MEETING NOTES

SOUTH CAROLINA ELECTRIC & GAS COMPANY
SALUDA HYDRO PROJECT RELICENSING
OPERATIONS RESOURCE CONSERVATION GROUP

SCE&G Training Center
January 26, 2006

ATTENDEES:

Alan Stuart, Kleinschmidt Associates
Alison Guth, Kleinschmidt Associates
Amanda Hill, USFWS
Bill Argentieri, SCE&G
Bill Hulslander, Congaree National Park
Bret Hoffman, Kleinschmidt Associates
Bud Badr, DNR
Dave Landis, Lake Murray Association
Dick Christie, SCDNR
Gina Kirkland, SCDHEC
Joy Downs, LMA
Kristina Massey, Kleinschmidt Associates
Michael Waddell, TU
Mike Schimpff, Kleinschmidt Associates
Mike Summer, SCE&G
Patrick Moore, SCCCL, Am. Rivers
Randy Mahan, SCANA Services
Ray Ammarell, SCE&G
Steve Bell, Lake Watch
Straud Armstrong, SCDNR
Theresa Thom, Congaree National Park
Tom Eppink, SCANA Services
Tom Ruple, Lake Murray Association

DATE: January 26, 2006

AGENDA TOPICS FOR NEXT MEETING:

Presentation (as described in minutes and requested by Patrick Moore, Michael Waddell, and Steve Bell) or TWC to present specific cost analysis for different methods of meeting reserve beyond what was explained in the Operations presentation, in order to effectively balance that cost with project impacts.

DATE OF NEXT MEETING: **TBD after the TWC has had time to start developing a model.**

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.

DISCUSSION

Mike Schimpff introduced himself and noted that the purpose of the day's discussion was not to inform the group as to which model he believed they should choose, but to give some understanding

as to what is available. Mike noted that there were hydraulic models, hydrologic models, economic models and WQ models and that these models could be combined.

Mike began to discuss some of the model uses that were identified at the previous Operations Meeting. These included lake levels, LSR minimum flows, inflows, generation, storage and graphic ability. Gina Kirkland also noted that water quality needs should be included as well when developing the model.

Mike briefly discussed a few models that were widely used. These included HEC-5, Oasis, CHEOPS, MIKE Basins, WMS and Decision Support Programs. Bud Badr asked Mike to explain a little about a Decision Support Model.

Gina noted that DHEC would like to have access to the model in order to run scenarios and verify the baseline settings. Mike Schimpff noted that it depended on which model was used because some models had proprietary constraints. Alan asked Gina if a DHEC representative could be present while they were running scenarios if a model with proprietary constraints was chosen. Gina noted she would discuss this with some individuals at DHEC, but the important thing would be that DHEC would need to feel like they are participating in the inputs. Bill Argentieri further noted that the objective was not to prevent agencies from using it, but to avoid breaking any proprietary laws.

Bud Badr shared a little about his experience with modeling to the group. He noted that when he and Larry Turner (DHEC) worked with Duke they used CHEOPS. He noted that an agreement was signed that allowed use of the model by agencies, but only for that particular project. Bud mentioned that one way to address water quality in the operations model was to address it using flows.

The group then began to discuss the Oasis Model. Mike explained that Oasis operates as a shell that programs can run inside of. Mike continued to explain that a benefit of Oasis is that it can interface with other models and run them simultaneously.

CHEOPS was the next model that the group discussed. Mike explained that it was private domain software that focuses on hydroelectric optimization. Bud Badr added that one of the deficiencies with CHEOPS in this situation was that it was 100 percent tilted toward hydroelectric generation and runs in 15 minute segments. He explained that this would make it difficult to sort through 50 years of data.

In a discussion on SCE&G's current flow forecasting model it was noted that it provided a good source for historical inflow data. Bud Badr also noted that the flow forecasting model dealt with tributaries as well.

There was some discussion on Water Quality issues and how they would be tied into the model. Dick Christie noted that outputs from the water quality model would be developed within the Water Quality RCG.

Mike Schimpff continued to discuss HEC versions with the group (HEC-5, HEC-RES-SIM).

After lunch the groups then began to define the constraints needed in the model. Bud explained that the model needed to be calibrated for high flow and low flow conditions. He noted that the longer the period of record that was available, the better. He explained that this was because it could include both the dry cycles and wet cycles. Bud added that a modeler did not want extreme events like a drought to run the model. He noted that those events should be considered outliers and dealt with in a low flow protocol.

In continued discussion on constraints Bud pointed out that in an Operations Model, constraints had to be related to lake elevations or downstream flows in some fashion. Mike gave the example that water quality in the Lake could be related to Lake levels.

<u>Constraints (with Tasks to Resource Group):</u>

- Instream flows and downstream water quality (Fish & Wildlife RCG)
- Spring spawning levels in the lake (Fish & Wildlife RCG)
- Public water withdrawals
- Drought Management
- Recreational lake levels (Recreation RCG)
- Recreational releases (Recreation RCG)
- Lake level stabilization – Winter drawdown issues (Lake and Land Mgnt RCG)
- Navigation flows (Recreation RCG, Fish & Wildlife RCG)
- Flood plain inundations – timing, frequency, magnitude (Fish & Wildlife RCG)
- Safety flows (Safety RCG)
- Reserve generation

Dick Christie noted that navigation flows were very important to DNR and pointed out that DNR policy requires them to recommend the highest flow that meets water quality, navigation and habitat criteria.

The QA/QC process was discussed with respect to input data to the Operations model. The group concurred that quality data is of the utmost concern and will be dealt with by the TWC. Anecdotal data would be evaluated on a case-by-case basis by the TWC.

Mike Schimpff concluded from the list of constraints that all of the issues could be boiled down to lake levels and minimum flows. Bud added that the model has to be able to provide downstream flows at different sites. The group concurred.

Looking at the issues, Mike Schimpff pointed out that they could be effectively modeled in an Excel spreadsheet, in HEC-5 and Oasis. The group agreed that CHEOPS would not be ideal because it looked at data every 15 minutes. Ray Ammarell noted that Oasis has the most flexibility and HEC-5 is developed around reservoir system modeling but might work well also. Gina asked if Oasis would interface well with models that were developed in other RCG's. Mike indicated that it would.

Bud explained that the HEC-5 and Oasis inputs are similar. However, he pointed out that HEC-5 is a public domain model. He also added that a benefit of HEC-5 was the HEC Support Center. Bud noted that a sophisticated model was not needed for a lake such as Lake Murray.

Alan noted that from a cost perspective, you would have to consider that a lot of upfront work may need to be done with HEC-5.

Bill Argentieri noted that if there were no objections, SCE&G would go ahead with Oasis, Oasis Lite or HEC-5. The group concurred as long as the chosen model would get the job done.

The discussion turned to developing a TWC. Mike Schimpff indicated that very technically skilled people are needed to run the models. Bud concurred that Mike should take the lead and the TWC serve as an advisory committee.

Patrick Moore stated the operations group needed to look at the specifics on reserve capacity options in order for the stakeholders to gauge the reasonableness of their requests. Patrick Moore continued to note the following, "There needs to be some quantifiable value on current operations. We heard a general discussion of alternatives from Lee with general descriptions of the logistical challenges of some alternatives. For example, gas turbines were stated to be about 50% reliable. Promotional materials from General Electric advertising 90% reliability , provided by Trout Unlimited, were referenced as an example of a possibility that could be explored at the next meeting or in a TWC. At other RCGs, reserve requirement issues significantly relating to safety, recreation, and water quality, are reserved for the Operations RCG. Options for meeting these reserves should

be specifically evaluated in preparing the Protection, Mitigation & Enhancement agreement." He requested that SCE&G provide this information to stakeholders at the next Operations meeting.[1]

Tom Eppink noted that while he didn't think there would be a problem in SCE&G doing this, he wasn't sure it could be developed by the next meeting. This due in part to the uncertainty of who within SCE&G could/would give the presentation and could not make the commitment on someone else's behalf. However, he added that they would begin the process of lining this up for the future.

TWC Members:

- Mike Schimpff
- Bud Badr
- Larry Turner
- NHI Representative
- Ray Ammarell
- Mike Waddell (Observer)

Mike would prepare a draft study with an outline of the model with a schedule and submit it to the TWC for review.

Meeting adjourned.

[1] Although Meeting Notes are not intended to be transcripts of the meeting, Mr. Moore requested that this paragraph be included in the notes after the meeting for clarification purposes.

Saluda Hydro Relicensing
Operations Resource Conservation Group

Meeting Agenda

January 26, 2006
9:30 AM
Saluda Shoals Park – Rivers Conference Center – SE Freight Room

- **9:30 to 12:00** Hydrologic Models Presentation and Question Session
- **12:00 to 12:30** Lunch
- **12:30 to 2:30** Interactive Discussion on Model Inputs and Sources
- **2:30 to 3:00** Develop List of Homework Assignments, Develop Agenda for Next Meeting, and Set Meeting Date

  Adjourn

Saluda HYDRO RELICENSING