

MEMORANDUM FOR FILE

SUBJECT: John H. Kerr 216 Feasibility Study 2nd Team Leaders' Meeting

1. The subject meeting was held on 16 December 2003, at the McKimmon Conference and Training Center in Raleigh, North Carolina. The meeting agenda is attachment 1. The list of attendees is attachment 2.
2. The meeting was opened by the members of the Executive Committee (EC) who shared expectations of the meeting. Colonel Alexander indicated that the intent of the meeting was to get status reports from teams in order to capture issues concerning their teams. It was emphasized that it was not the intent of the meeting to debate issues and that the Executive Committee did not intend to resolve issues at the meeting unless the resolution of the issue was very clear-cut. Colonel Alexander indicated that after review of the issue summaries the Team Leader should present their concerns to Bill Adams, Lisa Hetherman or Richard Lewis. Issues will be resolved or elevated to the EC, if necessary. John Morris was interested in hearing the Team Leaders' views on communications and how the process was working. John Morris emphasized that key issues needed to be raised and the teams should have no hesitation on bringing them up (ex. RRBROM as a fundamental tool) to keep the study moving forward. John Morris reiterated that team leaders should maintain close communication with Bill Adams. Dave Paylor re-emphasized the need to keep in close coordination Bill Adams and the EC. It was also emphasized that if there are questions between meetings they need to be raised immediately.
3. The following summarizes the findings and concerns of the eleven individual Teams.

a¹. Team 1: Downstream Flow Regime and Effects on Riparian Ecosystem, Jim Mead, Team Leader: This team has met twice and has encountered many complex issues. There are several areas that this team will study more thoroughly to determine the affect of John H. Kerr operations including: the road network, riparian vegetation, the animal community, and silvaculture. It was determined that the existing road network GIS layer needs to be augmented to include elevations. An expert subcommittee of 5 or 6 members was created to assist the study of the vegetation. Consultation with experts will begin to better understand the animal community downstream and how it is affected by releases. The team expressed difficulty in performing the short-term (18 month) adaptive management study and recommended that a long-term study be underway as well. Jim Mead asked if Operations and Maintenance funding could be used for a long-term study. This question will be explored. Jim Mead stated that the team needs assistance in determining the cost for the final draft study plan. Richard Lewis will provide guidance on cost estimating.

a. 2. Status of Review of RRBROM, Greg Williams: Corps review of RRBROM - Coastal Hydrology and Hydraulics Section is reviewing this model. John Hazelton and Tony Young will study this in detail with the assistance of Dan Emerson. Completion of the study is scheduled for the end of January. If John Hazelton is deployed to Iraq, Tony Young, Dan Emerson, and Terry Brown will complete the review. John Morris informed the panel that several people at the state level are very familiar with RRBROM and are available to help the review team in understanding this model. Colonel Alexander confirmed completion of review by the end of January.

b. Team 2: Water Quality, Frank Yelverton, and Jennifer Everett, Co-Team Leaders: Two meetings have been held so far – November 9th and December 7th. There was discussion about what types of modeling to use among the team. Issues on models have been costs, saltwater intrusion, and model boundaries. There are three tasks in the current Project Management Plan (PMP): river flood plain, assimilative capacity, and the tailrace. The team proposed to combine river flood plain and assimilative capacity into one task and leave the tailrace as a separate task. The team's next meeting is scheduled for January. Frank Yelverton provided a monthly update as a handout which is attachment 3. John Morris stated that water quality is the most expensive and important part of this study and it should end in recommendations for operations of John H. Kerr Lake. Frank Yelverton also stated that a dissolved oxygen gauge was installed downstream.

c. Team 3: Downstream Aquatic Habitat, Pete Kornegay, Team Leader: Pete Kornegay requested that team eight Anadromous Fish report immediately follow his report. Team three and Team eight held one joint meeting. Wilson Laney took very accurate and detailed notes of this meeting. These meeting notes will be posted on the study list server. The two teams reviewed tasks outlined in the PMP, time was spent considering re-defining tasks described in PMP. The teams reported that it was hard to separate out the issues because the tasks of these two teams are intrinsically connected. Pete Kornegay recommended that Team three and Team eight be combined. This group is scheduled to meet again in January.

Chuck Wilson, Team Leader of the Anadromous Fish Team recommended that Team three and Team eight be combined. The two teams concur combination of these teams is needed because of the similarity in subject matter and the number of team members that are serving on both workgroups. Combination of these teams will avoid duplication of effort and is in the best interest of cost efficiency. Chuck Wilson recommended that the membership of the two workgroups be combined as shown below. It was recommended that Jim Mead replace Tom Fransen as the NCDWR representative, which will allow Tom Fransen (formally of the Anadromous Fish Group) to perform other duties. It was also recommended that Ron Sechler (NMFS) should be added as an alternate member of the combined workgroup. Chuck Wilson recommended that Pete Kornegay and himself be co-team leaders of the new combined team which will be called Diadromous Fish and Riverine Aquatic Resources Team. The proposed membership of this team is as follows:

Chuck Wilson recommended that the workgroup's area of interest as described in the Draft PMP be expanded to include affects of operation of John H Kerr Reservoir on tributaries in addition to the main channel as currently described in the Draft PMP. Chuck Wilson submitted a written recommendation to the Executive Committee which is attachment 4.

The Executive Committee concurred with the proposal to combine the teams, approved the membership of the combined team, and the suggestion that tributaries be included in the study area. Ben Wood requested that this team consider what baseline to use to determine the degree of affect regarding fish kills. Jim Mead will make sure that Team three Downstream Aquatic Habitat and Team eight Anadromous Fish be deleted from the Lyris list server and the new team Diadromous Fish and Riverine Aquatic Resources Team added using the personnel listed above. This new team will become Team three. Team eight will be eliminated and the team numbers above eight changed to reflect the new reduced number of teams.

d. Team 4: Sedimentation and Channel Morphology, Hasan Pourtaheri, Team Leader: It was reported that this group met on November 15th. The minutes of this meeting are attachment 5. It was stated that vegetation is not growing on the banks downstream of John H. Kerr and that data need to be collected in order to pinpoint the cause. Hasan Pourtaheri also stated was that historic data collected needs be limited to the time period since the dam was constructed and needs to account for the lack of hydrologic equilibrium caused by the dam which results in downstream shoreline erosion. According to the team, this vegetation issue is magnified by ~~sedimentation and there is concern that the flood plain is filled with mud. The Corps of Engineers has a program that can handle this data.~~ The team is hoping to have some data by January. John Morris stated the need to target this data collection to variables in John H. Kerr Lake operations, which are complicated by releases downstream and adjustments to the peaking pattern downstream. Jim Mead indicated a need to look at week and day releases for downstream effects on channel and banks. Jim Mead also stated that there are some scouring effects attributable to day operations, or saturation and slumping as opposed to being attributed to shoreline erosion. The team will perform monitoring on 5-day schedules to find if it is affected by day or week releases. The team stated that there might be some overlap in how data may be gathered. It was reported that the decision to operate within day or week might overlap with Policy issues being investigated by Team ten. The affect on how weekly operation may impact the constraints under which Dominion operates the two downstream dams needs to be carefully considered. John Morris stated that the downstream sedimentation is an issue, but needs to be investigated in terms of the operation of John H. Kerr. Hasan Pourtaheri reported that the Corps of Engineers has two operation manuals for other dams that include how they operate and mitigate for impacts. These manuals will be utilized in the John H. Kerr 216 Study.

e. Team 5: Reservoir Resources, Tom Fransen, and Bud LaRoche Co-Team Leaders: This team has met twice and has spent time rewriting much of the PMP. It was stated that the

shoreline management plan has been in place for several years. The tasks in first section of the PMP revolve around how to inventory. The team also stated that there is a need to improve the management plan and to examine how resources play into the master plan for the reservoir. Concern was expressed about how the 216 project is related to the master plan for John H. Kerr. Wildlife impacts on the local economy was an issue added to the PMP by the team. The team decided that section three (fisheries section) of the PMP was not needed, so sections b and c were merged to reflect that. The team requested approval for the changes they suggested. The team needs to make sure that the results from the 216 are merged with the master plan. Therefore the master plan should not be updated until the 216 is complete. Colonel Alexander agreed to keep the master plan the same until the 216 Study is complete. Robert Dennis concurred.

f. Team 6: Downstream Flow Based Recreation, Jim Mead, Team Leader: The team held one meeting in early December and brainstormed. The minutes of this meeting is attachment 6. They found that the most relevant recreation issues could be targeted by the issue of access. This team should use the GIS road layer developed by Group 1 to perform this analysis. The team identified four key user groups: fisherman, hunters, platform camping, and nature observers. The first three are easy to identify and contact. These types of recreation are dependent on flow. Some recreational users utilize guides who are local sources of expertise. The nature observers, which include visitors such as bird watchers, eco-tourist groups, etc, are more diverse and not as easy to identify. Information is required from all of these groups to help perform the economic analysis. It was determined that the economic analysis should take place in phase three of the study, but there is a requirement to collect the data for the economic analysis during phase two of the study. Richard Lewis stated that if a survey would be used, it must be OMB approved and that there is a compact disc available with examples of OMB approved surveys. Jim Mead stated that interviews (<10 interviewees) with the guides who are experts in their area can be used and then OMB would not be required approval. John Morris pointed out that a survey which would be currently conducted and would continue to be conducted even in the absence of the John H. Kerr 216 Study by the Wildlife Resources Commission could be used to collect recreation data without requiring OMB approval. Jim Mead also reported that the recreation needs would be well addressed by these surveys. Richard Lewis indicated that we should not abandon the idea of developing surveys to collect needed information just because of the OMB approval process. Bill Adams cautioned the group that development of survey instruments was a grey area that would require careful consideration. John Morris reported that the State can help with funding for the surveys. Richard Lewis promised to provide the web address to Corps of Engineers regulations regarding the OMB approval process for survey instruments. Pete Kornegay stated that downstream recreational use is linked to flows, and that many people do not come during floods which can occur year around. Jim Mead added that nature observers are important because they are not confined to one season.

g. Team 7: Salt Wedge, John Hazelton, Team Leader: A brief overview of the physics associated with saltwater intrusion into rivers and estuaries was provided by Jerad Bales. The salt wedge dynamics along the Roanoke are driven chiefly by the kinetic energy of the river discharge and density differences between the freshwater and saltwater. Tides do not have as great of an impact on the intrusion compared wind affects and the long fetch of Albemarle Sound. The tides at Plymouth have a neap tide range of 0.5-ft and 1.0-ft spring range.

At the salt wedge meeting Martin Lebo of Weyerhaeuser gave a presentation on his experiences in studying saltwater intrusion along the lower Roanoke River. Weyerhaeuser has a

Pulp Mill in Plymouth, NC that uses water from the Roanoke River in its manufacturing process. High salinity water can damage equipment and increase maintenance cost. Saltwater intrusion in the lower Roanoke is the culmination of several factors; low flow in the Roanoke, high salinity in the western Albemarle Sound and a wind of long enough duration to push water from the Sound and into the Roanoke River. Complicating matters can be southerly winds moving higher saline water from the Pamlico Sound into the Albemarle Sound.

Weyerhaeuser has developed a 2-dimensional water quality model of the Roanoke from Jamesville to the Albemarle Sound. The CE-QUAL-W2 model is capable of simulating the movement of the saltwater intrusion. The model is dependent upon a salinity boundary condition at the Albemarle Sound. CE-QUAL-W2 has the capability to be expanded to simulate up to 20 water quality variables including dissolved oxygen. Martin Lebo will make inquiries with Weyerhaeuser as to the use of the existing CE-QUAL-W2 model by the Kerr 216 Study Group. A separate hydraulic model is used to route the flows from Roanoke Rapids to Jamesville.

The limitation of the existing CE-QUAL-W2 model is the boundary condition at the Albemarle Sound. A method will need to be developed for predicting the salinity levels in the western Albemarle. Expanding and calibrating the CE-QUAL-W2 model to include the Albemarle will be expensive and labor intensive. Flow from the Pamlico and the affects of varying wind patterns complicates the modeling effort. Inquiries with estuary modeling experts may provide an idea on the feasibility of modeling the Sound to determine salinity

Alternatives to using the CE-QUAL-W2 model to determine salinity levels in the Roanoke or western Albemarle were discussed. Tom Fransen inquired about the use of neural networks in the study of saltwater intrusion. An artificial neural network is a set of empirical relationships where the parameter(s) of interest is predicted from available measured (or estimated) data. Available data is the backbone of the technique since the mathematical dependencies are extracted from significant relationships in the data.

A proposed study in South Carolina will use a neural network to determine saltwater intrusion into the Waccamaw and Pee Dee Rivers during low flow conditions. Paul Conrads of the USGS may provide some guidance in the possible use of a neural network in our study. Neural network has also been used on a water quality study of the Savannah River. Jerad Bales and Martin Lebo stressed that neural networks are dependent on a quality data set that fits the range and situation you are studying.

Sources of water quality data were discussed. Known data sources include the USGS, NCDWQ, Weyerhaeuser and University studies. NCWRC and NC Division of Marine Fisheries may have water quality data and fisheries information. A better idea of the frequency of the data is needed and will be determined during Phase 2.

Discussion also included water quality problems associated with saltwater intrusion. Field measurements by Weyerhaeuser in the lower Roanoke revealed that when dissolved oxygen levels in the bottom portion of the water column decreased from 5 to 4 mg/l near the surface to anoxic conditions in bottom waters, with a sharp transition of <1 m. benthic organisms like mussels are unable to escape the anoxic conditions.

There was also discussion revolving around the question: "If investigating the feasibility of a storage pool at Kerr for use during saltwater intrusion was part of our scope of work?" A pulse of water from the dam could be released during critical times to push or flush the salt wedge towards the Albemarle Sound. The pulse will also have to pass through Gaston and Roanoke Rapids Dams and be coordinated with Dominion. In 1999 Kerr released 8,000 cfs for 24 hours which did lower salinity in the lower Roanoke.

The group discussed if withdrawals from the Roanoke upstream of Jamesville during drought can encourage saltwater intrusion. The group may need to determine the quantity of water removed from the system by municipal intakes and irrigation.

The group discussed the scope of our study. Determining the salinity levels, frequency and duration of saltwater intrusion before dam construction is not within our scope. The PMP has us looking at how the dam releases affect saltwater intrusion dynamics with the dam in place.

John Morris-observed that there may be a need to add a team to address modeling and data required for modeling. Greg Williams asked if the DWOOPR was the proper model to use for modeling the salt wedge. John Hazelton-responded that there may be other models. Sam Pearsall inquired if the salt wedge is a significant issue for other parties (ex-municipal users or irrigation) or was it a problem only for Weyerhaeuser. John Hazelton responded that the salt wedge does not seem to be a problem since there are no intakes that area affected by the salt wedge. Jim Mead indicated that there are water quality issues also. Pete Kornegay indicated that Weyerhaeuser was affected because they are limited in the amount of effluent they can discharge. It was pointed out by several participants that the salt wedge impacted fish and shellfish populations and has both acute and chronic effects. Jim Mead observed that the migration of anadromous fish moving downstream could be affected by the salt wedge.

h. Team 8 Anadromous Fish, Chuck Wilson, Team Leader: See Discussion for Team 3 in paragraph 3 c above.

i. Team 9 (now Team 8): Water Supply, Tom Fransen and Terry Wagner, co- Team Leaders: It was stated that the team has rewritten part of the PMP and they request that the study be basin-wide for water supply focus. In terms of storage analysis, the team asks if approval is needed for this restructure to include water storage. Terry Wagner noted that face-to-face meetings are more effective for the team than teleconference meetings. This will make the meeting process more time intensive on members. Bill Adams confirmed that the only EC issue is to expand the study area to basin wide. Tom Fransen stated that the water use is defined as all consumptive uses. He also questioned how good the hydrology in the basin is. Tom Fransen suggested for the team to look at the PMP to see if RRBROM is the appropriate tool and if it not, suggest that it be modified to be more useful. It was stated that a meeting on RRBROM alone would help to clear misunderstandings. John Morris stated that it is a good time to bring in people from other teams to make sure modeling efforts are well coordinated. Colonel Alexander agreed and suggested that a group should be established for modeling purposes. Dave Paylor questioned whether or not there were limitations on withdrawal for agricultural uses. Tom Fransen stated that in regards to the agricultural use in the basin, historical data needed to be updated and that the best data is with public systems. John Morris stated that almost every intake requires a permit and may require Corps of Engineers permit. Dave Paylor noted that new water withdrawals have limitations in Virginia, but that it is not the same as North Carolina. Terry

Wagner spoke about additional types of uses, looking at withdrawals up and downstream, and also expressed concern about Philpot and Smith Mountain lake releases. Terry Wagner questioned whether the scope of study be expanded for all impacts of water in the basin (excluding upstream of Smith Mountain lake).

j. Team 10 (now Team 9): Operating Policies and Administrative Procedures, John Morris and Joe Hassell, Co-Team Leaders: The team has not met yet, but plans on meeting in January. There are several official policies that regulate the operations of John H. Kerr Lake including: the Corps of Engineers policies, the John H. Kerr Operations Manual, national policies, and the Dominion power. John Morris stated that the essence of the task is to map out all operating policies, which will define the envelope to help management changes. John Morris brought up a question of policy modification and will send out ideas on how this will work. John Morris noted that this item may be contracted out.

k. Team 11: Applicable Laws and Regulations, Richard Lewis, Team Leader: It was reported that while this group had not formally met that communications using e-mail revealed that this team was having difficulty determining its function. It was also determined through discussions with team members from Team ten (Operating Policies and Administrative Procedures) that review of existing downstream permits to determine constraints on operations at John H. Kerr was part of Team ten's requirement. It was reported that other applicable laws and regulations would be addressed as part of the Feasibility Study process and the NEPA process. Because of these two factors, it was recommended that team 11 be eliminated or be inactivated until later in the study. Colonel Alexander asked how elimination of this team affected the stakeholders. It was stated that there would be no affect on stakeholders because review of the applicable law and regulations was a built in part of the study process and would be addressed during the required Independent Technical Review (ITR). Ben Wood asked why this team was created. Jim Mead responded that this team was created because every other team had review of applicable laws and regulations as their final task. The EC determined that while the Applicable Laws and Regulation Team should not be eliminated, it should become inactive until later in the study process.

4. Statements of Work and Cost Estimates: Richard Lewis gave a brief overview of what a statement of work should contain and the elements that make up a cost estimate. The following handouts were provided to all participants

a. Proposed Guidelines for Preparation of Scopes of Work to Accomplish Phase II Studies for the John H. Kerr 216 Feasibility Study is attachment 7.

b. Scope of Works (not attached)

- Wetland Creation, Bioswale Creation, Rain Garden Planting, Submerged Aquatic Vegetation Establishment and Bivalve Bed Creation for Wilson Bay, Jacksonville, North Carolina, N.D.

- Monitoring Plan to Assess Potential Environmental Impacts Associated with Dare County Beaches (Bodie Island) Shoreline Protection Project, Dare County, North Carolina, 11 June 2003.

- Monitoring Effects of Potential Tidal Range in the Cape Fear River Ecosystem Due to Deepening Wilmington Harbor North Carolina, Base Year (March 1, 2002 - February 28, 2003), N.D.

- Roanoke River Flood Project, Extended Monitoring of the Endangered Roanoke Logperch (*Percina rex*), August 2000.

- Determination of Recreation Demand for Federal Shore Protection Study Areas, Bogue Banks, Surf City and North Topsail Beach, Topsail Beach and Brunswick County Beaches, North Carolina, 15 May 2003.

c. Contract Cost Schedules (not attached)

- Generic Contract Wage Rate for Planning and Engineering, U.S. Army Corps of Engineers Wilmington District, 9 December 2003

- Generic Contract Wage Rate for Environmental Service, U.S. Army Corps of Engineers Wilmington District, 9 December 2003

5. Significant Issues: The following issues were brought up during the course of the meeting.

a. The Downstream Flow Regime and Effects on Riparian Ecosystem Team raised the question of how to fund monitoring which may be required beyond the life of the John H. Kerr 216 Feasibility Study. The question was raised if O&M funding was a proper way to fund these issues.

b. Downstream Aquatic Habitat and the Anadromous Fish Teams requested to be merged into a single team entitled Diadromous Fish and Riverine Aquatic Resources Team. This request was approved at the meeting.

c. Downstream Aquatic Habitat and the Anadromous Fish Teams requested that their study purpose be expanded to include the affects on tributaries of the Roanoke River. This request was approved at the meeting.

d. The Reservoir Resources Team inquired about the relationship between the 216 Study and any required master plan update. The Executive Committee indicated that the John H. Kerr 216 Feasibility Study should be completed prior to updating the master plan. The information collected as a result of the 216 Study will be used to update the master plan.

e. The Water Supply group has asked that their study area be expanded to include the whole basin and that water use be defined to include all including agriculture in the Roanoke Basin. This group was requested to present this proposal in writing to Bill Adams who would investigate policy issues and forward it (with his recommendations) to the Executive Committee.

f. John Morris indicated that there may need to be another team to look into modeling efforts to make sure modeling is efficiently done.

g. The Applicable Laws and Regulation Team requested that it be de-activated until later in the study process. This request was approved at the meeting.

h. The Executive Committee encouraged the teams to continue coordinating with each other and keep communications open.

6. Executive Committee Summary and Closing: Colonel Alexander indicated that he was impressed with the work done so far. He requested that the Water Supply Team submit their proposal for expanding the study area to include the entire Roanoke River Basin. Colonel Alexander cautioned that he did not want the scope of study to continue to grow. Dave Paylor indicated that he wanted the evaluations of the issues discussed by the teams to lead to practical decisions. He was very interested in learning how the collected data would aid in the operations of John H. Kerr. John Morris indicated that he felt the groups were doing well. He further observed that the teams were comprised of individuals with great talent and the necessary knowledge to contribute to the project. Colonel Alexander stated that the Executive Committee did not intend to set the meeting date for the next meeting but mentioned that it should be scheduled in late March or early April. The next meeting will be scheduled by Bill Adams based on the progress of the work the teams have completed. A date will be set, as necessary, and invitations provided to potential attendees one month in advance of the meeting. Ben Wood requested that a budget presentation and a discussion of team expectations be added to the agenda of the next meeting. Terry Brown requested that all team members keep in mind that complex issues need to be resolved with the aim of providing a simple and implementable set of instructions for reservoir operation. Jim Mead indicated he would take care of necessary changes to the list server. He pointed out that Bob Lindsey, former head of the Roanoke River Basin Association was replaced by Herald Johnson. Herald Johnson will replace Bob Lindsey on the three teams Bob Lindsey was a member. Jim Mead also indicated that the list server had problems with attachments. The list works fine for email, but one cannot put attachments in if initiating email is originated at the website itself. Richard Lewis encouraged team leaders to get notes in earlier so that more issues can be captured for meetings. Jennifer Everett ask how revision to the PMP should be submitted for approval and how final approved changes would be redistributed to group. Richard Lewis responded that changes should be submitted to Bill Adams, Lisa Hetherman and him. Bill, Lisa and Richard would staff the revised PMP and, if necessary, request action from the Executive Committee. Upon approval of the revisions the PMP would be posted on the Wilmington District John H. Kerr 216 web page and submitted to the list server for posting.

Rosemary E. Cohen
Richard H. Lewis