

Yadkin Hydroelectric Project (FERC No. 2197)
Operations Model IAG Meeting
March 14, 2003
Alcoa Conference Center
Badin, North Carolina

Final Meeting Summary

Agenda

See Attachment 1.

Meeting Attendees

See Attachment 2.

Welcome and Introductions

Gene Ellis, Yadkin, opened the meeting with introductions and a review of the agenda. Jane Peoples, Meeting Director, said that she had distributed copies of “Issue Advisory Groups Outline of Purpose and Suggested Process”, a document distributed originally at the February 28, 2003 Issue Advisory Group (IAG) Organizational Meeting to those who did not have a copy (see Attachment 3). Jane reviewed the three-stage relicensing process schedule. She noted that at the February 28 meeting the following IAG meeting dates were set: April 8-10, 2003; May 20-22, 2003; June 3-5, 2003; July 8-10; August 5-7, 2003; September 2-4, 2003; October 7-9, 2003; November 4-6, 2003; and December 2-4, 2003. Continuing, Jane also reviewed the meeting procedures (i.e. meeting agendas and meeting summaries) and various meeting norms

IAG Dispute Resolution Process

Jane mentioned that the issue of resolving study disputes was discussed briefly at the February 28 meeting, but was not resolved. Based on the discussions at the February 28 meeting, Jane said that she had prepared a single “IAG Dispute Resolution Process” document that could be used by all of the IAGs (for consistency of process). Jane distributed copies of this document before the meeting began (see Attachment 4) to those who did not have a copy. There were no new suggested revisions to the IAG Dispute Resolution Process, as proposed. Jane agreed to revise the document based on earlier comments by Larry Jones, High Rock Lake Association, and Steve Reed, North Carolina Division of Water Resources (see Attachment 5).

Introduction of Technical Consultants

After reviewing the issues/comments/study requests received by Yadkin during Stage 1 regarding Project operations and basinwide modeling (see Attachment 6), Gene introduced Paul Shiers, PB Power Inc. and Mary Tibbetts, PB Power Inc. Paul Shiers explained that PB Power Inc., an engineering consulting company with more than 10 years experience on the Yadkin Project, was working in cooperation with Hydrologics, Inc., a water management consulting

company specializing in hydrology, optimization, and modeling and the developers of OASIS (Operational Analysis and Simulation of Integrated Systems) on the operations model for the Yadkin Project.¹ Next, Paul briefly reviewed the modeling issues at the Project (as identified in comments to Yadkin) – power generation, reservoir water levels, downstream river flows, water supply, assimilative capacity, and salinity intrusion.

Overview of the OASIS Model

Continuing, Paul said that Yadkin would use the OASIS model to evaluate Project operational alternatives and their potential impacts. Paul noted that OASIS is the model recommended by the North Carolina resource agencies and the model used during Alcoa Power Generating Inc.'s Tapoco Project relicensing. Paul said that PB Power Inc. and Hydrologics, Inc. are currently working to build the OASIS model, with an anticipated completion date in late 2003.

Ann Bass, Yadkin Pee Dee Lakes Project, asked if Progress Energy was also using OASIS in their relicensing. Paul replied no. He said that based on his review of Progress Energy's Initial Consultation Document (February 2003), he understood Progress Energy to be using the CHEOPS model.

Paul introduced Mary Tibbetts, who presented an overview of the OASIS model, a simulation/optimization model. Mary Tibbetts said that the modeling goal is to develop a computer model that will simulate operating alternatives and quantify the impact of those alternatives on water levels in the Yadkin Project reservoirs, discharges from the Yadkin Project, and energy generation at the Yadkin Project. Mary explained that OASIS uses the principle of mass balance to ensure that all the water is accounted for while solving a set of linear equations for each time step to optimize benefits subject to user-defined constraints and targets. She noted that "Operations Control Language" (OCL) is used to communicate operating policies to the model. Mary said that OASIS can handle evaporation, maximum flow constraints, storage-area-elevation curves, consumptive uses, time pattern input, and time series.

Mary explained that OASIS is set up to represent the physical system. She showed the schematic used to represent the Tapoco system. Specifically, nodes are locations of interest such as reservoirs, junctions, and consumptive uses, and arcs are the conveyances between nodes, such as stream reaches, canals, or pipelines.

Mary said that after the model is constructed and calibrated/verified, information is input into the model (types of model input include inflows, storage-elevation relationships, turbine efficiencies, etc.). The model can then be used to evaluate alternatives.

Gerrit Jobsis, South Carolina Coastal Conservation League (SCCCL) and American Rivers, asked how the OASIS model is calibrated/verified (with the same data set or a new data set). Mary explained that PB Power's approach to model calibration and verification is to match historical stage and compare computed energy and discharges to the historical.

¹ PB Power's presentation slides are provided as Attachment 7.

Don Rayno, North Carolina Department of Water Resources (NCDWR), asked about the period of the run and the time step and asked if the data set used was daily or averaged data. Mary explained that the period of the run and the time step could be different – for example, at Tapoco, the period of the run was one year and the time step was hourly. Mary suggested that model runs for the Yadkin Project would likely be multi-year runs on a daily time step. Don asked how long it takes OASIS to complete one run. Mary answered about one to 15 minutes per run (each run for the Tapoco Project takes about three minutes). Paul Shiers added, that based on his experience at Tapoco, it is very helpful to have the alternatives identified about a week or so in advance of needing to make the actual runs to allow time for additional OCL programming, as necessary.

In response to Don's question about the data set, Chris Goudreau, North Carolina Wildlife Resources Commission (NCWRC), said that actual historic data for the period of the run is used (not an averaged, artificial data set). Don asked how it is possible to model Project operations, without knowledge of the actual stream flow. Paul explained that a 30-year historical hydrologic record would likely be used to simulate Project operations. Within the 30-year historical record there have been wet, dry, and average hydrologic years. The historical data, that has hydrologically occurred, will be used to evaluate various alternative operations and their impact on flows, generation, etc.

Larry Jones asked about the source of the inflows data set. Paul said that PB Power Inc. and Hydrologics, Inc. were considering using U.S. Geological Survey data (from USGS stream gages). Larry commented that the five USGS gages could not provide sufficient inflow information and suggested that a certain percentage of inflow be added to the flows recorded at the USGS gages. Paul said that PB Power Inc. and Hydrologics, Inc. would look at historical inflows into High Rock Reservoir as determined by Yadkin, as well as basin runoff characteristics to fill in the information gaps.

Larry said that the utility of the model is limited in that it can only provide a "look back". Paul said that OASIS could evaluate various alternative operating scenarios to see which targets (as identified by the user) can be met during a wet, dry, and average year. Randy Benn, Yadkin counsel, offered a layman's perspective. He said that OASIS is a tool representative of the Yadkin system, which can evaluate operational alternatives. He said that resource studies and data collected over the next two years could be input into the model (as alternative operating scenarios) to quantify water levels, discharges, and energy generation. Randy noted that the participants in the Tapoco Project relicensing had developed a high level of confidence in the OASIS model. Steve Reed, NCDWR, agreed that OASIS had been quite useful during the Tapoco relicensing.

Larry Jones asked why, if OASIS is the model of choice of the North Carolina resource agencies, Progress Energy was not using OASIS. Steve Reed said that the licensee chooses which model to use. Larry thought it imperative for both licensees to use the same model to be able to model the downstream effects of the two hydropower projects. Steve said that NCDWR feels strongly that there needs to be one model used basinwide.

Ann Bass asked if Yadkin was planning to use OASIS for the sole purpose of the relicensing or if it is a tool that Yadkin can use long-term. Paul responded that Yadkin plans to use OASIS as a tool during relicensing to model operational alternatives. Paul noted that the model does have the capability to be used over the long-term.

Bill Medlin, Yadkin Pee Dee Lakes Project, asked how and when participants should submit alternatives for evaluation using OASIS (e.g. recreational use of the dam spillways). Gene Ellis said that the OASIS model would not be constructed and calibrated/verified until late 2003.

Mary showed some sample model input screens. Harry Hicks, SaveHighRockLake.org, asked how many model runs PB completed at the Tapoco Project. Mary said that she had completed about 50 different model runs during preparation of the Preliminary Draft Environmental Assessment, another 50 model runs during completion of the Draft Environmental Assessment, and hundreds of runs during settlement negotiations.

Bud Badr, South Carolina Department of Natural Resources (SCDNR), asked what the target would be (for optimization) if there was more than one alternative being evaluated (e.g. reservoir levels, outflow etc.). Mary explained that when there are multiple targets it is necessary to weight the targets in the model so that one has priority over the other. In this case, OASIS will meet the first priority and then try to meet the next priority and so on.

Continuing the presentation, Mary said that the model outputs are discharges from the developments, reservoir elevations, and energy generated (in MWh and value). Mary showed an example output screen. In conclusion, Mary summarized Yadkin's approach to modeling – assemble data and construct the model; calibrate the model; and utilize the model to investigate operational alternatives.

Bud Badr asked about a basinwide hydrologic model (i.e. a model that includes Yadkin's four developments as well as Progress Energy's two developments). Gene stated that Progress had indicated that they would be using a different model (CHEOPS) to model their project operations. He said that Yadkin has questions and concerns about a basinwide modeling approach. He provided a model ($a+b+c=d$), where a =minimum flow required downstream for environmental reasons, b =minimum flow downstream for other reasons, c =any flow above $a+b$, and d = total flow. Gene said that Yadkin would be evaluating "a" during the relicensing, but not "b". Gene suggested that a process needed to occur outside of the Yadkin relicensing to evaluate "b". Gene acknowledged that Yadkin would have a role in this parallel process. Gene said that Yadkin was prepared to be engaged and do its part, but that water allocation was an issue between the states (North and South Carolina). Bud said that there needed to be one model to evaluate a , b , and c . Gene replied that he could not disagree, but thought that the issue needed to be discussed in a different forum (not relicensing).

Gerrit Jobsis disagreed that there is an "a" and a "b". He said that there is no other reason for flows downstream of the Yadkin Project than environmental reasons. He said that how the Yadkin Project operates will determine how Progress Energy can operate its developments.

Larry Jones said that the minimum flows downstream of the Project should be no more than inflow into the basin (what comes in goes out).

Mark Bowers, U.S. Fish and Wildlife Service (USFWS), asked about the other reasons for downstream flows (“b”). Gene said that other reasons for downstream flows could include municipal water supply needs and/or saltwater intrusion.

Randy Benn stated that water allocation issues are much larger than hydro relicensing. He noted that the Federal Power Act does not deal effectively with water allocation, which is primarily an issue of state law (Section 27 of the Federal Power Act preserves existing state laws and water rights). Randy said that there are two options that the states could pursue with regard to water allocation: 1) an interstate compact approved by Congress pursuant to Article I, Section 10 of the U.S. Constitution or 2) litigation between the states in the U.S. Supreme Court. He said that where it is demonstrated that the Project has a downstream effect, Yadkin is willing to commit to studying those effects in an environmental context (i.e. what amount of water is needed to protect the biota). Randy again encouraged North Carolina to initiate a separate process to discuss water allocation issues with South Carolina, Yadkin, and Progress Energy.

Gerrit Jobsis disagreed with Randy that the Federal Power Act does not address water allocation. He said that Section 10(a) of the Federal Power Act requires that the Project be best adapted to a comprehensive plan for improving or developing a waterway or waterways (including beneficial public uses including irrigation, flood control, water supply, and recreation). Randy restated that the Federal Power Act is not a water allocation statute and asked if there was any case precedent that showed that it is. Randy said that South Carolina is responsible for its water supply needs. He said that Yadkin did not want the relicensing process overwhelmed with water allocation issues. He said that Yadkin did not intend to run a basinwide model. He again suggested that North and South Carolina initiate a separate process to discuss water allocation issues.

Harry Hicks asked if the various models (OASIS and CHEOPS) provided similar information. Randy said that the outputs from the OASIS model (used to model Yadkin Project operations) could become the inputs for the CHEOPS model (used to model Progress Energy’s operations). Randy asked Paul Shiers how well the two models communicate. Paul said that OASIS would provide daily flow information from the Falls development that would be an input for the downstream projects.

Steve Reed said that North Carolina feels strongly that there needs to be one model for the entire basin. He said that North Carolina expects the OASIS model to include nodes far downstream of the Yadkin Project because there are Project effects far downstream (e.g. saltwater intrusion). Steve asked that the two utilities (Yadkin and Progress Energy) work together. Gene said that Yadkin was planning to use OASIS, based on North Carolina’s recommendation. Steve said that if the two utilities could not agree on one model that there would need to be two basinwide models – one using OASIS and one using CHEOPS. Gerrit Jobsis said that nodes would need to be included upstream (Kerr Scott), as well as downstream. He agreed with Steve that Project effects do not end at Falls Dam. He said that the Project’s effects on flow delivery into South Carolina need to be evaluated.

Bud Badr emphasized the need for one basinwide model. Gene acknowledged that there may be Project effects downstream of the Yadkin Project. However, he said that water allocation needs to be addressed in a forum other than relicensing. Gene said that North and South Carolina had worked well together during the 2002 drought and suggested they do the same to address water allocation.

Ann Bass said that she hoped that FERC would require everyone to work together on a basinwide model (and possibly create a basinwide management agency). She said that there is a need for a basinwide tool to look at things such as municipalities' need for drinking water, interbasin transfers etc.

Chris Goudreau restated the two issues: 1) the geographical context of Project effects and 2) a process context. He said that Yadkin had acknowledged that there may be Project effects below Falls but that Yadkin was making a distinction that the process to deal with downstream effects (other than environmental effects) should be a process outside of relicensing.

Drew German, Duke Buck Steam Station, commented that Yadkin's existing FERC license requires Yadkin to coordinate Project operations with the Buck Steam Station and Progress Energy. He asked how it would be possible for Yadkin to coordinate Project operations with the Buck Steam Station and Progress Energy if there was not a basinwide analysis.

Gerrit said that any Project effects downstream (environmental or otherwise) should be addressed in the relicensing context. He saw no reason to begin a separate process. Gene Ellis disagreed.

Marty Barfield, Pee Dee River Coalition, asked if any agreements made between North and South Carolina could be included in Yadkin's FERC license. Gene indicated that this concern is the reason why Yadkin would want to participate in any discussions between North and South Carolina about water allocation.

Danny Johnson, South Carolina Department of Natural Resources, said that South Carolina was willing to set up a meeting with North Carolina, Yadkin, and Progress Energy. He also said that South Carolina may go to FERC for clarification of Yadkin's arguments against including water allocation issues in the relicensing process.

Steve Reed disagreed that relicensing is not the forum for water allocation issues. He said that it would be imperative to have Progress Energy's managers at the next meeting and willing to discuss the issues. Mark Bowers said that the USFWS and National Marine Fisheries Service (NMFS) shared a similar position. He said that Yadkin has the major storage in the basin and therefore has the responsibility to ensure adequate downstream flows for the environment and recreation, as well as assimilative capacity.

Marty Barfield said that Yadkin's current FERC license requires Yadkin to discharge a weekly average of 1,500 cfs downstream and Progress Energy's FERC license requires it to discharge only 150 cfs downstream. He noted the large disconnect. He said that there needs to be some coordination between the two licenses.

Mark Bowers said that the USFWS had been close to asking FERC to require a single license for the two projects. Mark said that the USFWS made it clear in their January 2003 comments to Yadkin that there needed to be close coordination between the two licensees. Mark said that he had not seen any effort at coordination from Yadkin. Gene said that he felt Yadkin was doing its part – Yadkin was using the OASIS model and had some discussions with Progress Energy. Randy said that Yadkin had met with Progress Energy and was unable to coordinate to the extent Yadkin would like to.

Chris Goudreau said that there was a fundamental disagreement between Yadkin and the participants and suggested that the group test the dispute resolution protocol. Randy Benn did not agree that there was a dispute until a specific study request was rejected. Gerrit said that there was a study request that Yadkin was refusing and therefore there was a dispute. Gene said that there was no study request – the model is a tool, not a study.

Mark Bowers said that a separate process or forum to discuss water allocation would not have the certainty or enforceability of the relicensing process. Mark asked how an interstate compact between North and South Carolina would bind Yadkin. Gene said that Yadkin would have a vested interest in such a compact.

Wrap-up

Gene suggested that the interested parties (North and South Carolina, Yadkin, Progress Energy) schedule a meeting to discuss water allocation and basinwide modeling.

Steve Reed suggested that the “Meeting Norms” be posted at future IAG meetings.

The meeting adjourned at about 12:00 noon.

Attachment A – Meeting Agenda

**Alcoa Power Generating Inc. Yadkin Division (FERC No. 2197)
Communications Enhanced Three-Stage Relicensing Process**

Issue Advisory Group Meetings

**March 12-14, 2003
Alcoa Conference Center
Badin, North Carolina**

IAG Meeting Schedule

Wednesday, March 12 1:00 to 4:00 p.m.	Fish and Aquatics (RTE aquatic)
Thursday, March 13 8:00 to 10:00 a.m.	Water Quality
Thursday, March 13 10:00 to 12:00 noon	Wetlands, Wildlife, Botanical (RTE terrestrial)
Thursday, March 13 1:00 to 4:00 p.m.	Recreation, Aesthetics, Shoreline Management
Friday, March 14 8:00 to 10:00 a.m.	Operations Model
Friday, March 14 10:00 to 12:00 noon	County Economic Impacts

Agenda

(The following agenda applies to all individual IAG meetings)

1. Review of Meeting Schedule for 2003 and Procedures
2. Discussion of IAG Dispute Resolution Process
3. Introduction of Technical Consultants
4. Review and Discuss Study Requests and Study Scopes
5. Agenda for Next Meeting

Attachment B – Meeting Attendees

Name	Organization	Email
Ann Bass	Yadkin Pee Dee Lakes Project	aliebenstein@vnet.net
Bill Medlin	Yadkin Pee Dee Lakes Project	bmedlin@ctc.net
Bud Badr	SC Department of Natural Resources	badr@dnr.state.sc.us
Carl Davidson	Davie County	carl.davidson@co.davie.nc.us
Chris Ey	Framatome ANP	waterguy@carolina.rr.com
Chris Goudreau	NC Wildlife Resources Commission	goudrecj@wnclink.com
Coralyn Benhart	Alcoa	coralyn.benhart@alcoa.com
Danny Johnson	SC Department of Natural Resources	johnsond@dnr.state.sc.us
Don Rayno	NC Division of Water Resources	don.rayno@ncmail.net
Don Seitz	Concerned Property Owners High Rock Lake	bubbatdryrok@lexcominc.net
Drew German	Duke Energy	asgerman@duke.energy.com
Gene Ellis	APGI, Yadkin Division	gene.ellis@alcoa.com
Gerrit Jobsis	SC Coastal Conservation League	scribers@bellsouth.net
Greg Hankins	Seven Lakes Times	ghankins@ac.net
Greg Scarborough	Rowan Association of Realtors	gscarborough@cbiinternet.com
Harry Hicks	SaveHighRockLake.org	hicksh1@rjrt.com
Harry Saunders	Badin Lake Association	badinlake@rtmc.net
Jody Cason	Long View Associates	jjcason@worldnet.att.net
Julian Polk	APGI, Yadkin Division	julian.polk@alcoa.com
Kim Orick	Uwharrie Point Community Association	upca@rtmc.net
Larry Jones	High Rock Lake Association	larry@foxhollowfarm.org
Lawrence Dorsey	NC Wildlife Resources Commission	dorseylg@vnet.net
Lynn Farquhar	High Rock Lake Business Owners Group	lfarquhar@lexcominc.net
Mark Bowers	US Fish and Wildlife Service	mark_bowers@fws.gov
Marty Barfield	Pee Dee River Coalition	marty.barfield@weyerhauser.com
Mary Tibbetts	PB Power	tibbetts@pbworld.com
Paul Shiers	PB Power	shiers@pbworld.com
Randy Benn	Yadkin counsel	rbenn@llgm.com
Raymond Allen	City of Albemarle	rallen@ci.albemarle.nc.us
Roy Rowe	Piedmont Boat Club	rrowe@triad.rr.com
Steve Reed	NC Division of Water Resources	steven.reed@ncmail.net
Tom Stokom	Concerned Property Owners	cpohrl@lexcominc.net

Attachment C - Issue Advisory Groups Outline of Purpose and Suggested Process



Alcoa Power Generating Inc. – Yadkin Division
Communications Enhanced Three-Stage Relicensing Process

Issue Advisory Groups

Outline of Purpose and Suggested Process

Purpose

Issue Advisory Groups (IAGs) are being formed to advise Yadkin on the important resource issues requiring study during the relicensing process. As a member of an IAG, your primary role will be to help identify issues that should be considered in the relicensing process, help determine information and study needs in support of those issues and to review study results.

Membership

IAGs are composed of representatives from state and federal agencies, legislatures, tribes, affected municipalities and recognized non-government organizations (NGOs). Recognized NGOs are those who meet the following criteria:

- represent interests not represented in already existing NGOs
- represent an interest that is directly affected by Yadkin's relicensing
- represent the interests of a group of stakeholders rather than an individual
- demonstrate a defined organizational structure
- have a designated representative who can speak for the organization

Time Line

The first objectives of the IAG process are to help Yadkin develop a scope of technical resource studies to be conducted and to review study plans. It is anticipated that IAGs will then meet as needed throughout 2003, 2004 and the first quarter of 2005 to review study results, as available, and refine/adjust studies, as needed.

Meeting Procedures

The following are suggested procedures for managing the work of the IAGs. These suggestions are open for discussion and revision within the IAG.

Meeting Schedule

- Yadkin will schedule the initial meetings. Subsequent meetings will be held on an as needed basis as determined by the IAG or Yadkin. Yadkin will try to provide notice to IAG members of all IAG meetings about 30 days prior to the meeting, if possible. Meetings may be scheduled with less than 30 days notice, if necessary. IAG members who are unable to attend the meeting in person will be given the opportunity to participate by conference call.
- It may be helpful to select a particular week of the month to convene IAGs in order to avoid conflict with other regional licensing processes.

Agenda and Information

- IAG meeting agendas will be prepared by Yadkin with input from IAG members and distributed to members at least 14 days prior to the meeting. IAG members may submit comments about the agenda in writing, by phone, e-mail or fax up to one week prior to the meeting. In addition, the agenda may be modified at the beginning of the meeting with agreement from those attending.
- Yadkin and IAG members should endeavor to make available all documents and other information necessary to prepare for the meeting at least one week prior to the meeting. As an alternative, materials may be provided at the meeting.

Meeting Summary Preparation and Distribution

- Yadkin will provide a draft meeting summary to all meeting attendees within about 15 days of the meeting. Meeting attendees should provide their comments on the meeting summary to Yadkin in writing or by phone, fax, or e-mail within about 15 days following the meeting. Yadkin will then finalize the meeting summary within about 30 days after receiving comments and will distribute a final meeting summary to all IAG members, regardless of their

(continued)

Issue Advisory Groups (continued)

participation in the meeting. If no corrections are submitted, the meeting summary will become final 30 days after the date of the meeting.

Meeting Norms

- Meetings begin and end on time
- Agenda is followed during the meeting
- Needed information resources are available during the meeting
- Tangible progress is made toward accomplishment of the tasks
- All decisions are brought to closure in a way that is clearly understood
- Agenda for next meeting discussed at close of each meeting
- Group members demonstrate effective meeting behaviors

- One speaker at a time, one subject at a time, limit war stories
- Respect for opinions of others, look for merit in ideas
- Active participation of all
- All members present at start of meeting
- All members arrive informed about previous meeting and agenda for present meeting

Resolving Study Disputes

- As the process unfolds, disagreements may surface regarding the type and scope of studies to be conducted. It is anticipated that IAGs will consider developing an appropriate dispute resolution process with the goal of

resolving any study disputes within the IAG. Under FERC's regulations, a licensee is expected to conduct all "reasonable and necessary" studies requested by resource agencies and tribes. If through its dispute resolution process an IAG is not able to resolve a dispute regarding whether or how a particular study should be conducted, then Yadkin may opt to send the dispute to FERC for formal dispute resolution.

Yadkin's Communications Enhanced Three-Stage Relicensing Process

Stage One 2002-2003	Stage Two 2003-2006	Stage Three 2006-2008
1) Inform stakeholders and public (publish ICD) 2) Receive input from stakeholders and public 3) Form Issue Advisory Groups	4) Conduct studies 5) Review studies w/ IAGs and public 6) Draft Application 7) Receive comments on draft Application 8) File Application	9) FERC Reviews Application and Comments 10) Conducts Environmental Assessment 11) Issues License

Attachment 4 – IAG Dispute Resolution Process Document

**Alcoa Power Generating Inc.—Yadkin Division (FERC No. 2197)
Communications Enhanced Three-Stage Relicensing Process**

IAG Dispute Resolution Process

As the Issue Advisory Group process unfolds, there will be situations in which the issue being discussed cannot easily be resolved within the normal IAG setting. When such disputes first present themselves, Yadkin and the IAG members will discuss the issue and attempt to resolve the dispute through discussion commensurate with the nature and importance of the dispute. Should initial discussions over the dispute cause an inordinate delay of the work of the IAG or become an obstacle to the progress of the IAG, Yadkin will implement the following process:

- (1) The issue will be delegated by Yadkin or the meeting manager to a smaller dispute resolution work group made up of Yadkin representative(s) and IAG members who have a vested interest in the issue.
- (2) The dispute resolution work group will convene outside of the regular IAG meeting to discuss the issue. Interested parties who are part of the dispute resolution work group will have responsibility for development of their position statements.¹
- (3) Yadkin will take into consideration the position statements prepared by the interested parties while making a decision on the disputed issue. Yadkin's decision on the disputed issue and the position statements of the interested parties will be reported back to the full IAG.
- (4) Both the position statements prepared by the dispute resolution work group 's interested parties and Yadkin's report to the full IAG will become part of the IAG meeting summary and the final consultation record, which will be reviewed by FERC.

¹ For instance, in cases where the dispute is over a request to conduct a study or gather information, the position statements prepared by the dispute resolution work group should at a minimum include 1) a description of the study or information being requested, 2) the purpose of the study or need for the information being requested, and 3) the relationship between Project operations and effects on the resource to be studied.

Attachment 5 – IAG Dispute Resolution Process Document As Revised

**Alcoa Power Generating Inc.—Yadkin Division (FERC No. 2197)
Communications Enhanced Three-Stage Relicensing Process**

IAG Dispute Resolution Process

As the Issue Advisory Group process unfolds, there will be situations in which the issue being discussed cannot easily be resolved within the normal IAG setting. When such disputes first present themselves, Yadkin and the IAG members will discuss the issue and attempt to resolve the dispute through discussion commensurate with the nature and importance of the issue. Should initial discussions over the dispute threaten an inordinate delay of the work of the IAG or become an obstacle to the progress of the IAG, Yadkin will implement the following process:

- (1) The issue will be delegated by Yadkin or the meeting manager to a smaller dispute resolution work group made up of a Yadkin representative(s) and IAG members who have an expressed interest in the issue.
- (2) The dispute resolution work group will convene outside of the regular IAG meeting to discuss the issue and attempt to resolve it. As part of this effort, IAG members who are part of the dispute resolution work group will develop a written statement of their positions.¹ It is expected that these efforts will take place before the commencement of the next meeting of the IAG.
- (3) If the dispute resolution work group is unable to reach a timely resolution of the issue, Yadkin will take into consideration the position statements prepared by the interested parties when making a decision on the disputed issue. Yadkin's decision on the disputed issue and the position statements of the interested parties will be reported back to the full IAG.
- (4) Both the position statements prepared by the dispute resolution work group's interested parties and Yadkin's report to the full IAG will become part of the IAG meeting summary and the final consultation record, which will be reviewed by FERC.
- (5) If through this dispute resolution process an IAG is not able to resolve a dispute regarding whether or how a particular study should be conducted, then Yadkin or the resource agencies may opt to send the dispute to FERC for formal dispute resolution.

¹ For instance, in cases where the dispute is over a request to conduct a study or gather information, the position statements prepared by the dispute resolution work group should at a minimum include 1) a description of the study or information being requested, 2) the purpose of the study or need for the information being requested, and 3) the relationship between Project operations and effects on the resource to be studied.

Attachment 6 – Issues/Comments/Study Request Tables



PROJECT OPERATIONS AND BASINWIDE MODELING

ISSUE/COMMENT	STUDY REQUEST
Operation of the Yadkin Project affects power generation, reservoir water levels, downstream river flows, water supplies, assimilative capacity and salinity intrusion.	Develop a basinwide hydrologic model that can evaluate alternative Project operations (flow releases and reservoir levels) and their potential impacts on power generation, river hydrology, water supply intakes, assimilative capacity, and salinity.

Attachment 7 – PB Power Presentation Slides

***Operations Model
IAG Meeting
March 14, 2003***

1

ONSCREEN.PPT

Agenda

- Introduction
- Consultants
- Review of comments / issues
- Overview of OASIS model
- Future plans and future meeting dates

2

ONSCREEN.PPT

Operations Model IAG Technical Consultants

- PB Power, Inc.
 - Paul Shiers
 - Mary Tibbetts
- HydroLogics, Inc.
 - Brian McCrodden
 - Steve Nebiker
- Alcoa Power Generating Inc., Yadkin Division
 - Julian Polk

3

ONSCREEN.PPT

PB Power, Inc. *(A Parsons Brinckerhoff Company)*

- Engineering consulting company
- 1,200 employees worldwide
- Boston office: staff of over 30 focused on hydro
 - licensing / relicensing
 - hydrologic and hydraulic modeling
 - operations modeling
 - safety inspections
 - civil / structural design
- Over 10 years experience on the Yadkin Project

4

ONSCREEN.PPT

PB Power, Inc.

- Paul Shiers, P.E.
 - B.S. & M.S. in civil engineering
 - Over 25 years experience in hydropower operations
 - Worked on numerous FERC relicensing efforts
- Mary Tibbetts
 - B.S. & M.S. in civil engineering
 - 10 years experience in water resources projects
 - Used OASIS model in Tapoco relicensing effort

5

ONSCREEN.PPT

HydroLogics, Inc.

- Water management consulting firm
- 10 people, 3 states
- Specialties:
 - Hydrology
 - Optimization
 - Modeling
- Developers of OASIS and OCL

6

ONSCREEN.PPT

Review of Comments / Issues

- Operation of the Yadkin Project affects:
 - Power generation
 - Reservoir water levels
 - Downstream river flows
 - Water supplies
 - Assimilative capacity
 - Salinity intrusion

7

ONSCREEN.PPT

OASIS Model

- OASIS is the tool we will use to evaluate Yadkin Project operational alternatives and their potential impacts.
- OASIS is the model recommended by the NC agencies.
- OASIS is the model being used in the Tapoco relicensing to evaluate operational alternatives.
- Currently working on building the Yadkin Project model – anticipate completion by 4th quarter of 2003.

8

ONSCREEN.PPT

OASIS Model

- Goal of the model
- Overview of the model
- Application of OASIS at the Yadkin Project

9

ONSCREEN.PPT

Modeling Goal

Develop a computer model that will:

- Simulate operating alternatives
- Quantify impact of alternatives on:
 - Water levels in the Yadkin Reservoirs
 - Discharges from the Yadkin Project
 - Energy generation at the Yadkin Project

10

ONSCREEN.PPT

OASIS and OCL

- OASIS stands for Operational Analysis and Simulation of Integrated Systems
- OCL stands for Operations Control Language
- OASIS is the model; OCL is a means of expanding the model's capabilities and to tailor it to different systems through input data.

11

ONSCREEN.PPT

What is OASIS?

- Generalized water resources simulation/optimization model
- Used to evaluate operational alternatives
- LP formulation - operates with constraints and targets

12

ONSCREEN.PPT

How Does OASIS Work?

- Uses the principle of mass balance to ensure that all the water in the system is accounted for.
- Solves a set of linear equations for each time step to optimize benefits subject to user-defined constraints and targets.
- Uses OCL to communicate sophisticated operating policies to the model.

13

ONSCREEN.PPT

Model Features

- The model can handle:
 - Evaporation
 - Maximum flow constraints
 - Minimum flows
 - Storage-area-elevation curves
 - Consumptive uses
 - Time pattern input (repeating, annual cycle)
 - Time series

14

ONSCREEN.PPT

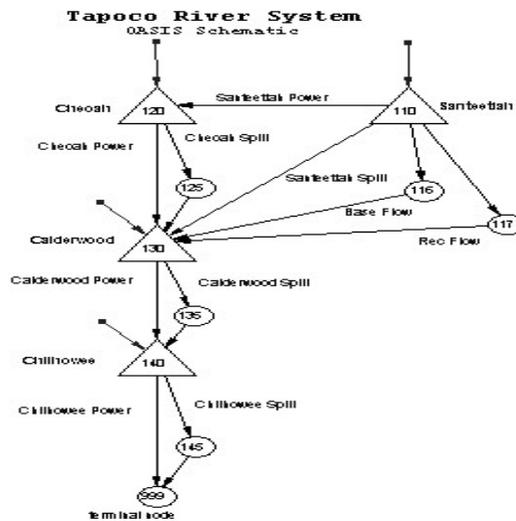
Representing the Physical System

- Nodes are locations of interest
 - Reservoirs
 - Junctions
 - Consumptive uses
- Arcs are conveyances between nodes
 - Stream reaches
 - Canals, pipelines, etc.

15

ONSCREEN.PPT

Example Schematic



16

ONSCREEN.PPT

Types of Model Input

- Time Series (e.g. inflows)
- Static (e.g. storage - elevation relationships)
- OCL (e.g. turbine efficiencies)

17

ONSCREEN.PPT

Model Input During Alternative Evaluation

- Initial conditions
- Period of the run
- Operating policies, e.g.
 - Guide Curves
 - Flood Control Operations
 - Minimum Releases

18

ONSCREEN.PPT

Sample Input Screen

Minimum Flow

US Number	DS Number	Units	Month	Day	Min Flow
110	116	cfs	1	1	90.000
110	116		1	31	90.000
110	116		2	1	90.000
110	116		2	28	90.000
110	116		3	1	90.000
110	116		3	31	90.000
110	116		4	1	90.000
110	116		4	30	90.000
110	116		5	1	80.000
110	116		5	31	80.000
110	116		6	1	60.000
110	116		6	30	60.000
110	116		7	1	40.000
110	116		7	31	40.000
110	116		8	1	30.000
110	116		8	31	30.000
110	116		9	1	30.000
110	116		9	30	30.000
110	116		10	1	30.000
110	116		10	31	30.000
110	116		11	1	40.000
110	116		11	30	40.000
110	116		12	1	90.000
110	116		12	31	90.000
130	135	cfs	1	1	0.000
130	135		12	31	0.000

Select items for editing. Output CURRENT

19

ONSCREEN.PPT

Sample Input Screen

Reservoir Rules

Node Number	Month	Day	Units	Lower Rule	Upper Rule
110	1	1	ft	1807	1816
110	2	28		1807	1816
110	4	1		1812	1816
110	6	25		1812	1816
110	7	1		1813	1816
110	9	15		1813	1816
110	9	21		1812	1816
110	10	31		1812	1816
110	11	30		1807	1816
110	12	31		1807	1816
120	1	1	ft	1150	1154
120	4	30		1150	1154
120	6	30		1149	1153
120	8	31		1150	1154
120	12	31		1150	1154
130	1	1	R	962	965
130	4	30		962	965
130	6	30		961	964
130	8	31		962	965
130	12	31		962	965
140	1	1	ft	872	874
140	2	29		872	874
140	3	31		871	874
140	9	30		871	874
140	12	31		872	874

Output CURRENT

20

ONSCREEN.PPT

Model Output

- Discharges from developments
- Reservoir elevations
- Energy generated (MWh and value)

For any point(s) in the system

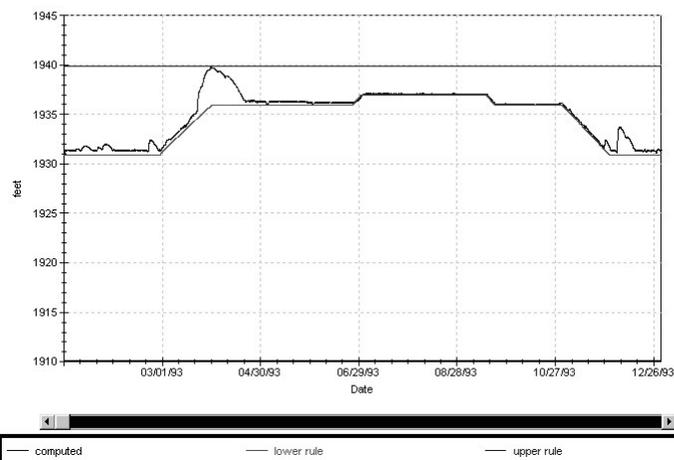
21

ONSCREEN.PPT

Sample Output Screen

Santeetlah Stage

D:\Tapoco_OASIS\runs\Simulation\DEA_Ave_Tap_8dist_RevLo\, Sun Mar 09 2003 13:27



22

ONSCREEN.PPT

Yadkin Project Model

- Approach
 - Assemble data and construct model
 - Calibrate model
 - Match historical stage and compare computed energy and discharges to historical
 - Utilize model to investigate operational alternatives