparker38@earthlink.net'; Shane Boring; 'bellsteve9339@bellsouth.net'; 'ssummer@scana.com'; 'suzrhodes@juno.com'; 'Stonecypher@istreamconsulting.com'; 'mark_Leao@fws.gov'; 'Prescott.Brownell@noaa.gov'; 'Amanda_Hill@fws.gov'; 'dengff@aol.com'; 'JCharlesFloyd@sc.rr.com'; 'k.westbury@saludacounty.sc.gov'; 'McKellarH@sc.dnr.gov'
Subject: WQ mission statement - final draft

Dear WQ Group,

My apologies, I have attached a version that does not include all of the editing of the previous version that was distributed to the group. ~ Alison

Water Quality Mission Statemen...

Alison Guth
Licensing Coordinator
Kleinschmidt Associates
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Suite 21A
West Columbia, SC 29170
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F: (803) 822-3183

Water Quality Resource Conservation Group
Mission Statement

The Mission of the Water Quality Resource Conservation Group (WQRCG) is to develop water quality related recommendations to be included in the Saluda Hydroelectric Project FERC license application. The goal will be to achieve State water quality standards compliance or beyond for Lake Murray and the lower Saluda River. A means to work towards that goal is to identify data needs and to gather or develop that data. A primary measure of success in achieving the mission and goals will be a published WQRCG Protection, Mitigation, and Enhancement (PM&E) Agreement.

Kacie Jensen

From: Alison Guth
Sent: Thursday, January 05, 2006 4:59 PM
To: Alan Stuart; Alison Guth; 'millerca@dhec.sc.gov'; 'bill_hulslander@nps.gov'; 'marshallb@dnr.sc.gov'; 'network@scpronet.com'; 'camlittlejohn@yahoo.com'; 'cheetahtrk@yahoo.com'; 'cstow@sc.edu'; 'tufford@sc.edu'; 'dchristie@infoave.net'; 'tyle6544@bellsouth.net'; 'ediebold@riverbanks.org'; 'kayakduke@bellsouth.net'; 'gjobsis@americanrivers.org'; 'KIRKLAGL@dhec.sc.gov'; 'Jeff_Duncan@NPS.gov'; 'johned44@earthlink.net'; 'Elymay2@aol.com'; 'kakustafik@columbiasc.net'; 'Keith_Ganz_Sarto@hotmail.com'; 'Malcolml@mailbox.sc.edu'; 'Lucky8Lady@aol.com'; 'Norm@sc.rr.com'; 'PatrickM@scccl.org'; 'crafton@usit.net'; 'bbull@sc.rr.com'; 'rkidder@pbtcomm.net'; 'RESKKEENER@PBTCOMM.Net'; 'ahler@dnr.sc.gov'; 'royparker38@earthlink.net'; Shane Boring; 'bellsteve9339@bellsouth.net'; 'ssummer@scana.com'; 'suzrhodes@juno.com'; 'Stonecypher@istreamconsulting.com'; 'mark_Leao@fws.gov'; 'Prescott.Brownell@noaa.gov'; 'Amanda_Hill@fws.gov'; 'dengff@aol.com'; 'JCharlesFloyd@sc.rr.com'; 'k.westbury@saludacounty.sc.gov'; 'McKellarH@sc.dnr.gov'
Subject: Draft WQ Mission Statement

Hello all,

Attached to this email is a draft of the Water Quality Mission Statement. For finalization purposes, please let me know of any comments that you may have by January 19th. Thanks so much for you participation in this process! ~ Alison

Water Quality Mission Statemen...

Alison Guth
Licensing Coordinator
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Kacie Jensen

From: Alison Guth
Sent: Friday, June 29, 2007 2:37 PM
To: Alison Guth; 'Andy Sawyer'; 'Tom Bowles (tbowles@scana.com)'; Alan Stuart; Alison Guth; 'Amanda Hill'; 'Amy Bennett'; 'Andy Miller'; 'Bill Argentieri'; 'Daniel Tufford'; 'Gerrit Jobsis (American Rivers)'; 'Gina Kirkland'; Jennifer Summerlin; 'Jim Glover'; 'Jim Ruane '; 'Larry Turner (turnerle@dhec.sc.gov)'; 'Malcolm Leaphart'; 'Randy Mahan'; 'Reed Bull (rbull@davisfloyd.com)'; 'Richard Kidder'; 'Roger Hall'; 'Ron Ahle'; 'Roy Parker'; Shane Boring
Subject: Final Water Quality Notes

Hello All,

Attached are the final meeting notes from the May 22nd Water Quality TWC meeting. Thanks and have a great weekend! Alison

2007-5-22 final Meeting Minute...

Alison Guth
Licensing Coordinator
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MEETING NOTES

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

SCE&G-Carolina Research Park
May 22, 2007

Final ACG 6-29-07

ATTENDEES:

Alison Guth, Kleinschmidt Associates
Bill Argentieri, SCE&G
Dan Tufford, USC
Roger Hall, SCDHEC
Shane Boring, Kleinschmidt Associates
Amanda Hill, USFWS
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: May 22, 2007

DATE OF NEXT MEETING: **August 7th, 2007**

INTRODUCTIONS AND DISCUSSION

The group began the meeting and brief introductions ensued. The purpose of the meeting was for Jim Ruane and Andy Sawyer to present their findings on the Ce Qual W2 model applications to examine the effects of operations on fish habitat in Lake Murray. These were determined in the previous Water Quality TWC meeting. Jim briefly reviewed what had taken place during the previous meeting with the group, and noted that there were several issues identified during that meeting. These items included: striped bass kills, blueback herring entrainment, habitat for fish species, and impacts to the tailwater fishery due to operational changes. As discussed in the previous meeting, Jim noted that the preliminary findings indicated that the primary cause for fish kills was shown to be high flows. Meeting discussions were supplemented with graphs that are depicted in the following PowerPoint presentation (http://www.saludahydrorelicense.com/documents/MicrosoftPowerPoint-May22-2007meetingreservoiroperationAnalysis.pdf). Andy also displayed a excel spreadsheet that depicted the monthly flows for several years. The spreadsheet cells were colored in blue if it was a high flow month, yellow if it was a low flow month and green if it was an average flow month. Fish kill months were colored in red. The special operation years of 2002 and 2004 were left off the illustration. Bill Argentieri asked if anything stood out to Jim or Andy in this illustration. Jim replied that primarily the year 1998 stood out. He explained that there were high flows from January through May. Jim also noted that 1993, also had several months of high flows early in the year. Ron Ahle observed that the chart indicates that it may almost have to be a drought situation

for there not to be a fish kill. Dan Tufford asked the group if the fish will migrate toward the water surface during the late summer months to find habitat. Gerrit Jobsis noted that he has observed that the fish will come to the surface after a cool rain event.

Jim and Andy then began to discuss the new operational constraints that were considered after the previous meeting discussions. Jim noted that they had evaluated the raised pool levels with the following considerations and assumptions:

Scenarios considered
- 354 (Jan 1) to 358 (May 1 through Sept 1) to 354 (Dec 31)
- 350 (Jan 1) to 358 (May 1 through Sept 1) to 350 (Dec 31)

Assumptions
- Assumed 500 cfs for minimum release
- Assumed reserve generation averaged 3 hrs every two weeks at 18000 cfs
- Balance of releases were assumed to be used to supplement system demand

Approach
- The above scenarios were developed by KA using daily average flows using HEC Res Sim
- CE Qual W2 was run using daily average flows and release flows were adjusted so that target pool levels were attained
- Using the daily average flows that were adjusted using the w2 model the hourly flows for each day were developed using the assumptions above

Andy then began to explain the scenarios to the group. He noted that when Unit 5 was run first on, last off, the model depicted that it either helped retain habitat, or did nothing. Andy also presented the group with an animation showing that running unit five first significantly preserved the cooler water for a longer period of time. Bill noted that although the habitat loss is delayed under this scenario, he asked if this scenario would only just serve to delay a fish kill. Ron replied that with delaying the habitat loss, they are increasing the potential for recovery. Dan Tufford asked if the animations could be placed on the relicensing website and Alison Guth noted that she would work with Andy to figure out the best way to do this.

The group also reviewed charts depicting the temperature changes in the tailrace during the unit 5 first on-last off scenario. Andy explained that it can be expected that there will be a warmer discharge by discharging out of unit 5. It was shown that there was a one to two degree difference during some times of the year. Andy also showed what the modeled difference in DO in the tailrace would be during this mode of operation. It was shown that there was not quite as big a difference with DO and in some cases the DO in the tailrace was improved by using unit 5 first. Ron noted that it would probably not be good to run Unit 5 first from August through September due to the cool water fishery downstream. Gerrit agreed and pointed out that the biggest jumps in temperature

downstream generally were depicted to be around September 15th , when they are past the crunch time in the lake. Ron also suggested using the discharge temperatures as an indicator for a switch in operation scenario. Andy asked if there was a specific temperature that would trigger a switch in mode of operations. Gerrit noted that it would be a temperature that allows the trout to remain healthy. Shane added that temperatures should probably stay below 17 to 18 degrees C. Ron noted that it would be important to determine at what release temperature would an appropriate temperature be provided for all the way downstream. The group also reviewed temperatures in front of unit 5 during alternative operation scenarios. The model showed that the temperature was cooler in front of unit 5 when it was used first on - last off.

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Group Adjourned

Kacie Jensen

From: Alison Guth
Sent: Monday, June 04, 2007 4:02 PM
To: 'Andy Sawyer'; Tom Bowles (tbowles@scana.com); Alan Stuart; Alison Guth; Amanda Hill; Amy Bennett; Andy Miller; Bill Argentieri; Daniel Tufford; Gerrit Jobsis (American Rivers); Gina Kirkland; Jennifer Hand; Jim Glover; Jim Ruane ; Larry Turner (turnerle@dhec.sc.gov); Malcolm Leaphart; Randy Mahan; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Roger Hall; Ron Ahle; Roy Parker; Shane Boring
Subject: Draft Water Quality Notes

Hello All,

Attached are the draft meeting notes from the May 22nd Water Quality TWC meeting. Please have any changes or additions back to me by June 18th. Thanks! Alison

2007-5-22 draft Meeting Minute...

Alison Guth
Licensing Coordinator
Kleinschmidt Associates
101 Trade Zone Drive
Suite 21A
West Columbia, SC 29170
P: (803) 822-3177
F: (803) 822-3183

MEETING NOTES

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

SCE&G-Carolina Research Park
May 22, 2007

Draft ACG 6-4-07

ATTENDEES:

Alison Guth, Kleinschmidt Associates
Bill Argentieri, SCE&G
Dan Tufford, USC
Roger Hall, SCDHEC
Shane Boring, Kleinschmidt Associates
Amanda Hill, USFWS
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: May 22, 2007

DATE OF NEXT MEETING: **August 7th, 2007**

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SOUTH CAROLINA ELECTRIC & GAS COMPANY
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Draft ACG 6-4-07

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SOUTH CAROLINA ELECTRIC & GAS COMPANY
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WATER QUALITY TWC

SCE&G-Carolina Research Park
May 22, 2007

Final ACG 6-29-07

ATTENDEES:

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Subject: Water Quality TWC Conference call

Hello All,

Just a reminder that we have a Water Quality TWC Conference call next Tuesday, May 22. *I need to know who will be meeting at the Carolina Research Park for the call, and who will be calling in from their own offices, as there are limited lines set up for call-in's.* Please let me know by Thursday, so that we can make other arrangements, if need be. As you may recall, there was a request at the last meeting that those of us located in Columbia meet at one location for the call, however Jim Ruane and Andy Sawyer will be joining by conference call only. As mentioned above, we will be meeting at the SCE&G offices at Carolina Research Park at 9:50, as our call will commence at 10:00. If you have any questions please feel free to email me. Directions are attached below. Thanks, Alison

Carolina Research Park - Direc...

-----Original Message-----
From: Alison Guth
Sent: Friday, April 13, 2007 1:49 PM
To: Tom Bowles (tbowles@scana.com); Alan Stuart; Alison Guth; Amanda Hill; Amy Bennett; Andy Miller; Bill Argentieri; Daniel Tufford; Gerrit Jobsis (American Rivers); Gina Kirkland; Jennifer Summerlin; Jim Glover; Jim Ruane ; Larry Turner (turnerle@dhec.sc.gov); Malcolm Leaphart; Randy Mahan; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Roger Hall; Ron Ahle; Roy Parker; Shane Boring
Subject: WQ Conference Call Reschedule

Hello All,

We originally had a conference call scheduled for Tuesday, May 1st for our Water Quality TWC meeting. However, Jim is still in the processes of getting some of the flow data that he needs finalized. We would like to postpone this conference call to later in the month of May. I am suggesting that we meet by conference call on either:

Friday, May 18th
Tuesday, May 22nd
Or Wednesday, May 23
Please respond back with which dates best fit in your schedule by next Wednesday and I will send out a final date. Thanks so much, Alison

Alison Guth
Licensing Coordinator
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Suite 21A
West Columbia, SC 29170
P: (803) 822-3177
F: (803) 822-3183

Water Quality Resource Conservation Group
Mission Statement

The Mission of the Water Quality Resource Conservation Group (WQRCG) is to develop water quality related recommendations to be included in the Saluda Hydroelectric Project FERC license application. The goal will be to achieve State water quality standards compliance or beyond for Lake Murray and the lower Saluda River. A means to work towards that goal is to identify data needs and to gather or develop that data. A primary measure of success in achieving the mission and goals will be a published WQRCG Protection, Mitigation, and Enhancement (PM&E) Agreement.

Deleted: is, through full and open good-faith cooperation,

Deleted: data relevant to all Lake Murray and lower Saluda River (LSR) water-quality related

Deleted: stakeholders' interests/issues, to understand those interests/issues and that data, and to consider all such interests/issues and

Deleted: relevant to and materially impacting upon Lake Murray and LSR water-quality (including quantity where quantity is a material issue relative to quality). The goal of the Water Quality Resource Conservation Group as it embarks upon the mission is to develop consensus-based recommendations for inclusion in the FERC license application and consideration by FERC as it drafts license conditions, relative to actions responsive to those interests/issues, which reasonably can be taken or fostered by SCE&G as licensee, and are reasonably designed and likely to achieve water quality standards compliance and may achieve beyond compliance. One

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Kacie Jensen

From: Alison Guth
Sent: Monday, May 07, 2007 5:24 PM
To: Alison Guth; 'Tom Bowles (tbowles@scana.com)'; Alan Stuart; Alison Guth; 'Amanda Hill'; 'Amy Bennett'; 'Andy Miller'; 'Bill Argentieri'; 'Daniel Tufford'; 'Gerrit Jobsis (American Rivers)'; 'Gina Kirkland'; Jennifer Summerlin; 'Jim Glover'; 'Jim Ruane '; 'Larry Turner (turnerle@dhec.sc.gov)'; 'Malcolm Leaphart'; 'Randy Mahan'; 'Reed Bull (rbull@davisfloyd.com)'; 'Richard Kidder'; 'Roger Hall'; 'Ron Ahle'; 'Roy Parker'; Shane Boring
Subject: Final Water Quality TWC Notes 3-26-07

Hello All,

Attached are the final Water Quality TWC Meeting notes from March 26th. Thanks! Alison

2007-3-26 final Meeting Minute...

Alison Guth
Licensing Coordinator
Kleinschmidt Associates
101 Trade Zone Drive
Suite 21A
West Columbia, SC 29170
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F: (803) 822-3183

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

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Richard Kidder, LMA
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Jim Ruane, REMI
Tom Bowles, SCE&G
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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**

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Sent: Tuesday, April 17, 2007 12:04 PM
To: Tom Bowles (tbowles@scana.com); Alan Stuart; Alison Guth; Amanda Hill; Amy Bennett; Andy Miller; Bill Argentieri; Daniel Tufford; Gerrit Jobsis (American Rivers); Gina Kirkland; Jennifer Hand; Jim Glover; Jim Ruane ; Larry Turner (turnerle@dhec.sc.gov); Malcolm Leaphart; Randy Mahan; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Roger Hall; Ron Ahle; Roy Parker; Shane Boring
Subject: Draft Water Quality TWC Notes

Hello All,

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2007-3-26 draft Meeting Minute...

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

SCE&G Training Center
March 26, 2007

Draft ACG 4-17-07

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Sent: Tuesday, April 17, 2007 12:04 PM
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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 1st (The meeting date has been since changed and will take place around the middle to end of May, more information to follow).

Kacie Jensen

Subject:	Updated: Water Quality TWC
Location:	Lake Murray Training Center
Start:	Mon 3/26/2007 8:30 AM
End:	Mon 3/26/2007 1:00 PM
Show Time As:	Tentative
Recurrence:	(none)
Meeting Status:	Not yet responded
Required Attendees:	Charles Floyd; Water Quality TWC; 'Wayne Beam'
Optional Attendees:	Alan Stuart; 'BOWLES, THOMAS M'; 'Gerrit Jobsis'; 'ARGENTIERI, WILLIAM R'; 'MAHAN, RANDOLPH R'; Shane Boring

Hello All,

Just a reminder that the next Water Quality TWC is this coming Monday, March 26th. This meeting will begin at 9:30 at the Lake Murray Training Center I have attached the meeting agenda below. Please RSVP for lunch by Friday morning. Thanks, Alison

Water Quality TWC Agenda 3-26-...

Saluda Hydro Relicensing
Water Quality Technical Working Committee

Meeting Agenda

March 26, 2007
9:30 AM
Lake Murray Training Center

- **9:30 to 9:45** Welcome
- **9:45 to 10:45** Discussion on Water Quality Workplan – *Andy Sawyer and Jim Ruane*
- **10:45 to 12:00** Discussion of the Results of the W2 Water Quality Analysis to Address Lake Murray Fish Kills and Unit 5 Operation - *Andy Sawyer and Jim Ruane*
- **12:00 to 1:00** Lunch
- **1:00 to 1:30** Update on Status of Temperature Impacts Study in Lower Saluda and Congaree Rivers – *Shane Boring*
- **1:30 to 2:00** Set Date, Develop Agenda and Assign Action Items for Next TWC Meeting

  Adjourn

Saluda HYDRO RELICENSING

Kacie Jensen

Subject:	Updated: Water Quality TWC
Location:	Lake Murray Training Center
Start:	Mon 3/26/2007 8:30 AM
End:	Mon 3/26/2007 1:00 PM
Show Time As:	Tentative
Recurrence:	(none)
Meeting Status:	Not yet responded
Required Attendees:	Charles Floyd; Water Quality TWC; 'Wayne Beam'
Optional Attendees:	Alan Stuart; 'BOWLES, THOMAS M'; 'Gerrit Jobsis'; 'ARGENTIERI, WILLIAM R'; 'MAHAN, RANDOLPH R'; Shane Boring

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Just a reminder that the next Water Quality TWC is this coming Monday, March 26th. This meeting will begin at 9:30 at the Lake Murray Training Center I have attached the meeting agenda below. Please RSVP for lunch by Friday morning. Thanks, Alison

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  Adjourn

Saluda HYDRO RELICENSING

Kacie Jensen

Subject: Water Quality TWC
Location: Lake Murray Training Center

Start: Mon 3/26/2007 10:30 AM
End: Mon 3/26/2007 3:00 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Required Attendees: Charles Floyd; Water Quality TWC; Wayne Beam

Hello All,

After much discussion, the final meeting date chosen for the next Water Quality TWC is March 26th. We will be sending out a meeting agenda closer to the day of the meeting. However, I wanted to send out this reminder early so that everyone will be able to mark it on their calendars. Hope to see all of you there! Alison

Kacie Jensen

Subject: Updated: New Meeting Date - Water Quality TWC
Location: To Be Determined

Start: Wed 3/7/2007 9:30 AM
End: Wed 3/7/2007 3:00 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Required Attendees: Water Quality TWC
Optional Attendees: 'MAHAN, RANDOLPH R'; 'ARGENTIERI, WILLIAM R'; Alan Stuart; Gerrit Jobsis

Hello All,

We have a date change already. Please let me know if March 7th will work with your schedules. Thanks, Alison

Previous Message:

Good Afternoon Folks,

Unfortunately, our Water Quality TWC that was originally scheduled for next Tuesday, February 13th, will have to be postponed due to some issues that have come up. However, we would like to reschedule this meeting for Tuesday, March 6th. Please let me know by Friday if this date is agreeable to your schedules and I will send out a final meeting date. I am also in the process of checking on meeting locations, and I will let you know of that in an upcoming email. Thanks, Alison

Kacie Jensen

Subject: New Meeting Date - Water Quality TWC
Location: To Be Determined

Start: Tue 3/6/2007 9:30 AM
End: Tue 3/6/2007 3:00 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Required Attendees: Water Quality TWC

Good Afternoon Folks,

Unfortunately, our Water Quality TWC that was originally scheduled for next Tuesday, February 13th, will have to be postponed due to some issues that have come up. However, we would like to reschedule this meeting for Tuesday, March 6th. Please let me know by Friday if this date is agreeable to your schedules and I will send out a final meeting date. I am also in the process of checking on meeting locations, and I will let you know of that in an upcoming email. Thanks, Alison

Kacie Jensen

From: Alison Guth
Sent: Tuesday, February 06, 2007 5:39 PM
To: Tom Bowles (tbowles@scana.com); Alan Stuart; Alison Guth; Amanda Hill; Amy Bennett; Andy Miller; Bill Argentieri; Daniel Tufford; Gerrit Jobsis (American Rivers); Gina Kirkland; Jennifer Hand; Jim Glover; Jim Ruane ; Larry Turner (turnerle@dhec.sc.gov); Randy Mahan; Reed Bull (rbull@davisfloyd.com); Richard Kidder; Ron Ahle; Roy Parker; Shane Boring
Subject: March Dates for Water Quality TWC

Hello folks,

Well, after the flurry of emails this afternoon I think that I might have a couple dates that would work for the Water Quality TWC. Please keep March 27th and 28th open on your calendars. We would prefer the 27th for the water quality TWC, so please let me know if this date works for you. Alan will be contacting those of you involved with the annual SCCCL Settlement Agreement Meetings regarding the 2007 meeting that we would like to hold on the 28th. Please let me know by Monday if you are available to attend the water quality TWC meeting on March 27th. Thanks. Alison

Kacie Jensen

Subject: Canceled: New Meeting Date - Water Quality TWC
Location: To Be Determined

Start: Wed 3/7/2007 9:30 AM
End: Wed 3/7/2007 3:00 PM
Show Time As: Free

Recurrence: (none)

Meeting Status: Not yet responded

Required Attendees: Alison Guth; Water Quality TWC
Optional Attendees: 'MAHAN, RANDOLPH R'; 'ARGENTIERI, WILLIAM R'; Alan Stuart; 'Gerrit Jobsis'

Importance: High

I apologize for the flood of emails. The 7th has been cancelled as well. I will keep you posted of new proposed meeting dates. Alison

Previous Message:

Hello All,

We have a date change already. Please let me know if March 7th will work with your schedules. Thanks, Alison

Good Afternoon Folks,

Unfortunately, our Water Quality TWC that was originally scheduled for next Tuesday, February 13th, will have to be postponed due to some issues that have come up. However, we would like to reschedule this meeting for Tuesday, March 6th. Please let me know by Friday if this date is agreeable to your schedules and I will send out a final meeting date. I am also in the process of checking on meeting locations, and I will let you know of that in an upcoming email. Thanks, Alison

MEETING NOTES

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

SCE&G-Carolina Research Park
May 22, 2007

Final ACG 6-29-07

ATTENDEES:

Alison Guth, Kleinschmidt Associates
Bill Argentieri, SCE&G
Dan Tufford, USC
Roger Hall, SCDHEC
Shane Boring, Kleinschmidt Associates
Amanda Hill, USFWS
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: May 22, 2007

DATE OF NEXT MEETING: **August 7th, 2007**

INTRODUCTIONS AND DISCUSSION

The group began the meeting and brief introductions ensued. The purpose of the meeting was for Jim Ruane and Andy Sawyer to present their findings on the Ce Qual W2 model applications to examine the effects of operations on fish habitat in Lake Murray. These were determined in the previous Water Quality TWC meeting. Jim briefly reviewed what had taken place during the previous meeting with the group, and noted that there were several issues identified during that meeting. These items included: striped bass kills, blueback herring entrainment, habitat for fish species, and impacts to the tailwater fishery due to operational changes. As discussed in the previous meeting, Jim noted that the preliminary findings indicated that the primary cause for fish kills was shown to be high flows. Meeting discussions were supplemented with graphs that are depicted in the following PowerPoint presentation (http://www.saludahydrorelicense.com/documents/MicrosoftPowerPoint-May22-2007meetingreservoiroperationAnalysis.pdf). Andy also displayed a excel spreadsheet that depicted the monthly flows for several years. The spreadsheet cells were colored in blue if it was a high flow month, yellow if it was a low flow month and green if it was an average flow month. Fish kill months were colored in red. The special operation years of 2002 and 2004 were left off the illustration. Bill Argentieri asked if anything stood out to Jim or Andy in this illustration. Jim replied that primarily the year 1998 stood out. He explained that there were high flows from January through May. Jim also noted that 1993, also had several months of high flows early in the year. Ron Ahle observed that the chart indicates that it may almost have to be a drought situation

for there not to be a fish kill. Dan Tufford asked the group if the fish will migrate toward the water surface during the late summer months to find habitat. Gerrit Jobsis noted that he has observed that the fish will come to the surface after a cool rain event.

Jim and Andy then began to discuss the new operational constraints that were considered after the previous meeting discussions. Jim noted that they had evaluated the raised pool levels with the following considerations and assumptions:

Scenarios considered
- 354 (Jan 1) to 358 (May 1 through Sept 1) to 354 (Dec 31)
- 350 (Jan 1) to 358 (May 1 through Sept 1) to 350 (Dec 31)

Assumptions
- Assumed 500 cfs for minimum release
- Assumed reserve generation averaged 3 hrs every two weeks at 18000 cfs
- Balance of releases were assumed to be used to supplement system demand

Approach
- The above scenarios were developed by KA using daily average flows using HEC Res Sim
- CE Qual W2 was run using daily average flows and release flows were adjusted so that target pool levels were attained
- Using the daily average flows that were adjusted using the w2 model the hourly flows for each day were developed using the assumptions above

Andy then began to explain the scenarios to the group. He noted that when Unit 5 was run first on, last off, the model depicted that it either helped retain habitat, or did nothing. Andy also presented the group with an animation showing that running unit five first significantly preserved the cooler water for a longer period of time. Bill noted that although the habitat loss is delayed under this scenario, he asked if this scenario would only just serve to delay a fish kill. Ron replied that with delaying the habitat loss, they are increasing the potential for recovery. Dan Tufford asked if the animations could be placed on the relicensing website and Alison Guth noted that she would work with Andy to figure out the best way to do this.

The group also reviewed charts depicting the temperature changes in the tailrace during the unit 5 first on-last off scenario. Andy explained that it can be expected that there will be a warmer discharge by discharging out of unit 5. It was shown that there was a one to two degree difference during some times of the year. Andy also showed what the modeled difference in DO in the tailrace would be during this mode of operation. It was shown that there was not quite as big a difference with DO and in some cases the DO in the tailrace was improved by using unit 5 first. Ron noted that it would probably not be good to run Unit 5 first from August through September due to the cool water fishery downstream. Gerrit agreed and pointed out that the biggest jumps in temperature

downstream generally were depicted to be around September 15th , when they are past the crunch time in the lake. Ron also suggested using the discharge temperatures as an indicator for a switch in operation scenario. Andy asked if there was a specific temperature that would trigger a switch in mode of operations. Gerrit noted that it would be a temperature that allows the trout to remain healthy. Shane added that temperatures should probably stay below 17 to 18 degrees C. Ron noted that it would be important to determine at what release temperature would an appropriate temperature be provided for all the way downstream. The group also reviewed temperatures in front of unit 5 during alternative operation scenarios. The model showed that the temperature was cooler in front of unit 5 when it was used first on - last off.

Jim then reviewed what the next steps would be. Jim noted that one of the benefits of drawing down the pool level is it scours out the sediment buildup in the coves, particularly near the inflow areas. Jim continued to explain that most reservoirs do not have an issue with internal nutrient cycling, but the Little Saluda River embayment does have quite a bit of internal nutrient cycling, and thus not drawing the lake down could have a negative effect on water quality. The group discussed that there was quite a bit of information available that pointed to where most of the nutrient input was coming from. The group discussed DHEC criteria for nutrients and that it would take public outreach to help the nutrient situation in the lake. There was some dialogue on a TMDL, and Shane reminded the group that they had previously discussed a TMDL and it had been decided that it was outside the relicensing process, as there had to be an initiative from DHEC to begin establishing a TMDL. However, the group decided to focus on what they could do with respect to Project operation to improve water quality. The model had shown that water quality could be slightly improved with a higher pool elevation and the preferential use of Unit 5. Ron noted that before any changes were made in operation in 2007, however, the group should complete the next steps of the model.

Next Steps included:

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,

The group concluded and decided that Jim and Andy would work on the next steps of the analysis before any operational changes were made. The next meeting will be held on August 7th, 2007, and Jim and Andy will attend in person to present their findings to the group. The group will then begin discussing recommendations.

Group Adjourned