

Attachments to The State of North Carolina's 21st Century Plan for the Use of The Yadkin River Resources

Volume 2

September 8, 2009



Prepared by Karen A. West, Acting General Counsel, (919) 715-5579 kwest@nccommerce.com; with contributions from Stephanie G. McGarrah, Asst. Secretary for Policy, Research and Strategic Planning and Christopher Harder, Director of Economic Analysis (economic analysis sections); Allan Sandoval, GIS Specialist (maps); Asst. Secretary for Communications and External Affairs Katharine C. Neal (primary Commerce functions); Stewart Dickinson, Commerce Finance Director and Mark N. Poole, Finance Specialist (financial model).

North Carolina Dept. of Commerce | 301 North Wilmington Street | Raleigh, NC 27601-1058
Mailing Address | 4301 Mail Service Center | Raleigh, NC 27699-4301

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Attachment I

Motion for Reconsideration and Rescission of
Order, Project Nos. 2197, 2206, *In re*
Carolina Aluminum Co. (Aug. 23, 1957)

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FEDERAL POWER COMMISSION

UNITED STATES OF AMERICA
FEDERAL POWER COMMISSION

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In the Matters of :
CAROLINA ALUMINUM COMPANY : Project No. 2197
and : and
CAROLINA POWER & LIGHT COMPANY : Project No. 2206
----- X

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MOTION FOR RECONSIDERATION
AND RESCISSION OF ORDER

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<i>[Signature]</i>	
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CAROLINA ALUMINUM COMPANY (Aluminum) by its attorneys, moves that the Commission reconsider and rescind its order issued August 21, 1957 in the above-entitled proceedings, which order consolidates for the purpose of public hearing the matters involved in the application filed by Aluminum for a license for its Project No. 2197 and in the application filed by CAROLINA POWER & LIGHT COMPANY (Power & Light) for a license for its Project No. 2206.

In support of its motion Aluminum alleges:

1. The principal issue concerning the application filed by Aluminum is the term of any license which may be issued for its Project No. 2197. While the Commission's order recites that this same question is presented by Power & Light's application for license for its Project

-2-

No. 2206, Aluminum believes that the considerations compelling the issuance of a fifty-year license for Project No. 2197 are substantially different from those affecting the license term of Project No. 2206.

2. Project No. 2197, when completed, will consist of Aluminum's existing High Rock, Narrows and Falls Developments and the proposed Tuckertown Development, a new development which will accomplish full utilization of the hydroelectric potentials of the Yadkin-Peedee River in the reach controlled by Aluminum. Power & Light's Project No. 2206, on the other hand, does not contemplate any new development but simply seeks a license for two existing plants, one of which is to be improved by the installation of a new unit.

3. Aluminum's Project No. 2197 is designed to provide the hydroelectric power required for the operation of Aluminum's smelting works at Badin, North Carolina. The project is essentially an adjunct to an industrial enterprise and the fifty-year license term sought is necessary, as a matter of economics, for the continuance of the smelting operation at Badin, which is the principal industry serving that area of North Carolina. The possibility of discontinuance or diminution of Aluminum's smelting operation at Badin, by reason of issuance of a license for Project No. 2197 for a term too short to be economically

-3-

feasible for Aluminum, would entail losses to the community in taxes and employment that would be disastrous in their effect. No such considerations, it is submitted, are involved in Power & Light's application for license for Project No. 2206.

4. The evidence supporting the two applications as to the license term is, therefore, clearly unrelated and, it is submitted, no useful purpose would be served in hearing the two applications together.

5. In addition, the Commission will consider evidence as to the effect of the two projects upon the interests of interstate or foreign commerce. In a prior proceeding designated "Docket No. DI-135", evidence was presented relating to the hydraulic effect of Aluminum's existing developments on the Yadkin-Peedee River and of the anticipated effect of the development then proposed to be constructed at Tuckertown. Although Aluminum and the Staff of the Commission disagree as to the interpretation of the hydraulic evidence presented at the prior proceeding, there is little, if any, factual dispute. It has been proposed by the Staff that the record in Docket No. DI-135 be incorporated in the hearing on the application for license for Project No. 2197, which procedure would, the Staff believes, substantially shorten the hearing and expedite an early determination.

-4-

6. Since Power & Light was not a party to the proceeding in Docket No. DI-135, introduction of the record in that proceeding might well be objected to by Power & Light, insofar as it might serve as a basis for any determination the Commission might make with respect to licensing jurisdiction over Project No. 2206. Furthermore, since Power & Light's two developments are downstream from Aluminum's three existing developments and the proposed Tuckertown Development, questions will almost inevitably arise between the two applicants relating to the hydraulic effects of their separate developments which will inject new and complicated issues into the hearing if the consolidation is permitted to stand.

7. Aluminum filed its original application on May 29, 1956. As stated in the application, if a license acceptable to Aluminum is issued by the Commission, Aluminum plans to renovate and improve its smelting facilities at a cost of over \$20,000,000. It is of vital concern to Aluminum and its parent, Aluminum Company of America, that a decision with respect to Project No. 2197 be issued at an early date, since, if it should be determined that renovation and improvement of the smelting plant at Badin should be uneconomical by reason of too short a license term for Project No. 2197, other plans must be formulated,

-5-

and put into effect with dispatch, to provide for necessary expansion of smelting facilities for Aluminum Company of America.

8. For the reasons stated, Aluminum submits that consolidation of the two applications would promote difficulty and delay in that the economic issues involved in the two proceedings are wholly unrelated and the issues involving hydraulic factors would be augmented and confused by the consolidation. In the opinion of Aluminum, the consolidation would clearly not be in the public interest.

WHEREFORE, Aluminum respectfully moves that the Commission reconsider its order issued August 21, 1957 and upon reconsideration rescind said order and provide for a separate hearing on Aluminum's application for license for Project No. 2197 on October 15, 1957, all in accordance with the Commission's order of June 20, 1957.

Dated: August 23, 1957

Respectfully submitted,

LE BOEUF, LAMB & LEIBY
Attorneys for
Carolina Aluminum Company
15 Broad Street
New York 5, New York

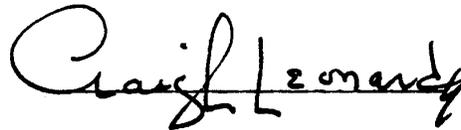
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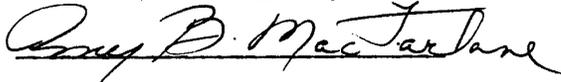
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CRAIGH LEONARD, being duly sworn, deposes
and says:

I am a partner in the law firm of LeBoeuf,
Lamb & Leiby, attorneys for Carolina Aluminum Company
in this proceeding. I have read the foregoing motion
and know the contents thereof. All of the statements
contained therein are true and correct to the best of
my knowledge and belief. I further certify that I have
served a copy of the foregoing motion upon Carolina
Power & Light Company, the applicant for Project No.
2206.



Sworn to before me this
23rd day of August, 1957.



AMY B. MAC FARLANE
Notary Public, State of New York
No. 31-7649500
Qualified in New York County
Commission expires March 30, 1958

Attachment II

Brief on Behalf of Intervenor State of
North Carolina, Project No. 2197,
Docket No. IT-5499, *In re Carolina Aluminum Co.*
Federal Power Commission (Nov. 14, 1957)

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UNITED STATES OF AMERICA
FEDERAL POWER COMMISSION

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In the Matter of : Project No. 2197
: and
CAROLINA ALUMINUM COMPANY : Docket No. IT-5499

BRIEF IN BEHALF OF INTERVENOR
STATE OF NORTH CAROLINA

GEORGE B. PATTON
Attorney General of North Carolina

RALPH MOODY
Assistant Attorney General

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UNITED STATES OF AMERICA

FEDERAL POWER COMMISSION

In the Matter of : Project No. 2197
: and
CAROLINA ALUMINUM COMPANY : Docket No. IT-5499

BRIEF IN BEHALF OF INTERVENOR

STATE OF NORTH CAROLINA

S T A T E M E N T

North Carolina will not attempt to restate the history of these applications since these particular steps are all a matter of record in the files of the Commission and no doubt will be reviewed in the briefs filed in behalf of the applicants. Carolina Aluminum Company will be referred to as: Carolina Aluminum; and Carolina Power & Light Company will be referred to as: Carolina Power. The State of North Carolina will hereafter be referred to as: North Carolina.

The Commission allowed North Carolina to intervene pursuant to its order issued on October 31, 1957, which confined the intervention of this State to "asserted rights and interests specifically set forth in the petition for leave to intervene." North Carolina, however, by virtue of the order of the Commission, is not recognized as a party that might be aggrieved because of any order or orders of the Commission in the proceeding. North Carolina supports the applications of Carolina Aluminum and Carolina Power, and it is the position of the State that these applicants should be granted a

50-year license for their projects dating from the date of issuance. It is the position of North Carolina that there is no conflict of interests between Carolina Aluminum and Carolina Power and no conflict of interests between public and private power, and the State is therefore not supporting one set of applicants as opposed to the interests of other citizens and applicants residing within the State.

A R G U M E N T

I.

The position of intervenor, Miss Eliza Doby.

North Carolina refers to the argument of the intervenor, Miss Eliza Doby (Transcript Volume 1, page 30 et seq). This intervenor is supported by her sister, Miss Julia Doby, whose statement appears in Volume 1, page 53 of the Transcript. These ladies are particularly interested in the matter because they own land located in the reservoir area of the Tuckertown project which will be covered with water if the project is developed. These are the same arguments that are always made by persons who will to some extent suffer some inconvenience because of the location of their property and when their interest is compelled to yield to the overall and larger interests of industry, commerce and the community at large. It goes without saying that these people will all be compensated for their property and holdings within this area and, in case of disputes that cannot be amicably settled, a jury of their neighbors will determine the value of their property.

It is submitted that the new-found love of these ladies for conservation of natural resources and for the retention of all things in their natural state springs from the fact that they own land within the contemplated reservoir of the Tuckertown project. It would appear that these ladies love a controversy, and, as authority for this statement, see BROWN v. DOBY, 244 N. C. 746.

II.

Economic and technical arguments in support of application.

North Carolina does not enter into the economic and technical arguments in support of the applicants' positions. The transcript of evidence produced in behalf of the applicants, as well as the exhibits, have been reviewed, and North Carolina is of the opinion that the opinions, both economic and technical, as therein stated, are sound and correct. From previous experience with these companies, North Carolina has confidence in the integrity and honesty of the management of these companies and believes that the statements and opinions of the technical staffs of the applicants can be relied upon, and North Carolina urges upon the Commission that their views be accepted. So far as this phase of the case is concerned, North Carolina adopts the evidence of the applicants, and exhibits filed in support of same.

III.

The interests of the State of North Carolina.

North Carolina supports the position of the applicants for the following reasons:

(1) The State for many years has fostered the development of its resources by the private enterprise method and believes that the results have been good. Carolina Power is one of the major public service companies of the State engaged in the generation, sale and distribution of electric energy, and serves almost one-half of the area of the State, as well as one-fourth of the area of South Carolina, and this service includes 400,000 customers of various categories, such as residential, commercial, textile and industrial. Carolina Aluminum is an affiliate of a large organization and has been in business in Stanly County for approximately 40 years. Companies such as these take root in a State and weave themselves into the economic life and well-being of the people and their industries. These larger units become almost institutions of the State and the economic status and well-being of many families depend upon their regularity of operation and a progressive modernization of plants and installations.

(2) The Yadkin River is one of 16 major rivers in the State. It rises on the eastern slopes of the Blue Ridge Mountains, crosses the piedmont plateau and traverses the coastal plain, reaching the ocean near Georgetown, South Carolina. As far as the mouth of Uwharrie River, it is known as the Yadkin, and below the mouth of the Uwharrie, it is

known as the Pee Dee. There are five dams within a reach of about 85 miles. The basin is composed of 157 townships, 39 of which are partially within the basin, and 63 towns and cities. The river flows through what might be called the principal industrial region of the State.

(3) The dams involved are the Blewett Falls Plant on the Pee Dee, and Norwood or Tillery Plant, Yadkin Falls Plant, the Narrows Plant, and High Rock Plant. The Blewett Falls installations and the Tillery installations are operated by Carolina Power - the other operations are operated by Carolina Aluminum. The State of North Carolina prefers that its portion of the river be developed by these companies.

(4) There are no conflicting applications on the part of other firms or corporations and, so far as North Carolina knows, all appropriate federal agencies have been notified, and it is not believed that there is any substantial opposition from these quarters, and the office of the Chief of Engineers of the Department of the Army says that the proposed developments would not affect the interest of navigation in the foreseeable future. The North Carolina Wildlife Commission has some contentions as to access areas, but, for the purpose of this hearing, it is not necessary for North Carolina to now take the position, since the Commission has the authority, upon appropriate notice, to reopen and to re-examine this question.

(5) So far as the Tuckertown development is concerned,

an anticipated expenditure of approximately \$37,000,000.00 is involved. North Carolina wishes this expenditure made within its borders and wishes its people to have the benefit of this employment, and the same position is taken with reference to the proposed expansion of Carolina Power.

(6) The economic effect of a license for 40 years on the constructed projects and 50 years on the Tuckertown development really reduces the license period to 37 years from the viewpoint of utilization of a synchronized and integrated project since it will require three years to construct Tuckertown and this period is valueless for integrated purposes. The object is to provide a source of power for the Badin Smelting Works. In order to become competitive in the aluminum industry the Badin Smelting Works requires extensive and costly modernization and the additional electric power that can be furnished from the Tuckertown development. Because of increased costs the amount of \$37,000,000.00 will be necessary for the modernization and construction of the Tuckertown development. This expenditure is justified only on the basis of a 50-year license period. The reduced license term for the three existing developments would prohibit coordinated operation for the balance of the license term of the Tuckertown development.

(7) The Commission is required to issue a license for a project that will be best adapted to a comprehensive plan for the improvement or development of a waterway. The project

on a 50-year license basis would permit the production of additional aluminum for defense and ordinary commercial purposes with attendant benefits in taxes and employment arising from additional industrial activity. The completion of the Yadkin project and modernization of the Badin Smelting Works are interdependent. The Company cannot go forward with modernization unless assured of additional power from Tuckertown.

(8) Carolina Aluminum is the largest employer of labor and the largest taxpayer in the Badin area, and its ability to continue in business is in the public interest. Carolina Aluminum employs at Badin about 1,000 persons and about 75% of these persons reside in surrounding portions of Badin Township and Stanly County. The remainder reside on farms in five adjacent counties within a radius of 30 miles. The annual payroll is approximately \$5,000,000.00 and is one-third of the total non-farm income in Stanly County. About 17% of the employees at Badin have had 25 years or more of continued service with the Company. The Company pays approximately 85% of the taxes levied in Badin Township and more than 10% of the taxes levied in Stanly County. At the present time the productive capacity is about 68,000,000 pounds per year, and it is estimated that the completion of this project will result in a production of 105,000,000 pounds, but this will still be one of the smallest smelting units in the aluminum industry in the nation. The Company would have to

seriously consider whether or not it would be best to invest this \$37,000,000.00 in the expansion of one of Alcoa's larger and newer plants. A license term of less than 50 years would have an adverse effect upon the financing of plant expansion.

(9) Carolina Power and Light has an annual payroll in excess of \$9,000,000.00, and it pays to the State of North Carolina approximately \$5,645,837.00 in taxes. All that we have said in behalf of Carolina Aluminum can just as well be stated in behalf of Carolina Power, except that it should be stated that Carolina Power is a public service company regulated by the North Carolina Utilities Commission, and its expansion and modernization is closely related to the public service status of the State.

(10) The State is interested in increased employment that will result from these expenditures, and it is also interested in its citizens who are employees who have accumulated retirement and pension rights because of many years of service, and it does not wish these rights to be curtailed in any manner.

In closing, North Carolina again emphasizes that on this river no question of discrimination as to the time of the length of license arises since these applicants are developing the river in a cooperative manner. North Carolina is also supported in its position as to Carolina Aluminum by its Senators, the Congressman from the District involved,

ATTACHMENT II

and other Congressmen, as well as Chambers of Commerce and local officials. North Carolina, therefore, requests the Commission to approve the applications of Carolina Aluminum and Carolina Power for the full 50-year term from the date of issuance and without retroactive effect on the plants and installations already in existence.

Respectfully submitted,

George B. Patton
GEORGE B. PATTON
Attorney General of North Carolina
Ralph Moody
RALPH MOODY
Assistant Attorney General

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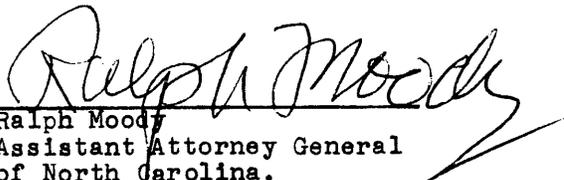
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In the Matter of	:	
CAROLINA ALUMINUM COMPANY	:	Project No. 2197
and	:	
CAROLINA POWER AND LIGHT COMPANY	:	Project No. 2206

 PROOF OF SERVICE OF BRIEF

I, Ralph Moody, Assistant Attorney General of North Carolina, do hereby certify that I have this day served copy of brief by mail on Mr. Charles Rouse, Attorney for Carolina Power and Light Company, Raleigh, North Carolina; Mr. Randall J. LeBoeuf, Jr., of 15 Broad Street, New York 5, New York, Attorney for Carolina Aluminum Company; Miss Eliza Doby, Box 143, Albemarle, North Carolina, intervenor; Miss Julia Doby, Albemarle, North Carolina, intervenor.

Witness whereof I hereunto set my hand on this 13th day of November 1957.


 Ralph Moody
 Assistant Attorney General
 of North Carolina.

Attachment III

North Carolina
Drought Management
Advisory Council
Activities Report - 2008
Oct. 1, 2008 (Revised Dec. 18, 2008)
North Carolina Division of Water Resources
Department of Environment and Natural Resources

North Carolina
Drought Management Advisory
Council
Activities Report - 2008

Oct. 1, 2008 (Revised Dec. 18, 2008)
North Carolina Division of Water Resources
Department of Environment and Natural Resources

North Carolina Drought Management Advisory Council; Annual Report – 2008

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North Carolina Drought Management Advisory Council, Annual Report - 2008

Introduction

This is the fourth Annual Report of the North Carolina Drought Management Advisory Council on the implementation of North Carolina General Statute 143-355.1, which created the council in 2003. The General Assembly amended the statute in 2004 adding a new section requiring an annual report: “(g) (2003-387, s. 2; 2004-195, s. 2.5)” The Council shall report on the implementation of this section to the Secretary, the Governor, and the Environmental Review Commission no later than Oct. 1 each year was added. The report shall include a review of drought advisories issued by the council and any recommendations to improve coordination among local, state, and federal agencies, public water systems and water users to improve the management and mitigation of the harmful effects of drought.

Drought Management Advisory Council

The Drought Monitoring Council was an interagency coordination and information exchange body created in 1992. The council did a credible job of monitoring and coordinating drought responses in 2002 and increased public awareness of its functions and effectiveness. The General Assembly recognized the Drought Monitoring Council’s leadership and performance by giving it an official statutory base and by changing its name to Drought Management Advisory Council (DMAC), reflecting the broader role of the council, which goes beyond monitoring drought conditions.

North Carolina General Statute 143.355.1., ratified 17-July 2003, assigned the DMAC an important new role, the need for which became evident in 2002. A number of local governments indicated that it would be helpful to have official, objective drought status advisories, to give them a reliable basis for their management responses. The new statute assigned that role to the DMAC and specifies the drought advisories to be based on technical data and crafted to fit varying conditions in different parts of the state. This process avoids the problems that some states have experienced in declaring drought warnings statewide, when conditions did not warrant it in all parts of the state.

Section 1 of this act also makes drought response provisions mandatory in local government water supply plans and extends this planning responsibility to all community water systems that serve 1,000 or more connections or 3,000 or more individuals.

The intent of the statute was for the DMAC to continue with essentially the same membership and functions that the Drought Monitoring Council previously exercised, but with new statutory authority and a new responsibility for providing a system of drought advisories when needed. Most importantly, the operation of the DMAC continues the same role as the Drought Monitoring Council did in support of the North Carolina Emergency Operations Plan.

Drought Legislation, Section 16 of Session Law 2008-143

An act to improve drought preparedness and response in North Carolina as recommended by the Environmental Review Commission was signed into law by Gov. Mike Easley on July 31, 2008. Section 16 of SL 2008-143 called for minor changes in the law (2003) establishing the Drought Management Advisory Council. The law now requires that appointees to the council have expertise in water resource evaluation and management related to drought and drought

North Carolina Drought Management Advisory Council, Annual Report - 2008

impacts. It removes language that previously allowed DENR to expand the membership of the council. DENR can invite representatives of other organizations, including water systems regulated by the NC Utilities Commission, to “participate in the work of the Council.” The DMAC will provide consistent and accurate information on drought conditions in the state to the U.S. Drought Monitor, the Environmental Management Commission, the secretary of the Department of Environment and Natural Resources, the Environmental Review Commission, and the public.

In the matter of DMAC issuing drought classification and response actions by county, SL 2008-143 requires that if the U.S. Drought Monitor of North Carolina shows more than one drought designation in a county, the drought classification for the county is the highest drought designation that applies to at least twenty five percent (25%) of the land area of the county. Drought response actions are based on the drought classification for each county within a drought area that is listed each Thursday on the DMAC Web page (<www.ncdrought.org>).

The law states that the council may recommend to the secretary a drought designation for a county that is different from the designation based on the U.S. Drought Monitor of North Carolina if the depiction of drought does not accurately reflect localized conditions. In recommending a drought designation that differs from the U.S. Drought Monitor designation, the council will consider stream flows, ground water levels, the amount of water stored in reservoirs, weather forecasts, the time of year and other factors that are relevant to determining the location and severity of drought conditions.

Drought Assessment Oct. 2007 -- Oct. 2008

Since the last DMAC Annual Report (#3) in 2007, drought continued to persist and expand in North Carolina. The drought in 2007 was the worst for North Carolina since record keeping began in North Carolina in 1895. In 2007, drought conditions in the state went from normal to record drought in less than year

The year 2007 was recorded as the driest year by the National Weather Service in more than 100 years in North Carolina and was #1 in the 2007 statewide temperature ranks (Figure 1). Records were set in many areas for number of days of low humidity and number of days with temperatures above 90 F (Figure 2).

Forest landowners and many residents in wildfire-prone areas were impacted by the drought. The lack of rainfall left pine straw and other vegetation crispy and dry and fueled far more wildfires than we typically average. As a result, local firefighters and the Division of Forest Resources fought 30 percent more wildfires than North Carolina’s 5,000 wildfire-a-year average. The 7,200 wildfires in 2007 burned more acreage than had burned in any year during the last two decades.

North Carolina Drought Management Advisory Council, Annual Report - 2008

Figure 1 - January-December 2007 Statewide Temp Ranks

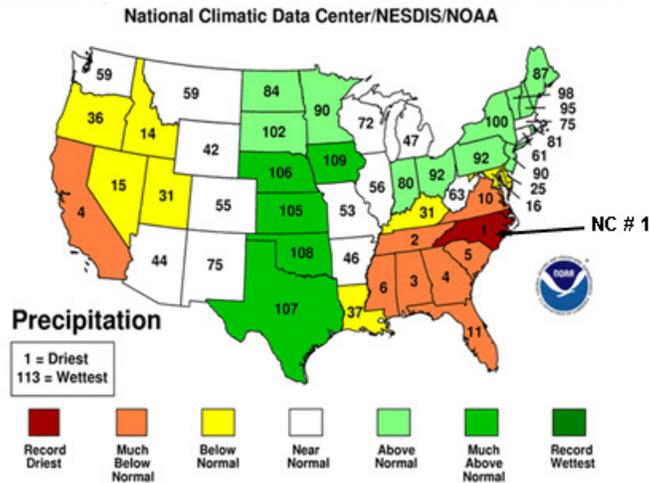
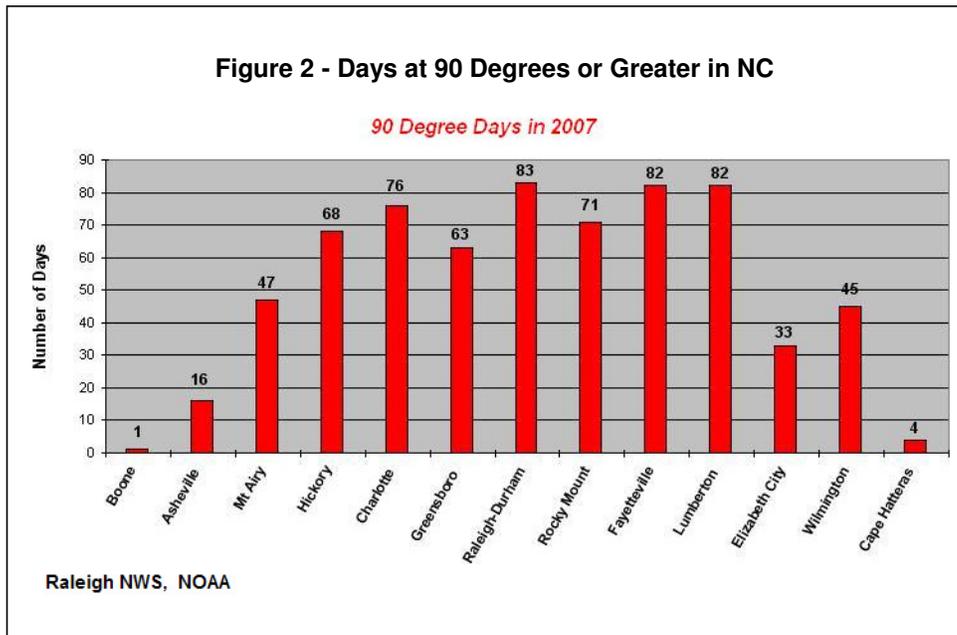


Figure 2 - Days at 90 Degrees or Greater in NC



The NC Dept of Agriculture and Consumers Services (NCDA) have worked to help producers with drought related issues during the fall of 2007 through the year of 2008. Many livestock farmers took advantage the NCDA Hay Relief effort that helped get much needed forage to livestock operations in the western part of the state. As 2008 came around, NCDA efforts

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focused on what farmers could do to minimize their water usage. NCDA staff worked in cooperation with the Rural Center and the Soil & Water Conservation Districts to help farmers clean out ponds, dig new wells, and conserve more water in livestock operations. Staff is also a part of the many legislative activities surrounding water usage and drought management. USDA in partnership with NCDA&CS is now conducting a water usage survey to calculate the water usage by agriculture in the state so that the legislature can make a wise decision on drought management legislation and how it could affect NCDA agricultural economy.

Soil moisture was not a grave problem during the planting season of 2008. However the lack of rains through out the spring and summer months stunted or prohibited crop growth in some areas. Some areas had record low yields while some other areas seemed to make it through the drought because of isolated showers which doused fields at the right times of the growing season.

At one point, as many as 30 cities and towns were forced to confront the realization that they may run out of water or have to ration water. Many of those were within 100 days of running out of water. At one point, as many as 30 cities and towns were forced to confront the realization that they may run out of water or have to ration water. Many of those were within 100 days of running out of water.

In Siler City, officials had to ship in water supplies by truck. Rocky Mount sought and received the state's permission to extend a pipeline to Wilson to keep from running out of water.

In many ways, it was fortunate that in North Carolina we had confronted a serious drought before – just five years earlier. In 2002, we experienced what we thought was the drought to end all droughts.

In October, 2007 Gov. Mike Easley activated the State Emergency React Team at a Level 3 (SERT) of the North Carolina Emergency Operations Plan (NCEOP). In addition the Agriculture Task Force, Economic Impact Task Force, Energy Loss Task Force, and Health Task Force were activated to join in with the Water Sources Task Force that was activated in August 2007. The task forces are part of the Drought Assessment and Response Plan, NCEOP.

The U.S. Drought Monitor of North Carolina on 25-Dec 2007 (<www.ncdrought.org>) the reference for drought classifications and response actions, showed all 100 counties in drought; 78 counties with exceptional drought (D4) conditions with the remaining 22 counties with extreme (D3) or severe (D2) drought. The drought monitor labels drought by intensity, with D1 being the least intense and D4 as being the most intense. D0 signifies no drought but is a watch area either drying out and possibly heading for drought, or recovering from drought but not yet back to normal, suffering long-term impacts such as low reservoir levels or minimum streamflow for the time of year.

The Technical Drought Advisory Team, a sub group of the council participates each Tuesday in a telecom to gather and feed information to the National Drought Monitor author about local drought conditions in North Carolina that are valid on 8 a.m. EST each Tuesday. The team includes DMAC technical experts and National Weather Service offices located in

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Tennessee, South Carolina, and Virginia. The Drought Monitor is published on Thursday morning of each week.

Council Meetings

The DMAC chairman called for meetings of the council on 20-Dec 2007, Mar. 6, 29-May, and 14-Aug 2008 in Raleigh. Average attendance was about 50 representatives including representatives from the Office of the Governor. The total number of people in attendance at the 20-Dec DMAC meeting was approximately 90 people, including Gov. Mike Easley and representatives from the media. Many of the meetings were available on web-casting.

Items on the meeting agenda included assessment and forecast reports about the seasonal drought outlook and the impact of drought on streamflow and ground water levels, lake and reservoir levels, agriculture, forestry and public water systems and special reports from the Office of the Governor.

Press Releases

Press releases were sent out after each DMAC meeting. More than 20 news releases were issued concerning drought conditions and current drought advisories.

On-Going Drought Assessment 2007-2008

1. The technical drought advisory team of the DMAC continued to hold a weekly telecom on each Tuesday to assess drought conditions. Information they pulled together was included in the weekly update reported to the author of the U.S. Drought Monitor that was released to the public each Thursday.
2. The Water Sources Task Force as part of the N.C. Emergency Response Plan was activated by the DMAC at the August 2007 council meeting. They joined the DMAC technical drought advisory team in the weekly telecom and worked with the Public Water Supply Section (PWSS) to identify and monitor the status of water systems considered to be the most vulnerable to drought.
3. The DMAC Web site, www.ncdrought.org provided real-time data and the reference for drought classifications and response actions each week for water users in the state.
4. The DMAC Web site allows users to search a statewide database of local water systems and weekly water use reports. This easy-to-use Web site provides information on total water use in local systems as well as the percentage change in water consumption. About half of the systems we track are reporting this information.
5. At the river basin level, weekly conference calls to coordinate releases from reservoirs, hydroelectric power generation, etc. to conserve as much water as possible and to balance upstream and downstream needs. The Corps of Engineers and the utility companies, owners of the biggest reservoirs, are all working together in this effort.
6. DENR personnel performed weekly, then bi-weekly, drought monitoring in the Neuse, Tar and Cape Fear river basins, beginning in early October 2007. Physical data and

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field observations of the river conditions were collected and analyzed and these results were shared with the Army Corps of Engineers to assist in decision-making regarding the water releases from Jordan Lake and Falls Lake. Drought monitoring was also conducted in the Tar River, beginning in June 2007.

7. DENR personnel performed reconnaissance visits to about 50 sites in the Cape Fear River Basin. Based on these visits, much of the Cape Fear Basin was rescheduled for water quality sampling in 2009.
8. A fish community drought recovery study was initiated in March 2008 for three sites that had either no water or no flow in December 2007. These sites will be sampled monthly until the fish community returns to pre-drought conditions.
9. Additional sampling was conducted in the Little River in Durham and in Mill Creek in Moore County in January 2008 to better document impacts at sites where flow had ceased.
10. DENR staff and personnel from the U.S. Geological Survey monitored hundreds of surface water gauges and 46 groundwater wells to continually measure and assess drought conditions throughout 2007 and 2008.

Drought Response Activities

1. The Water Sources Task Force identified and monitored weekly 102 public water supply systems that area considered to be the most vulnerable to drought. Reference to Tier definitions and a Web site showing status of Tier-level systems.

Tier Definitions

- **Tier-1:** systems are considered to be in a crisis mode (or) have less than 100 days of present supply remaining (or) are likely to be in a crisis if conditions persist because they lack interconnections for emergency water supply.
- **Tier-2:** systems are not in crisis now but could be within the next few months.
- **Tier-3:** systems are not yet in a vulnerable position but are subject to change as the drought continues.

This ranking is a subjective assessment based on best professional judgment and experience of PWSS field staff coupled usually with recent communication with the systems. Systems remain at their highest Tier-level until a resource is online (operating) that will provide an emergency water supply to minimize the system's vulnerability to drought

http://www.ncwater.org/Drought_Monitoring/reporting/weekstatust123.php

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2. League of Municipalities made arrangements for DENR and the League staff to have on-site Meetings with (33) Tier-1 and Tier-2 water system officials. .
3. The Water Sources Task Force and PWSS had meetings with all of the Tier-1 systems to help in identifying a near-term water supply solution and funding to obtain an emergency supply of potable water.
4. The North Carolina Emergency Operations Drought and Response Plan were activated at a Level 3 on 25-Oct, 2007, by Gov. Mike Easley. At a Level 3, the NCEO Drought and Response Plan would be carried out with the cooperation of the Division of Emergency Management, Department of Environment and Natural Resources and the DMAC.
5. The remaining task forces were activated in October 2007 and are designed to assess the range of needs that can result from drought. The task forces for Agriculture, Economic Impact, Energy Loss, and Health and the Water Sources Task Force met bi-weekly and made assessment reports of drought impacts and conditions.
6. In fall of 2007, Rocky Mount and Siler City reported to the DMAC that they were having a water supply emergency. Raw water from Jordan Lake, 200,000 + gallons per day, had to be shipped in by truck to the Siler City water treatment plant to maintain an adequate finished water supply to keep chicken processors in operation. The chicken processing operations are a major part of the Chatham County economy.

Rocky Mount sought and received the state's permission to extend a pipeline to Wilson to keep from running out of water. Emergency assistance was provided by DENR, the U.S. Army Corps of Engineers, the Water Sources Task Force, and the N.C. Rural Center with fast-track permitting approvals and crisis drought funding. Additional water was obtained through interconnections between Rocky Mount and Wilson, Goldsboro and Wayne County and Siler City's potable water interconnection with Sanford.
7. DENR continue to track and be in regular contact with water systems most vulnerable to drought and identify their needs and resources, particularly in regard to connection to alternative or backup water sources.
8. On 22-Oct 2007, Gov. Easley requested that all community water systems reduce water-use consumption and start weekly water use reporting to DENR.
<http://www.ncwater.org/Drought_Monitoring/reduction/weeklyreport.php>
9. Regional drought meetings were held in Raleigh, Greensboro and Asheville for local government officials and major water users. The meetings addressed current and future climate and water resource impacts, water conservation, water supply system efficiencies, rate structures and case studies from local water systems.
10. NC Utilities Commission issued an order in November 2007 requiring all of their water utilities to notify customers they must discontinue outdoor water use.

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11. The Division of Pollution Prevention and Environmental Assistance (DPPEA) worked with local water systems to train their business and industries on water conservation approaches and sources of further assistance/information.
12. DPPEA conducted water conservation audits at some major water users or critically impacted facilities.
13. At the request of and in cooperation with the Department of Commerce, developed a brochure and pay envelope stuffer that companies can provide their employees on water conservation at home.
14. DPPEA started contacting home improvement companies (i.e., Home Depot and Lowes) about highlighting and expanding the number of water conservation devices and fixtures in their stores and on their Web sites.
15. Gov. Mike Easley brought 30 of the state's worst hit water systems together on Jan. 14, 2008 in Greensboro to review the status of these systems. Those at the conference reviewed what their plans are if the drought deepens and made sure they have reserve sources of water available. In addition, those water systems that needed assistance for water audits, funding for drought, and related water needs from the state were able to make sure they got the help they needed to have effective emergency plans in place.
16. Tier 1 systems met with Infrastructure Funding Agencies in Valdese that was called by the N.C. Rural Center on Jan 29, 2008.
17. The Division of Water Resources (DWR) reported 30 priority systems were identified for water audits. Twenty water systems requested help conducting water audits of their systems. DWR has obtained services of five engineering firms to conduct the water audits and report their findings to the DWR. Studies began in April, 2008, and 13 have been completed.
18. The NC Utilities Commission order issued in November 2007 requiring all of their utilities to notify customers they must discontinue outdoor water use was modified on May 23, 2008. These restrictions were modified depending on the current drought classification and advisory for their county as shown on DMAC Web page (www.ncdrought.org).
19. DPPEA is working successfully to provide technical help to more than 70 North Carolina organizations including industries, businesses and government agencies to identify ways to reduce and conserve water.
20. The NC Division of Forest Resources initiated a statewide ban on open burning and cancelled all burning permits 14-Feb 2008. The burn ban was lifted on 1-Mar, due to the rains at that time across the state.

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21. State water resource experts have met several times since 25-Feb with water users of the Neuse River basin to discuss the future water usage plans in the basin, which includes a number of public water supply systems including Raleigh and New Bern.
22. On 11-Mar, Gov. Mike Easley announced a three-part legislative package to modernize North Carolina's public water systems, mandate water conservation and efficiency and upgrade the response to water emergencies. The governor also unveiled a new Web site, www.savewaternc.org, aimed at continued water conservation.
23. DWR sponsored a tabletop drought exercise in May to test the abilities of federal, state and local participants to respond to the crisis brought on by an increasingly severe drought. A "Drought Toolbox" was one product of the exercise and a follow-up workshop was conducted for systems in the Neuse River Basin.
24. On 3-Oct 2008, Gov. Mike Easley asked the U.S. Department of Agriculture to declare 59 of North Carolina's 100 counties disaster areas because of drought-related crop losses. Agriculture department loss assessment reports show excessive agricultural losses for at least one major crop, and significant losses on corn, soybeans, hay, and pasture and other forage crops.
25. Water systems continue to respond favorably to requests by Gov. Mike Easley to call for water conservation and water use restrictions and to work to reduce year-round water use. Millions of North Carolina residents, or most of those who receive water from systems the state tracks, are subject to voluntary or mandatory water use restrictions.
26. PWSS Regional offices and DWR staff continue to stay in touch with Tier 1 systems not taking action to help alleviate drought at this time to help in identifying a near-term water supply solution and funding to obtain an emergency supply of potable water.

Critical Local Government Drought Response Projects:

Introduction: The following table summarizes one of DENR's and Drought Management Advisory Council most critical, ongoing drought related activities. In response to the 2007 drought, DENR Staff identified those North Carolina communities that are most at-risk of "running out of water" and then identified the most practical short-term projects that could supply an expedient, supplemental water source to these "at-risk" communities. In order to facilitate the implementation of these supplemental water supply projects, DENR staff working with the League of Municipalities, coordinated and arranged meetings between these identified communities and agencies that could potentially fund their proposed water supply projects. DENR continues to monitor, provide technical assistance and assist with the ultimate completion of these much-needed projects.

Note: The following abbreviations are used in this table to designate the various funding sources:

NCRC – N.C. Rural Center

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PWSS – DENR Public Water Supply Section State Revolving Fund

ARC – Appalachian Regional Commission

USDA – U.S. Dept of Agriculture

<i>Project Description</i>	<i>Tier Rating</i>	<i>Potential Funding</i>	<i>Comments</i>
Bessemer City – Interconnection with Gastonia	1	\$100K funding in 2009 Governor’s Budget.	Bessemer City could not provide the additional funding needed to go along with the State funds.
Boone – ASU Interconnection	1	\$168K from NCRC.	Agreement for interconnection has been approved by both Boone and ASU.
Boone – New intake on South Fork of the New River.	1	Primary funding for this project is expected from USDA.	Intake site has not yet been secured. This should be resolved in May 2009.
Boone – Blowing Rock Interconnection	1	\$1.5M pending approval from NCRC. Application for \$2.2M to PWSS. \$300K from ARC.	Environmental impact analysis will be required.
Hendersonville – Water main with temp pump station on French Broad.	1	\$500K from NCRC. Application for \$2.5M expected to PWSS.	Funds requested from Army Corps not available until 2009. Intake area will need to be reclassified by NC DWQ.
Lenoir – New raw water intake and pump station,	1	\$500K from NCRC. \$5.8M application undergoing review at PWSS. \$300K from ARC.	NCRC approved. Plans for permanent intake are currently in the design phase.
Mars Hill – Weaverville Interconnection	1	\$500K from NCRC. Application for \$600K to NC Commerce. \$300K from ARC. USDA low interest loan for \$600K.	Mars Hill and Weaverville have both passed resolutions in support of this project.
Marshall – 2 new wells, storage tank, & line repair.	1	NC Commerce reviewing application for \$600K. \$300K from ARC. Low interest loan for \$750K to USDA	Funding approved; in design phase project completion 2009.
Robbinsville – 3 new wells & piping.	1	\$193K from NCRC. Possible funding in 2009 Governor’s Budget.	Funding received from NCRC, test wells installed early 2009.

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<i>Project Description</i>	<i>Tier Rating</i>	<i>Potential Funding</i>	<i>Comments</i>
Regional interconnect – Hendersonville, Saluda, Tryon, & Columbus	1	\$1.73M from NCRC. \$1.43M application expected to PWSS. \$300K from ARC.	Columbus, Saluda, and Tryon have all passed resolutions of support.
Valdese – Temp water lines to Lake Rhodhiss.	1	\$40K from NCRC. \$80K from ARC.	In place 2008
Rocky Mount – interconnect with Wilson	1	\$500K from NCRC	Operational early 2008
Siler City – interconnect with Sanford		\$500K from NCRC	Operational 2007
North Wilkesboro – dredging intake pool & Wilkesboro connect	1	\$259K from NCRC approved for dredging, application for Wilkesboro connect	Dredging to be completed in 2008.
Yadkinville – Possible interconnection with Davie County	1	\$100K funding in 2009 Governor’s Budget.	Yadkinville could not provide the additional funding needed to go along with the State funds.
King – Forsyth County interconnect.	2	\$100K funding in 2009 Governor’s Budget.	King to submit application to DENR

Water Reclamation and Reuse Activities:

- DENR personnel developed an expedited permitting process in order to respond to the high level of interest from municipalities and industries in using reclaimed water for non-potable water uses. Additional information on the use of reclaimed water can be found on the Division of Water Quality’s Web site at:

<http://h2o.enr.state.nc.us/admin/pubinfo/ReclaimedWaterInfoOct07.htm>

- DENR personnel are engaged in rule revisions that will provide even greater uses for reclaimed water in North Carolina in the future.
- In order to facilitate and encourage the collection and reuse of rain water, DENR personnel are developing a policy that will provide stormwater control and treatment credit for the harvesting and reuse of rain water. This policy is expected to become effective in 2009.

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- DENR staff created a fact sheet on the use of gray water in an effort to address residents' questions concerning the residential use of gray water.

Informational, Outreach, and Educational Activities:

- DENR funded a production company to develop two drought response public service announcements for broadcast television stations across the state. The total cost for these public service announcements was approximately \$100,000.
 - DENR Staff produced and delivered a wide range of educational and water conservation materials for educators, children, and adults. These materials were distributed to a broad audience all across the State.
 - DENR Personnel developed memorandums regarding the amount of allowable reduction of water usage in food service and lodging establishments. These memorandums have been distributed to county health departments.
 - DENR Staff have participated in a variety of drought-related symposiums, outreach events, conferences and forums that are too numerous to list here.
 - DENR Staff have provided numerous drought reports and updates to the news media, concerned citizens, the General Assembly, and the Environmental Management Commission.
 - DPPEA is working successfully to provide technical help to more than 70 North Carolina organizations including industries, businesses and government agencies to identify ways to reduce and conserve water.
1. On 11-Mar, Gov. Mike Easley announced a three-part legislative package to modernize North Carolina's public water systems, mandate water conservation and efficiency and upgrade the response to water emergencies. The governor also unveiled a new Water Conservation Web site <http://www.savewaternc.org/> providing information for citizens, water systems, state agencies, businesses, and industries. The Web site is a joint effort between the state departments of Environment and Natural Resources and Crime Control and Public Safety and the Governor's Office.
 2. DWR sponsored a tabletop drought exercise in May to test the abilities of federal, state and local participants to respond to the crisis brought on by an increasingly severe drought. A "Drought Toolbox" was one product of the exercise and a follow-up workshop was conducted for systems in the Neuse River Basin.
 3. On 3-Oct 2008, Gov. Mike Easley asked the U.S. Department of Agriculture to declare 59 of North Carolina's 100 counties disaster areas because of drought-related crop losses. Agriculture department loss assessment reports show excessive agricultural losses for at least one major crop, and significant losses on corn, soybeans, hay, and pasture and other forage crops.

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4. Water systems continue to respond favorably to requests by Gov. Mike Easley to call for water conservation and water use restrictions and to work to reduce year-round water use. Millions of North Carolina residents, or most of those who receive water from systems the state tracks, are subject to voluntary or mandatory water use restrictions.
5. PWSS Regional offices and DWR staff continue to stay in touch with Tier-1 systems not taking action to help alleviate drought and encouraging in identifying a near-term water supply solution and funding obtaining an emergency supply of potable water.

River Basin Management

The DMAC and the Water Sources Task Force is participating in weekly conference calls with managers of major reservoirs, including the Corps of Engineers private power companies, and the Tennessee Valley Authority, to review specific drought conditions in each basin and discuss changes needed in reservoir management to conserve stored water. These conference calls have resulted in significant adjustments in reservoir release policies, with a resulting increase in the conservation of stored water and a reduction in our risk of depleting reservoirs. These changes are made with the participation of the Division of Water Quality, the U.S. Army Corps of Engineers, and the Wildlife Resources Commission. River basins with on-going telecons include the Neuse, Catawba, Roanoke, Yadkin, Cape Fear and Tennessee Valley.

In September 2008 the Division of Water Resources sent a message to public water system managers statewide, reminding them of the necessity to monitor water supply and demand, and the requirement to mandate water use restrictions as indicated by their local water supply plans. Also, letters were sent to golf courses concerning water use registration requirements. These messages followed a press release by Gov. Easley asking for local water conservation actions to avoid a state government mandate for mandatory water use restrictions.

The USGS reported record low water levels in May for North Carolina rivers in Western North Carolina and in August 2007 reported the lowest streamflows in more than 110 years for some North Carolina rivers as drought conditions worsened.

DMAC Web Site

The DMAC Web site <www.ncdrought.org> presents a picture of the U.S. Drought Monitor (USDM) for North Carolina that is updated and released on Thursday of each week. The drought conditions reported are valid for 8 a.m. EST for the prior Tuesday of the week.

Drought advisories are based on the weekly USDM for all water users located in or dependent on water resources in the counties of the state experiencing drought conditions. The U.S. Drought Monitor establishes a baseline for hydrological and agricultural drought conditions. North Carolina is fortunate because it has the DMAC to work closely with the U.S. Drought Monitor to adjust designations weekly to better reflect North Carolina's local conditions. The USDM is defined as the official drought map nationally and for North Carolina.

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The DMAC Web site also has a number of tabs that link to available resources of information, some with real-time data about [current conditions](#), [news](#), the [DMAC](#), [drought contacts](#), [information](#) and [drought education](#), [drought monitor archives](#), and [water conservation tips](#).

Drought Classification and Status of Water Conservation

The DMAC issues official drought advisories based on drought classification to provide all water users with a reliable basis for managing and calling for drought response actions in their region. The list of counties under drought advisories is updated each week (www.ncdrought.org) to reflect local drought classifications on the weekly U.S. Drought Monitor for North Carolina.

The USDM-NC 24-Apr 2007 released showed severe drought conditions returning to the southern mountains with exceptional drought returning to North Carolina during the first week of October 2007.

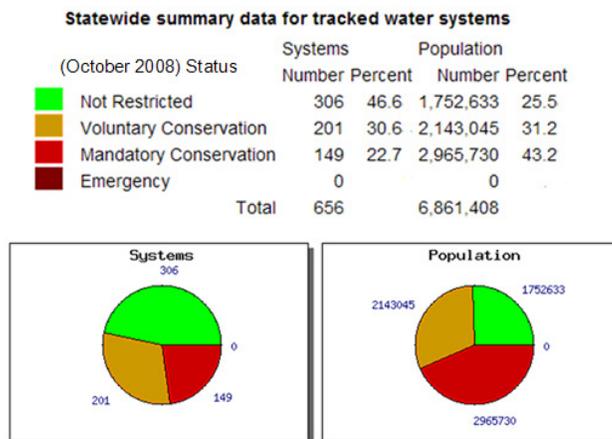
From August 2007, to February 2008, the entire state experienced some level of drought classification. Figure 3 summarizes the percent of the state each week under drought advisories as issued by the DMAC.

A history of the drought monitor classifications for each week is available. Records start in 2000 and include classifications by percent of state and also by county. This drought monitor history can be found at: < <http://www.ncdrought.org/archive/index.php>>

DWR and PWSS maintain a Web site *Water Conservation Level Status* for more than 600 (Figure 3) tracked public water systems statewide. This online, real-time database provides a consistent way to document and track impacts of drought related causes on public water supply systems. To see if your community has enacted water conservation measures, go to:

<http://www.ncwater.org/Drought_Monitoring/reporting/displaystate.php>

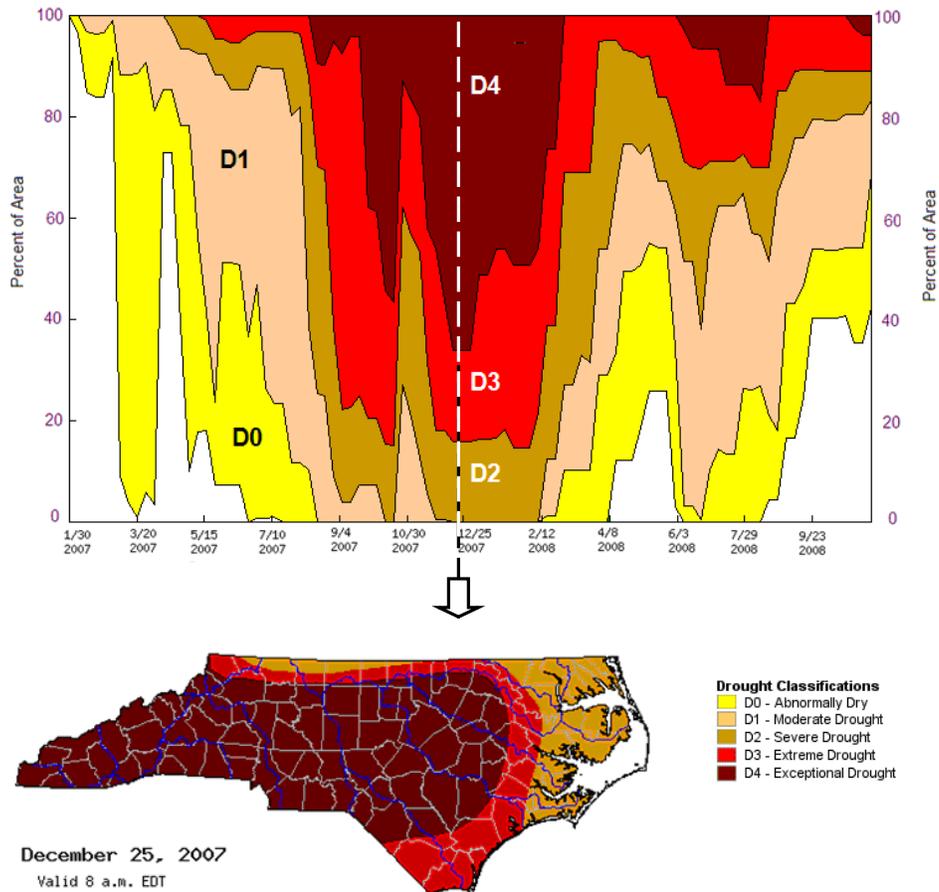
Figure 3 – Water Conservation Level Status



October 2008

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Figure 4 - Weekly Drought Classifications Jan 2007-Nov 2008



The DMAC issues official drought advisories based on drought classification to provide all water users with a reliable basis for managing and calling for drought response actions in their region. The list of counties under drought advisories is updated each week (www.ncdrought.org) to reflect local drought classifications on the weekly U.S. Drought Monitor for North Carolina.

Figure 4, shows severe drought conditions returning to North Carolina with exceptional drought returning in August 2007.

From August 2007, to February 2008, the entire state experienced some level of drought classification and a time when most of the state experienced the worst drought of record in North Carolina. Figure 4 summarizes the percent of the state each week under drought

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advisories as issued by the DMAC for this period. Also Figure 4 includes the depiction of drought classifications in the state for 25-Dec., 2007, when 78 counties were under an exceptional drought (D-4) advisory with 9 counties with extreme drought (D-3) and 13 counties in the coastal plain under a severe drought (D-2) advisory.

Improving Coordination and Drought Depiction

Drought Indicator Wells -- Drought indicator wells are a network of wells that monitor the effects of droughts and other climate variability on groundwater levels in the surficial aquifers (water table). The Division of Water Resources' goal is to increase the number and geographic distribution of drought indicator wells. DWR has 46 actively monitored wells in the network and a short-term goal of adding two wells to that network this fiscal year. The long-term goal is to have at least 60 drought indicator wells. This will allow a much more complete assessment of impending or actual drought conditions in each of the major river basins of the state.

http://www.ncwater.org/Data_and_Modeling/Ground_Water_Databases/Drought_Indicator_Wells/

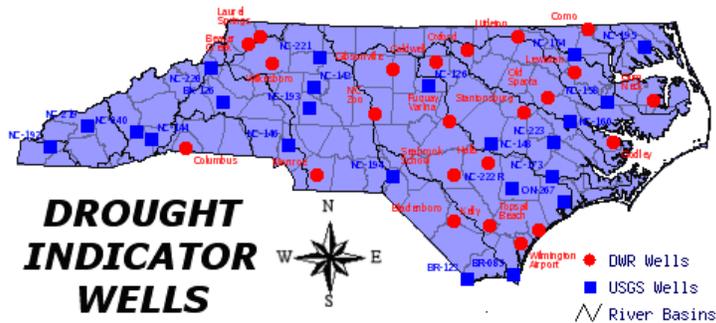


Figure 5

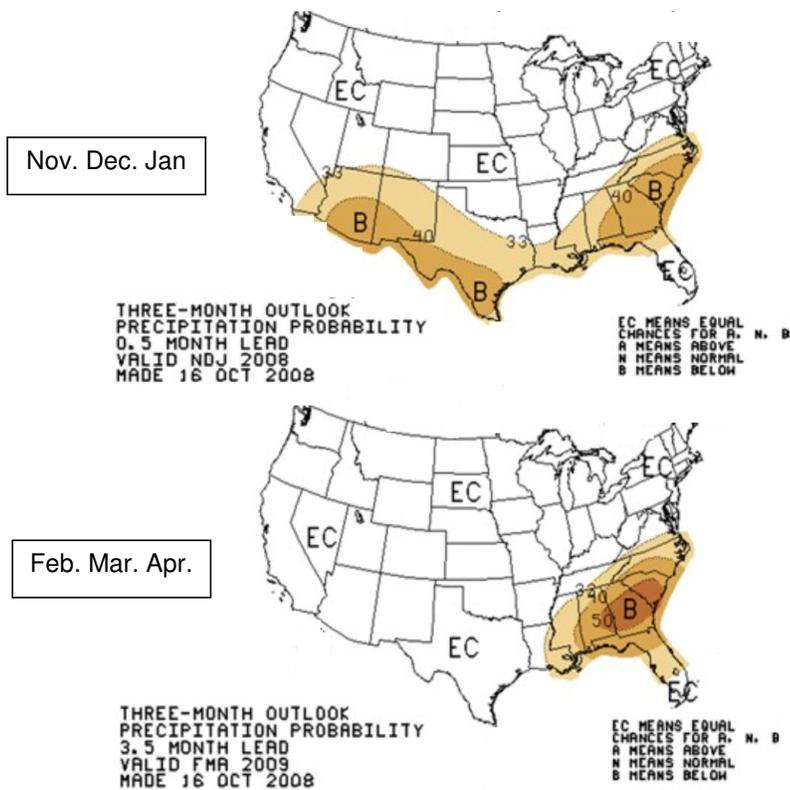
River Basin Drought Management Plans -- As part of the relicensing of hydropower projects in the Catawba-Wataree and Yadkin-Pee Dee river basins, procedures have been established and tested for adjusting operations during periods of low-inflow to conserve the limited water supply during the 2007 drought. The Low-Inflow Protocol (LIP) provides trigger points and procedures for how the projects will be operated as well as water withdrawal reduction measures and goals for other water users during periods of low-inflow. Planning is underway with stakeholders in the Neuse River Basin to work with the Division of Water Resources and others to fund and develop a drought management model for the basin. The Division of Water Resources is working with the U.S. Army Corps of Engineers and stakeholders on updating drought management plans on Falls and Jordan reservoirs.

Water Resources Information -- The Division of Water Resources continues to work with the N.C. State Climate Office, the U.S. Army Corps of Engineers, the N.C. Ground Water Management Section, and the U.S. Geological Survey and have developed a water resources information, storage, analysis, and retrieval system (WRISARS). This program will provide an archive of historical and on-the-spot data about hydrology (including stream flow,

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groundwater and reservoir data), weather and climate, and water use in North Carolina.
Products are now available for public use at <http://www.ncwater.org/wrisars/index.php>.

Figure 6 - Outlooks Nov. 2008 through April, 2009

Climatic Prediction Center, NOAA



Attachment IV

Curriculum Vitae
for
David H. Moreau, Ph. D.

ATTACHMENT IV

DAVID HUMPHREYS MOREAU

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EDUCATION:

Ph.D., Water Resources and Environmental Engineering, Harvard University, 1967
M.Sc., Environmental Engineering, Harvard University, 1964
M.Sc., Civil Engineering (Environmental), North Carolina State University, 1963
B.Sc., Civil Engineering, Mississippi State University, 1960

EMPLOYMENT HISTORY:

- Chair, Curriculum for the Environment and Ecology, The University of North Carolina at Chapel Hill, 2009-2012
- Director, Water Resources Research Institute of The University of North Carolina, 1983 1995; July 2005-2008; ex-officio Executive Director of the North Carolina Urban Water Consortium, a consortium of eleven cities in North Carolina to conduct research on water supply and wastewater treatment and management processes
- Chairman, Department of City and Regional Planning, University of North Carolina, Chapel Hill, 1997-2002
- Senior Associate Dean for Planning and Programs, College of Arts and Sciences, University of North Carolina, Chapel Hill, 1978-1983
- Professor, Departments of City and Regional Planning and of Environmental Sciences and Engineering, University of North Carolina, Chapel Hill, 1976-present
- Associate Professor, Department of City and Regional Planning, University of North Carolina, Chapel Hill, 1971- 1976.
- Assistant Professor, Departments of City and Regional Planning and of Environmental Sciences and Engineering, University of North Carolina, Chapel Hill, 1968-1971.
- Assistant Professor, Department of Environmental and Systems Engineering, University of Florida, Gainesville, 1966-1968.
- Engineer, Jordan, Kaiser, and Sessions Consulting Engineers, Natchez, Mississippi, periodic employment, 1958-1963.

SELECTED ACTIVITIES:

Statewide Public Service:

Chairman, North Carolina Environmental Management Commission (EMC),
1993- 2008. The EMC is North Carolina's administrative commission for water quality, air quality, and water allocation.

Chairman, North Carolina Sedimentation Control Commission, 1991 1993

Service to NRC:

Member, Board of Water Science and Technology, National Research Council, 2007-2010

Chairman, Committee to advise the EPA on implementation of the Total Maximum Daily Load approach across the Mississippi River basin. appointed by the National Research Council, 2008

ATTACHMENT IV

Member, Committee on Independent Scientific Evaluation of Progress on Restoration of the Everglades, appointed by the National Research Council, 2007-2011

Member, Committee on Regional Hurricane Protection System for New Orleans, appointed by the National Academy of Science to provide peer review of investigations by the Interagency Performance Evaluation Team of the failure of levees during Hurricane Katrina, 2005-2009

Member, Committee to Review Hydrologic and Economic Analysis by the International Joint Commission on the Great Lakes, Water Science and Technology Board, National Research Council, 2005

Member, Committee on Water Quality Management in the Pittsburgh Region, Water Science and Technology Board, National Research Council, 2002-2004

Member, Committee to Review the Upper Mississippi River-Illinois Waterway Navigation System Feasibility Study, Water Science and Technology Board, National Research Council, 2000-2001

Chairman, Committee to Assess the U.S. Army Corps of Engineers Project Planning Procedures, Water Science and Technology Board, National Research Council, 1996-1999

Significant Consulting Assignments in past five years:

- RTI International, Demand Side Management of Public Water Supply, 2008-2009
- Blue Ribbon Advisory Panel on Reliability of the New York City Water Supply, 2004-2010, Joint Venture between Hazen and Sawyer and CDM

Attachment V

*Water for Electricity
and Public Water Supply
in the Yadkin River Basin,*
David H. Moreau, Ph.D.
(Aug. 26, 2009)

Water for Electricity and Public Water Supply in the Yadkin River Basin

A statement by David H. Moreau, PhD
August 26, 2009

The purpose of this statement is to demonstrate that some or all waters of the Yadkin River Basin that are now used for hydroelectric power generation may be far more valuable to the State of North Carolina over the next 40 to 50 years if the State is to satisfy the rapid growth of urban water demand that the region has experienced over the past several decades. Very few opportunities remain in North Carolina to develop new reservoirs to meet that demand. The ability to respond to changing values of the resource, including reallocation of storage in reservoirs now used for hydroelectric power, is critical to the State. It is in the public interest that residents of the region be assured that waters of the Yadkin River can be shifted to higher valued uses as demands arise. Making reallocation decisions from hydroelectric to urban use in a timely, reasonable way would be far more likely if the reservoirs of the Yadkin River were owned by the State of North Carolina. Reallocation of storage would be far more difficult if the reservoirs are locked up in a license held by a privately owned company whose primary purpose is to generate and sell electricity.

Growth in Demand

The Yadkin River Basin is strategically located in the heart of a rapidly growing urban megalopolis that stretches from Raleigh, North Carolina to Atlanta, Georgia, even to Birmingham, Alabama. This is one of the fastest growing regions in the United States. Growth in the Metropolitan Statistical Areas of Charlotte-Gastonia-Concord, Atlanta, and Raleigh exceeded 14.4 percent from 2000 to 2007, more than twice the national average. The Charlotte MSA increased by 24 percent from 2000 to 2007, growing to a population of 1.65 million. With an estimated per capita use of 150-160 gallons per day per person (NC State Water Plan for 2001), the metro area water demand is 250-265 million gallons per day.

Growth has not been limited to just a few locations. Statewide growth in the region, as shown in Table 1, demonstrates that the population in North Carolina has increased by 54 percent just in the last 27 years.

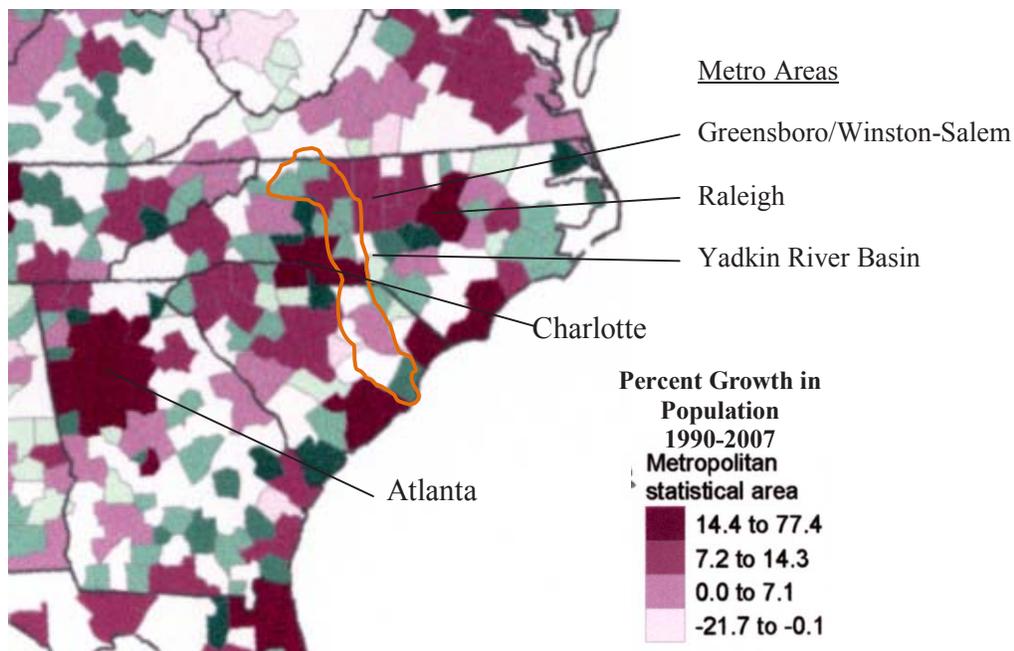


Figure 1. Growth in Metropolitan Statistical Areas in the Southeast 1990-2007

Table 1. Population of Georgia, South Carolina and North Carolina 1980-2007 (population in millions)

	<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>2007</u>	<u>Percent Increase 1980-2007</u>
GA	5.463	6.478	8.186	9.545	74.72
NC	5.882	6.629	8.049	9.061	54.05
SC	3.122	3.487	4.012	4.408	41.20

That growth has made the region quite vulnerable to droughts, adding substantially to demand while supply is relatively fixed. The extent of the most recent severe drought is shown in Figure 2. It brought all of the cities in the Piedmont into a near crisis mode for managing water supply.

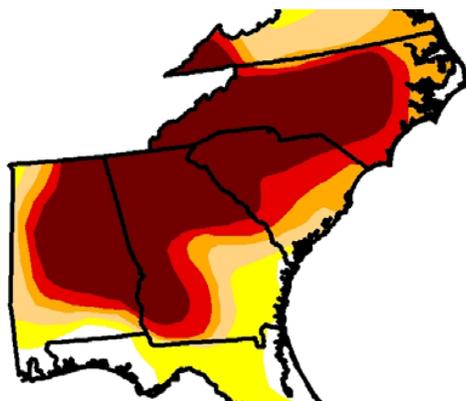
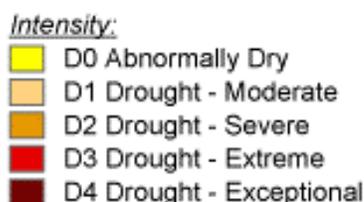


Figure 2.
Drought Conditions in the Southeast
December 25, 2007
Source: U.S. Drought Monitor



Because of the lack of abundant groundwater in the area, the region is heavily dependent on surface supplies.

Options for expanding public water supplies are quite limited. As noted in a report from the Water Resources Research Institute of the University of North Carolina (Moreau, 1992), the rate of expansion of storage in reservoirs in North Carolina has slowed dramatically. Only modest additions to storage have occurred since the early 1980's when Falls and Jordan Lakes were completed. Most of the best reservoir sites in North Carolina have already been developed. That trend is not unique to North Carolina as shown by an analysis of the national dataset on dams (Graf, 1999).

Electric Power Generation

For sure, population growth in the region carries with it growth in demand for electricity as well as growth in demand for public water supply. But hydroelectricity is becoming an increasingly small part of the mix of "fuel" for electricity. When the Narrows, Falls and High Rock reservoirs were built in the period 1917-1926, hydro was a relatively low cost source of electricity and there was very little demand for the water for other uses. Hydro was a far more significant part of the generating mix than it is today.

The decline of hydro as a percent of total electricity generation at the national level over the past 60 years is shown in Figure 3. In 1949 hydro generation accounted for over 30 percent of the total electricity generation. Today it accounts for about six percent. In North Carolina, the decline has been even more pronounced as shown in Figure 4. In just 17 years hydro dropped from over nine percent down to just over two percent of total electricity generation. Alcoa reported in its filings with FERC that the annual average output of the Yadkin Division was

844,300 MWhr per year over the period 1986-2005. That is about eight tenths of one percent of annual average electric utility output of 105.3 million MWhr for the entire state over the period 1990-2007¹. That is only seven tenths of one percent of the total 1.23 million electric utility output in North Carolina in 2007.

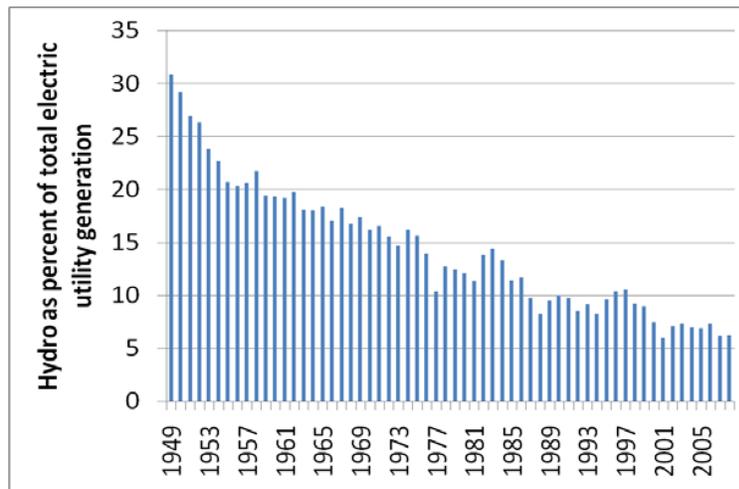


Figure 3. Hydroelectric as a percentage of total electric utility generation in the United States.

Source: Electricity Net Generation: Electric Power Sector 1949-2008

www.eia.doe.gov/emeu/aer/elect.html

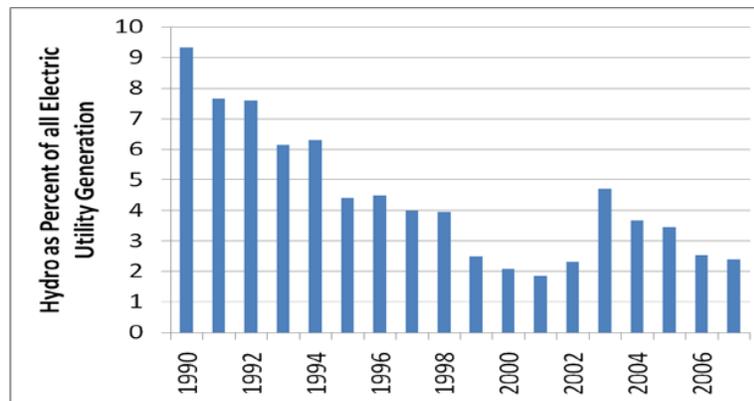


Figure 4. Hydroelectric as a percentage of total electric utility generation in North Carolina

Source: U.S. Department of Energy. Table 5. Electric Power Industry Generation by Primary Energy Source, 1990 Through 2007 www.eia.doe.gov/cneaf/electricity/st_profiles/sept05nc.xls

¹ Energy Information Administration, eia.doe.gov/cneaf/electricity/st_profiles/sept05nc.xls

Value of Water for Alternative Uses

The value of water for electric power in the Yadkin River is quite modest. According to the APGI License Application for the Yadkin Project submitted to FERC on April 26, 2006 (Exhibit B), the turbines on the Yadkin operate with hydraulic flows in the range of approximately 7,000 to 10,000 cubic feet per second. That flow through High Rock, Tuckertown, Narrows, and Falls Reservoirs drops through an effective head of about 340 feet to generate 216 MW of electric power. For purposes of calculating an approximate value of that water, take a flow of 8,000 cubic feet per second through the turbines. If the turbines operated at 100 percent efficiency, 8000 cubic feet per second dropping through 340 feet would generate 170 million foot-pounds per second or 238 MW of power. At turbine efficiency at 90 percent, the output would be 214 MWhr. A MWhr of electricity from the Yadkin system has a market value of somewhere between \$50 to \$75. The volume of water used to produce that output would be equivalent to 661 acre-feet or 215 million gallons. That would put the value of the water in the range of \$0.08 to 0.11 per acre-foot or \$0.23 to 0.35 per million gallons.

To put that in some perspective, a typical residential customer of the Charlotte-Mecklenburg Utility Department who uses about 6,000 gallons per month is currently paying \$2.10 per thousand gallons or \$2,100 per million gallons. That same usage in Greensboro would cost a customer \$2.72 per thousand gallons or \$2,720 per million gallons. That price covers the cost of transmission, treatment, and distribution of finished water to customers, but clearly at that price, customers would be willing to pay far more than \$ 0.35 for a million gallons of raw water.

A working paper published by the National Bureau of Economic Research (Brewer, et al, 2007) reviewed experience in western states where water is marketed. The authors reviewed 1,013 transactions in the period 1987-2005 involving the sale of water rights from agricultural uses to urban uses. The median price paid by urban water suppliers was in \$2,643 per acre-foot in constant 1995 dollars; the average price was \$4,366. It is clear that the value of water for public water supplies is orders of magnitude higher than for its use to generate electricity.

Yield for Urban Purposes

There is an abundance of water available for urban purposes in the Yadkin River. As an example, take the 109,500 acre-feet of storage between full pool and normal drawdown of 10

feet in High Rock Lake. Unregulated inflows to that reservoir can be estimated from U.S. Geological Survey records for a 45 year period 1964-2008. Effects of upstream regulation in Kerr Scott Reservoir can be eliminated by taking the difference between flows at Elkin and Yadkin College. A weighted average of runoff per square mile for that difference and flows in the South Yadkin River at Mocksville provide a reasonable representation of unit runoff values into High Rock. With those inflows, the 109,500 acre-feet of storage would yield in excess of 800 million gallons per day for urban purposes if it were dedicated exclusively to that purpose. While demands of that magnitude are not likely to be realized over the next 50 years, this estimate does underscore the fact that there is a generous supply available for public water supplies if even a portion of the storage in High Rock is reallocated for that purpose. Furthermore, it should be noted that reallocation of a portion of the High Rock for urban uses would not preclude its use for recreation, electric power generation, aesthetics and other benefits to the region.

Concluding Remarks

It is clear from the data and analysis discussed in this statement that North Carolina in general and metropolitan areas in the vicinity of the Yadkin River Basin have experienced extraordinary growth over the past 27 years. The Charlotte-Gastonia-Concord metro area has grown by 24 percent in the last several years. It would not be a stretch to foresee a doubling of the population over the next 50 years. That growth brings a comparable increase in demand for publicly supplied water in areas that have already experienced severe water shortages during droughts.

While a relatively modest amount of electricity is generated by the four facilities in the Yadkin Division of APGI, the value to APGI is substantial as they have generated over \$40 million in revenues in recent years. During those years, they have contributed less than one percent of electricity generated by utilities in North Carolina. Furthermore, the value of water used for generating electricity is several orders of magnitude smaller than its value for public water supply.

The 109,500 acre-feet of storage in High Rock Lake now used for generating electricity would yield something in excess of 800 million gallons per day for urban uses. That is several

times the current usage in the Charlotte MSA. It is unlikely that all or even a substantial portion of that supply would be needed over the life of the new license, but it is clear that reallocation of storage from electricity to public water supply would be facilitated if the ownership of the license were in public hands rather than being controlled by a private entity.

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Attachment VI

Review of PCB Data
From Badin Lake

John H. Rodgers, Jr., Ph.D.
(July 27, 2009)

John H. Rodgers, Jr., Ph.D.
102 Santee Trail
Clemson, SC 29631

July 27, 2009

Review of PCB Data From Badin Lake

This report summarizes our analysis and evaluation of the recent Polychlorinated Biphenyl (PCB) data from Badin Lake in Stanly County, NC. As you know, fish from Badin Lake were sampled in 2008 and fish tissue was analyzed for PCBs using a modern congener-specific analysis (for all 209 congeners). Based on the results from these analyses, the NC Department of Health and Human Services issued a fish consumption advisory for Badin Lake (February 11, 2009). Subsequently, we participated in a sampling event in Badin Lake (April 2, 2009) concurrent with the NC Division of Water Quality (DWQ) and collected sediment samples for analysis of PCB congeners as well as several other analytes. We were also provided information from the NC Division of Waste Management (McDaniel 2009) regarding the PCBs that were used at the Alcoa Badin Works Plant in Stanly County. Based upon the specific Aroclors or commercial blends of PCB congeners used at the Alcoa facility, we could analyze the congener-specific data for relationships between the PCBs in the fish tissue, sediments and those associated with the Alcoa facility.

PCBs are a family of industrial chlorinated chemical compounds that include 209 possible forms, or “congeners”. Commercial PCBs are usually a mixture of 50 or more congeners. The laboratory methods for analyzing specific congeners require very sensitive techniques, and therefore laboratories often “qualify” data as estimated concentrations for various reasons. These reasons can include values that are higher or lower than the calibration range of the analytical instrument, concentrations that are below method reporting limits but above detection limits, quantitative interference, and detection of the compound in laboratory method blanks. Although data may be qualified for these various reasons, they represent detected chemicals at estimated concentrations and can be useful for interpreting general trends or patterns in environmental samples, such as fish tissue and sediments. Data that require no laboratory qualification (or are “unqualified”) are those that can be clearly quantified by the laboratory (not estimated) and meet all quality assurance/quality control standards set by the laboratory without reservation. In this analysis of the Badin Lake fish tissue and sediment data, we initially considered unqualified PCB congener data separately, and then included the qualified data in our assessment to be thorough in our analysis since the data were limited (7 sediment samples and 30 fish samples).

Initially, we (Dr. Matt Huddleston and I) compared the PCB congeners and concentrations in the fish tissue with those in sediment samples from the southwest arm (near the Alcoa facility), the northwest arm, and the northeast arm of Badin Lake. Based upon our analysis, we reached the following conclusions.

When considering the unqualified congener data only (these are data that met all laboratory QA/QC standards without reservation):

- 1. There is a relationship between PCB congeners in sediments from the southwest arm of the lake and PCBs in fish from Badin Lake.** All PCB congeners detected in the

sediments from the southwest arm of Badin Lake, with the exception of congener no. 2, were also detected in fish tissues regardless of the collection location for the fish. Even the fish collected outside of the southwest arm of Badin Lake contained PCB congeners found in the sediments from the southwest arm.

When considering all of the congener data (actual and estimated concentrations):

- 2. Congeners detected in the fish tissue provided further evidence of sediments as a source of PCBs.** The PCB congeners measured in the sediments of Badin Lake are essentially the same congeners measured in the fish tissue collected throughout the lake. Many congeners not detected in sediments were also not detected in fish tissues. This is additional information implicating sediments as a source of PCBs in fish tissues.
- 3. PCB congeners detected in sediments from the southwest arm of the lake (near the Alcoa facility) have concentrations significantly greater (on the order of 10 to 100 times greater) than sediments from other parts of the lake.** These congeners were also present in fish sampled from the southwest arm. This is the pattern that would be expected if the sediments were a primary source of PCBs in fish tissues. Since sediments and fish do not accumulate or metabolize PCBs or congeners in the same manner, we would expect to find some differences. In other words, PCBs in sediments and fish change and breakdown differently over time, even within different sediment types (mud, sand, etc.) and different fish species. **Despite the expected differences, the pattern of detected PCB congeners common to sediments and fish in Badin Lake is apparent.**
- 4. PCB congeners in sediments from the southwest arm of Badin Lake co-occur more frequently with congeners detected in fish sampled throughout the lake than do congeners in sediments from other parts of the lake.** As part of the data analysis, we ranked PCB congener concentrations from high to low for each fish tissue and sediment sample to determine if the congeners measured at the highest concentrations were common to both fish and sediments. Of the ranked PCB congeners measured in sediments from the southwest arm, there were 14 co-occurrences of ranked PCB congeners in each of the fish sampling locations (southwest arm, northwest arm and northeast arm of the lake). Of the ranked PCB congeners measured in sediments collected from near Narrows Dam, 12 congeners also occurred in fish collected from the southwest arm, 11 co-occurred in fish collected from the northwest arm, and 12 co-occurred in fish collected from the northeast arm of the lake. When compared to ranked PCB congeners measured in sediments from the northwest arm of Badin Lake, only 6 congeners co-occurred in fish tissue samples collected from each arm of the Badin Lake. In summary, the PCB congeners with the highest concentrations in sediments from the southwest arm of Badin Lake co-occur more frequently with congeners in fish tissue samples than do congeners measured in sediments from other parts of the lake.
- 5. Fish sampled from the southwest arm of Badin Lake were more consistently contaminated by PCBs than fish collected from other parts of the lake.** In the samples from the initial study, the highest PCB concentrations were detected in a few fish from the northwest arm; however, PCB concentrations were more uniform in fish from the southwest arm. PCB concentrations in fish tissue collected from the northeast arm of

Badin Lake were generally lower than concentrations in fish from the southwest and northwest arms.

In summary, there is a close match between PCB congeners detected in the sediments of Badin Lake and those found in fish tissue in this study. The pattern observed between congeners measured in fish tissue collected throughout the lake and those measured in sediments from the southwest arm of the lake would be expected if the sediments were a primary source of PCBs in fish tissues.

Subsequently, we compared the predominant PCB congeners in the sediment and the fish with the congeners present in the Aroclors associated with the Alcoa facility (McDaniel 2009).

When considering the unqualified congener data only:

- 1. The Alcoa-related PCB congeners # 3, 4, 8, and 12 occur in sediment from the southwest arm (near the Alcoa facility) and in fish tissue sampled in the southwest, northwest, and northeast arms of the lake.**

When considering all of the congener data (actual and estimated concentrations):

- 2. Most of the Alcoa-related PCB congeners were detected in fish tissue and sediment samples in Badin Lake.** Of the 76 PCB congeners associated with Alcoa operations, 18 were either not analyzed in fish tissue or were combined with other congeners for analysis of sediments. Of the remaining 58 congeners that were analyzed individually, 57 occurred in fish tissue, 55 occurred in sediments, and 54 occurred in both fish tissue and sediments (>93% match).
- 3. Based on analysis of all of the PCB data, approximately 32 of the congeners associated with Alcoa Aroclors measured in fish tissue also exist at elevated concentrations (on the order of 10 to 100 times greater) in the southwest arm of Badin Lake when compared to concentrations in other parts of the lake.**
- 4. When PCB congeners were ranked from highest to lowest concentration as described above, many of the congeners with the highest concentrations are associated with the Alcoa Aroclors and occur in both fish tissue and sediments.** Eleven of the Alcoa-related congeners were detected in more than 60% of the fish tissue samples (Table 1). In sediment samples, approximately 20 of the 53 potentially present congeners (some congeners were analyzed together and not distinguished) are associated with Aroclors used by Alcoa.

Table 1. Occurrence of PCB congeners associated with the Alcoa facility detected in fish tissue samples from Badin Lake.

PCB Congener #	Occurrence in Fish Tissue Samples (n=30)	Aroclors Associated with the Alcoa Facility
187	100%	1260; 1254
153	100%	1260; 1254; 1248
129	100%	1260; 1254; 1248
118	100%	1260; 1254; 1248; 1242
99	100%	1260; 1254; 1248; 1242
110	90%	1260; 1254; 1248; 1242
66	90%	1254; 1248; 1242; 1232; 1221; 1016
52	87%	1254; 1248; 1242; 1232; 1221; 1016
61	83%	1254; 1248; 1242; 1232; 1221; 1016
180	77%	1260; 1254
44	63%	1254; 1248; 1242; 1232; 1221; 1016

In summary, there is a relationship between the PCBs used at the Alcoa facility and the PCBs contained in the sediments and fish in Badin Lake. We have congener specific analytical data for the PCBs in the sediments and the fish. Information regarding the PCBs used at the Alcoa Badin Works Facility was provided by the NC Division of Waste Management.

With more samples and analyses, we could further examine the strength of the relationships apparent in the current data and confirm whether or not there is an ongoing source of PCBs in Badin Lake.

If any questions arise, please contact me.

Sincerely,

John H. Rodgers, Jr.

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Attachment VII

Curriculum Vitae
for
John H. Rodgers Jr., Ph.D.

4/2009

CURRICULUM VITAE

John H. Rodgers, Jr.

BIRTHDATE: February 1, 1950

BIRTHPLACE: Dillon County, South Carolina, U.S.A.

SSN: Available on request

MARITAL DATA: Wife's maiden name - Martha W. Robeson
Children - Daniel Joseph
(Born January 16, 1978)
Frank Clifford
(Born July 7, 1985)

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PRESENT POSITION: Professor
Department of Forestry and Natural Resources
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Clemson Environmental Institute
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Director, Ecotoxicology Program
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Rodgers-1

- EDUCATION:**
- Virginia Polytechnic Institute and State University, Blacksburg, VA,
Ph.D. Degree, Botany, Aquatic Ecology, 1977.
- Clemson University, Clemson, SC,
M.S. Degree, Botany, Plant Ecology, 1974.
- Clemson University, Clemson, SC,
B.S. Degree, Botany, 1972.
- PROFESSIONAL EXPERIENCE:**
- Clemson University (1998-present):**
- Professor, Department of Forestry and Natural Resources
Director, Ecotoxicology Program
2003 – Present.
- Director, Clemson Institute of Environmental Toxicology
Chair, Department of Environmental Toxicology
Professor, Department of Environmental Toxicology
Co - Director, Clemson Environmental Institute
1998 - 2003.
- University of Mississippi:**
(Department of Biology)
- Professor, Department of Biology,
1989 - 1998.
Director, Ecotoxicology Program,
1995 – 1998.
Adjunct Research Professor, Research Institute for
Pharmaceutical Sciences,
1989 - 1998.
Director, Biological Field Station,
1990 – 1995.
Director, Center for Water and Wetland Resources,
1993 – 1995.
Associate Director, Biological Field Station,
1989 - 1990.
- University of North Texas:**
(Division of Environmental Sciences,
Department of Biological Sciences)
Director, Water Research Field Station,
1987 - 1989.
Associate Professor, Department of Biological Sciences,

1985 - 1989.

Associate Director, Institute of Applied Sciences,
1982 - 1988.

Assistant Professor, Department of Biological Sciences,
1982 - 1985.

Research Scientist II, Institute of Applied Sciences,
1979 - 1981.

East Tennessee State University:

(Department of Environmental Sciences,
Aquatic Ecology Section)

Assistant Professor, 1978 - 1979.

**Virginia Polytechnic Institute
and State University:**

(Biology Department, Center for
Environmental Studies)

Postdoctoral Research Associate, 1977 - 1978.

Research Assistant- Energy Research and
Development Administration, 1975 - 1977.

Clemson University (1972-1974):

(Botany Department)

Research Assistant - Water Resources Research
Institute, 1972 - 1974.

Laboratory Teaching Assistant – Plant Physiology,
Plant Ecology, Biological Oceanology, Botany, 1972 - 1974.

**MILITARY
SERVICE:**

U.S. Air Force Reserve, Second Lieutenant,
1972 - 1975.

U.S. Air Force Reserve, First Lieutenant,
1975 - 1978.

U.S. Air Force Reserve, Captain,
1978 - 1984.

U.S. Air Force (Active Duty),
June 1 - August 29, 1976.

U.S. Air Force, Honorable Discharge, 1984.

Pilot Certificate - 34 hours, Single engine aircraft.

RESEARCH SUPPORT:

Clemson University (1972-1974):

Research Assistantship, Water Resources Institute, Project No. B-053-SC (\$42,000), 1972 - 1974. Impact of Thermal Effluent from a Nuclear Power Plant on Reservoir Productivity.

Thesis Parts Award, USAEC, The E.I. DuPont de Nemours & Co., Savannah River Laboratory (Thermal Effects Laboratory), Aiken, S.C., 1973-1975. Effects of Elevated Temperatures on Periphyton Productivity in Lotic Aquatic Ecosystems.

Savannah River Laboratory, Research Assistantship, Research Contract USAEC Funding (\$50,000), 1973-1975. Impacts of Ash from Coal Combustion on Swamp Receiving Systems.

Virginia Polytechnic Institute and State University:

Research Assistantship, Research Contract, American Electric Power Corporation Funding (\$93,000), 1974-1975. Thermal Tolerances and Electivities of Fish Adjacent to a Coal-Fired Power Plant.

Research Assistantship, Research Contract, Energy Research and Development Administration Funding (\$112,000), 1975 - 1976. Structural and Functional Responses of Aquatic Communities to Power Generation.

Research Assistantship, Research Contract, Energy Research and Development Administration Funding (\$132,000), 1976 - 1977. Responses of Aquatic Communities to Perturbations Associated with Power Generation.

Co-principal Investigator, Research Contract, Water Resources Research Institute Funding (\$68,000), 1977 - 1979. Environmental Tolerances of *Corbicula fluminea* from the New River, Virginia.

East Tennessee State University:

Principal Investigator, Research Contract, ETSU Research Development Committee Funding (\$3,270), 1978 - 1979. Primary Production and Nutrient Dynamics in the Watauga River, Tennessee.

Oak Ridge Associated Universities Travel Contract, 1978 - 1979. Impacts of Power Production on Aquatic Ecosystems of Savannah River Laboratory.

University of North Texas:

Co-Principal Investigator, Research Contract, Chemical Manufacturers' Association Funding (\$80,000), 1979 - 1980. Modeling the Fate of Chemicals in Aquatic Environments.

Principal Investigator, Research Contract, NTSU Faculty Research Grant Funding (\$4,000), 1979 - 1980. Biotransformation of Xenobiotics in Aquatic Systems.

Co-principal Investigator, Research Contract, International Paper Company Funding (\$149,530), 1980 - 1981. Impacts of Paper Mill Effluent on Aquatic Ecosystems.

Co-principal Investigator, Research Contract, Victor Equipment Company Funding (\$5,000), 1980. Optimization of Packaged Waste Treatment System for Metal Removal.

Co-principal Investigator, Research Contract, International Paper Company Funding (\$171,830), 1980 - 1981. Investigation of Pre- and Post-Operational Effects of a Paper Mill on Aquatic Systems.

Principal Investigator, Research Contract, NTSU Faculty Research Grant Funding (\$4,620), 1980 - 1981. Predicting Bioconcentration of Chemicals by Aquatic Organisms.

Co-principal Investigator, Research Contract, Chemical Manufacturers' Association Funding (\$30,000), 1981. Validation of Chemical Fate Models for Aquatic Ecosystems.

Co-principal Investigator, Research Contract, U.S. Environmental Protection Agency Funding (\$305,866), 1981 - 1983. Development of a Decision Support System for Integrated Management of Nuisance Aquatic Vegetation.

Principal Investigator, Research Contract, NTSU Faculty Research Grant Funding (\$3,600), 1981-1982. Fate and Effects of the Herbicide, Endothall, in Aquatic Systems.

Co-principal Investigator, Research Contract, Chemical Manufacturers' Association Funding (\$59,985), 1981 - 1982. Studies of Fate and Effects of Chemicals in Aquatic Ecosystems.

Co-principal Investigator, Research Contract, International Paper Company Funding (\$113,000), 1982. Effects of Paper Mill Effluent on Aquatic Ecosystems.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$24,500), 1982. Ecosystem Study of Pat Mayse Lake, A Southwestern Reservoir.

Co-principal Investigator, Research Contract, International Paper Company Funding (\$348,926), 1982 - 1985. Further Studies of Effects of Paper Mill Effluent on Aquatic

Ecosystems.

Principal Investigator, Research Contract, NTSU Faculty Research Grant Funding (\$3,500), 1982 - 1983. Proximate Oxygen Demand of Aquatic Plants.

Co-principal Investigator, Research Contract, U.S. Environmental Protection Agency Funding (\$199,500), 1982 - 1983. Validation of Decision Support Systems for Integrated Management of Nuisance Aquatic Vegetation.

Co-principal Investigator, Research Contract, American Petroleum Institute (\$83,809), 1981 - 1982. Bioavailability of Petroleum-Derived Chemicals in Aquatic Ecosystems.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$25,000), 1983. Further Studies: Pat Mayse Lake, A Southwestern Reservoir.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$1,000), 1983. Remote Sensing of Aquatic Vegetation in Pat Mayse Lake.

Co-principal Investigator, Research Contract, Shell Development Company Funding (\$17,000), 1983. Impact of Petroleum Compounds on Aquatic Organisms.

Principal Investigator, Research Contract, NTSU Faculty Research Grant Funding (\$4,500), 1983 - 1984. Threshold Responses of Aquatic Vegetation to Herbicides.

Co-principal Investigator, Research Contract, Shell Development Company Funding (\$29,758), 1984. Inter-Laboratory Comparison of Bioassays Using Freshwater and Marine Organisms.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$20,000), 1984. Water Quality Monitoring and Aquatic Vegetation in Pat Mayse Lake.

Principal Investigator, Research Contract, Pennwalt Corporation Funding (\$11,500), 1984. Comparative Study of Two Aquatic Herbicides.

Principal Investigator, Research Contract, Shell Oil and Chemical Company Funding (\$14,000). Aquatic Toxicology Studies for the Petrochemical Industry.

Principal Investigator, Research Contract, Dallas County Utility and Reclamation District Funding (\$12,000), 1984 - 1985. Eutrophication Potential in an Impoundment Receiving Wastewater.

Co-principal Investigator, Research Contract, Shell Development Company Funding (\$31,797), 1985. Development of Data on Proper Selection of Bioassay Species.

Co-principal Investigator, Research Contract, Texas Instruments, Inc. Funding

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(approximately \$12,000, equipment), 1985. Development of Expert Systems for Water Quality Management.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$24,500), 1985. Development of a Water Quality Model and Lake Management Strategy for Pat Mayse Lake.

Co-principal Investigator, Research Foundation Award, Shell Research Foundation (\$15,000), 1985. The Response of Marine and Freshwater Species to Xenobiotics.

Principal Investigator, Research Contract, NTSU Faculty Research Grant Funding (\$2,700), 1986 - 1987. Experimental Analysis of Bioassay Methods.

Co-principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$168,693), 1986 - 1987. Ecological Analysis of the Lake Ray Roberts Project Site.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding, (\$68,000), 1986 - 1987. Coupling an Environmental Fate and Effects Model for 2, 4-D and Water Hyacinth.

Co-principal Investigator, Research Contract, Shell Research Foundation Funding (\$15,000), 1986. Osmoregulation in Marine Bioassay Species.

Principal Investigator, Research Contract, American Petroleum Institute Funding (\$8,000), 1986. Evaluation of Marine Bioassay Species.

Principal Investigator, Research Contract, American Petroleum Institute and U.S. Environmental Protection Agency Funding (\$10,000), 1986. A Workshop on Culture and Life History of *Mysidopsis* sp.

Co-principal Investigator, Research Contract, Shell Research Foundation Funding (\$20,000), 1987. Sediment Organic Carbon Content in Aquatic Systems of the U.S.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$24,500), 1987 - 1988. Endothall Fate and Effects on *Myriophyllum spicatum* in Pat Mayse Lake, Texas.

Co-principal Investigator, Research Contract Hoechst-Roussel Agri-Vet (Hoechst-Celanese) Co. Funding (\$185,000), 1987 - 1988. Development of Mesocosms and Water Research Field Station.

Co-principal Investigator, Research Contract, City of Dallas Funding (\$319,964), 1987 - 1989. Ecological Survey and Study of the Trinity River, Texas.

Co-principal Investigator, Research Contract, Hoechst-Roussel Agri-Vet (Hoechst-

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Celanese) Co. Funding (\$325,000), 1988 - 1989. Fate and Effects of Tralomethrin in Mesocosms.

Co-principal Investigator, Research Contract, Hoechst Roussel Agri Vet (Hoechst--Celanese) Co. Funding (\$185,000), 1988 - 1989. Further Development of Mesocosms and Water Research Field Station.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$24,500), 1988 - 1989. Further Development of a Water Quality Model and Lake Management Strategy for Pat Mayse Lake.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$24,550), 1988 - 1989. Research on SONAR in Pat Mayse Lake.

Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$107,000), 1988-1989. Water Research Field Station-Coupling a Herbicide Fate and Effects Model.

Principal Investigator, Research Contract, Pennwalt Corporation (\$2,000), 1988-1989. Degradation of Endothall by Chlorine.

Co-principal Investigator, Research Contract, Mobay Corporation (\$852,000), 1988-1990. Fate and Effects of Cyfluthrin in Mesocosms.

Co-principal Investigator, Research Contract, Shell Development Corporation (\$55,000) 1989-1990. Bioavailability of Sediment-sorbed Chemicals to Freshwater Organisms.

University of Mississippi:

Principal Investigator, Research Contract U.S. Army Corps of Engineers - Tulsa District Funding (\$24,500), 1988-1989. Limnology and Aquatic Botany of Pat Mayse Lake, Texas.

Principal Investigator, Research Contract, Shell Development Company Funding (\$50,000), 1989-1990. Evaluation of Sediment Toxicity Testing Procedures.

Co-principal Investigator, Research Contract Soil Conservation Service Funding (\$50,000), 1990-1991. Wetlands for Interception and Processing of Pesticides in Agricultural Runoff.

Co-principal Investigator, Research Contract Tennessee Valley Authority Funding (\$171,410), 1990-1991. Analysis of Aquatic Herbicides in Lake Guntersville, Alabama for the Aquatic Plant Management Program.

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Principal Investigator, Research Contract, Ciba Giegy Corporation Funding (\$31,000), 1990. Effects of Atrazine on Aquatic Vascular Plants.

Co-principal Investigator, Research Contract, Dow-Elanco Corporation Funding (\$40,000), 1990. Analysis of Fluridone in Florida Aquatic Plant Management Programs.

Principal Investigator, Research Contract, U.S. Environmental Protection Agency - Gulf of Mexico Program (\$17,565) 1990-1991. Assistance with the Citizen's Advisory Group of the Gulf of Mexico Program.

Co-principal Investigator, CHP International, Inc. (U.S. Peace Corps) Funding (\$22,000), 1990. Aquaculture Training Sessions for Volunteers for Africa.

Co-principal Investigator, University of Mississippi Funding (\$1,000), 1989-1990. Water Systems for an Aquatic Toxicology Laboratory.

Principal Investigator, Internal Equipment Funding, University of Mississippi Associates Funding (\$25,000), 1990-1991. Aquisition of an Ion Chromatograph/High Performance Liquid Chromatograph.

Principal Investigator, U.S. Army Corps of Engineers, Waterways Experiment Station Funding (\$250,000), 1990-1993. Development of Controlled Release Herbicides for Aquatic Use.

Principal Investigator, American Petroleum Institute Funding, (\$250,000), 1990 -1992. Reference Toxicants and Reference Sediments for Sediment Toxicity Testing.

Principal Investigator, Research Contract, Tennessee Valley Authority Funding (\$168,000), 1991-1992. Aquatic Herbicides in Guntersville Reservoir, Alabama - National Demonstration Project.

Co-principal Investigator, Research Contract, U.S. Department of the Army, Vicksburg District, Corps of Engineers Funding (\$96,036), 1991-1992. Monitoring Water Quality at Arkabutla, Enid, Grenada, and Sardis Lakes.

Principal Investigator, Research Contract, ABC Laboratories, Inc. and Zoecon Corporation Funding (\$10,000), 1991. Outdoor Microcosm Study of an Insect Growth Regulator.

Co-principal Investigator, Research Contract, Shell Development Company Funding (\$192,000), 1991-1993. Development of a Model Stream Facility and Evaluation of the Environmental Safety of a Surfactant.

Principal Investigator, Research Contract, U.S. Army Waterways Experiment Station Funding (\$25,000), 1991-1992. Evaluation of New Herbicide Delivery System for Control

of Aquatic Plants.

Principal Investigator, Research Contract, U.S. Army Waterways Experiment Station Funding (\$64,000), 1992-1993. Evaluation of New Herbicide Delivery Systems for Control of Aquatic Plants.

Principal Investigator, Research Contract, American Petroleum Institute Funding (\$100,000), 1992-1993. New Sediment Bioassays and Reference Sediments. Principal Investigator, Mississippi State Department Of Wildlife, Fisheries, and Parks Funding (\$6,000), 1991-1993. Cooperative Agreement for Assistance with Walleye Culture.

Co-Principal Investigator, Research Contract, U.S. Army Corps of Engineers Funding (\$100,848), 1992-1993. Monitoring of Water Quality at Arkabutla, Sardis, Enid, and Grenada Lakes.

Principal Investigator, Mississippi State Department of Wildlife, Fisheries and Parks Funding (\$3,000), 1992-1993. Cooperative Agreement for Assistance with Walleye Culture.

Principal Investigator, Research Contract, U.S. Army Waterways Experiment Station Funding (\$30,000), 1992-1994. Mobility and Bioavailability of Sediment Associated Contaminants.

Principal Investigator, Research Contract, U.S. Army Waterways Experiment Station Funding (\$25,000), 1992-1993. Effects of Food Quantity on Fathead Minnow Survival, Growth and Reproduction.

Principal Investigator, Research Contract, Eastman Kodak and the Silver Coalition Funding (\$53,183), 1992-1994. Evaluations of the Bioavailability and Toxicity of Silver in Sediments.

Principal Investigator, Research Contract, Shell Development Company Funding (\$150,000), 1992-1993. Ecological Evaluation of a Non-ionic Surfactant in Model Stream Mesocosms.

Principal Investigator, Research Contract, Shell Development Company Funding (\$30,342), 1993-1994. Assistance with Development and Construction of Constructed Wetlands for Tertiary Treatment of Refinery Effluent.

Principal Investigator, U.S. Department of Agriculture/ Cooperative State Research Service Funding (\$1,377,400), 1994-1995. Center for Water and Wetland Resources (Year 4).

Co-Principal Investigator, Research Contract, International Paper Company Funding (\$99,631), 1994-1995. Extensive Ecological and Toxicological Evaluation of the

Arkansas River at Pine Bluff, AR.

Co-Principal Investigator, Research Contract, International Paper Company Funding (\$99,631), 1994-1995. Extensive Ecological and Toxicological Evaluation of the Yazoo River near Vicksburg, MS.

Principal Investigator, Research Contract, Shell Development Company Funding (\$150,000), 1994-1995. Ecological Evaluation of a Homologous Non-ionic Surfactant in Model Stream Mesocosms.

Principal Investigator, Research Contract, Shell Development Company Funding (\$144,242), 1994-1996. Evaluation of Constructed Wetlands for Tertiary Treatment of Refinery Effluent.

Principal Investigator, Research Contract, Texaco, Inc. Funding (\$20,000), 1995-1996. Evaluation of a Constructed Wetland for Removal of Ammonia from a Refinery Effluent.

Principal Investigator, Research Contract, Texaco, Inc. Funding (\$20,000), 1995-1996. Evaluation of a Constructed Wetland for Removal of Trace Metals from a Refinery Effluent.

Clemson University (1998-present):

Principal Investigator, Assistance with Design and Construction of a Wetland for Wastewater Treatment Sponsored by Shell Oil Products from 4/1/98 to 4/1/00 (\$10,000).

Principal Investigator, Evaluation of the Tombigbee River. Sponsored by Weyerhaeuser, Inc. 1/98 – 1/02 (\$22,000).

Principal Investigator, Constructed Wetland for Wastewater Treatment at IP's Mansfield, LA Facility, Sponsored by International Paper Company 8/98 – 12/00 (\$18,250).

Principal Investigator, Investigations of Pesticide Toxicity, Sponsored by Applied Biochemists, Inc. 1/00 – 1/01 (\$10,000).

Principal Investigator, Wetlands for Wastewater Treatment at Savannah River Site Sponsored by DOE thru SCUREF (SC Universities Research and Education Foundation) from 1/14/99 to 2/28/00 (\$28,088).

Principal Investigator, A-01 Outfall Constructed Wetlands Sponsored by DOE thru Westinghouse Savannah River thru SCUREF from 7/11/99 to 9/30/00 (\$624,730).

Principal Investigator, Design and Construction of a Wetland for Effluent Treatment. Sponsored by International Paper Company 6/00 – 7/01 (\$25,000).

Principal Investigator, Evaluation of Foam Products. Flexible Products, Inc Funding from 9/99 – 1/01 (\$15,000).

Principal Investigator, US Department of Interior Funding (\$43,106), 2002-2004. Renovating Water for Conservation and Reuse.

Co-Principal investigator, US Department of Agriculture Funding (\$539,677), 2002-2004. Adhesion-Specific Nanoparticles for Removal of *Campylobacter jejuni* from Poultry.

Principal Investigator, Duke Energy Corporation Funding (\$54,473). 2001. Evaluation of the Oconee Nuclear Station Conventional Waste Treatment System.

Principal Investigator, Chevron Texaco Inc. Funding (\$24,000), 2001-present. Evaluation of Best Management Practices for Stormwater and Other Contaminated Waste Streams.

Principal Investigator, US Department of Energy Funding (\$26,024). 2001-2003. A01 Constructed Wetland Treatment Facility Redox Probe Maintenance and Consultation for the Savannah River Site (from WSRC through SCUREF).

Principal Investigator, U.S. Department of Interior Funding (\$43,106). 2002-2003. Renovating Water for Conservation and Reuse.

Principal Investigator, Sustainable Universities Initiative (\$7,000). 2002-2003. A Constructed Wetland Treatment System: A Green and Sustainable Solution to Prevent Water Pollution on Campus.

Principal Investigator, Duke Energy Corporation in Cooperation with Progress Energy Funding (\$187,000). 2003-2004. Treatment of Mercury, Selenium and Other Targeted Constituents in FGD Wastewater: A Constructed Wetland Pilot Study.

Principal Investigator, Chevron Corporation Funding (\$33,600). 2003-2004. Panama Storm Water Treatment Wetland.

Principal Investigator, Griffin Corporation Funding (\$20,000). 2002-2003. Response of Aluminum from Boat Pontoon to Komeen Exposures in Lake Murray, SC Water (with Sediments and *Hydrilla*).

Principal Investigator, Alabama Power Company Funding (\$75,000). 2004-2006. Development of Strategies for Controlling Nuisance Growths of *Lyngbya* in Alabama Power Company Reservoirs.

Principal Investigator, Department of Energy Funding (\$125,000) 2004-2005. Designing constructed wetlands to treat gas storage produced waters.

Principal Investigator, Duke Energy Corporation in Cooperation with Progress Energy

Funding (\$105,000). 2004-2005. Continuing Studies of Treatment of Mercury, Selenium and Other Targeted Constituents in FGD Wastewater Using a Constructed Wetland Treatment System.

Principal Investigator, U.S. Department of Energy Funding (\$300,000) 2005-2008. Innovative Techniques for Remediation of Nontraditional Waters for Reuse in Coal-Fired Power Plants.

Principal Investigator, Duke Energy Corporation and ENTRIX Funding (\$100,000) 2006-2007. Further Evaluations of Constructed Wetland Treatment Systems for Flue Gas Desulfurization Waters.

Co-Principal Investigator, Chevron-Texaco Funding (\$50,000) 2006-2007. Evaluation of Boron Biogeochemistry in Constructed Wetlands.

Co-Principal Investigator, Monsanto Company Funding (\$300,000) 2006-2008. Potential Effects of Glyphosate Formulations on Amphibians.

Principal Investigator, Florida Department of Environmental Protection Funding (\$60,000) Effects of Invasive Algae in Crystal River, FL and Potential Control Strategies to Protect the Florida Manatee.

Co-Principal Investigator, Chevron-Texaco Funding (\$50,000) Specifically Designed Constructed Wetland Treatment Systems for Produced Water in Chad.

Principal Investigator, Duke Energy Corporation and ENTRIX Funding (\$30,000) 2007-2008. Additional Evaluations of Constructed Wetland Treatment Systems for Flue Gas Desulfurization Waters.

Co-Principal Investigator, Clemson University Funding (\$50,000) 2006-2008. Evaluation of Constructed Wetland Treatment Systems for Parking Lot Stormwater (with Dr. Rockie English).

Principal Investigator, Applied Biochemists, Inc. Funding (\$36,000) 2006. Approaches for Mitigation of Risks from Harmful Algal Blooms.

Co-Principal Investigator, Chevron-Texaco Funding (\$50,000) Specifically Designed Constructed Wetland Treatment Systems for Specific Produced Water (San Ardo, CA).

Co-Principal Investigator, U.S. Department of Energy Funding (\$800,000) Evaluation of Constructed Wetland Treatment Systems for Produced Waters.

HONORS AND AWARDS:

Phi Sigma Doctoral Research Award, April, 1977.

Sigma Xi Doctoral Research Award, May, 1978.

Who's Who in the South and Southwest, 1979.

Personalities of the South, 1981.

International Who's Who, 1981.

Directory of Distinguished Americans, 1981.

Men of Achievement (International Biographical Center), 1981.

Phi Kappa Phi Honor Society, 1982.

Gordon Research Conference Travel Award, 1982.

NTSU President's Award to the Institute of Applied Sciences, 1985.

Mortar Board NTSU "Top Prof" Teaching Award, 1985.

Elected to NTSU Graduate Faculty, 1987.

Co-author - Best Student Paper (Burton Suedel and Phil Clifford), published in 1992 in *Environmental Toxicology and Chemistry*.

Certificate of Appreciation, 1993 Mississippi Region 7 Science and Engineering Fair. 1993.

Designated "Distinguished Southerner" by Editors Of *Southern Living*. Article on Water Watchdogs In April, 1994 edition of *Southern Living*.

Co-author - Best Student Paper (Arthur Dunn), Mid-South Aquatic Plant Management Society. Birmingham, AL. 1994.

Certificate of Appreciation, Environmental Biology Review Panel, U.S. EPA, January, 1995.

President, Oxford Exchange Club – Prevention of Child Abuse, 1996-1998.

Board of Directors, Society of Environmental Toxicology and Chemistry, 1989-1991;

1995-2001. Executive Committee 1997-2000. Vice President 1998-1999. President 1999-2000.

Member, Expert Advisory Committee, Canadian Network of Toxicology Centres. Environment Canada and Health and Welfare, 1992-2000.

Chair, Expert Advisory Committee, Canadian Network of Toxicology Centres, Environment Canada and Health and Welfare, 1996-1999.

Who's Who Among America's Teachers, 7th ed. 2002. p. 400.

Certificate of Appreciation for Outstanding Service to the Society of Environmental Toxicology and Chemistry, 2003.

RESEARCH AND TEACHING INTERESTS:

Teaching Interests:

I have taught General Botany, General Biology Environmental Biology, Assessment of Water Quality, Water Quality Management, Environmental Analysis, Aquatic Toxicology, Limnology, Microbial Ecology, Radioisotopes, and Research Techniques, Aquatic Botany, Aquatic Microbiology, Sediment Toxicology, and Analysis of Biological Data, Ecological Risk Assessment, Plant Physiology, and Water Chemistry. My teaching interests also include: Plant Ecology, Wetland Ecology, and Phycology.

Research Interests:

Effects of heated effluents and other perturbations on primary productivity of vascular and non-vascular plants in terrestrial and aquatic systems.

In situ measurements of assimilatory sulfate reduction by periphytic organisms (algae, bacteria, and fungi), sulfur content and cycling in aquatic systems.

Physical models of aquatic systems as tools for the study of acute and chronic effects of industrial and power plant effluents on structural and functional aspects of aquatic microbial communities with emphasis on photosynthesis and sulfate assimilation.

Production, decomposition and role in nutrient cycling of aquatic macrophytes.

Impact of ash from industrial and power production processes on receiving systems and indigenous biota.

Decomposition and role of autochthonous and allochthonous detritus in aquatic and terrestrial systems with emphasis on the influences of macro-invertebrates, bacteria and

fungi.

Invasion rates, population dynamics and elemental accumulation of the Asiatic Clam (*Corbicula fluminea*).

Extracellular products and other organic compounds as regulating factors of structural and functional aspects of aquatic microbial communities.

Benthic metabolism and physical and biological sediment characterization (using SCUBA-implemented techniques) as an index of eutrophication rates.

Electron transport system activity of benthic microflora as a pollution monitoring tool.

Serum enzymes of fish as an indicator of the quality and quantity of mixed effluents and their effects on receiving systems.

Ecosystem responses to stress in aquatic systems; Ecological risk assessment.

Relationships between carbon quantity and quality in ecosystems.

Responses of microbes (algae, bacteria, and fungi) to magnetic fields.

Ecological impacts associated with pulp and paper mills.

Biology and ecology of *Taxodium distichum* (Bald cypress) swamps in the Southwest.

Development of models for integrated control of nuisance aquatic vegetation and aquatic ecosystem management.

Microcosms and mesocosms as tools for ecological and environmental research.

Reservoir limnology and eutrophication.

Secondary aquatic plant products and biocontrol of aquatic plants.

Bioavailability of xenobiotic chemicals (e.g. pesticides) to aquatic organisms.

Sediments as sources and sinks for contaminants in aquatic ecosystems.

Population biology and physiological ecology of aquatic plants.

Artificial Intelligence in ecological problem solving.

Constructed wetlands for rehabilitation and wastewater treatment.

Metal speciation and bioavailability.

ORGANIZATIONS:

American Society of Limnology and Oceanography, Ecological Society of America, American Water Resources Association, North American Benthological Society, Water Pollution Control Federation, Phi Sigma Society Alpha Psi (VPI&SU) Chapter, Sigma Xi (VPI&SU) Chapter, American Institute of Biological Sciences, American Association for Advancement of Science, Phi Kappa Phi (NTSU) Chapter, Aquatic Plant Management Society, Society of Environmental Toxicology and Chemistry.

OTHER PROFESSIONAL ACTIVITIES:

Consulting Aquatic Ecologist Microbiology Department, Clemson University, 1973-1975.

Investigator on Facilities Use Agreement #15 at Savannah River Laboratory in conjunction with Clemson University and VPI & SU, 1973-1975.

Consulting Aquatic Ecologist to American Electric Power Service Corporation, Canton, Ohio, 1974 - 1975.

Investigator on Facilities Use Agreement #28 at Savannah River Laboratory in conjunction with University of Texas, School of Public Health and VPI&SU, 1975 - 1979.

Consulting Microbial Ecologist to Bioengineering Research and Development Group, Oak Ridge National Laboratory, Oak Ridge, Tennessee, 1977.

Consulting Aquatic Ecologist to Virginia State Water Control Board, Richmond, 1977.

Invited lecturer in Plant Ecology and Environmental Biology, Botany Department, Clemson University, 1977.

Consulting Aquatic Ecologist to Center for Environmental Studies VPI&SU, 1978 - 1979.

Participant in Savannah River National Environmental Research Park meeting on Aquatic Research, Aiken, S.C., 1978.

Grant Proposal Review for the Division of Environmental Biology of the National Science Foundation, 1978 - 1987.

Consulting Aquatic Ecologist to Tennessee Eastman Company, Kingsport, Tennessee,

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1978 - 1979.

ETSU Research Development Committee Presidential Appointment 1978 - 1979.

Consulting Aquatic Ecologist to Victor Equipment Company, Denton, Texas, 1980 -1983.

Review of publications for American Society for Testing and Materials.

Consulting Aquatic Ecologist to Environmental Biology Group, Oak Ridge National Laboratory, Oak Ridge, Tennessee, 1980.

Gordon Research Conference Participant (Environmental Sciences - Water), 1980.

Participant in Workshop on the role of aquatic microcosms in evaluating ecosystem effects of chemicals under the Toxic Substances Control Act (USEPA sponsored), 1980.

NTSU representative to Texas Systems of Natural Laboratories. (Presidential Appointment), 1981 - 1986.

Consulting Aquatic Ecologist to Environmental Systems Branch, U.S. Environmental Protection Agency, 1981.

School of Community Service Computing Services Advisory Council (Dean's Appointment), 1981-1986.

NTSU Biosafety Committee (Presidential Appointment), 1980 - 1987.

Peer Review of Research Program for Environmental Systems Branch of the U.S. Environmental Protection Agency (with H.T. Odum), 1981.

Participant in Workshop on Modeling the Fate of Chemicals in the Aquatic Environment (USEPA sponsored), Pellston, MI, 1981.

Co-chaired session on Microcosm Testing in Aquatic Toxicology at the Society of Environmental Toxicology and Chemistry's Annual Meeting, Washington, D.C., 1981.

Elected to Editorial Board of Environmental Toxicology and Chemistry, 1981- 1983.

Research advisor to the Ecosystem Branch of the U.S. Environmental Protection Agency, Las Vegas, 1982.

Gordon Research Conference Participant (Environmental Sciences-Water), 1982.

President, Sigma Xi, NTSU Club, 1982-1983.

ATTACHMENT VII

Chair, Employment Service Committee of the Society of Environmental Toxicology and Chemistry, 1982 - 1984.

Review of manuscripts for Ecological Society of America, 1981 - present.

College of Arts and Sciences Committee on Interdisciplinary Research (Dean's Appointment), 1983.

Department of Biological Sciences Radiation Safety Officer, 1983 - 1987.

Participant, Workshop on Bioavailability of Chemicals from Dredged Materials (U.S. Army Corps of Engineers sponsored) Vicksburg, Mississippi, 1984.

Consulting Aquatic Ecologist to the City of Reno, Nevada, 1983 - Mitigation of Impacts of Population Growth and Development on Lake Tahoe, Truckee River and Pyramid Lake.

Consulting Aquatic Ecologist to the Las Colinas Development, 1983 - Impacts of Development on the Trinity River and Watershed.

School of Community Services Committee on Resources and Nontraditional Education (Dean's Appointment), 1983 - 1984.

Peer review of research programs of the Narragansett Bay, R.I., U.S. Environmental Protection Agency Research Laboratory (elected chairman of the review team), 1984.

North Texas State University Committee on Science and Technology (Presidential Appointment), 1984.

President, J.K. G. Silvey Society, North Texas State University, 1983 - 1984.

Invited Attendee, Society of Petroleum Industry Biologists, Annual Meeting, Houston, Texas, 1984.

Chair of the Annual Meeting of the Society of Environmental Toxicology and Chemistry, St. Louis, Missouri, Nov. 10-14, 1985.

Participant - Workshop on the Bioavailability of Sorbed Chemicals (U.S. Environmental Protection Agency and American Petroleum Institute sponsored) Florissant, Colorado, 1984.

Faculty Committee Member, Cooperative Education Program of the Institute of Applied Sciences, 1984.

Faculty Representative for the Sciences, elected to NTSU Faculty Senate, 1986.

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Served as Chairman of Placement Committee of Aquatic Plant Management Society, 1987.

Peer review of research programs of the Gulf Breeze, FL., U.S. Environmental Protection Agency Research Laboratory (with H. Bergman and K. Solomon), 1987.

Consulting aquatic ecologist to the City of Dallas (Water Utilities), Algal Workshop, 1987.

Consulting aquatic toxicologist to the American Petroleum Institute, Bioavailability of Chemicals Sorbed to Sediments, 1987.

Consulting aquatic ecologist to the Association of Central Oklahoma Governments, Use Attainability Study of Crutcho Creek and the North Canadian River, 1987.

Chair, Professional Opportunities Committee (Placement) of the Aquatic Plant Management Society, 1987.

Co-chair (with L. Goodman), Workshop on Mysid Culture and Testing, at the Eighth Annual Meeting of the Society of Environmental Toxicology and Chemistry, Pensacola, FL, 1987.

Co-chair, sessions on Perspectives of Water Quality-Based Permitting and Field Validation of Laboratory Results, at the Eighth Annual Meeting of the Society of Environmental Toxicology and Chemistry, Pensacola, FL, 1987.

Appointed to the South Carolina Aquatic Plant Management Commission, 1987.

Presented short courses on Aquatic Plant Management in Texas, 1987.

Presented seminars at short courses on Aquatic Plant Management in Florida, Ft. Lauderdale and Orlando, FL, 1987.

Advisor on American Petroleum Institute Study of Bioavailability of Sediment Bound Chemicals (with P. Chapman and C. Missimer), 1987 - 1988.

Participated in a Workshop on Mesocosm Research Sponsored by USEPA, Duluth, MN, 1987.

Promotion review team member for P.R. Parrish, Environmental Research Laboratory, Gulf Breeze, FL, 1987.

Chair, session on Sediment Criteria Development and Testing at the South Central Chapter Meeting of the Society of Environmental Toxicology and Chemistry, Houston, TX, 1987.

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- Scientific Advisory Group, Proctor and Gamble Corporation, Cincinnati, Ohio, 1988,
- Scientific Advisory Group, Botanical Research Institute of Texas (BRIT). Fort Worth, TX, 1988.
- Adjunct Faculty, University of Guelph. Guelph, Ontario, Canada, 1988-1990.
- Invited participant, North American Benthological Society Annual Meeting. Blacksburg, VA, May 22, 1990.
- Invited participant, Association of Southeastern Biologists Special Workshop on Teaching the Limnology Laboratory. Baltimore, MD, April 20, 1990.
- Invited participant, Aquatic Plant Management Meeting. Mobile, AL, July 16, 1990.
- Chair, Education Committee of the Society of Environmental Toxicology and Chemistry, 1989-1991.
- Chair, Professional Opportunities Committee of the Aquatic Plant Management Society, 1989-1991.
- Chair, Discussion session on Wetlands Toxicology At the Society of Environmental Toxicology and Chemistry Annual Meeting. Washington, D.C., November 12, 1990.
- Member, Aquatic Effects Dialogue Group of the Conservation Foundation, 1989-1991.
- Member, Advisory Group to the World Wildlife Fund, 1989-1991.
- Consulting Aquatic Ecologist and Toxicologist to Proctor and Gamble Company. Cincinnati, OH, 1989-1991.
- Served on a discussion panel on the Future of Aquatic Plant Management with emphasis on regulatory issues regarding herbicides at the 25th Annual Meeting of the Aquatic Plant Control Research Program - U.S. Army Corps of Engineers. Orlando, FL, November 26-30, 1990.
- Served on a discussion panel on the Future of Aquatic Plant Management with Emphasis on Simulation Technology and Modeling at the 25th Annual Meeting of the Aquatic Plant Control Research Program - U.S. Army Corps of Engineers. Orlando, FL. November 26-30, 1990.
- Consulting Aquatic Toxicologist, U.S. Environmental Protection Agency, Ecorisk Program evaluation. 1990-1991.

Consulting Aquatic Toxicologist, International Paper Company. 1990-1991.

Consulting Aquatic Toxicologist, State of Mississippi. 1990-1991.

Consulting Aquatic Toxicologist, Environment Canada, Health and Welfare Canada - Canadian Network of Toxicology Centers, Expert Advisory Committee. 1991- 2001.

Consulting Aquatic Toxicologist, Ecorisk Forum on the Rocky Mountain Arsenal Refuge Technical Expert Advisory Panel. 1991-1992.

Consulting Biologist and Ecotoxicologist, Arkansas Department of Higher Education and Arkansas State University Ph.D. Program Development. 1991- 1998.

Invited participant, Tiered Testing Issues for Freshwater and Marine Sediments, sponsored by U.S. EPA Office of Water and Office of Research and Development. Washington, D.C., September 16-18, 1992.

Invited speaker, Workshop on the Bioavailability and Toxicity of Copper, sponsored by the University of Florida, Center for Aquatic Plants. Gainesville, FL, September 2-3, 1992.

Peer reviewer for U.S. EPA, Framework for Ecological Assessment, Risk Assessment Forum. Washington, D.C., 1992 (EPA/130/R-92/001 - February 1992).

Invited speaker, 4th Annual Meeting of the Soil and Water Conservation Society. Baltimore, MD, August 9-12, 1992.

Participant, U.S. EPA Workshop on Bioaccumulation of Hydrophobic Chemicals. Washington, D.C., June, 1992.

Invited lecturer and participant, Young Scholars Program, NSF funded. Oxford, MS, 1992.

Counselor for summer interns with the Minorities Science Program, University of Mississippi funded. Oxford, MS, 1992.

Peer Review, Biology Peer Review Panel, U.S. EPA. Knoxville, TN, January, 1993.

Conference Co-organizer, First International Conference on Transport, Fate, and Effects of Silver in the Environment. University of Wisconsin, Madison, WI, August 8-10, 1993.

Chair, Exhibits Committee, 14th Annual Meeting of the Society of Environmental Toxicology and Chemistry. Houston, TX, November, 1993.

Consulting Aquatic Ecologist and Toxicologist to Weyerhaeuser Corporation. Columbus,

MS, 1994 – 1999.

Member, Student Scholarship Committee, Mid-South Aquatic Plant Mangement Society. 1994 – 1997.

OSHA Safety Course. Norco, LA, 1994. Joint Agency Task Force Member, Guntersville Project. Guntersville, AL, April, 1994.

Featured speaker, Seminar on Pollution Prevention for Silver Imaging Systems. Lake Buena Vista, FL. May, 1994.

Conference Organizer, Second International Conference on Transport, Fate and Effects of Silver in the Environment. University of Wisconsin, Madison, WI, September 11-14, 1994.

Chair - Subcommittee, National Institute of Environmental Health Sciences (NIEHS) - Superfund Hazardous Substances Basic Research Program. Research Triangle Park, NC, October 16-19, 1994.

Discussion Panel Participant, 2nd International Conference on Environmental Fate and Effects Of Bleached Pulp Mill Effluents. Vancouver, B.C., Canada, November, 1994.

Genetic Toxicology Course (Audit). Oxford, MS, 1995.

Board of Directors, Society of Environmental Toxicology and Chemistry (elected), 1995.

Participant, U.S. EPA Environmental Biology Review Panel. Fort Worth, TX, January, 1995.

Participant, Society of Environmental Toxicology and Chemistry Workshop on Wetlands. Butte, MT, August, 1995.

Conference Organizer, Third International Conference on Transport, Fate and Effects of Silver in the Environment. Washington, D.C., August, 1995.

Featured Speaker, 1995 Scholars Conference, University of Mississippi. Oxford, MS, October, 1995.

Participant, Society of Environmental Toxicology and Chemistry Workshop on Whole-Effluent Toxicology. Pellston, MI, October, 1995.

Invited Participant, Round Table Discussion of Surfactant Toxicity in Aquatic Systems. Thornton, England, May, 1996.

Keynote Speaker, Mid-South Society of Environmental Toxicology and Chemistry

(inaugural meeting). Memphis, TN, May, 1996.

Invited Speaker on Endocrine Disruption, Seminar on Emerging Water Issues, International Paper Company. Memphis, TN, June, 1996.

Instructor, Short Course on Constructed Wetlands, U.S. Army Waterways Experiment Station. Berkeley, CA. July, 1996.

Short Course on Constructed Wetland Design and Monitoring. Houston, TX, July, 1996.

Conference Organizer, Fourth International Conference on Transport, Fate and Effects of Silver in the Environment. Madison, WI, August, 1996.

Friends of Lake Keowee (FOLKS), Board of Directors (elected) and Member of the Technical Committee, 2003-present.

Bob C. Campbell Geology Museum, Clemson University, Board of Directors Member, 2003-present.

Associate Editor, Journal of Toxicology and Environmental Health Part B : Critical Reviews. 1999-2006.

Chair, Science Advisory Panel for the California Environmental Protection Agency – Aquatic Pesticides Committee, 2002-present.

Member, Science Advisory Panel, USDA Jimmy Carter Plant Materials Center, Americus, GA. 2003-present.

Member, Science Advisory Panel for the USEPA/ SETAC Whole Effluent Toxicity Testing Committee, 1998-2004.

Member, Science Advisory Panel for Proposal and Research Review, Water Environment Federation, 2001-present.

Member, Science Advisory Panel for the National Council for Air and Stream Improvement – Long Term Receiving Water Studies, 1999-present.

Member, Board of Directors – Aquatic Plant Management Society, (elected) 2003-2006.

Co-editor (with Dr. J.W. Castle), Special Issue of Environmental Geoscience on Constructed Wetland Treatment Systems

Member, Board of Directors – South Carolina Aquatic Plant Management Society, (elected) 2007-2009.

Chair, Peer Review Panel, Canadian Foundation for Innovation 2009

BOOKS, BOOK
CHAPTERS, AND
MONOGRAPHS

M.Sc. Thesis: Rodgers, J.H., Jr. 1974. Thermal Effects on Primary Productivity of Phytoplankton, Periphyton, and Macrophytes in Lake Keowee, S.C. Botany Department, Clemson University. 88 pp.

Bi-weekly in situ determinations of Carbon-14 assimilation rates were made using SCUBA and chambers in a reservoir receiving thermal effluent from a nuclear power plant. Emphasis was placed upon relative contributions of each group of plants to the overall lake productivity and statistical correlations of productivity with water temperatures (1972-1974).

Ph.D. Dissertation: Rodgers, J.H., Jr. 1977. Aufwuchs Communities of Lotic Systems: Nontaxonomic Structure and Function. Biology Department and Center for Environmental Studies, VPI&SU. 336 pp.

Six model streams were constructed to assess effects of typical industrial and municipal effluents on primary productivity, assimilatory sulfate reduction and structural aspects of assemblages of attached microorganisms. Net microbial productivity of aufwuchs and primary productivity were estimated by assimilatory (S35) sulfate reduction and carbon-14 fixation, respectively, with heterotrophic productivity being the difference. Concurrent laboratory studies verified the efficacy of these procedures. The ability of methods to discern perturbations was tested. Direct correlations between structural measurements and functions were ascertained by regression analysis. Field investigations of aufwuchs communities were inconclusive due to variability and the heterogeneous distribution of aufwuchs communities (1974 - 1977).

Guthrie, R.K., D.S. Cherry, and J.H. Rodgers, Jr. 1974. The Impact of Ash Basin Effluent on Biota in the Drainage System. *Proc. Seventh Mid-Atlantic Industrial Waste Conference*: pp. 17-43. Drexel University, Philadelphia, Pa.

Dickson, K.L., J. Cairns, Jr., J.R. Clark and J.H. Rodgers, Jr. 1978. Evaluating Pollution Stress on Ecosystems. In: K.C. Flynn and W.T. Mason (eds.) *The Freshwater Potomac - Aquatic Communities and Environmental Stress*. The Interstate Commission on the Potomac River Basin, Rockville, Maryland. pp. 80 - 83.

Rodgers, J.H., Jr., D.S. Cherry, K.L. Dickson, and J. Cairns, Jr. 1979. Invasion, Population Dynamics and Elemental Accumulation of *Corbicula fluminea* in the New

River at Glen Lyn, Virginia. In: *Proc. First International Corbicula Symposium* J.C. Britton (ed.). Texas Christian University Research Foundation Publishers, Fort Worth, TX, pp. 99-110.

Rodgers, J.H., Jr., K.L. Dickson, and J. Cairns, Jr. 1979. A Review and Analysis of Some Methods Used to Measure Functional Aspects of Periphyton. In: R.L. Weitzel (ed.) *Methods and Measurements of Periphyton Communities: Review*. American Society for Testing and Materials, Philadelphia, Pennsylvania (ASTM STP 690), pp. 142-167.

Rodgers, J.H., Jr., D.S. Cherry, R.L. Graney, K.L. Dickson, and J. Cairns, Jr. 1980. Comparison of Heavy Metal Interactions in Acute and Artificial Stream Bioassay Techniques for the Asiatic Clam (*Corbicula fluminea*). In: J.G. Eaton, P.R. Parish, and A.C. Hendricks (eds.) *Aquatic Toxicology*. American Society for Testing and Materials, Philadelphia, PA. (ASTM STP 707), pp. 266-280.

Cherry, D.S., J.H. Rodgers, Jr., R.L. Graney, and J. Cairns, Jr. 1980. *Dynamics and Control of the Asiatic Clam in the New River, Virginia*. Bulletin 123, Virginia Water Resources Research Center. Virginia Polytechnic Institute and State University, Blackburg, VA. 72 pp.

Dillon, C.R. and J.H. Rodgers, Jr. 1980. *Thermal Effects on Primary Productivity of Phytoplankton, Periphyton, and Macrophytes in Lake Keowee*. S.C. Technical Report No. 81, Clemson University Water Resources Research Institute, Clemson, S.C. 115 pp.

Rodgers, J.H., Jr., J.R. Clark, K.L. Dickson, and J. Cairns, Jr. 1980. Nontaxonomic analyses of structure and function of aufwuchs communities in lotic microcosms. In: J.P. Geisy, Jr. (ed.) *Microcosms in Ecological Research*. USDOE (CONF-781101) pp. 625-643.

Lee, C.M., H. Bergman, W. Wood, and J.H. Rodgers, Jr. 1982. Workshop Summary and Conclusions. In: K.L. Dickson, A.W. Maki and J. Cairns, Jr. (eds.) *Modeling the Fate of Chemicals in the Aquatic Environment*, Ann Arbor: Ann Arbor Science Publ. pp. 397-407.

Cairns, J., Jr., A.L. Buikema, Jr., D.S. Cherry, E.E. Herricks, R.A. Matthews, B.R. Neiderlahner, J.H. Rodgers, Jr. and W.H. Van der Schalie. 1982. *Biological Monitoring in Water Pollution*. Pergamon Press: New York. 116 pp.

Rodgers, J.H., Jr., M.E. McKeivitt, D.O. Hammerland, K.L. Dickson and J. Cairns, Jr. 1983. Primary production and decomposition of submergent and emergent aquatic plants of two Appalachian rivers. In: T.D. Fontaine III and S.M. Bartell (eds.) *Dynamics of Lotic Ecosystems*. Ann Arbor Science Publ. pp. 298-301.

Staples, C.A., K.L. Dickson, F.Y. Saleh, and J.H. Rodgers, Jr. 1983. A microcosm study

- of lindane and naphthalene partitioning for model validation. In: W. Bishop, R.D. Caldwell, and B.B. Heidolph (eds.) *Aquatic Toxicology and Hazard Assessment*. STP 802 ASTM Publications, Philadelphia, PA. pp. 26-41.
- Rodgers, J.H., Jr. K.L. Dickson, and M.J. Defoer. 1983. Bioconcentration of lindane and naphthalene in bluegills (*Lepomis macrochirus*). In: W. Bishop, R.D. Cardwell, and B.B. Heidolph (eds.) *Aquatic Toxicology and Hazard Assessment*. STP 802. ASTM Publications, Philadelphia, PA. pp. 300-311.
- Saleh, F.Y., K.L. Dickson, and J.H. Rodgers, Jr. 1984. Transport Processes of Naphthalene in the Aquatic Environment. In: L. Pawlowski, A.J. Verdier, and W.J. Lacy (eds.) *Chemistry for Environmental Protection*. Elsevier Publisher. pp. 119-131.
- Vance, B.D. and J.H. Rodgers, Jr. 1984. *General Botany*, 2nd Ed. Hunter Textbooks, Inc., Winston - Salem, NC. 93 pp.
- Staples, C.A., K.L. Dickson, J.H. Rodgers, Jr., and F.Y. Saleh. 1985. A Model for Predicting the Influence of Suspended Sediments on Bioavailability of Neutral Organics in the Water Compartment. In: R.D. Cardwell, R.C. Bahner and R.E. Purdy (eds.) *Aquatic Toxicology and Hazard Assessment*. ASTM STP 845, ASTM Philadelphia, PA. pp. 417-428.
- Dickson, K.L. and J.H. Rodgers, Jr. 1985. Assessing the Hazards of Effluents in the Aquatic Environment. In: H. Bergman, A. Maki and R. Kimerle (eds.) *Assessing the Hazards of Effluents to Aquatic Life*. Pergamon Press.
- Rodgers, J.H., Jr., K.L. Dickson, F.Y. Saleh, and C.A. Staples. 1987. Bioavailability of Sediment-bound Chemicals to Aquatic Organisms; Some Theory, Evidence and Research Needs. In: K.L. Dickson, A.W. Maki and W.A. Brungs (eds.) *Fate and Effects of Sediment-Bound Chemicals in Aquatic Systems*. Pergamon: Elmsford, N.Y. pp. 245-266.
- Anderson, J., W. Birge, J. Gentile, J. Lake, J.H. Rodgers, Jr. and R. Swartz. 1987. Biological Effects, Bioaccumulation, and Ecotoxicology of Sediment-associated Chemicals. In: K.L. Dickson, A.W. Maki, and W.A. Brungs (eds.) *Fate and Effects of Sediment-Bound Chemicals in Aquatic Systems*. Pergamon: Elmsford, N.Y. pp. 267-296.
- Rodgers, J.H. Jr., P.A. Clifford and R.M. Stewart. 1991. Enhancement of HERBICIDE, the Aquatic Herbicide Fate and Effects Model. In: *Proceedings, 25th Annual Meeting, Aquatic Plant Control Research Program*. Misc. Paper A-91-3. pp. 279-282. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
- Rodgers, J.H. Jr. 1991. Herbicide Registration for Aquatic Use: A Look to the Future. In: *Proceedings, 25th Annual Meeting, Aquatic Plant Control Research Program*. Misc.

Paper A-91-3. pp. 245-248. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Graney, R.L., J.H. Kennedy and J.H. Rodgers, Jr. (eds.). 1993. *Aquatic Mesocosm Studies in Ecological Risk Assessment*. Lewis Publishers, Boca Raton, FL. 723 pp.

Rodgers, J.H., Jr., A.W. Dunn and A.B. Jones. 1993. Triclopyr Concentrations in Eurasian Watermilfoil: Uptake Under Differing Exposure Scenarios. In: *Proceedings, 28th Annual Meeting, Aquatic Plant Control Research Program*. Misc. Paper A-94-2. pp. 249-259. U.S. Army Waterways Experiment Station, Baltimore, MD. November 15-18, 1993.

Rodgers, J.H., Jr. and A.W. Dunn. 1994. TVA - Guntersville Reservoir Herbicide Monitoring Survey 1991-1992. A Report to the Tennessee Valley Authority and U.S. Army Corps of Engineers Joint Agency Program. 116 p.

Solomon, K., D. Bright, P. Hodson, K.-J. Lehtinen, B. McKague and J. Rodgers, Jr. 1999. Evaluation of ecological risks associated with the use of chlorine dioxide for the bleaching of pulp. Report prepared for the Alliance for Environmental Technology. 86 pp.

Rodgers, J.H., Jr. and J.F. Thomas. 2004. Evaluations of the Fate and Effects of Pulp and Paper Mill Effluents from a Watershed Multistressor Perspective: Progress to Date and Future Opportunities. In: *Pulp and Paper Mill Effluent Environmental Fate and Effects*. D. L. Borton, T. J. Hall, R.P. Fisher, and J.F. Thomas (eds.). DEStech Publications, Lancaster, PA. pp.135-146.

PAPERS AND PUBLICATIONS:

Rodgers, J.H., Jr., G.L. Powell, and J.F. Geldard. 1973. Triple-label Liquid Scintillation Radioassay: Possible or Impossible? Seventh Annual Regional Meeting (Oct . 5) Wilmington, N.C. 43 pp.

Rodgers, J.H., Jr. and R.S. Harvey. 1976. The Effect of Current on Periphyton Productivity Determined Using Carbon-14. *Water Res. Bull.* 12(6): 1109-1118.

Cherry, D.S., R.K. Guthrie, J.H. Rodgers, Jr., K.L. Dickson, and J. Cairns, Jr. 1976. Responses of Mosquito Fish (*Gambusia affinis*) to Ash Effluent and Thermal Stress. *Trans. Am. Fish Soc.* 105(6):686-694.

Rodgers, J.H., Jr., D.S. Cherry, J.R. Clark, K.L. Dickson, and J. Cairns, Jr. 1977. The

Invasion of Asiatic Clam, *Corbicula manilensis* (Philippi), in the New River, Virginia. The Nautilus 91(2):43-46.

Rodgers, J.H., Jr., D.S. Cherry, and R.K. Guthrie. 1978. Cycling of Elements in Duckweed (*Lemna perpusilla* Torrey) of an Ash Settling Basin and Swamp Drainage System. Water Research 12:765-770.

Rodgers, J.H., Jr., K.L. Dickson, and J. Cairns, Jr. 1978. A Chamber for *In Situ* Measurement of Primary Productivity and Other Functional Processes of Periphyton in Lotic Systems. Arch. Hydrobiol. 84(3):389-398.

Clark, J.R., J.H. Rodgers, Jr., K.L. Dickson, and J. Cairns, Jr. 1980. Using Artificial Streams to Evaluate Perturbation Effects on Aufwuchs Structure and Function. Water Res. Bull. 16(1):100-104.

Graney, R.L., D.S. Cherry, J.H. Rodgers, Jr., and J. Cairns. 1982. The Influence of Thermal Discharges and Substrate Composition on the Population Structure and Distribution of the Asiatic Clam, *Corbicula fluminea*, in the New River, Virginia. The Nautilus 94(4):130-135.

Matthews, R.A., A.L. Buikema, J. Cairns, Jr. and J.H. Rodgers, Jr. 1982. Biological Monitoring Part IIA Receiving System Functional Methods, Relationships and Indices. Water Res. 16:129-139.

Saleh, F.Y., K.L. Dickson, and J.H. Rodgers, Jr. 1982. Fate of Lindane in the Aquatic Environment: Rate Constants of Physical and Chemical Processes. Environ. Toxicol. Chem. 1:289-297.

Dickson, K.L. and J.H. Rodgers, Jr. 1982. Assessing the Hazards of Effluents in the Aquatic Environment. In: H.L. Bergman, R.A. Kimerle and A.W. Maki (eds.) Environmental Hazard Assessment of Effluents. New York: Pergamon Press.

Rodgers, J.H., Jr., K.L. Dickson, F.Y. Saleh, and C.A. Staples. 1983. Use of Microcosms to Study Transport, Transformation and Fate of Organics in Aquatic Systems. Environ. Toxicol. Chem. 2:155-167.

Reinert, K.H. and J.H. Rodgers, Jr. 1984. Influence of Sediment Types on the Sorption of Endothall. Bulletin of Environmental Contamination and Toxicology. 32:557-564.

Rodgers, J.H., Jr., K.H. Reinert, and M.L. Hinman. 1984. Water Quality Monitoring in Conjunction with the Pat Mayse Lake Aquatic Plant Management Program. In: Proceedings, 18th Annual Meeting, Aquatic Plant Control Research Program. November 14-17, 1983. Raleigh, NC. U.S. Army Corps of Engineers. Misc. Paper A-84-4. pp.17-24.

Reinert, K.H., S. Stewart, M.L. Hinman, J.H. Rodgers, Jr., and T.J. Leslie. 1985. Release

- of Endothall from AQUATHOL GRANULAR AQUATIC HERBICIDE. *Water Research* 19:805-808.
- Reinert, K.H., J.H. Rodgers, Jr., M.L. Hinman, and T.J. Leslie. 1985. Compartmentalization and Persistence of Endothall in Experimental Pools. *Ecotoxicology and Environmental Safety* 10:86-96.
- Reinert, K.H., J.H. Rodgers, Jr., T.J. Leslie, and M.L. Hinman. 1986. Static Shake-Flask Biotransformation of Endothall. *Water Research*. 20:255-258.
- Reinert, K.H. and J.H. Rodgers, Jr. 1984. Validation Trial of Predictive Fate Models Using and Aquatic Herbicide (Endothall). *Environmental Toxicology and Chemistry* 5:449-461.
- Saleh, F.Y., K.L. Dickson, J.H. Rodgers, Jr. and C.A. Staples. 1985. Fate of Naphthalene in the Aquatic Environment. *Environmental Toxicology and Chemistry* 6: 449-461.
- Jop, K.M., J.H. Rodgers, Jr., P.B. Dorn and K.L. Dickson. 1985. Use of Hexavalent Chromium as a Reference Toxicant in Aquatic Toxicity Tests. In Tim Poston and R. Purdy (eds.) *Aquatic Toxicology and Environmental Fate* ASTM STP 921, American Society for Testing and Materials, pp. 390-403.
- Dorn, P.B., J.H. Rodgers, Jr., K.M. Jop, J.C. Raia and K.L. Dickson. 1987. Hexavalent Chromium as a Reference Toxicant in Effluent Toxicity Tests. *Environmental Toxicology and Chemistry* 6:435-444.
- Reinert, K.H., P.M. Rocchio, and J.H. Rodgers, Jr. 1986. Parameterization of Predictive Fate Models: A Case Study. *Environmental Toxicology and Chemistry* 6:99-104.
- Jop, K.M., J.H. Rodgers, Jr. E.E. Price, and K.L. Dickson. 1986. Renewal Device for Test Solutions in *Daphnia* Toxicity Tests. *Bull. Environ. Contam. Toxicol.* 36: 95-100.
- Hall, W.S., K.L. Dickson, F.Y. Saleh, J.H. Rodgers, Jr., D. Wilcox and A. Entazami. 1986. Effects of Suspended Solids on the Acute Toxicity of Zinc to *Daphnia magna* and *Pimephales promelas*. *Water Res. Bull.* 22(6):913-920.
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- Hall, W.S., K.L. Dickson, F.Y. Saleh and J.H. Rodgers, Jr. 1986. Effects of Suspended Solids on the Bioavailability of Chlordane To *Daphnia magna*. *Arch. Environ. Contam. Toxicol.* 15:529-534.
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- Statistical Approach to Assess Factors Affecting Water Chemistry Using Monitoring Data. *Wat. Res. Bull.* 24:1017-1026.
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- Reinert, K.H. and J.H. Rodgers, Jr. 1987. Fate and persistence of aquatic herbicides. *Reviews of Environmental Contamination and Toxicology* 98:61-98.
- Reinert, K.H., M.L. Hinman, and J. H. Rodgers, Jr. 1988. Fate of Endothall During the Pat Mayse Lake (Texas) Aquatic Plant Management Program. *Archives of Environmental Contamination and Toxicology* 17:195-199.
- Davis, T.M., B.D. Vance, and J.H. Rodgers, Jr. 1988. Productivity Responses of Periphyton and Phytoplankton to Bleach-kraft Mill Effluent. *Aquatic Toxicology* 12:83-106.
- Rodgers, J.H., Jr., P.A. Clifford, and R. M. Stewart. 1988. Development of A Coupled Herbicide Fate and Target Plant Species Effects Model (FATE). Proceedings, 22nd Annual Meeting, Aquatic Plant Control Research Program.
- Parkerton, T.F., S.M. Stewart, K.L. Dickson, J.H. Rodgers, Jr., and F.Y. Saleh. 1988. Evaluation of the Indicator Species Procedure for Deriving Site-Specific Water Quality Criteria for Zinc. *Aquatic Toxicol and Hazard Assess.:10th Vol, ASTM STP 971.* Philadelphia. pp. 423-435.
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- Suedel, B.C. and J.H. Rodgers, Jr. 1991. Variability of Bottom Sediment Characteristics of the Continental United States. *Water Res. Bull.* 27:101-109.
- Suedel, B.C., J.H. Rodgers, Jr. and P.A. Clifford. 1993. Bioavailability of Fluoranthene in Freshwater Sediment Toxicity Tests. *Environ. Toxicol. Chem.* 12:155-165.
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J.H. Rodgers, Jr. and B.M. Johnson. 2008. *Lyngbya* in Kings Bay/Crystal River, FL.: Management Implications. Presented at the 32nd Annual Meeting of the Florida Aquatic Plant Management Society. Oct. 13-16, 2008. Daytona Beach, FL.

Rodgers, John H., Jr. 2008. Algae ID, Problems and Control. Presented at the Short Course on Pond Management. Nov. 5, 2008. NC State University, Mountain Horticultural Crops Research & Extension Center, Mills River, NC.

J. Rodgers, Jr., L. Fuentes, L.J. Moore, W. Bowerman, G. Yarrow, W. Chao and K. Leith. 2008. Ecological risk assessment for anuran species and Roundup[®] herbicides: Laboratory studies. Presented at the 29th Annual Meeting of the Society of Environmental Toxicology and Chemistry. Nov. 16-20, 2008. Tampa, FL.

W.M. Bishop, B.M. Johnson and J. Rodgers, Jr. 2008. Comparative responses of seven algal species to exposures of a copper-based algaecide. Presented at the 29th Annual Meeting of the Society of Environmental Toxicology and Chemistry. Nov. 16-20, 2008. Tampa, FL.

L.J. Moore, L. Fuentes, J. Rodgers, Jr., W. Bowerman, G. Yarrow, W. Chao and K. Leith. 2008. Comparative toxicity of the original formulation of Roundup[®] herbicide to three anuran species in laboratory tests. Presented at the 29th Annual Meeting of the Society of Environmental Toxicology and Chemistry. Nov. 16-20, 2008. Tampa, FL.

L. Fuentes, L.J. Moore, J. Rodgers, Jr., W. Bowerman, G. Yarrow, W. Chao and K. Leith. 2008. Role of sediments in modifying the toxicity of Roundup WeatherMax[®] to anuran species: A laboratory study. Presented at the 29th Annual Meeting of the Society of Environmental Toxicology and Chemistry. Nov. 16-20, 2008. Tampa, FL.

V. Molina, B.M. Johnson, W.M. Bishop, J. Rodgers, Jr. and A.R. Johnson. 2008. Evaluation of methods for cell disruption and microcystin measurement in *Microcystin aeruginosa*. Presented at the 29th Annual Meeting of the Society of Environmental Toxicology and Chemistry. Nov. 16-20, 2008. Tampa, FL.

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J. Horner, P. Pham, J.W. Castle, J.H. Rodgers, Jr., C. Murray-Gulde and J.E. Myers. 2008. Performance of a pilot-scale constructed wetland treatment system for beneficial reuse of oil field produced water. Presented at the 29th Annual Meeting of the Society of Environmental Toxicology and Chemistry. Nov. 16-20, 2008. Tampa, FL.

Bishop, W.M., B.M. Johnson and J.H. Rodgers, Jr. 2009. Targeted management of problematic algae. Presented at the 10th Annual Meeting of the Northeast Aquatic Plant Management Society. Jan. 19-21, 2009. Saratoga Springs, NY.

J.H. Rodgers, Jr., B.M. Johnson and W.M. Bishop. 2009. Do algae spill their guts when treated with algaecides?: A look at the data and implications for decision making. Presented at the 10th Annual Meeting of the Northeast Aquatic Plant Management Society. Jan. 19-21, 2009. Saratoga Springs, NY.

B.M. Johnson and J.H. Rodgers, Jr. 2009. A risk and management assessment for *Lyngbya wollei* in Kings Bay/Crystal River, Florida. Presented at the 10th Annual Meeting of the Northeast Aquatic Plant Management Society. Jan. 19-21, 2009. Saratoga Springs, NY.

J.H. Rodgers, Jr., B.M. Johnson and W.M. Bishop. 2009. Do algae spill their guts when treated with algaecides?: A look at the data and implications for decision making. Presented at the 29th Annual Meeting of the Midwest Aquatic Plant Management Society. March 1-4, 2009. Lisle, IL.

Bishop, W.M., B.M. Johnson and J.H. Rodgers, Jr. 2009. Targeted management of problematic algae. Presented at the 29th Annual Meeting of the Midwest Aquatic Plant Management Society. March 1-4, 2009. Lisle, IL.

B.M. Johnson and J.H. Rodgers, Jr. 2009. A risk and management assessment for *Lyngbya wollei* in Kings Bay/Crystal River, Florida. Presented at the 29th Annual Meeting of the Midwest Aquatic Plant Management Society. March 1-4, 2009. Lisle, IL.

Rodgers, J.H., Jr., J.W. Castle, J. Horner, M. Spacil, D. Eggert, B. Alley, A. Beebe, P. Pham, Y. Song, J.E. Myers, C. Murray Gulde, M. Huddleston, and D. Mooney. 2009. Constructed wetland treatment systems for renovation of energy produced water for beneficial reuse. Presented at the 17th Annual David S. Snipes/Clemson Hydrogeology Symposium. April 2, 2009. Clemson, SC.

Horner, J., M.P. T. Pham, S. Chandler, J.W. Castle, J.H. Rodgers, Jr., C. Murray Gulde and J.E. Myers. 2009. Performance of a pilot-scale constructed wetland treatment system for beneficial reuse of oilfield produced water. Presented at the 17th Annual David S. Snipes/Clemson Hydrogeology Symposium. April 2, 2009. Clemson, SC.

Spacil, M. and J.H. Rodgers, Jr. 2009. Treatment of selenium in simulated refinery effluent using a pilot-scale constructed wetland treatment system. Presented at the 17th Annual David S. Snipes/Clemson Hydrogeology Symposium. April 2, 2009. Clemson, SC.

Attachment VIII

Badin Lake
Fish Consumption Advisory
Photos

ATTACHMENT VIII

1

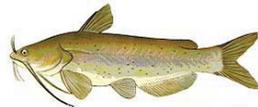


2



3

Badin Lake Fish Consumption Advisory



Catfish (*Bagre*)



Largemouth Bass (*Huro/ Róbalo de boca grande*)

Do not eat more than one (1) meal a week of catfish or largemouth bass from Badin Lake. If you are pregnant, may become pregnant, are nursing, or are a child under 15 years of age, do not eat any of these fish. Elevated levels of polychlorinated biphenyls (PCBs) have been found in some catfish and largemouth bass. Swimming, boating, and handling fish do not present a known health risk.

Health Effects of PCBs

Eating more than one meal a week of these fish may increase a person's risk of developing health problems such as cancer, infection, or skin problems. The babies of pregnant or nursing women who eat these fish may experience developmental or other health problems.

**For more information contact:
N.C. CARELINE at 1-800-662-7030**

For other fish advisories in your area, see the N.C. Division of Public Health website, www.epi.state.nc.us/epi/fish.

No coma más de una porción del pez bagre o huro/róbalo de boca grande a la semana del Lago Badin. No coma ninguno de estos peces, si está embarazada, podría quedar embarazada, está amamantando, o es un niño/a menor de 15 años. Niveles elevados de bifenilos policlorados (BPCs) se han encontrado en algunos peces bagre y el huro/róbalo de boca grande. El nadar, pasear en bote o tocar los peces no presenta un riesgo conocido para la salud.

Efectos a la Salud de los BPCs

El comer más de una porción de estos peces a la semana puede aumentar el riesgo de desarrollar problemas de salud como cáncer, infección, o problemas de la piel. Los bebés de mujeres embarazadas o amamantando que comen estos peces pueden tener retrasos en el desarrollo u otros problemas de salud.

**Para más información comuníquese con:
N.C. CARE-LINE al 1-800-662-7030**

Vea la página electrónica de la División de Salud Pública de Carolina del Norte para información de otros avisos de consumo de pescado en su área, www.ncdhhs.gov/espanol.



Dr. Jeffrey P. Engel, State Health Director

5/15/09

Attachment IX

Petition for Contested Case Hearing filed by APCI
with the North Carolina Office of Administrative
Hearings regarding the Badin Lake fish advisory in
that contested case, entitled *Alcoa Power Generating
Inc. v. N.C. Dep't of Health & Human Services & its
Div. of Pub. Health*, No. 09-DHR- 2505 (North
Carolina Office of Administrative Hearings,
filed April 9, 2009)

ATTACHMENT IX

PLEASE PRINT CLEARLY OR TYPE

STATE OF NORTH CAROLINA
COUNTY OF STANLY

FILED

IN THE OFFICE OF
ADMINISTRATIVE HEARINGS

ALCOA POWER GENERATING INC.,

PETITIONER,

v.

NORTH CAROLINA DEPARTMENT OF HEALTH AND HUMAN
SERVICES and its DIVISION OF PUBLIC HEALTH,

RESPONDENT.

ADMINISTRATIVE HEARINGS

PETITION
FOR A
CONTESTED CASE HEARING

Petitioner Alcoa Power Generating Inc. ("APGI") hereby asks for a contested case hearing as provided for by North Carolina General Statute § 150B-23, regarding and in response to the fact that, on or after February 11, 2009, Respondent North Carolina Department of Health and Human Services ("DHHS") and its Division of Public Health ("DPH") issued a Fish Consumption Advisory (the "Advisory") concerning the consumption of catfish and largemouth bass caught in the waters of Narrows Reservoir (also referred to as "Badin Lake") located in Stanly, Montgomery and Davidson Counties (the "Lake"). The version of the Advisory posted on the internet can be found as the first of the site-specific advisories listed at <http://www.epi.state.nc.us/epi/fish/current.html>. Additional facts and allegations in support of this petitioner are stated in attached additional pages.

Because of these facts, the State agency or board has:

- deprived me of property;
- ordered me to pay a fine or civil penalty; or
- otherwise substantially prejudiced my rights;

AND

- exceeded its authority or jurisdiction;
- acted erroneously;
- failed to use proper procedure;
- acted arbitrarily or capriciously; or
- failed to act as required by law or rule.

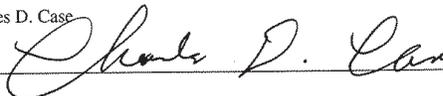
Date: April 9, 2009

Your phone number: (919) 899-3000

Print your full address: P.O. Box 109, Raleigh, North Carolina 27602

Print your name: Charles D. Case

Your signature:



You must mail or deliver a COPY of this Petition to the State agency or board named on line (3) of this form. You should contact the agency or board to determine the name of the person to be served.

CERTIFICATE OF SERVICE

I certify that this Petition has been served on the State agency or board named below by depositing a copy of it with the United States Postal Service with sufficient postage affixed OR by delivering it to the named agency or board:

Emery Edwards Milliken, North Carolina Department of Health and Human Services, Division of Public Health
(name of person served)

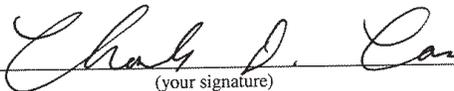
2001 Mail Service Center
(street address/p.o. box)

Raleigh
(city)

N.C.
(state)

27699-2001
(zip code)

This the 9th day of April, 2009.



(your signature)

When you have completed this form, you MUST mail or deliver the ORIGINAL AND ONE COPY to the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, NC 27699-6714.

**ATTACHMENT TO THE
PETITION FOR CONTESTED CASE HEARING
FILED BY ALCOA POWER GENERATING INC. v.
NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
AND ITS DIVISION OF PUBLIC HEALTH
(page 1 of 4)**

This document is attached to (and made a part of) a petition for contested case hearing filed by Petitioner Alcoa Power Generating Inc. (“APGI”) against respondent North Carolina Department of Health and Human Services (“DHHS”) and its Division of Public Health (“DPH”). As noted therein, the Petition requests a contested case hearing to contest and otherwise appeal a fish consumption advisory (the “Advisory”) issued by DPH and DHHS on or after February 11, 2009. The version of the Advisory posted on the internet can be found as the first of the site-specific advisories listed at <http://www.epi.state.nc.us/epi/fish/current.html>.

Summary and Overview

The Advisory purports to communicate to the public the presence of chemicals in catfish and largemouth bass (“Covered Fish”) located in the waters of Narrows Reservoir (also referred to as “Badin Lake”) located in Stanly, Montgomery and Davidson Counties, and, purportedly on that basis, indicates that members of the public should either limit their consumption of those Covered Fish, or avoid eating the Covered Fish altogether. In addition, DHHS and DPH (“Respondent”), based on the Advisory, are arranging for the manufacture of signs (“Advisory Signs”) that will repeat the substance of the information contained in the Advisory, and are also arranging for the posting of those Advisory Signs at various locations around Badin Lake. By virtue of the issuance of the Advisory and the posting of the Advisory Signs, and the impacts of those actions as discussed herein, APGI is an aggrieved person within the meaning of G.S. 150B-2(6) and other provisions of the Administrative Procedure Act (“APA”), because the Advisory and Advisory Signs directly and indirectly affect Petitioner substantially in its property and has otherwise substantially prejudiced APGI’s rights.

APGI is appealing the Advisory because Respondent changed its evaluation criteria and held Badin Lake to a different standard than other North Carolina lakes and rivers that have been tested and shown to have similar conditions. Specifically, DPH has never before issued a fish advisory based on the findings in a single fish with slightly elevated levels, but that is what DPH did with largemouth bass in Badin Lake. The failure to use consistent evaluation criteria calls into question the confidence the public will place in fish advisories issued by DPH. For the reasons set out below and elsewhere herein, a fish advisory was not warranted and has, upon information and belief, created misimpressions and unnecessary and unjustified concerns among the public and also potentially harms APGI without justification.

While APGI respects Respondent’s duty and desire to protect the public health and inform the public of purported risks, APGI does not believe that an arbitrary and misleading Advisory can or should be allowed to go unchallenged. This Advisory adversely affects the public’s ability to fully utilize the recreational benefits of Badin Lake without undue concern. By failing to use procedures to gather and analyze data that are well-established and have been used consistently for fish advisories at other lakes within the State, the Respondent has done a disservice to the citizens of Stanly, Montgomery, and Davidson Counties (as well as other North Carolinians) who wish to use and enjoy Badin Lake without undue apprehension.

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Background

APGI owns and operates the hydroelectric dam that created Badin Lake (“Dam”) pursuant to a license granted to it (“FERC License”) by the Federal Energy Regulatory Commission (“FERC”) for the Yadkin Hydroelectric Project No. 2197 (“Project”). The Dam is one of four (4) dams and the associated impoundments along the Yadkin River included in the Project. APGI also owns certain lands and property rights that it purchased for the creation of Badin Lake and that are now either submerged under or adjacent to Badin Lake. These lands are included within the boundary of the Project and are covered by the FERC License (the “Project Lands”). APGI has certain responsibilities under the FERC License and the related statutory provisions, rules and regulations (the “FERC Requirements”) including by way of example, but not by way of limitation, providing reasonable public access for recreational and other activities on the lakes within the Project including Badin Lake.

The inaccuracies and impacts of the Advisory and the Advisory Signs on APGI arise because of errors that Respondent made in reaching the decision to issue the Advisory. Among other things, Respondent:

- (a) as part of the public process stated in writing that it would base the decision to issue the Advisory on the average level of concentration, then failed to follow its self-described standards and procedures in the issuance of the Advisory. Specifically, Respondent issued, at the beginning of the process leading to the Advisory, a document entitled a “Communication Plan,” a copy of which is attached hereto as Exhibit A (the “Advisory Plan”), and failed to follow the standards and procedures set forth in its own Advisory Plan;
- (b) improperly selected and applied a testing method that has never before been used in evaluating fish from other waters in the State;
- (c) took the unprecedented action -- which it had never before done, upon information and belief -- of issuing the Advisory as it pertains to largemouth bass based on a slightly elevated level of contamination in a single largemouth bass, as it did in issuing this Fish Advisory, particularly where, as here, all of the other largemouth bass that were caught and sampled contained levels significantly below the stated levels of concern;
- (d) failed to follow its own well-established practice that Respondent has used consistently in its consideration and issuance of other similar fish advisories throughout the State for other lakes, including, without limitation, the fact that Respondent has, upon information and belief, typically issued fish advisories in the past based on average level of contamination in the fish tissue, as DPH had committed to do in this case, but then refused to follow this prior course of conduct or its previously issued Communication Plan, and followed a different approach;

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(e) based the decision to issue the Advisory on an *ad hoc* approach to data interpretation, which was not appropriate given the monitoring and testing procedures used;

(f) applied a new and different standard and issued the Advisory without any basis or explanation as to why they reached what appears to be an arbitrary and capricious determination, and despite other instances where similar levels of contamination have been detected in tissue from fish caught in other lakes, rivers, streams or other surface waters, with no fish advisory being issued as a result;

(g) issued the Advisory without basing its decision on standards that were adequate to support a delegation of authority to the Respondent from the General Assembly; and

(h) in effect, held Badin Lake to a different standard than other lakes and rivers in North Carolina.

Because of these and other errors and shortcomings in the process that Respondent followed, it exceeded its authority or jurisdiction; acted erroneously; failed to use proper procedure; acted arbitrarily and capriciously; failed to act as required by law or rule (including its own guidance); and acted without supporting substantial evidence, all contrary to the requirements of the APA.

Misimpressions of the quality of the Badin Lake environment created as a result of the issuance of the Advisory and posting of the Advisory Signs based on such inadequate, arbitrary and unsupported data and conclusions can be expected to impact use of Badin Lake by the public. While language was included in the Advisory Signs at APGI's urging to attempt to mitigate this misimpression, it will not, upon information and belief, be sufficient to avoid those impacts entirely.

In addition to the immediate impacts that the Advisory and the Advisory Signs will have, as outlined above, they also threaten to have an adverse impact on future decision-making processes involving Badin Lake and Dam. For example, APGI is in the process of seeking a long-term renewal of the FERC License ("FERC Renewal"). The issuance of the FERC Renewal is conditioned upon APGI receiving a Water Quality Certificate for Project discharges, including discharges from Badin Lake, under Section 401 of the Clean Water Act ("401 Certification"). In order for APGI to receive the FERC Renewal, the Division of Water Quality ("DWQ") within the North Carolina Department of Environment and Natural Resources must either issue or deny the 401 Certification by May 7, 2009, or waive its right to do so. APGI has already entered into a settlement agreement with 22 other parties, but the numerous benefits of that agreement including the commitments to increased recreational access opportunities are contingent upon a FERC Renewal as provided in the agreement. APGI's timely receipt of the 401 Certification is important to APGI's receipt of the ultimate long-term FERC Renewal and APGI's operation of Badin Lake and Dam and the benefits to the public that flow therefrom.

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Under Section 401 of the Clean Water Act, a state may condition a certification with “appropriate requirement[s] of State law.” There is no standard promulgated as a rule pursuant to Chapter 150B that is applicable to PCB content of sediment or fish tissue, nor any rule governing how PCB data pertaining to sediment or fish tissue should be interpreted. Nevertheless, DWQ has referenced Respondent’s data and conclusions (culminating in the issuance of the Advisory) as having some role in its process. Thus, Respondent’s actions in issuing the Advisory have already had an adverse impact on DWQ’s consideration of APGI’s application for the 401 Certification and, upon information and belief, could well have additional adverse effects on that process, including APGI’s receipt of the 401 Certification in a timely fashion. It is APGI’s belief and position that the Advisory is not relevant to the issuance of the 401 Certification. Nevertheless, DWQ has already recited the issuance of the Advisory as a basis for putting the consideration of the 401 Application temporarily on hold, and for seeking additional information in response to the Advisory; this was done by letter from Coleen H. Sullins, DWQ Director, to APGI, dated February 24, 2009 (“DWQ Information Request”), a copy of which is attached hereto and labeled Exhibit B. Among other things, paragraph 2 on page 2 of the DWQ Information Request recites that, in order to address whether the concentrations of PCBs that are the subject of the Advisory:

are related to a discharge, staff of [DWQ] will be comparing congeners [sic] of the PCBs in the fish tissue to the congeners [sic] of the PCBs in sediment found at the old Alcoa site. Until this analysis is done, this information is not available for the [DWQ] director’s decision and therefore [APGI’s 401 Certification] application will remain on hold until that information is available and DWQ has the opportunity to review it in the context of our 401 Water Quality Certification decision.

This delay in DWQ’s processing of APGI’s 401 Certification application that has already occurred is directly attributable to the issuance of the Advisory. In addition, it has required the expenditure of time and resources to respond to the request for information, and the delay has resulted in there being less time for final action by DWQ on APGI’s 401 Certification application, which must be acted on no later than May 7, 2009, in order for DWQ to grant the 401 Certification, as required for the FERC Renewal.

In addition, given the reference in DWQ’s Information Request to the Advisory, it appears, upon information and belief, that DWQ might rely on the Advisory, or the data produced in support of the Advisory, in reaching a final decision on the 401 Certification. Any such action, notwithstanding APGI’s position regarding the lack of relevance, could or might materially and adversely affect the 401 Certification process including possible conditions that may be included in the 401 Certification. This, in turn, could well adversely impact APGI’s timely receipt of the FERC Renewal.



**Communication Work Plan
Badin Lake Fish Tissue Exposure Investigation**

September 17, 2008

Prepared by:

Occupational & Environmental Epidemiology Branch
Epidemiology Section
Division of Public Health
North Carolina Department of Health & Human Services

Communication Work Plan Badin Lake Fish Tissue Exposure Investigation

Objective:

Disseminate to appropriate audiences information gathered through Badin Lake (Stanly & Montgomery Counties, NC) Exposure Investigation (EI). EI is for fish tissue sampling and analysis for polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) to determine potential adverse health effects to persons ingesting Badin Lake fish.

Study overview:

PCBs and PAHs have been detected in sediments and PCBs have been detected in fish collected from Badin Lake in past years. Prior sediment and fish sampling has been limited to the southwest portion of the lake. The Occupational and Environmental Epidemiology and Branch (OEEB) of the N.C. Division of Public Health has proposed an EI through its Health Assessment, Consultation, and Education program to collect fish from three trophic levels (three types of fish) throughout the lake. Fish tissue will be analyzed for PCBs and PAHs. OEEB will evaluate detected levels of PCBs and PAHs in the fish tissue for potential adverse human health effects to persons ingesting those fish. Communication of study results will be provided to county officials, recreational fishermen on Badin Lake, and the public.

Site: Badin Lake, Stanly and Montgomery Counties, NC
Source: Sediments contaminated with PCBs and PAHs
Exposure route: Ingestion of fish tissue
Contaminants: PCBs and PAHs in fish tissue
Potentially exposed population: Recreational fishermen on Badin Lake

Dates:

Fish tissue sampling – August - September 2008
Communication of study results – Anticipated time frame January -February 2009

DHHS Team:

1. Sandy Mort – Exposure Investigation Coordinator, Risk Assessor
2. Rick Langley – Medical Epidemiologist, Risk Assessor
3. Ken Rudo – Toxicologist, Risk Assessor
4. Mercedes Hernandez-Pelletier – Health Educator, Develop fact sheets and coordinate communication outreach

Audience:

1. County health departments
2. Recreational users of Badin Lake
3. Recreational and subsistence fishers of Badin Lake
4. Public
5. Local industry associated with Badin Lake
6. NC Wildlife Resource Commission
7. Environmental groups

ATTACHMENT IX

Anticipated communication products:

1. Exposure investigation results final report
2. Recommendations for fish consumption advisories for Badin Lake
3. Fact sheets, PCBs and PAHs
4. Press release
5. Public meeting to discuss study results
6. Fish advisory signs posted at Badin Lake fishing areas, if testing shows a potential for adverse health effects

Proposed timeline – Badin Lake Fish Tissue Exposure Investigation:

Activity	Responsible	Communication	Due date
Collect fish tissue samples	S. Mort, OEEB; J. DeBerardinis, DENR/DWQ	<ul style="list-style-type: none"> ▪ Update NCDHHS, NCDENR, SCHD, Local industry on status (telephone, e-mail) 	August – September 2008
Analytical services	SGS Environmental Services, Wilmington, NC	<ul style="list-style-type: none"> ▪ Update NCDHHS, NCDENR, SCHD, Local industry on status (telephone, e-mail); ▪ Provide analytical data report to NCDHHS, NCDENR, SCHD, Local industry (e-mail) 	September – October 2008
Risk assessment	S. Mort, R. Langley, K. Rudo, OEEB	<ul style="list-style-type: none"> ▪ Provide draft document for comments to NCDHHS, NCDENR, SCHD, Local industry (e-mail); ▪ Provide 2 weeks for above groups to review of draft document (e-mail) 	November - December 2008
EI Final Report	S. Mort., OEEB	<ul style="list-style-type: none"> ▪ Send draft Final Report to ATSDR (www). Send ATSDR/NCDHHS Final Report to NCDHHS, NCDENR, SCHD, Local industry (e-mail) 	December 2008 – January 2009
Health consult	S. Mort, R. Langley, K. Rudo, M. Hernandez-Pelletier, OEEB	<ul style="list-style-type: none"> ▪ See communications products above, provided to NCDHHS, NCDENR, SCHD, Local industry (e-mail, telephone, public meetings, web postings, press releases, documents) 	January – February 2009

NCDHHS = North Carolina Department of Health & Human Services, Raleigh NC

NCDENR = North Carolina Department of Environment & Natural Resources, Raleigh NC

ATSDR = Agency for Toxic Substances & Disease Registry, Atlanta GA

OEEB = NCDHHS Occupational & Environmental Epidemiology Branch, Raleigh NC

SCHD = Stanly County Health Department

Health risk communication objectives:

1. Inform county and public of why the Exposure Investigation was undertaken.
2. Explain results of study.
3. Explain why alteration of patterns of ingestion of fish caught at Badin Lake (may) be necessary. Identify sensitive populations.
4. Explain why it is in their best interest to alter their ingestion patterns of fish.

Outcome/Message Matrix:

Total PCB Concentration (mg/kg) ^{1,2,3}	Consumption Message
< 0.05	Unlimited consumption
0.05 – 0.10	Limit to one meal per week
0.11 – 0.50	Limit to one meal per month
≥ 0.50	Do not eat

¹ PCB, Polychlorinated Biphenyls

² Aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260

³ Mean of PCB in each trophic level by location

Total PAH Concentration (mg/kg) ^{1,2,3}	Consumption Message ⁴
< 0.02	Unlimited consumption
0.02 – 0.08	Limit to one meal per week
0.09 – 0.35	Limit to one meal per month
≥ 0.35	Do not eat

¹ PAH, Polycyclic Aromatic Hydrocarbons

² Draft DHHS PAH limits based on USEPA 2000a, Table 5-3 PAH screening value for carcinogenic effects of benzo(a)pyrene

³ Mean of PAH concentration in each trophic level by location

⁴ Includes loss factor due to cooking

Reference:

USEPA 2000a. USEPA Office of Water. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories. Volume 1, Fish Sampling and Analysis, Third Edition. EPA 823-B-00-007



North Carolina Department of Environment and Natural Resources
Division of Water Quality

Beverly Eaves Perdue
Governor

Coleen H. Sullins
Director

Dee Freeman
Secretary

February 24, 2009

Mr. Gene Ellis
Licensing and Property Manager
Alcoa Power Generating Inc.
Yadkin and Tapoco Divisions
P.O. Box 576
Badin, NC 28009-0576

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Dear Mr. Ellis:

RE: Additional information needed for 401 Water Quality Certification for APGI hydroelectric license

DWQ # 2007-0812 version 2, Davidson, Rowan, Montgomery and Stanly Counties

On January 15, 2009, the Division of Water Quality (DWQ) conducted a public hearing for the abovementioned project. In response to that hearing, the division has received information from a variety of interested parties concerning your application dated May 9, 2008 and the additional information received on August 29, 2008 and October 2, 2008 for the above referenced project. Based on an initial review of this information, the DWQ has determined that your application was incomplete and/or provided inaccurate information as discussed below. The DWQ will require additional information in order to process your application to impact protected wetlands and/or streams on the subject property in accordance with 15A NCAC 2H .0507(a). We will place this project on hold as incomplete until we receive this additional information. Please provide the following information so that we may continue to review your project.

Additional Information Required:

1. Dissolved oxygen sag – Commentors from the public hearing have asked whether sufficient sampling is being done or is being planned (after turbine upgrades) along river transects below the dams to detect any DO sag which may reduce the effectiveness of turbine improvements. Please clarify where DO samples were taken and are planned to be taken downstream of the dams to address this issue.

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1617 Mail Service Center, Raleigh, North Carolina 27699-1617
Location: 512 N. Salisbury St. Raleigh, North Carolina 27604
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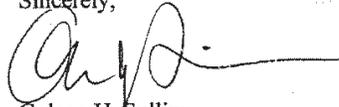
ATTACHMENT IX

2. As you know, the Department of Health and Human Services has released their recent study on fish tissue analysis for PCBs in Badin Lake. In order to address whether these concentrations of PCBs are related to a discharge, staff of the Division of Solid Waste Management in DENR will be comparing congeners of the PCBs in the fish tissue to the congeners of the PCBs in sediment found at the old Alcoa site. Until this analysis is done, this information is not available for the director's decision and therefore the application will remain on hold until that information is available and DWQ has the opportunity to review it in the context of our 401 Water Quality Certification decision.
3. As you know, the division plans to conduct some water and sediment sampling from the discharges from the dams. Until that sampling is done and analyzed, that information is also not available to the director and the application will remain on hold until that information is available and DWQ has the opportunity to review it in the context of our 401 Water Quality Certification decision.
4. A question has arisen during the review of the water sample from the Badin Lake discharge as to how the water sample was handled for processing after the sample was taken. Please clarify how the sample was handled during preservation and provide documentation on sample preparation.
5. Please provide data and a map showing all known locations of PCBs at the Alcoa site and in the nearby cove of Badin Lake.
6. Please provide copies of the lab sheets for the sediment sampling in Badin Lake.
7. Please provide copies of the 2007 and 2008 dissolved oxygen data that you reference in your response to the public hearing.
8. Please address the following questions related to the discharge sampling from Badin Lake –
 - a. What was the depth of the water withdrawal from the lake when the sample was taken?
 - b. What is the approximate zone of influence from the withdrawal? In other words when the sample was taken, what is your estimate of the area from which the water was being withdrawn?
 - c. What is the depth of sediment that has accumulated at the dam and what are its characteristics with respect to approximate particle sizes?

Please contact the DWQ in writing within three weeks of the date of this letter to verify that you have received this letter and that you remain interested in continuing to pursue permitting of your project and will be providing the DWQ the requested information at a later date. If we do not hear from you within three weeks, we will assume that you no longer want to pursue this project and we will consider the project as withdrawn. Also please be aware that staff (including the hearing officers) are still reviewing the record and we expect that additional information may be requested in a follow-up letter to you once that review is completed.

This letter only addresses the application review and does not authorize any impacts to wetlands, waters or protected buffers. Please be aware that any impacts requested within your application are not authorized (at this time) by the DWQ. Please call Mr. John Dorney of my staff at 919-733-9646 if you have any questions regarding or would like to set up a meeting to discuss this matter.

Sincerely,



Coleen H. Sullins

CBK/jrd

cc: File Copy

Filename: 20070812ver2Alcoa(Davidson, etc)on hold letterFeb242009

2

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Attachment X

Order Granting Motion to Amend
Scheduling Order (July 27, 2009)
(Fish Advisory Case)

STATE OF NORTH CAROLINA
COUNTY OF STANLY

FILED
2009 JUL 28 A 7:18

IN THE OFFICE OF
ADMINISTRATIVE HEARINGS
09 DHR 2505

ALCOA POWER GENERATING, INC. OFFICE OF
PETITIONER

Petitioner,

vs.

NORTH CAROLINA DEPARTMENT OF
HEALTH AND HUMAN SERVICES, and
its DIVISION OF PUBLIC HEALTH,

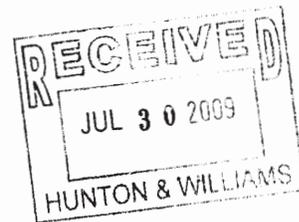
Respondent,

and

STANLY COUNTY, NORTH CAROLINA,

Intervenor-Respondent.

**ORDER GRANTING
MOTION TO AMEND
SCHEDULING ORDER**



The Court entered a scheduling order in this matter on April 17, 2009. Petitioner and Respondent in this matter filed a Joint Motion to Amend Scheduling Order (Motion) requesting time to explore settlement of the matter, including the entry of possible stipulations between the parties. Respondent-Intervenor Stanly County indicates that it agrees to the stay requested in the motion.

The Court hereby GRANTS the Motion and stays this matter pending the outcome of the 401 appeals (as defined in the Motion), or until the parties notify the Court that they have reached a settlement of the matter, or until any of the Parties inform the Court that this matter cannot be resolved amongst themselves and should be rescheduled for discovery and hearing.

ORDERED.

This the 27 day of July, 2009.

J. Randall May
J. Randall May
Administrative Law Judge

ATTACHMENT X

On this date mailed to:

Charles D. Case, Esq.
Craig A. Bromby, Esq.
Jason S. Thomas, Esq.
Hunton & Williams LLP
Attorneys at Law
P.O. Box 109
Raleigh, NC 27602
ATTORNEY FOR PETITIONER

John P. Barkley, Esq.
Assistant Attorney General
North Carolina Department of Justice
Health & Public Assistance Section
P.O. Box 629
Raleigh, NC 27602-0629
ATTORNEY FOR RESPONDENT

Thomas N. Griffin III, Esq.
Mary Katherine H. Stukes Esq.
Parker Poe Adams & Bernstein, LLP
Three Wachovia Center
Suite 3000
401 South Tryon Street
Charlotte, NC 28202
ATTORNEYS FOR INTERVENOR-RESPONDENT

This the 28th day of July, 2009


Office of Administrative Hearings
6714 Mail Service Center
Raleigh, N.C. 276998-6714
Phone: 919-431-3000
Fax: 919-431-3100

Attachment XI

N.C. 401 Water Quality Certification No. 003173
(issued to APGI) (May 7, 2009), and accompanying
documentation, including one-page DENR release

Beverly Eaves Perdue, Governor



Dee Freeman, Secretary

N.C. Department of Environment and Natural Resources

Release: Immediate
Date: May 7, 2009

Contact: Susan Massengale
Phone: (919) 807-6359

WATER QUALITY CERTIFICATION WITH CONDITIONS ISSUED TO ALCOA

RALEIGH – The state Division of Water Quality today issued a water quality certification to Alcoa Power Generating Inc. with conditions to ensure that operation of the hydroelectric generating system will protect state water quality standards, including guaranteed financial support for upgrades related to water quality improvements. This certification does not address issues raised in Gov. Perdue’s intervention in the FERC relicensing procedure.

DWQ’s review for the certification considered potential water quality impacts from all aspects of the hydroelectric operation that includes facilities at Badin Lake Dam, Falls Dam, High Rock Reservoir and the Tuckertown hydroelectric complex. The evaluation included water quality testing of discharges from the dams; potential movement of sediments and contaminants as a result of the operation of the dams; and low-flow conditions and other potential impacts to aquatic life.

To protect surface water quality in the Yadkin River system, the 401 Water Quality Certification includes the following requirements:

- Sediment removal at the city of Salisbury raw water intake facilities to promote the continued functioning of the intake and use of the waters as related to the designated use for water supply.
- Monitoring of the discharge from the four power generating stations to ensure compliance with water quality standards.
- Monitoring of sediment in the Badin Lake swim/picnic area and Badin Lake boat access area down to the Badin Lake dam for heavy metals, PCBs and poly-aromatic hydrocarbons to ensure that the project operation does not result in the downstream transport of contamination.
- Plan to monitor and regulate reservoir levels and flows of power-generating station operations. The plan must include low-flow protocols for the lakes in the APGI Yadkin River system project in case of drought.
- A plan to increase dissolved oxygen levels in order to meet water quality standards done in accordance with the settlement agreement schedule. An additional in-depth engineering study will be done this summer by APGI to demonstrate the effect of recent turbine upgrades.
- A continuing compliance provision (reopener clause) to ensure that the Division of Water Quality can modify the 401 Certification if water quality-related problems develop in the future that can be remedied in the 401 Certification.
- Portions of the Relicensing Settlement Agreement that are relevant to water quality along with additional site-specific conditions.
- A surety bond in the amount of \$240 million to guarantee that financial resources are available to make improvements to the hydroelectric turbine system in order to improve dissolved oxygen levels in the discharges.

The 401 Certification and hearing officer’s report can be found online at <http://h2o.enr.state.nc.us/admin/pubinfo/DWQPubInfoNewsReleases.htm>.

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Office of Public Affairs
Phone: (919) 715-4112
1601 Mail Service Center, Raleigh, NC 27699-1601

Diana Kees, Director
FAX (919) 715-5181
diana.kees@ncmail.net

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North Carolina Department of Environment and Natural Resources
Division of Water Quality

Beverly Eaves Perdue
Governor

Coleen H. Sullins
Director

Dee Freeman
Secretary

May 7, 2009

Mr. William Bunker
Alcoa Power Generating Inc.
V.P. Hydro Operations - Yadkin Division
P.O. Box 576
Badin, NC 28009-0576

Re: Yadkin Hydroelectric Project
Stanly County
DWQ # 2007-0812; FERC Project No. 2197

APPROVAL of 401 Water Quality Certification with Additional Conditions

Dear Mr. Bunker:

The Division staff have reviewed your application, supporting documentation, additional information and public comments and attached hereto is a copy of Certification No. 003173 issued to Alcoa Power Generating, Inc. dated May 7, 2009. Please note that this Certification requires Alcoa Power Generating Inc. to submit a surety bond (or equivalent instrument) to address the need for financial assurance that the improvements related to improvement in water quality will be completed. Please see condition #7 for the specifics of the requirements.

Please note that this Certification is not transferable except after notice to the Division. This Certification does not affect the legal requirements to obtain any other federal, state or local permits including (but not limited to) permits which may be required by the Division of Land Resources, the Division of Waste Management and any other permits required by the Division of Water Quality..

Please contact John Dorney at 919/733-9646 or me at 919/807-6357 if you have questions regarding this Certification.

Sincerely,

Coleen H. Sullins

CHS/jrd/ijm

1

ATTACHMENT XI

Attachments: Certificate of Completion
Surety Bond Form

cc: Becky Fox, EPA, 1307 Firefly Road, Whittier, NC 28789
Alan Johnson, DWQ, Asheville Regional Office
DLR Mooresville Regional Office
File Copy
Central Files
David Treme, Office of the City Manager, Town of Salisbury, P.O. Box 479, Salisbury, NC 28145
Steve Reed, N.C. Division of Water Resources
Ms. Kimberly Bose, Secretary, Federal Energy Regulatory Commission, 888 First Street, N.E.,
Washington, DC 20426
Andy Lucas, County Manager's office, Stanly County, 1000 N. First Street, Suite 10, Albemarle, NC 28001
Thomas N. Griffin, III, Three Wachovia Center, Suite 3000, 401 South Tryon Street, Charlotte,
NC 28202-1935
Todd Ewing, NC Wildlife Resources Commission
Rob McDaniel, Hazardous Waste Section, Division of Waste Management
Sandy Mort, DHHS
Commentors from Public Notice
W. Max Walser, Commissioner Davidson County

Filename: **Certification 003173**

2

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NORTH CAROLINA 401 WATER QUALITY CERTIFICATION

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (DWQ) Regulations in 15 NCAC 2H, Section .0500 to Alcoa Power Generation Incorporated (APGI) to relicense the Yadkin Project (High Rock, Tuckertown, Narrows (Badin) and Falls reservoirs) on the Yadkin River in Stanly County, North Carolina, pursuant to an application originally filed on the May 10, 2007, withdrawn on May 8, 2008 and subsequently refiled on May 8, 2008 and additional correspondence received August 27, 2007, October 19, 2007, June 20, 2008, October 1, 2008, March 9, 2009, February 16, 2009, March 17, 2009, April 3, 2009 and April 15, 2009.

The application and supporting documentation provides adequate assurance that the proposed work will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application, the supporting documentation, and conditions hereinafter set forth.

This approval is only valid for the purpose and design submitted in the application. If the project is changed, written notification to DWQ and a new application for a new Certification may be required. If the property is sold, the new owner must be given a copy of the Certification and is thereby responsible for complying with all conditions of this Certification. Any new owner must notify the Division and request that the Certification be issued in its name. For this approval to be valid, compliance with the conditions listed below is required.

Conditions of Certification:

Sediment and Erosion Control for any project-related construction:

1. During any project-related construction, erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards:
 - a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.
 - b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
 - c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
 - d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

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2. No waste, spoil, solids, or fill of any kind shall occur in wetlands, waters, or riparian areas. All construction activities, including the design, installation, operation, and maintenance of sediment and erosion control Best Management Practices, shall be performed so that no violations of state water quality standards, statutes, or rules occur;
3. Sediment and erosion control measures shall not be placed in wetlands or waters to the maximum extent practicable. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, they shall be removed and the natural grade restored within six months of the date that the Division of Land Resources has released the project;

Continuing Compliance:

4. APGI shall conduct project operations and any construction activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with section 303(d) of the Clean Water Act) and any other appropriate requirements of State law and federal law. If the Division determines that such standards or laws are not being met by the operation of the Yadkin Project (including the failure to sustain a designated or achieved uses of High Rock, Tuckertown, Badin and Falls Lakes related to water quality of the discharge or sediment levels of toxicants) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the Division may reevaluate and modify this Certification to include conditions appropriate to assure compliance with such standards and requirements in accordance with 15A NCAC 2H.0507(d). Before modifying the Certification, the Division shall notify APGI and the Federal Energy Regulatory Commission (FERC), provide public notice in accordance with 15A NCAC 2H.0503 and provide opportunity for public hearing in accordance with 15A NCAC 2H.0504. Any new or revised operating conditions shall be provided to APGI in writing, shall be provided to the FERC for reference in any License issued pursuant to the Federal Power Act, and shall become conditions of the License to operate the Yadkin Hydroelectric Project.

Other conditions:

5. Sediment removal at City of Salisbury water supply intake

APGI shall allow access to and provide for dredging operations to remove sand and other debris that may accumulate at the City of Salisbury's water supply intake whenever the accumulation of sand and other debris makes use of the intake inoperable. If this condition conflicts with any existing arrangements between APGI and other parties, then additional written approval is from DWQ to resolve this conflict.

6. Additional monitoring conditions

- 6.1. The Fish Sampling Work Plan for Narrows Reservoir dated December 14, 2007 as prepared by URS Corporation shall be conducted by APGI. DWQ shall approve the timing of this sampling.
- 6.2. APGI shall provide yearly monitoring of the discharges from the four lakes for pollutants to include heavy metals and organic pollutants including volatile organic compounds, acid-extractable compounds, base-neutral compounds, and PCBs using a priority pollutant scan analyzed in accordance with 40 CFR Part 136. Test results shall be reported to DWQ, Wetlands Unit and the Mooresville Regional Office of DWQ within 90 days of sampling using DWQ Form – A MR=PPA1 or in a form approved by the Director. This monitoring shall be done annually for at least five years unless the monitoring detects levels of pollutants that violate water quality standards. At the end of five years, APGI may submit a request for approval to modify the monitoring requirements. If this monitoring reveals levels of contaminants that are of concern with respect to water quality standards, then the Continuing Compliance Clause (condition 4 above) shall be invoked and a plan developed by APGI for DWQ's written approval to address these concerns. Sensitivity levels for these analyses must be at least those used by DWQ's Central Laboratory.
- 6.3. APGI shall provide yearly monitoring for lake sediment in a series of transects from the Alcoa Badin Works Plant site to the discharge from the dam for those heavy metals and compounds including PCBs and PAHs that are present in the sediment in the swimming area as reported in the Badin Lake Swim/Picnic Area and Badin Boat Assess Sediment Assessment, Stanly County. This monitoring shall be done annually for at least five years unless the monitoring detects movement of these contaminants from the cove toward the dam. Sensitivity levels for these analyses must be at least those used by DWQ's Central Laboratory. At the end of the five years, APGI may submit a request for approval to modify the monitoring requirements. If movement of these toxicants is detected, then APGI shall submit a plan for written DWQ approval that ensures that the contaminant movement shall be stopped and that water quality and uses are not degraded.

- 7.0 Performance/surety bond – APGI or its parent company Alcoa, shall provide a surety bond (or equivalent instrument) in favor of the State of North Carolina, executed by a surety approved by the Commissioner of Insurance. This bond shall be in the amount of \$240 million to cover all water quality improvement costs including costs associated with modifications at High Rock, Tuckertown, Narrows (Badin) and Falls Lake dams for turbine improvements, including the dissolved oxygen monitoring necessary to show the success of these improvements. This bond shall be provided within ninety days of receipt of the Certification, must be continuous in nature, must bind to APGI or Alcoa as well as their heirs and successors. The bond shall be conditioned upon the faithful performance of the requirements set forth in this Certification. Upon filing the bond with the Department, APGI or its parent company Alcoa, or its heirs and successors shall lose all right, title, and interest in the bond while the bond is held by the Department. The bond shall be maintained until the improvements and the monitoring confirms that the dissolved oxygen standard has been met for at least three (3) consecutive years and approved in writing by the Division unless released via written notification from the Division. In no event shall the liability to the surety exceed the amount of the surety bond required by this Condition. Notification shall be given upon completion of compliance or acceptance by the Division of a substitute bond. This bond shall remain in force until canceled by the surety. Cancellation by the surety shall be effectuated only upon 60 days written notice thereof to the Division and to the operator. If the surety bond is canceled, then APGI or its parent company Alcoa as well as their heirs and successors shall provide a

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new surety bond within ninety days of the cancelation that also meets the same requirements as previously described in this Condition. If that new surety bond is not issued in this time frame, then this Certification is null and void. This surety bond may be terminated by the State of North Carolina upon an affirmative showing that the improvements and the monitoring have been successfully accomplished such that dissolved oxygen water quality standards have been met for at least three (3) consecutive years. This Certification is only effective once the required performance/surety bond is in place.

8. APCI must conduct a study similar to the 2004 study on the Narrows (Badin) Lake turbines during the summer of 2009 (with both turbines upgraded) in order to provide scientific and engineering assurance that the plan to meet dissolved oxygen standards will be successful below Narrows (Badin) Lake. DWQ must approve the final study plan and the results of the study. A similar study will need to be once both upgrades are done to the High Rock Lake turbines. A study plan shall be submitted to DWQ for approval prior to implementation. The final results of the study shall be submitted to DWQ upon completion.
9. Other Relicensing Settlement Agreement Conditions – The following conditions were taken from appropriate sections of the Relicensing Settlement Agreement February 2007 related to project operations affecting water quality standards and uses including dissolved oxygen enhancements, in-stream flows, reservoir shoreline protection and compliance monitoring. Any conflict with these conditions and the Relicensing Settlement Agreement will need additional written confirmation from DWQ in order to address these conflicts.

a. Project Operations

Unless in accordance with the Hydro Project Maintenance and Emergency Protocol (HPMEP) and Low Inflow Protocol (LIP), Project minimum flows take priority over reservoir water elevations, as specifically described in Articles PO-1 and PO-2, below.

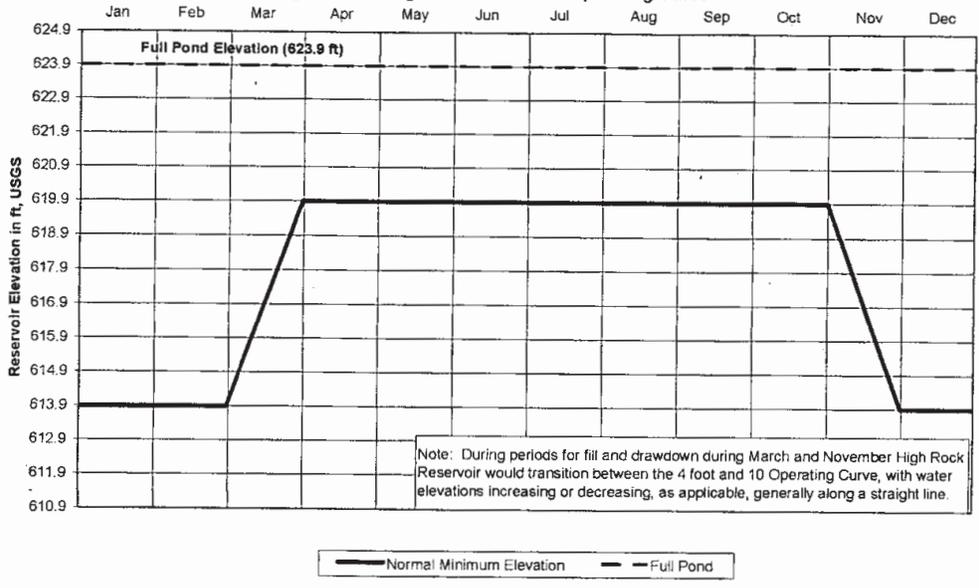
Article PO-1 - Reservoir Operations

A. High Rock Reservoir Operations

The Applicant (APGI) shall operate High Rock Reservoir at or above the normal minimum elevation (NME) as depicted on the High Rock Operating Curve (Figure PO-1), except as needed in order to maintain minimum flows or as provided under the Low Inflow Protocol (LIP) or the Hydro Project Maintenance and Emergency Protocol (HPMEP). High Rock Reservoir may be drawn down below its NME in order to meet the Required Minimum Instream Flow at Falls, as specified in Article PO-2, only after Narrows Reservoir has reached its NME. If High Rock Reservoir water elevation is below the NME at 12:01 AM on any operating day, where the operating day is defined as 12:01 AM through 12:00 midnight, the Applicant shall reduce releases from High Rock Reservoir for that operating day up to a maximum of the daily average flow equivalent of the minimum flow requirement at Falls, as specified in Article PO-2. Under this condition, releases from Falls will be limited to those defined in Article PO-2.

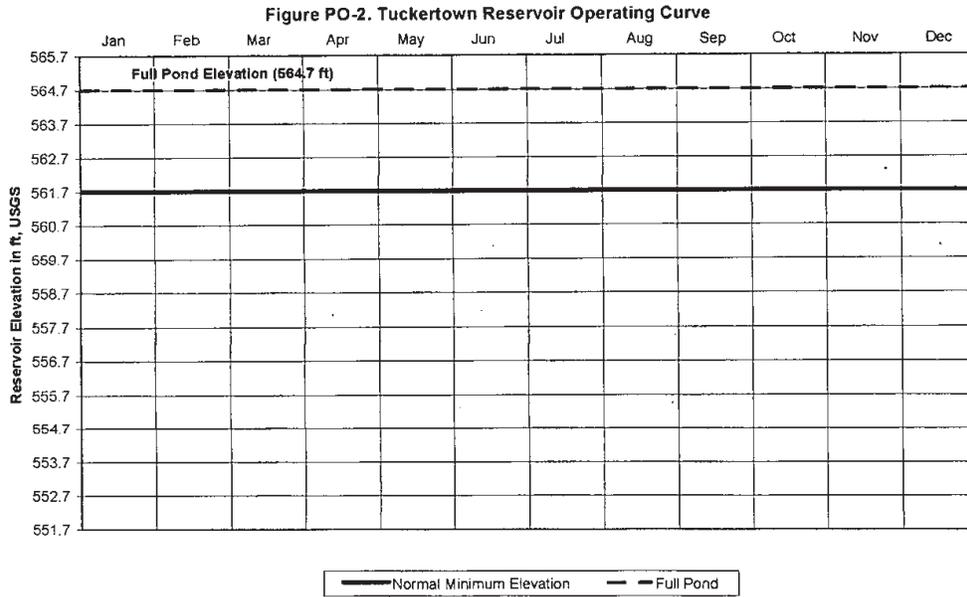
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Figure PO-1. High Rock Reservoir Operating Curve



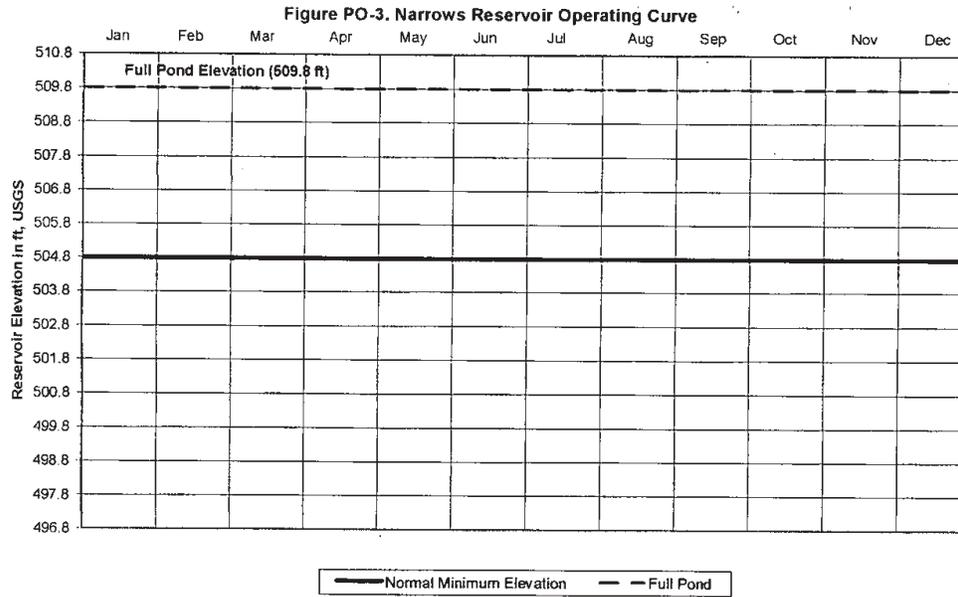
B. Tuckertown Reservoir Operations

The Applicant shall operate Tuckertown Reservoir at or above the NME as depicted on the Tuckertown Operating Curve (Figure PO-2), except as provided in the HPMEP.



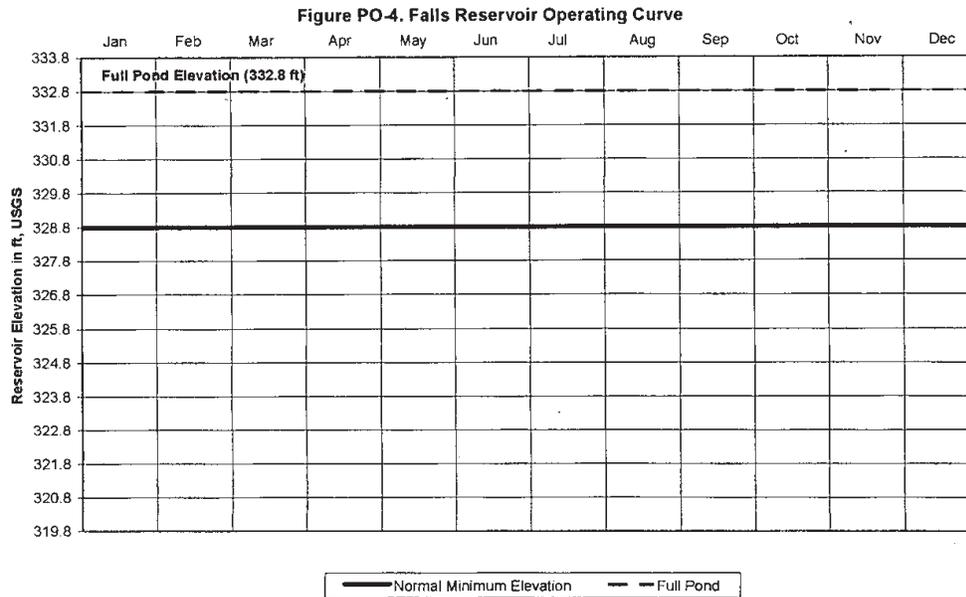
C. Narrows Reservoir Operations

The Applicant shall operate Narrows Reservoir at or above the NME as depicted on the Narrows Operating Curve (Figure PO-3), except as needed in order to maintain minimum flows, or as provided under the LIP or HPMEP.



D. Falls Reservoir Operations

The Applicant shall operate Falls Reservoir at or above the NME as depicted on the Falls Operating Curve (Figure PO-4), except as provided in the HPMEP.



E. Reservoir Stabilization to Enhance Fish Spawning

From April 15 through May 15 of each year, the Applicant will endeavor to maintain reservoir water elevations at all four Project reservoirs no lower than -1.0 feet below the elevation of each reservoir on April 15 to enhance conditions for fish spawning in the reservoirs. No later than August 31 of each year, the Applicant will report the resulting reservoir water elevations at each reservoir during the April 15 through May 15 period in a letter report to the North Carolina Wildlife Resources Commission (NCWRC). The letter report will provide an explanation of any circumstances that prevented the Applicant from maintaining the target water elevations. Within 60 days of filing the letter report with the NCWRC, a copy of the letter report will be filed with NCDWQ and FERC. Satisfaction of these reporting commitments shall constitute compliance with this Article.

Article PO-2 - Project Instream Flows

A. Required Minimum Instream Flows

Commencing no later than six months from the effective date of the License and except when operating under the Low Inflow Protocol (LIP) or Hydro Project Maintenance and Emergency Protocol (HPMEP), the Applicant shall operate the Project to provide a daily average minimum flow from the Falls Development according to the following schedule:

June 1 – January 31	1,000 cfs
February 1 – May 15	2,000 cfs
May 16 – May 31	1,500 cfs

B. Flow Adjustment for Enhancement of Downstream Spawning

The Applicant will work with the licensee of the Yadkin-Pee Dee River Project, FERC No. 2206, (Downstream Licensee), the North Carolina Division of Water Resources (NCDWR), the North Carolina Wildlife Resources Commission (NCWRC), the South Carolina Department of Natural Resources (SCDNR), the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), The Nature Conservancy (TNC) and American Rivers (collectively, Group) to develop a process to allow the Downstream Licensee to provide adjusted flow between February 1 and May 15 to enhance spawning conditions in the lower river downstream of the Blewett Falls development, part of the Yadkin-Pee Dee River Project.

The Applicant's role in enhancing downstream spawning below Blewett Falls will be limited to:

1. Attending an annual meeting with the Group, if held, to consider expected flow and hydrologic conditions and to schedule adjusted flow period(s) for the upcoming spawning season, and
2. Once the schedule for adjusted spawning flow period(s) has/have been established by the Group, the Applicant will communicate its daily generation/flow release schedule during the adjusted spawning flow period(s) to the Downstream Licensee at least one week in advance of the start of the adjusted spawning flow period(s). If unexpected hydrologic conditions, or other conditions, such as those covered in the Low Inflow Protocol (LIP, Appendix A) or the Hydro Project Maintenance and Emergency Protocol (HPMEP, Appendix B), occur during any adjusted spawning flow period, the Applicant shall communicate to the Downstream Licensee any resulting changes in its daily generation/flow release schedule for the remainder of that adjusted spawning flow period.

The Applicant will not be required to attempt to match Yadkin Project outflow to inflow during any adjusted spawning flow period(s), nor will the Applicant be required to provide an instantaneous minimum flow release from the Yadkin Project during any adjusted spawning flow period(s).

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The Applicant's participation in enhancement of downstream spawning will take place within the confines of the other requirements of the New License and 401 Water Quality Certification relating to management of flows and reservoir water elevations, and would not result in any modification of those flow and reservoir management requirements. Specifically, nothing in this section will require or cause the Applicant to fall below the Project Minimum Flows as described in Article PO-2 or to have to modify its reservoir operations as prescribed in Article PO-1.

If state and federal agencies and the Downstream Licensee are unable to come to an agreement on what measures are to be undertaken by the Downstream Licensee to achieve Flow Adjustment for Enhancement of Downstream Spawning, the Applicant will be under no obligation to meet the commitments outlined in Article PO-2, section B.

Article PO-3 - Flow and Reservoir Elevation Monitoring

Within six months of the effective date of the License, the Applicant shall file with the North Carolina Division of Water Quality (NCDWQ) a final Flow and Reservoir Elevation Monitoring and Compliance Plan for the Yadkin Project. The Flow and Reservoir Elevation Monitoring and Compliance Plan shall be developed in consultation with the North Carolina Division of Water Resources (NCDWR), the South Carolina Department of Natural Resources (SCDNR), the U.S. Geological Survey (USGS) and the Downstream Licensee (the Licensee of the Yadkin-Pee Dee River Project, FERC No. 2206), and shall include detailed provisions for monitoring reservoir water elevations and for monitoring flows from both the Falls and High Rock developments.

The Applicant shall include with the final plan documentation of consultation, copies of comments and recommendations on the draft plan after it has been prepared and provided to the agencies and Downstream Licensee, and specific descriptions of how comments are accommodated by the final plan. The Applicant shall allow a minimum of 30 days for the agencies and Downstream Licensee to comment prior to filing the plan with the NCDWQ. If the Applicant does not adopt a recommendation, the filing shall include the Applicant's reasons, based on Project-specific information.

The NCDWQ reserves the right to require changes to the plan. Upon NCDWQ approval, the Applicant shall submit the plan to the FERC for approval. Upon receiving FERC approval, APGI shall implement the plan, including any changes required by the NCDWQ. The Applicant shall file the final plan with NCDWQ within 30 days of receiving FERC approval.

A. Releases from High Rock Development

Flow monitoring from the High Rock Development will serve as the measure for the flow releases from the High Rock Development required under Article PO-1 or under the Low Inflow Protocol (LIP). Daily average flows within +25% of the applicable maximum flow, measured from 12:01 AM to 12:00 midnight, shall be considered compliant for each operating day.

B. Releases from Falls Development

Flow monitoring from the Falls Development will serve as the compliance measure for the flow release from the Falls Development required under Articles PO-1, PO-2 or under the LIP. Daily average flows within -5% of the applicable minimum flow, measured from 12:01 AM to 12:00 midnight, shall be considered compliant for any operating day so long as:

- a) Whenever High Rock Reservoir is at or above its normal minimum elevation (NME), the applicable daily average minimum flow is achieved on a weekly average basis, measured from 12:01 AM Saturday to 12:00 midnight Friday.
- b) Whenever High Rock Reservoir is drawn down below its NME (when a maximum release from Falls is also applicable), releases from Falls shall be limited to +/- 5% of the cfs equivalent of the Required Instream Minimum Flow at Falls, as measured on a weekly average basis from 12:01 AM Saturday to 12:00 midnight Friday.

The Applicant shall endeavor to meet the Required Minimum Instream Flows required in Article PO-2, and shall not routinely use the flow variances provided above. The Applicant shall prepare an annual flow monitoring report documenting its compliance with minimum flow releases, including a record of any days during the year when the daily average required minimum instream flow fell within the -5% and was made up as part of the weekly average, a record of flows during any period when High Rock was below its NME, and a record of any LIP events. By no later than March 31 of the following year, the Applicant shall file the report with NCDWQ of the North Carolina Department of Environment and Natural Resources (NCDENR) summarizing its evaluation. If, based on the results of the report, the State of North Carolina has a concern about the frequency or pattern of use of the variance by the Applicant, the State may request consultation with the Applicant to discuss the Applicant's reasons for that use and any practicable alternatives to that use.

Article PO-4 - Low Inflow Protocol (LIP)

This Article highlights the responsibilities of the Applicant from Appendix A, "Low Inflow Protocol for the Yadkin and Yadkin-Pee Dee River Hydroelectric Projects." The complete text of the LIP is also attached for inclusion by reference in the 401 Water Quality Certificate.

A. Definitions

The following definitions shall be applicable to this Article PO-4:

- Stream Gage Three-Month Rolling Average Flow – The three-month rolling average of streamflow at the following U.S. Geological Survey (USGS) stream gages:
 - Yadkin River at Yadkin College (02116500)
 - South Yadkin River near Mocksville (02118000)

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- Abbotts Creek at Lexington (02121500)
- Rocky River near Norwood (02126000)

On the last day of each month, the Applicant shall calculate the arithmetic mean of (a) the daily flows of the current month and (b) the arithmetic mean of the daily flows of each of the two preceding months. The sum of the three-month rolling average for these four gage stations shall be compared by the Applicant to the Historic Stream Gage Three-Month Rolling Average Flow for the corresponding period and a percentage of Historic Three-Month Rolling Average shall be calculated.

- Historic Stream Gage Three-Month Rolling Average Flow – The historical three-month rolling average flow for each of the four designated USGS stream gages for the period 1974 through 2003 (except for the Abbotts Creek gage, for which the period is 1988 through 2003) are set forth in Table LIP-1 below:

Table LIP-1. Historic Stream Gage Three-Month Rolling Average Flow

For Evaluation of Flow Trigger on:	Average of daily flows during:	Historic Three-Month Rolling Average Flow, cfs
January 1	Oct-Nov-Dec	4,000
February 1	Nov-Dec-Jan	5,200
March 1	Dec-Jan-Feb	6,250
April 1	Jan-Feb-Mar	7,700
May 1	Feb-Mar-Apr	7,550
June 1	Mar-Apr-May	6,850
July 1	Apr-May-Jun	5,350
August 1	May-Jun-Jul	4,200
September 1	Jun-Jul-Aug	3,600
October 1	Jul-Aug-Sep	3,200
November 1	Aug-Sep-Oct	3,300
December 1	Sep-Oct-Nov	3,550

- Full Pond Elevation – The Full Pond Elevation for each development's reservoir is listed in Table LIP-2:

Table LIP-2. Full Pond Elevations

Reservoir	Full Pond Elevation (feet, USGS datum – NGVD 1929)
High Rock	623.9
Tuckertown	564.7
Narrows	509.8
Falls	332.8

- Normal Minimum Elevation (NME) – NME for each Project reservoir is listed in Table LIP-3.

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Table LIP-3. Normal Minimum Elevations (feet, USGS datum - NGVD 1929)

Month	High Rock	Tucker-town	Narrows	Falls
Full Pond	623.9	564.7	509.8	332.8
January 1	613.9	561.7	504.8	328.8
February 1	613.9	561.7	504.8	328.8
March 1	transition	561.7	504.8	328.8
April 1	619.9	561.7	504.8	328.8
May 1	619.9	561.7	504.8	328.8
June 1	619.9	561.7	504.8	328.8
July 1	619.9	561.7	504.8	328.8
August 1	619.9	561.7	504.8	328.8
September 1	619.9	561.7	504.8	328.8
October 1	619.9	561.7	504.8	328.8
November 1	transition	561.7	504.8	328.8
December 1-15	613.9	561.7	504.8	328.8
December 16-31	613.9	561.7	504.8	328.8

- U.S. Drought Monitor Three-Month Numeric Average** – The Applicant shall calculate a three-month rolling average of U.S. Drought Monitor (<http://www.drought.unl.edu/dm/monitor.html>) values by (a) assigning a numeric value equal to the highest U.S. Drought Monitor designation (e.g. D0=0, D1=1, D2=2, D3=3 and D4=4) for any part of the Yadkin-Pee Dee River Basin draining to Blewett Falls development as of the last day of that month; and (b) calculating an arithmetic mean of that numeric value and numeric values correspondingly assigned for the previous two months. A normal condition in the basin, defined as the absence of a drought designation, shall be assigned a numeric value of negative one (-1).
- Yadkin-Pee Dee River Basin Drought Management Advisory Group (YPD-DMAG)** –The YPD-DMAG shall consist of one representative from each of the following organizations (to the extent that they are willing to participate): Alcoa Power Generating Inc. (APGI), Progress Energy (PE), North Carolina Department of Environment and Natural Resources (NCDENR), North Carolina Division of Water Resources (NCDWR), North Carolina Division of Water Quality (NCDWQ), North Carolina Wildlife Resources Commission (NCWRC), South Carolina Department of Natural Resources (SCDNR), South Carolina Department of Health and Environmental Control (SCDHEC), the United States Fish and Wildlife Service (USFWS), High Rock Lake Association (HRLA), Badin Lake Association (BLA), Duke Power Company, Lake Tillery Homeowners Association, South Carolina Pee Dee River Coalition (SCPDRC) and owners of intakes that withdraw more than one million gallons of water per day from the impoundments of either the Yadkin Project (FERC Project 2197) or the Yadkin-Pee Dee Project (FERC Project 2206).

B. Implementation Procedure

1. Table LIP-4 sets forth the combinations of conditions under which the LIP shall be implemented. The determination of the applicable LIP Stage shall be made using the High Rock Reservoir water elevation as of midnight between the last day of the previous month and the first day of the current month in combination with the U.S. Drought Monitor Three-Month Numeric Average and the Stream Gage Three-Month Rolling Average Flow to determine the need to declare or change a Stage of the LIP. The LIP shall be implemented beginning at Stage 0 and, if the combination of conditions becomes more severe, the Stages shall increase in one Stage increments.

Table LIP-4: Summary of LIP Triggers					
Stage	High Rock Reservoir Elevation		US Drought Monitor Three-Month Numeric Average		Stream Gage Three-Month Rolling Average as a percent of the Historical Average
0	< NME minus 0.5 ft	and	any	or	any
	OR				
	< NME	and either	≥ 0	or	< 48 %
1	< NME minus 1 ft	and either	≥ 1	or	< 41 %
2	< NME minus 2 ft	and either	≥ 2	or	< 35 %
3	< NME minus 3 ft	and either	≥ 3	or	< 30 %
4	< ½ of (NME minus Critical Reservoir Water Elevation)	and either	≥ 4	or	< 30 %

2. The average daily flows set forth in Table LIP-5 shall be initiated no later than seven days after the determination of the applicable LIP Stage and shall be in effect for the balance of the month except as provided in the section titled "Recovery from LIP Stages."

Table LIP-5: LIP Flows⁽¹⁾, cfs						
Stage	High Rock (daily average maximum flow target)			Falls⁽²⁾ (daily average flow target)		
	Feb 1-May 15	May 16- 31	Jun 1-Jan 31	Feb 1- May 15	May 16-31	Jun 1-Jan 31
0	2000	1500	1000	2000	1500	1000
1	1450	1170	900	1450	1170	900
2	1080	950	830	1080	950	830
3	770	770	770	770	770	770
4	Additional measures may be determined by consensus of the Applicant and State Agencies, subject to NCDWQ approval					
	<p>1 (1) Developments shall be operated to achieve the target flows to the extent practicable as a first priority and to supplement inflows equitably from the storage reservoirs as a second priority. For LIP Stages 1, 2, 3 and 4, APGI shall achieve the indicated average daily flows set forth in this table by supplementing Project inflows by drawing proportionally from High Rock and Narrows reservoirs such that the difference between the respective drawdowns below NME of High Rock and Narrows reservoirs shall be approximately one foot.</p> <p>2</p> <p>3 (2) For LIP Stages 0-3, the values shown in this table reflect flow targets. These values cannot be met exactly as shown and shall likely vary slightly on a real time basis from the values shown here, but it is expected that the variances from the target flows shall be minimal.</p>					

3. The Applicant shall notify via email the NCDWR of LIP implementation or a change in Stage as soon as practicable but no later than (i) three business days after a Stage 0 determination; (ii) two business days after a Stage 1 or a Stage 2 determination; or (iii) 48 hours after a Stage 3 or Stage 4 determination.

4. The Applicant shall consult with the YPD-DMAG with respect to issues relating to or arising out of implementation of the LIP, including, but not limited to, (i) notification to the public of the possible effects of and/or continuance of drought; (ii) issues relating to the effects of drought conditions on life, health,

property, wildlife, aquatic life; (iii) possible public health concerns; and (iv) short and long term prospects for recovery from drought.

5. The Applicant shall develop and provide information on its website to inform the public on reservoir water elevations, Project releases, usability of public access areas, reservoir inflows, meteorological forecasts, Historic and Actual Stream Gage Three-Month Rolling Average Flow calculations, U.S. Drought Monitor Three-Month Numeric Average calculations, LIP status, YPD-DMAG meeting summaries, and implementation of maintenance or emergency operation plans.

C. Recovery from LIP Stages

1. Recovery from the LIP shall be triggered by the occurrence of any of the three following conditions either separately or in combination:

- Condition 1: All three triggering conditions associated with a lower numbered LIP Stage, as described in Table LIP-4, are met.

OR

- Condition 2: High Rock Reservoir water elevations return to at or above the NME plus 2.5 ft.

OR

- Condition 3: High Rock Reservoir water elevations return to at or above the NME for 2 consecutive weeks.

2. When any of these three conditions occurs, the Applicant shall take the following actions as indicated by the particular condition:

- Condition 1: The LIP recovery shall be a stage-by-stage reversal of the staged approach described in Table LIP-4 above, beginning at the first day of each month.
- Condition 2: Implementation of the LIP shall be immediately discontinued.
- Condition 3: Implementation of the LIP shall be immediately discontinued.

3. The Applicant shall notify the NCDWR via email within 3 business days following attainment of any of the conditions necessary to return to a lower stage of the LIP.

D. Updating the LIP

During the term of this license, the Applicant shall consult with the YPD-DMAG at least once every five (5) years to review and consider updating the LIP. The use of the period of record 1974 through 2003 to calculate the Historic Stream Gage Three-Month Rolling Average flows set forth in Table LIP-1 of this Article shall be evaluated every five years during such review. On the basis of such consultation, review and consideration, the Applicant may propose modifications to this Article for the NCDWQ's review and approval.

Funding of Gages

Assuming the U.S. Geological Survey (USGS) has necessary rights for the License term, the Applicant shall continue to provide 100% funding support during the License term for the maintenance of the following USGS standard flow gages that are used in the LIP to determine the Three-Month Rolling Average Flow:

- Yadkin River at Yadkin College (02116500)
- South Yadkin River near Mocksville (02118000)
- Abbotts Creek at Lexington (02121500)

Any substantial increase in funding support due to changes in these flow gages are subject to review by the Applicant with the North Carolina Department of Environment and Natural Resources (NCDENR). The Applicant may review and propose changes in the contractor, location, or equipment associated with these gages. Any changes proposed by the Applicant will require agreement of NCDENR's Division of Water Quality.

Article PO-5 - Hydro Project Maintenance and Emergency Protocol

If conditions so warrant, the Applicant shall operate the Project in accordance with the Hydro Project Maintenance and Emergency Protocol (HPMEP) included as Appendix B, "Yadkin Project Hydro Project Maintenance and Emergency Protocol." The complete text of the HPMEP is also attached for inclusion by reference in the 401 Water Quality Certificate.

b. Water Quality

Article WQ-1 - Water Quality

A. Tailwater Dissolved Oxygen Enhancement Schedule

The Applicant shall install equipment and implement measures designed to enhance Yadkin Project (Project) tailwater dissolved oxygen (DO) conditions as specified in the schedule in Table WQ-1.

Table WQ-1. Dissolved Oxygen Enhancement and Monitoring Schedule

Year	DO Enhancement Action	Monitoring/Reporting
2007 ¹		<ul style="list-style-type: none"> - Continuous DO/temperature monitoring 5/1-11/30 at existing stations in all four tailwaters. - File Draft DO Monitoring Plan and Quality Assurance Project Plan (QAPP) with the North Carolina Division of Water Quality (NCDWQ) as part of 401 Application.
	Narrows Units 2 & 4 - Completed	<ul style="list-style-type: none"> - Continuous DO/temperature monitoring 5/1-11/30 at existing stations in all four tailwaters. - File Final DO Monitoring Plan and QAPP for approval by NCDWQ and the Commission.
2009	Narrows Unit 1 - Addition of two aeration valves by 12/31/09.	<ul style="list-style-type: none"> - Implement NCDWQ/FERC approved DO Monitoring Plan. - File annual DO monitoring data report with NCDWQ by March 31.
2010	<p>Narrows Unit 3 - Addition of two aeration valves by 12/31/10.</p> <p>High Rock Unit 3 - Install "through the blade" aerating turbine by 12/31/10.</p>	<ul style="list-style-type: none"> - Monitoring/reporting in accordance with DO Monitoring Plan.
2011	High Rock Unit 2 - Install a "through the blade" aerating turbine by 12/31/11.	<ul style="list-style-type: none"> - Monitoring/reporting in accordance with DO Monitoring Plan. - Initiate special study (up to 2 years) to evaluate the effectiveness of the aeration at Narrows on DO levels being discharged from Falls (2011-2012).

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Year	DO Enhancement Action	Monitoring/Reporting
2012	High Rock Unit 1 - Install a "through the blade" aerating turbine by 12/31/12.	<ul style="list-style-type: none"> - Monitoring/reporting in accordance with DO Monitoring Plan. - Complete second year of 2-year study of effectiveness of aeration at Narrows on DO at Falls by 12/31/12 and prepare Study Report.
2013		<ul style="list-style-type: none"> - Monitoring/reporting in accordance with DO Monitoring Plan. - File 2-year Narrows/Falls DO Study Report with NCDWQ by 3/1/13. - If 2-year study does not demonstrate compliance at Falls, file an Action Plan for DO (DOAP) enhancement at Falls with NCDWQ by 12/31/13. - Initiate special study (up to 2 years) to evaluate the effectiveness of aeration at High Rock on DO levels being discharged from Tuckertown (2013-2014).
2014	Falls Unit 1 - Install aeration valves or other appropriate aeration technology, if needed, in accordance with Falls Action Plan by 12/31/14.	<ul style="list-style-type: none"> - Monitoring/reporting in accordance with DO Monitoring Plan. - Complete second year of 2-year study of High Rock/Tuckertown DO by 12/31/14 and prepare Study Report.
2015	Falls Unit 2 - Install aeration valves or other appropriate aeration technology, if needed, in accordance with Falls Action Plan by 12/31/15.	<ul style="list-style-type: none"> - Monitoring/reporting in accordance with DO Monitoring Plan. - File 2-year High Rock/Tuckertown DO Study Report with NCDWQ by 3/1/15. - If 2-year study does not demonstrate compliance at Tuckertown, file an Action Plan for DO enhancement at Tuckertown by 12/31/15.

Year	DO Enhancement Action	Monitoring/Reporting
2016	<p>Falls Unit 3 - Install aeration valves or other appropriate aeration technology, if needed, in accordance with Falls Action Plan by 12/31/16.</p> <p>Tuckertown - Install aeration technology, if needed, at Tuckertown in accordance with Tuckertown Action Plan by 12/31/16.</p>	- Monitoring/reporting in accordance with DO Monitoring Plan.

Notes: 1 Actions to be taken under the current, existing FERC License for the Yadkin Project, not the New License.

B. Tailwater Dissolved Oxygen Enhancement Operations

As DO enhancement equipment or measures are installed or implemented on the schedule in Table WQ-1, the Applicant shall operate the generating units with DO enhancement equipment added on a “first-on-last-off” basis, subject to unit availability, from no later than May 1 of each year through November 30 of each year. If DO enhancement equipment or measures are not associated with generating equipment, once completed, that equipment or those measures shall be operated or implemented as designed from no later than May 1 of each year through November 30 of each year.

If at any time during the term of the New License, the Applicant can demonstrate through studies and/or monitoring that DO conditions have improved, the Applicant may consult with the North Carolina Division of Water Quality (NCDWQ) regarding the possibility of reducing the period of DO enhancement operations (May 1 – November 30). Should any such consultation result in an agreement between the Applicant and the NCDWQ to modify the operation of the Project for purposes of DO enhancement, the Applicant shall consult with the NCDWQ to develop a plan to revise DO enhancement operations. The Applicant shall include with the plan, an implementation schedule, documentation of consultation, copies of comments and recommendations on the plan after it has been prepared and provided to NCDWQ, and specific descriptions of how NCDWQ’s comments are accommodated by the plan. The Applicant shall file the plan with the FERC within 30 days of receiving NCDWQ’s written approval of the plan.

Article WQ-2 - Dissolved Oxygen Monitoring

Within six months of the effective date of the New License, the Applicant shall file with NCDWQ a Dissolved Oxygen Monitoring Plan (DO Monitoring Plan) and Quality Assurance Project Plan (QAPP) for the Project. The DO Monitoring Plan and QAPP will be developed in consultation with NCDWQ and other appropriate state and federal resource agencies.

The primary component of the DO Monitoring Plan will be the operation of four (4) continuous DO/temperature monitors (one in each tailwater), for the period May 1 through November 30 of each year. The Plan shall include a schedule for preparing an annual DO and temperature data report. The annual report shall be filed with NCDWQ and the Downstream Licensee no later than March 31 of the following year.

The Plan shall also include provisions for conducting two studies as part of the overall DO enhancement schedule (Table WQ-1) designed specifically to investigate the effectiveness of aeration technology installed and operating at Narrows on the DO conditions in the Narrows and Falls tailwaters, and the effectiveness of aeration technology installed and operating at High Rock on DO conditions in the High Rock and Tuckertown tailwaters. At the completion of each of the two studies, the Applicant shall prepare a study report which shall be filed with NCDWQ in accordance with the schedule in the DO Monitoring Plan. If the study results demonstrate that the Falls and/or Tuckertown tailwaters do not meet state dissolved oxygen standards as a result of Project operations, the Applicant shall prepare a DO Action Plan (DOAP) for the Falls and Tuckertown developments, respectively. The resulting DOAP(s), if needed, will be filed with NCDWQ in accordance with the schedule shown in Table WQ-1.

The Applicant shall file the DO Monitoring Plan with the FERC within 30 days of receiving NCDWQ's written approval of the plan. The Applicant shall include with the DO Monitoring Plan an implementation schedule, documentation of consultation, copies of comments and recommendations on the plan after it has been prepared and provided to NCDWQ, and specific descriptions of how NCDWQ's comments are accommodated by the plan.

Article WQ-3 - Additional Dissolved Oxygen Enhancement Actions

If at any time during the term of the New License, after all the DO enhancement equipment and measures outlined in Table WQ-1 have been installed and implemented, all of the planned unit upgrades have been completed and the upgraded units are operational, and at least two additional years of monitoring have been completed, the Applicant is notified by the NCDWQ that based on the results of monitoring under the DO Monitoring Plan, State water quality standards are not being met as a result of the Applicant's hydroelectric operations, the Applicant shall consult with the NCDWQ to develop a plan to implement corrective actions. The Applicant shall file a Dissolved Oxygen Corrective Action Plan (DOCAP) for NCDWQ approval within one year of initiating consultation with the NCDWQ. The Applicant shall include with the DOCAP an implementation schedule, documentation of consultation, copies of comments and recommendations on the plan after it has been prepared and provided to NCDWQ, and specific descriptions of how NCDWQ's comments are accommodated by the plan. The Applicant shall file the plan with the FERC within 30 days of receiving NCDWQ's written approval of the plan.

Article WQ-4 - Total Maximum Daily Load Process

The Applicant agrees to participate in the High Rock Total Maximum Daily Load (TMDL) process for High Rock Reservoir initiated by the State of North Carolina in 2005. The Applicant will contribute up to \$50,000 in in-kind services for planned water quality sampling efforts, upon notification that the Yadkin-Pee Dee River Basin Association has received federal or state grants of at least \$50,000, for which the Applicant's contribution will be used as the required "matching funds".

If, during the term of the New License, other TMDL processes are required for the Yadkin River or its tributaries, within the Project Boundary of the Yadkin Project, the Applicant will participate in these processes.

c. Shoreline Management

Article SMP-1 - Shoreline Management Plan

The Applicant shall file a revised Shoreline Management Plan (SMP) for the Project with the Federal Energy Regulatory Commission within two years of the effective date of this License. The Applicant shall revise the SMP in consultation with state and federal resource agencies and other interested parties. The Applicant shall provide the consulted parties with a 30-day period to review and comment on a draft revised SMP. The Applicant shall include with its filing copies of all comments received on the draft revised SMP and a discussion of those comments, including whether the Applicant adopted the comments or the Applicant's rationale for not incorporating the comments in the final revised SMP. Additional written DWQ approval is needed for this shoreline management plan notably for those issues related to water quality such as buffer zones and management of shoreline erosion.

Upon Federal Energy Regulatory Commission approval, the Applicant shall implement the approved SMP, including any changes required by the Commission.

d. Incorporation of Appendix A and B by reference.

The following Appendices are hereby incorporated by reference as conditions to this Certification and are drawn verbatim from the Relicensing Settlement Agreement. In a few instances, "NCDWQ" should be substituted for "FERC" or "Commission" in these appendices – specifically in the sections that describe approval of LIP or HPMEP updates or revisions, and approval of additional stages (level 4 and beyond) to the LIP.

Appendix A: Low Inflow Protocol for the Yadkin & Yadkin-Pee Dee River Hydroelectric Projects

Appendix B: Yadkin Project, Hydro Project Maintenance and Emergency Protocol

Also, this approval to proceed with your proposed impacts or to conduct impacts to waters as depicted in your application shall expire upon expiration of the new FERC License and any Annual Licenses issued after the expiration of the new License.

ATTACHMENT XI

If this Certification is unacceptable to you, you have the right to an adjudicatory hearing upon written request within sixty (60) days following receipt of this Certification. This request must be in the form of a written petition conforming to Chapter 150B of the North Carolina General Statutes and filed with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. If modifications are made to an original Certification, you have the right to an adjudicatory hearing on the modifications upon written request within sixty (60) days following receipt of the Certification. Unless such demands are made, this Certification shall be final and binding.

This the 7th day of May 2009
DIVISION OF WATER QUALITY



Coleen H. Sullins, Director

CHS/jrd

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1617 Mail Service Center, Raleigh, North Carolina 27699-1617
Location: 512 N. Salisbury St. Raleigh, North Carolina 27604
Phone: 919-807-6300 \ FAX: 919-807-6492 \ Customer Service: 1-877-623-6748
Internet: www.nowaterquality.org
An Equal Opportunity \ Affirmative Action Employer

One
North Carolina
Naturally

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

Water Quality Section

KNOW ALL MEN BY THESE PRESENTS, That _____

a _____ and having its principal office at _____

in the State of _____, as principal, and _____

a corporation organized under the laws of the State of _____ and duly authorized by the
Insurance Commissioner of North Carolina to do business in North Carolina, with an office located at _____

_____, in the City of _____, North Carolina, as surety, are held and firmly bound

unto the State of North Carolina in the sum _____ of Bond No. _____

lawful money of the United States of America, to the payment of which will and truly be made, we bind
ourselves, our heirs, administrators and successors jointly and severally, firmly by these presents.

Signed, sealed and delivered this ____ day of _____, 20__.

THE CONDITIONS OF THIS BOND ARE SUCH, That Whereas, the said

conducts or will conduct the required water quality-related modifications to the APGI project in North
Carolina as described in the original application for a 401 Certification dated May 9, 2008 (received May 8,
2009) and has obtained approval of this application on the _ day of _____, 20__, from the
Department of Environment and Natural Resources under Water Quality Certification Number 003173
issued on May 7, 2009.

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NOW THEREFORE, if the said _____
shall comply with the requirements set forth in Water Quality Certification Number 003173 issued on May 7,
2009 and with the rules and regulations adopted pursuant thereto and faithfully perform all obligations under
the Certification then this obligation shall be null and void; otherwise to be and remain in full force and effect
until released by the Department of Environment and Natural Resources or canceled by the surety.
Cancellation by the surety shall be effectuated only upon 60 days written notice thereof to the Department of
Environment and Natural Resources and the operator.

ATTEST:

_____ Secretary or Assistant Secretary		_____ Principal
(Attach)	By	_____ President, Vice President, Partners, or Owner
(Corporate Seal)		
(here of Corporation)		
_____ Surety		

Countersigned at _____, North Carolina

By: _____
Resident Agent of NC Agent and Attorney in Fact

***PLEASE MAIL THIS FORM AND THE ATTACHED INSTRUMENT
TO THE FOLLOWING ADDRESS:**

WATER QUALITY SECTION
WETLAND PROGRAM DEVELOPMENT UNIT
1617 MAIL SERVICE CENTER
RALEIGH, NC 27699-1617

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North Carolina Department of Environment and Natural Resources
Division of Water Quality

Beverly Eaves Perdue
Governor

Coleen H. Sullins
Director

Dee Freeman
Secretary

DWQ Project No.: 003173 County: Stanley County
Applicant: Alcoa Power Generating Inc.
Project Name: Yadkin Hydroelectric Project
Date of Issuance of 401 Water Quality Certification: May 7, 2009

Certificate of Completion

Upon completion of all work approved within the 401 Water Quality Certification or applicable Buffer Rules, and any subsequent modifications, the applicant is required to return this certificate to the 401/Wetlands Unit, North Carolina Division of Water Quality, 1650 Mail Service Center, Raleigh, NC, 27699-1650. This form may be returned to DWQ by the applicant, the applicant's authorized agent, or the project engineer. It is not necessary to send certificates from all of these.

Applicant's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date: _____

Agent's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date: _____

If this project was designed by a Certified Professional

I, _____, as a duly registered Professional _____ (i.e., Engineer, Landscape Architect, Surveyor, etc.) in the State of North Carolina, having been authorized to observe (periodically, weekly, full time) the construction of the project, for the Permittee hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature _____ Registration No. _____

Date _____

1650 Mail Service Center, Raleigh, North Carolina 27699-1650
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Phone: 919-733-1786 \ FAX: 919-733-6893 \ Customer Service: 1-877-623-6748
Internet: <http://h2o.enr.state.nc.us/nw/wetlands>
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Attachment XII

Letter from David R. Poe,
Counsel to APGI,
to Magalie R. Salas, Sec'y, FERC, Project
No. 2197-037 (Mar. 10, 2006)

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March 10, 2006

Magalie R. Salas
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

Re: Alcoa Power Generating Inc., Yadkin Hydroelectric Project No. 2197-038

Dear Secretary Salas:

By this letter, the Yadkin Division of Alcoa Power Generating Inc ("Yadkin") hereby respectfully (i) requests authorization from the Federal Energy Regulatory Commission ("Commission") for modification of certain upgrade activities from what the Commission previously approved for the Yadkin project in 2000, and (ii) informs the Commission of changes in the authorized installed capacity and flow capacities for the Yadkin project reflecting these modified upgrades, as updated to be consistent with the Commission's current methodology for calculating authorized installed capacity.

As shown herein, the proposed modification of the upgrade activities from what the Commission previously approved results in shifting work on the Narrows, High Rock and Falls units that was originally intended to occur before the end of the existing license to now be within the term of the new license; the activities themselves are unchanged. Thus, all that is changing is the timing of the work. Under these circumstances, Yadkin respectfully submits that the Commission can approve the modification of the schedule as a technical revision to its prior order approving the upgrades. Nonetheless, if the Commission finds it necessary to further amend the existing license, Yadkin respectfully requests that Commission treat this filing as a request for such amendment and waive any further requirements of its regulations.¹

¹ Yadkin submits that the changes identified in this letter are minor technical updates to matters determined as part of its December 3, 1999 license amendment application, and thus Part 4.200 of the Commission's regulations, 18 C.F.R. §§ 4.200-4.201 (200602401-00011), is not applicable. Therefore, Yadkin has not styled this document as an

Magalie R. Salas
March 10, 2006
Page 2

A. Background

On December 3, 1999, Yadkin, Inc. submitted an application seeking Federal Energy Regulatory Commission ("FERC" or "Commission") authorization to amend the license for Yadkin Project No. 2197 to allow Yadkin to undertake unit upgrades at certain of the developments of the project.² The Director of the Commission's Office of Energy Projects ("OEP"), on delegated authority, approved Yadkin's application to amend the license on August 2, 2000. *Alcoa Power Generating Inc.*, 92 FERC ¶ 62,084 (2000) (the "August 2 Order").

In its December 1999 application, Yadkin sought Commission approval to replace existing turbine runners and re-wind generators at the Narrows, High Rock and Falls developments, three of the four developments that comprise the project. The plan was to perform the upgrade activities on a unit-by-unit basis in the following order: (1) Narrows Unit 4; (2) Narrows Units 1 and 2; (3) Narrows Unit 3 and High Rock Unit 1; (4) High Rock Units 2 and 3; and (5) Falls Unit 2. Yadkin indicated that it planned to undertake the proposed upgrades in the next several years before the end of the term of the current license in 2008.

Now, the original schedule of the upgrades needs to be modified to reflect Yadkin's more than 4 years' experience in implementation. The upgrades performed to date have taken longer to complete than Yadkin anticipated and, as a result, Yadkin cannot undertake all of the upgrades the Commission authorized in the August 2 Order before the current license expires in 2008. As a result, Yadkin proposes to modify the upgrade plan as described below.

B. Change In Upgrade Activities

Yadkin has completed the upgrade of Narrows Unit 4. Yadkin plans to complete the upgrade of Narrows Unit 2 in early 2008. However, given the complications and attendant delays, it is no longer feasible to complete the upgrades to Narrows Units 1 and 3, High Rock Units 1, 2 and 3, and Falls Unit 2 prior to the expiration of the existing project license. Instead, Yadkin will include the planned upgrades to these units as part of Yadkin's application for a new license for the project.

As will be more fully described in its application to relicense the project, which will be filed in the coming weeks, Yadkin anticipates that it will complete these upgrades early in the new license term.

application to amend the license to reflect the changes described herein but would seek formal amendment if the Commission determines that the situation so requires. A similar letter request for technical updates to the February 24, 2000 Tapoco Project 2169 license amendment application submitted to the Commission on February 12, 2003 was approved on September 12, 2003. *Alcoa Power Generating Inc.*, 104 FERC 62,181 (2003). Under these circumstances, Yadkin further respectfully submits that Order No. 663, 112 FERC ¶ 61,297, is likewise inapplicable because this letter does not constitute a "pleading" within the meaning of Rule 203, 18 CFR § 385.203.

² On July 17, 2000, the Commission approved the transfer of the Yadkin license to Yadkin Inc.'s affiliate company, Alcoa Power Generating, Inc. *Yadkin, Inc.*, 92 FERC 62,029 (2000).

Magalie R. Salas
March 10, 2006
Page 3

C. Changes to Authorized Installed Capacity and Flow Capacities

As indicated December 1999 application, the performance of upgrades at the specific project units would result in a slight increase in the installed capacity of the project as a result of replacing existing older equipment with modern equivalents. In addition to the foregoing, Yadkin is providing as an appendix hereto updated authorized installed capacities and flow information for each of the project developments. These updated numbers reflect the completed upgrade to Narrows Unit 4, the planned upgrade of Narrows Unit 2, as well as revised installed capacities that are now calculated pursuant to the revised methodology set forth in the Commission's Order No. 576.³

Accordingly, Yadkin respectfully requests that the Commission approve the proposed changes in its specific upgrade activities and informs the Commission of the consequent changes to the authorized installed capacity for the project (consistent with the Commission's revised calculation methodology) and flow capacities.

If you have any questions, please contact the undersigned at (202) 986-8000.

Respectfully submitted,

/s/ David R. Poe
David R. Poe

Counsel for Alcoa Power Generating Inc.

cc: All parties

³ *Charges and Fees for Hydroelectric Projects, 1991-1996 FERC Stats. & Regs. ¶ 31,016 (1995).*

APPENDIX

REVISED AUTHORIZED INSTALLED AND HYDRAULIC FLOW CAPACITIES

YADKIN PROJECT UNITS	2000 AMEND	2006 FILING	2000 AMEND	2006 FILING
	<u>AUTHORIZED INSTALLED CAPACITY</u>		<u>MAXIMUM HYDRAULIC CAPACITY</u>	
	MW	MW	FLOW - CFS	FLOW - CFS
HR1	13.20	10.97	3680	3350
HR2	13.20	10.97	3680	3350
HR3	13.20	10.97	3680	3350
HR Total	39.6	32.91	11040	10050
TT1	12.68	12.68	3825	3825
TT2	12.68	12.68	3825	3825
TT3	12.68	12.68	3825	3825
TT Total	38.04	38.04	11475	11475
NR1	27.20	26.86	2500	2500
NR2	27.20	28.21	2500	2390
NR3	27.20	26.86	2500	2500
NR4	27.20	26.86	2500	2290
NR Total	108.8	108.79	10000	9680
FL1	8.75	8.75	2685	2685
FL2	10.00	11.19	2800	3085
FL3	11.19	11.19	3085	3085
FL Total	29.94	31.13	8570	8855
Project Total	216.38	210.87	41085	40060

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list in this proceeding in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure.

Dated at Washington, D.C. this 10th day of March, 2006.

/s/ David R. Poe

David R. Poe

LeBoeuf, Lamb, Greene & MacRae LLP

1875 Connecticut Avenue, N.W.

Washington, D.C. 20009-5728

202-986-8000

Attachment XIII

Fish and Aquatics IAG and Water Quality IAG
Joint Meeting, Final Meeting Summary
(Feb. 3, 2004), *reprinted in* Alcoa Power
Generating, Inc., Application for License,
Project No. 2197, vol. V(C) (2006),
available at eLibrary Accession No.
20060425-4005 (attachments omitted)

Fish and Aquatics IAG and Water Quality IAG Joint Meeting

February 3, 2004

**Alcoa Conference Center
Badin, North Carolina**

Final Meeting Summary

Meeting Agenda

Attachment 1.

Meeting Attendees

Attachment 2.

Introductions, Review Agenda

Jane Peeples, Meeting Director, opened the meeting with introductions and a review of the agenda. Jane mentioned that she had been asked about the procedure for postponing the Issue Advisory Group (IAG) meetings in the event of inclement weather. Jane explained that if Yadkin has to postpone a meeting, Yadkin would send a notice via email to the IAG. Wendy Bley, Long View Associates, said that the purpose of the meeting was to update the IAG on the ongoing fish and aquatics and water quality studies.

Update on Water Quality Studies

Wendy Bley explained that Yadkin recently completed four consecutive years of monthly reservoir water quality monitoring. She added that Yadkin also operated continuous temperature and dissolved oxygen (DO) monitors in all four tailwaters during 2003. Also, as part of the upgrade program, Yadkin operated continuous monitors in the Narrows and Falls tailwaters in 2001 and 2002 (for a total of three years of consecutive data from these areas). Wendy explained that Yadkin is required by the FERC order to continue operating the continuous monitors in the Narrows and Falls tailwaters. She said that one year of continuous temperature and DO data from below the High Rock and Tuckertown dams should be sufficient to characterize the conditions below the dams and suggested that these monitors be removed and no additional data be collected in 2004. Continuing, Wendy introduced Don Kretchmer, Normandeau Associates, who reviewed water quality data collected in 2003.

First, Don reviewed the objectives of the water quality studies: 1) characterize baseline water quality in the reservoirs and tailwaters, 2) evaluate effects of Project operations on reservoir water quality, and 3) evaluate effects of Project operations on tailwater water quality (see Attachment 3). Don also briefly reviewed the study components: continuous monitoring of temperature and DO below Narrows and Falls from 2001 through 2004; continuous monitoring of temperature and DO below High Rock and Tuckertown in 2003; and a series of lateral transects in the tailraces to confirm monitor placement. Don said that he was convinced that the monitors were located in a representative location downstream of the dams. Darlene Kucken, NC

Division of Water Quality, asked if Normandeau had also completed the longitudinal investigation of DO. Don said no, Normandeau could not complete the work during summer 2003 because of the high flows in the river.

Next, Don reviewed the continuous monitoring results. He showed river flow at the Yadkin College gage from 1999 through 2003 (the sampling period) and the daily water elevations at each of the four reservoirs (see Attachment 3). Andy Abramson, Central NC Land Trust, asked if there were any times that the High Rock Reservoir elevation was greater than 655-ft. Don said that 655-ft is full pond. Gene Ellis, Yadkin, said that APGI would spill at the dam before allowing the reservoir to top 655-ft. Continuing, Don reviewed the minimum daily DO for each of the tailwaters. He explained that 4.0 mg/l is the instantaneous standard. He noted the instances when minimum daily DO was below the 4.0 mg/l standard in the four tailwaters.

Gerrit Jobsis, SC Coastal Conservation League and American Rivers, noted that there is not a lot of difference in the number of violations in the high and low flow years in the Narrows tailwater. Larry Jones, High Rock Lake Association, said that flow, or water condition, through the turbines at Narrows is representative of the conditions of flow entering Narrows Reservoir.

Gerrit Jobsis asked Don if the DO violations at Narrows were occurring earlier than June and later than October. Don answered that the violations were occurring as early as May. Don said that the data would be presented year-by-year in the study report and would therefore be easier to interpret. Don said that he saw no clear pattern among the dry (2002), wet (2003), and average (2001) years. Gerrit said the pattern across the years was that there are water quality violations from about late spring through early fall.

Mark Oden, High Rock Lake Business Owners Group, asked what was causing the low DO concentrations. Don replied that low DO conditions are a result of several factors: river flow, temperature, and particularly, nutrients entering the system from upstream sources.

Next, Don reviewed the daily average DO data for each of the tailwaters. The daily average standard for DO is 5.0 mg/l. Don highlighted the instances when the DO in the tailwaters did not meet this standard. Larry Jones commented that 2001 should not be considered an “average year”. Don explained that while overall it was a dry year, hydrologically, 2001 was closer to an average year than 2002, since it did not have the same mid-summer issues that 2002 had. Continuing, Don discussed the relationships among turbine discharge, spill, and DO at each of the developments. He highlighted spills at the dam and the related spike in DO. He also noted spikes in DO, unrelated to spills at the dam (e.g. Tuckertown tailwater in August 2003). Mark Oden asked if the continuous temperature and DO data was collected from one location. Don replied yes – there was one continuous monitor in each tailwater collecting data every 15 minutes from May through November 2003. Larry asked if the spike with no turbine discharge at Tuckertown is reflective of what happens when the mix does not occur. Mark asked Normandeau to plot the temperature and DO data together. Gerrit Jobsis commented that it would be beneficial to understand what happened to water temperatures during spill events. Don agreed to look at the effect of spills on water temperature, but noted that water temperatures in 2003 were generally lower because of the higher river flows and reduced reservoir stratification. Jim Mead, NC Division of Water Resources, asked about the location of the continuous monitors and

questioned if they were placed far enough downstream to pick up water spilling over the dam. Don said that the monitors were located in the tailwaters based on consultation with the resource agencies and then the location of the monitors was confirmed with lateral transects.

In conclusion, Don said that the monthly reservoir monitoring was completed in 2004; the longitudinal DO survey will be completed in summer 2004; and the continuous temperature and DO monitoring will continue at Narrows and Falls. Ben West, US Environmental Protection Agency, questioned the purpose of the lateral transects in the reservoir. Don explained that the IAG asked Normandeau to study the effects of changes in operation at the dam on DO profiles up and downstream of the dam (e.g. DO profiles above and below before and after generation). Gerrit Jobsis asked if Normandeau was collecting any DO data on inflows to High Rock. Don answered that Normandeau collected grab samples from the monthly monitoring station above the reservoir.

Chris Goudreau, NC Wildlife Resources Commission, asked about the status of the turbine upgrades at Narrows. Gene Ellis explained that Yadkin had successfully completed one of the unit upgrades (unit four) at Narrows but Yadkin notified FERC in early 2003 when it filed its Notice of Intent that the original upgrade program would be modified and some of the upgrades would not be completed under the present license. Gene said that the economics of the planned upgrades were stalled when capital dried up but that APGI is continuing to evaluate the issue. Wendy Bley added that the one upgrade completed at Narrows also added air injection capabilities at the unit. The air injection at unit four is currently operated continually May through November, whenever unit four is operating. Having seen the continuous DO data at Narrows, Gerrit asked when the air injection was operational. Wendy replied that the air injection was operational in 2002 and 2003 and possibly part of 2001. Wendy said that Yadkin had measured the contribution of unit four during its operation and had found a substantial improvement in DO (about a 1.0-2.0 mg/l enhancement). A report including this information was filed with FERC.

Darlene Kucken observed that even with the air injection in place at Narrows, there are still violations of the DO standard. Wendy explained that the current license amendment approves upgrades at High Rock and Narrows. As these units are upgraded, APGI can consider the design and installation of aeration technology. Wendy said that an outstanding question is whether aeration technology is needed at all or a portion of the units at the dams.

Mark Oden asked if air injection is required by FERC or is it done voluntarily by the licensee. Darlene explained that to get a new license from FERC, APGI must first be issued a Clean Water Act Section 401 Water Quality Certificate from North Carolina. In order to receive a 401 Certificate, APGI must meet water quality standards at the Project. Larry Jones asked about the consequences of not meeting the standards. Darlene explained that the state would either 1) require APGI to conduct further studies and implement measures to achieve the standards, or 2) not issue a 401 Certificate.

Based on the data, Gerrit Jobsis commented that even a 1.0-2.0 mg/l enhancement might not help Yadkin meet the standard. He asked if APGI had considered oxygen injection. Wendy Bley said that the aeration technology used would be specific to each unit and site. She said that APGI had

considered oxygen injection and for a variety of reasons (cost, safety etc.), APGI would prefer not to do oxygen injection.

Jim Melton, SaveHighRockLake.org, asked if the benefit of the air injection is system-wide or more localized. Wendy answered system-wide. Wendy said if the water quality is improved at High Rock Dam, some improvement in DO might be evident all of the way downstream. Larry commented that if the water quality is improved in High Rock Reservoir, water quality would be improved system-wide.

Gerrit Jobsis asked whether air injection is different than venting. Wendy said that like venting, air injection is forcing air into the water, as opposed to pure oxygen. Gerrit said that several hydro projects were considering how different gate openings at the dam could help improve DO levels (e.g. set the wicket gates a certain way to create more turbulence in the water). Wendy explained that when Voith designed the air injection valve at Narrows unit four, changes in operation at the dam were also considered. Gerrit added that other projects have been able to run more efficiently with changes in operations without extensive and costly upgrades. He said that baffles to increase turbulence in the water only result in a 1-2 percent loss in efficiency. He said that APGI was at the end of the line and asked what it planned to do.

Gene Ellis stated that APGI does want a 401 Certificate and that it will continue working to correct the DO violations, but that it might take a while. John Ellis, US Fish and Wildlife Service, asked if APGI contemplated correcting the violations before submitting its application for a new license to FERC. Gene said that actions to correct the DO violations would be staged during the new license term. Gene said that APGI still desires to complete the unit upgrades because the upgrades can increase generating efficiency and address the DO problem, but currently there is no capital to complete the upgrades. Gene said that APGI had notified FERC of the change in schedule.

Mark Oden asked about preventative measures to reduce pollutants in the river basin (e.g. the “Don’t Mess with Texas” campaign). John Ellis said that the USFWS works with landowners and farms to implement water quality improvement strategies, with the focus of restoring fish and wildlife habitat. Mark Cantrell, USFWS, said that his agency also provides comments to the NC Division of Water Quality on NPDES (National Pollutant Discharge Elimination System) permits. Andy Abramson added that the NCDWQ also has developed basinwide water quality plans for each of the state’s river basins. He said that the agencies have many “carrots” to encourage the landowners to do the right thing, but no “sticks”.

Larry Jones commented that there is still time before APGI submits its license application to explore operating High Rock differently to demonstrate that dam operation does or does not have an effect on downstream water quality problems. He suggested that if the Project was operated as run-of-river and High Rock was kept full year round, water quality might improve.

Darlene Kucken said that improving water quality in High Rock Reservoir will first require improving water quality flowing into the reservoir. She said that the watershed is disproportionately big when compared to the much smaller reservoir. She encouraged the locals to work with their local governments to encourage responsible land use and management. She

said that the NCDWQ developed a TMDL (Total Maximum Daily Load) for the South Yadkin River, but there are no regulations to allow implementation of the TMDL. Mark Oden observed that there were no local government officials present at the meeting. Mark asked if it was typical in a hydropower relicensing to see no involvement from local leaders. Gene Ellis noted that APGI had in December 2003, reached out again with letters and phone calls to local government officials, inviting them to participate in the relicensing process. Andy Abramson said that the Land Trust invited all the riparian landowners to a public meeting and only 30 showed up. He said the interest in these types of issues is not there.

Wendy Bley commented that though the root cause of the DO problem is upstream sources of nutrients and BOD (biological oxygen demand), Yadkin recognizes that the reservoirs may also be contributing to the problem. She said that for APGI to get a 401 Certificate it expects to take care of its share of the responsibility. She concluded that the IAG would have to come up with some concepts to address the DO problem.

John Ellis asked if APGI envisioned everything happening after the issuance of a new license, or if would try to do something in the interim to show a good faith effort. Gene Ellis said that he would be willing to consider looking into possible modifications in operations at the dams to improve tailwater DO. John Ellis suggested that changes in operation at the dam could be a “band-aid” until the capital becomes available to complete the unit upgrades. Jim Mead asked if the lack of capital was local problem. Gene said no, the lack of capital is a company-wide problem due to the general downturn in the economy. Wendy suggested that Normandeau complete their data analysis to determine if there are any operational changes that could be tested in lieu of more permanent measures to improve DO at the Project.

For clarification, Darlene Kucken said that while she is representing the NCDWQ, she does not work for the 401 water quality certification division. She said that she could not say if the certification division would provide a water quality certificate based on a promise to meet the standards in the future. Darlene thought it worthwhile to meet with John Dorney. John Ellis suggested that John Dorney be invited to come and speak to the IAG. Darlene agreed to invite John Dorney to a future IAG meeting.

Mark Cantrell asked that Normandeau show percent saturation on the graphs included in the study report. Don Kretchmer agreed.

Before moving to the next topic on the agenda, Wendy asked that the IAG resolve the outstanding question about monitoring in 2004. She said that Normandeau plans to do the longitudinal transects and continuous monitoring below Narrows and Falls. Ben West asked if Wendy was recommending no further continuous monitoring below High Rock and Tuckertown. Wendy said that originally, she was concerned about having only one year of continuous data below High Rock and Tuckertown because of the abnormally high flows. However, the 2003 data did document a problem in those tailwaters as well. Wendy recommended no further continuous monitoring below High Rock and Tuckertown. Ben agreed that it makes sense to focus on evaluating potential ways to mitigate the problem rather than just continuing to document it.

Darlene Kucken thought it worthwhile to continue monitoring temperature and DO below High Rock on a continuous basis because of the high flows, reduced reservoir stratification, and other unknowns. Chris Goudreau suggested that APGI ask FERC permission to remove the continuous monitors from below Narrows and Falls and instead operate one of the monitors below High Rock. Jim Mead agreed that the monitor below Falls is probably no longer necessary. Gerrit suggested that APGI start looking at changes in operations at Narrows (rather than continue to monitor) to address the DO problem.

Wendy Bley thought the only issue about asking FERC about revising the monitoring plan would be that FERC would have questions about the upgrades and associated schedule that APGI might not be able to answer. Wendy suggested the following actions: complete data analysis; review analysis of the operation of unit four at Narrows with air injection; consider asking FERC permission to revise the monitoring plan (specifically, to remove the monitor from below Falls and monitor at High Rock and Narrows); and start investigating gate settings at Narrows. Gene Ellis indicated that he wanted the opportunity to discuss these actions with his internal team first before making a commitment to go to FERC. Jim Mead said that APGI would only need FERC's approval to remove the Falls monitor.

Jim Mead commented that the longitudinal monitoring might suggest some other options for improving water quality. For clarification, Wendy explained that the lateral surveys would not extend all the way up into the headwaters; rather, the monitoring would be conducted immediately above and below the four dams.

Gerrit Jobsis asked what Normandeau would be looking at specifically during its analysis of the data. Don said that he would look at, among other things, water quality coming in and going out of the reservoirs; generation and no generation; unit four at Narrows operating and not operating etc. Gerrit said the focus should be the effect of the Project on water quality (i.e. how temperature is being altered; seasonal loading of nutrients etc.).

Mark Cantrell asked if there were operational scenarios being developed that may influence water quality. Wendy Bley explained that the Operations Model IAG is not that far along yet, that the OASIS model is still being developed, and that it would be some time before specific operational scenarios were being discussed. She acknowledged, however, that there will be alternative operating scenarios to considered in the future.

Ben asked when the study report would be available. Don said the report should be available sometime during the third quarter of 2004.

After some discussion, it was agreed that the Water Quality IAG would meet independent of the Fish and Aquatics IAG on March 31 and May 4. Wendy said that Normandeau would try to complete its data analysis prior to the March meeting. She said that the IAG could possibly hear from APGI sooner than March 31 if APGI decides to seek FERC permission to revise the current DO monitoring plan and remove the Falls continuous monitor. Darlene Kucken committed to asking John Dorney to participate in the May meeting. Agenda topics for the March 31 meeting include a review of the data analysis (focus on parameters that directly impact DO such as chlorophyll a) and recommendations for investigations of gate settings and/or additional data

analysis. Larry Jones suggested that APGI give its operational staff a “heads up” about potential investigations of gate settings and other operational changes for summer 2004. Donley Hill, US Forest Service, suggested that APGI also consider long sustained periods of one unit generation (i.e. pick out instances when there was generation with one turbine and look at the effect on DO in the tailwater).

Update on Tailwater Fish and Aquatic Studies

Wendy Bley introduced Rick Simmons, Normandeau, who provided an update on the status of the fish and aquatic studies. Rick mentioned that the Fish Entrainment Evaluation was nearly complete and that a draft study report would be available soon for review by the IAG. Specific to the Tailwater Fish and Aquatic Study, Rick said that Normandeau had completed both summer (August/September 2003) and fall (November 2003) fish and mussel sampling (see Attachment 4). Rick shared fish species lists for each of the Project tailwaters. The Falls tailwater was sampled August 26-28 and November 4-6 and bluegill, redbreast sunfish, and white perch were the top three species captured (by percent composition). The Narrows tailwater was sampled August 28-September 1 and November 6-8 and white perch, largemouth bass, and gizzard shad were the top three species captured. The Tuckertown tailwater was sampled September 1-4 and November 9-11 and bluegill, gizzard shad, and white perch were the top three species captured. The High Rock tailwater was sampled September 15-18 and November 11-13 and bluegill, white perch, and channel catfish were the top three species captured.

Mark Oden asked if Rick considered the reservoirs to have a healthy fish population. Rick said that based on the number of species present in the reservoirs, he considers the reservoir fish populations to be healthy. He said that if conditions were poor, he would expect to find less species. He said that some species captured are very sensitive to water quality. He said that how the reservoirs are operated impact species assemblages (e.g. largemouth bass, adults and juveniles, benefit from a drawdown). In response to a question from Mark Cantrell, Rick said that he would be providing the age and lengths of the captured fishes.

Continuing, Rick explained that Wendell Pennington, Pennington and Associates, surveyed the tailwaters in September and November 2003 for macroinvertebrates and mussels. Rick commented that the Falls tailwater provides the best habitat for mussels. The USFWS and NCWRC noted that the *Lampsilis radiata* and *Villosa delumbis* are both rare species. Mark Cantrell noted that additional mussel species that were not found in September were found in November. Rick said that visibility may have been a factor in September. Mark also asked if Pennington had looked at the fish in the tailwaters for glochidia (larvae). Rick said he would ask his crew to look for this. Rick showed species lists for the other three tailwaters (see Attachment 4).

Larry Jones asked about the relationship between the mussel populations in the reservoir and the tailwater. Specifically, he said, that High Rock Reservoir used to have a large number of mussels present. He wondered if the decline of mussels in the reservoir had affected the tailwater mussel population.

Mark Oden asked how long it would take macroinvertebrates and mussels to recolonize after a drought. Ryan Heise, NCWRC, said that most freshwater mussel species typically live in flowing water environments (rivers and streams) and that while some mussel species may persist in reservoirs, they may never be able to reproduce. However, mussel species that prefer a still water environment and many macroinvertebrate species can recover within one year. Rick said it would take about 45 days for the macroinvertebrates to recolonize.

Update on Reservoir Aquatic Habitat Assessments

Rick said that Normandeau completed the Narrows Reservoir Aquatic Habitat Assessment in December 2003. He discussed the habitat composition of the drawdown area (see Attachment 4) – cobble and boulder are the dominant habitat types. Rick noted that boat docks and the default substrate had not been included in this calculation of habitat composition. Rick commented that Narrows had more gravel habitat than expected. Chris Goudreau asked if Sarah Allen's (Normandeau) aquatic vegetation work would be included in the habitat assessment. Rick replied yes. Rick explained that Normandeau filmed the entire Narrows shoreline and had collected gps data for eroding areas (with a minimum 30-ft linear extent).

Rick explained that Normandeau is currently working on the High Rock Reservoir Aquatic Habitat Assessment. At the time of the meeting, Normandeau had surveyed 160 shoreline miles. Rick showed a graphic, which depicted the areas surveyed to date. Larry Jones said that he knew that some areas shown as having been surveyed were not in fact surveyed. Rick said that his crew had filmed all of the areas surveyed. When asked, Rick said that he expected the assessment to be completed within about a week and a half (by February 13, 2004).

Habitat Fragmentation Study Request

Rick distributed several Yadkin River RTE species maps and asked that the IAG not distribute this sensitive information. Wendy Bley felt that the mussel species maps are a good starting point to determine what, if any, additional data collection and analysis should be done to complete the Habitat Fragmentation Study. Wendy commented that Progress Energy was asked to collect mussel data, but not to conduct a habitat fragmentation study, as Yadkin had been. Chris Goudreau said that he had asked Progress to do such a study, but that they are more focused on looking for opportunities for mitigation.

Mark Cantrell suggested that Normandeau also look at the fish hosts for the mussels and overlay the dams, land use, and NPDES discharges to the maps.

Wendy asked that the agencies look at the maps and then get back to Normandeau with ideas to build the database and refine the study. The agencies agreed that they would review the mussel data and get together to discuss possible next steps.

Progress Energy Instream Flow Study

Wendy Bley said that she had attended a December meeting of the Progress Energy Instream Flow Study subcommittee to discuss the details of an instream flow study plan. She said that

Progress recently distributed a draft study plan, which she had not had the opportunity to review. She added that the subcommittee would be meeting on February 12 to discuss the draft study plan. Field work is planned for summer 2004. Chris Goudreau said that he had reviewed the study plan and that it was well put together.

Jim Mead acknowledged that both Wendy and Paul Leonard, Entrix, were participating on the subcommittee on behalf of Yadkin. He asked that Yadkin formally bless the study plan for the record to avoid any disagreements later on about methodology etc.

Schedule and Agenda for Next Meeting

Chris Goudreau suggested that an hour be set aside on March 31 for a discussion of the Habitat Fragmentation Study.

Gene Ellis acknowledged that Yadkin had received numerous emails and phone calls about the High Rock drawdown and that Yadkin had surprised many with how deep the draw was. He acknowledged that Yadkin could have communicated better. Gene explained that one of Alcoa's communications representatives is contacting several key stakeholders to solicit ideas about how to improve communications in the future. Larry Jones commented that Yadkin had done a great job communicating with shoreline residents on Narrows during the planned drawdown, but not with those living on High Rock. Mark Oden asked if the newspapers respond to Yadkin when it distributes a press release. Gene said that both drawdowns were well covered by the press. Max Walser, Davidson County Commissioner, reiterated Gene's commitment to improve communications to the county and shoreline residents.

The Water Quality IAG will meet on March 31, 2004 and May 4, 2004. A discussion of the Habitat Fragmentation Study will be included on the March 31 agenda.

Attachment XIV

Yadkin Hydroelectric Project, FERC No. 2197,
Relicensing Settlement Agreement, (Feb. 2007),
filed in *Alcoa Power Generating Inc.*, Project
No. 2197-073 (May 7, 2007), *available at* eLibrary
Accession No. 20070507-5011 (selected sections)

**Yadkin Hydroelectric Project
FERC No. 2197**

Relicensing Settlement Agreement

February 2007

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Appendix A - Low Inflow Protocol for the Yadkin & Yadkin-Pee Dee River Hydroelectric Projects

Appendix B - Yadkin Project Hydro Project Maintenance and Emergency Protocol

Appendix C - Yadkin Project Recreation Facility Enhancements

Appendix D - Modifications to the Yadkin Project Specifications for Private Recreation Facilities, Shoreline Stewardship Policy, and Subdivision Access Approval, Multi-use Facility Permitting, and Industrial Approval Procedures for Inclusion in the Revised Shoreline Management Plan

Appendix E - Maps of Land Conveyances and Land Grants

Appendix F - List of Parties and Primary Contacts

of the Settlement Agreement. The proposed amendment shall not go into effect until all authorizations, including the New License, are conformed to the proposed amendment. However, if the proposed amendment lacks the unanimous consent of the Parties or FERC denies modification of the New License, that lack of unanimous consent or denial of the proposed amendment shall not constitute grounds for withdrawal under Section 1.3.9.

1.3.11.4.8 Amendment of the New License

To the extent permitted by law, a Party may petition FERC to amend the New License, pursuant to any reopener condition contained in the New License, or to take any other action with regard to the Licensee or the Project or may petition the Section 401 Agency to amend its Section 401 Certification, pursuant to any reopener condition included in any Certification, or to take any other action with regard to the Licensee or the Project, so long as the amendment or other action would not substantially conflict with this Agreement. Before filing any such petition or initiating any such action, the Party shall notify all other Parties and consult with any Party that wishes to consult, but under no circumstance shall such consultation requirement be construed to prevent a Party from pursuing any action within the time required by law or regulation.

1.3.12 Rights, Duties, and Obligations Regarding Section 401 Certification

Except as permitted under the terms of the third paragraph, below, the Parties shall not: (1) request or support any Section 401 Certification conditions for the Project that conflict with the proposed license conditions or any other terms of this Agreement or that add substantial additional burdens, costs or risks to the Licensee beyond those to which all Parties have herein agreed or (2) oppose any Section 401 Certification conditions that are not inconsistent with the proposed license articles or any other terms of this Agreement; or oppose any Section 401 Certification conditions that are standard State of North Carolina Section 401 Certification conditions. These standard North Carolina Section 401 Certification conditions are, as included in the Section 401 Certification for the Tapoco Hydroelectric FERC Relicensing Project, dated December 17, 2003, with reference number 03-0191: conditions no. 9 (regarding reporting of consumptive uses), 10 (regarding continuing compliance), and 11 (regarding property rights). The inclusion in the Section 401 Certification, and therefore in the New License, of any conditions that are not inconsistent with the proposed license articles or any other terms of this Agreement shall not be deemed a FERC-Imposed Modification.

The Parties reserve the right to be actively involved in any Section 401 Certification process, and nothing in this Agreement shall prevent the Licensee from opposing any Section 401 Certification condition that it, in its sole judgment, determines is or could be inconsistent with any provision of this Settlement Agreement.

Nothing in this Settlement Agreement is intended to or shall be construed to affect in any way the authority of the State of North Carolina pursuant to 33 U.S.C. § 1341, and related state statutes and rules, such as by limiting the authority of the State of North Carolina to issue, condition, or in any way alter a water quality certification or by limiting the exercise of the State of North Carolina's discretion. Execution of this Settlement Agreement by the State of North Carolina or any agency thereof expresses or implies no representation that the requirements of this Settlement Agreement ensure compliance with State water quality standards and other appropriate requirements of State law. Nothing in this Agreement shall limit the right of the State of North Carolina from enforcing its Section 401 Certification and from taking any steps, within the sole discretion of the State, to protect and defend its authority, such as by seeking rehearing

of any FERC action regarding issues related to the exercise of the State's authority with regard to 33 U.S.C. § 1341. Similarly, nothing in this Agreement shall be construed to limit SC's or the EPA's right to initiate the procedures under 33 U.S.C. § 1341 should it be deemed necessary by SC or EPA.

1.3.13 Potential for Negotiation of Recreation Easements

Notwithstanding section 1.3.14, in the event that the Project ceases to be a federally licensed hydropower project, the Licensee shall convey recreational easements to the United States of America and/or the State of North Carolina. No later than one year prior to the date that the Project ceases to become a federally licensed hydroelectric project, the Licensee shall negotiate recreational easements with the United States and/or the State of North Carolina to ensure continued public access to the public recreational facilities on the Project reservoirs as they exist at the time the Project ceases to be federally licensed hydroelectric project. Such easements will only become effective in the event that the Project ceases to be a federally licensed hydroelectric project. However, nothing in this Agreement shall prevent the Licensee (under which circumstances would be a former Licensee and owner of private land encumbered by any recreational easements) from proposing to the United States or the State of North Carolina the closure of a recreational facility that becomes a "stranded asset" or has otherwise fallen into disuse for any reason, and agreement to such closure shall not be unreasonably withheld by the United States or the State of North Carolina.

1.3.14 Termination of Settlement Agreement

This Settlement Agreement shall terminate as to all Parties and have no further force or effect upon withdrawal of the Licensee, or upon expiration of the New License and any Annual License issued thereafter

2.0 Settlement Provisions Not Covered by Proposed License Articles

2.1 Project Operations

2.1.1 Flow Adjustment for Enhancement of Downstream Spawning

The Licensee (Alcoa Power Generating Inc. or APCI) will work with the licensee of the Yadkin-Pee Dee River Project, FERC No. 2206, (Downstream Licensee), the North Carolina Division of Water Resources (NCDWR), the North Carolina Wildlife Resources Commission (NCWRC), the South Carolina Department of Natural Resources (SCDNR), the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), The Nature Conservancy (TNC) and American Rivers (collectively, Group) to develop a process to allow the Downstream Licensee to provide adjusted flow between February 1 and May 15 to enhance spawning conditions in the lower river downstream of the Blewett Falls development, part of the Yadkin-Pee Dee River Project.

The Parties agree that the Licensee's role in enhancing downstream spawning below Blewett Falls will be limited to:

- a) Attending an annual meeting with the Group, if held, to consider expected flow and hydrologic conditions and to schedule adjusted flow period(s) for the upcoming spawning season, and
- b) Once the schedule for adjusted spawning flow period(s) has/have been established by the Group, the Licensee will communicate its daily generation/flow release schedule during the adjusted spawning flow period(s) to the Downstream Licensee at least one week in advance of the start of the adjusted spawning flow period(s). If unexpected hydrologic conditions, or other conditions, such as those covered in the Low Inflow Protocol (LIP, Appendix A) or the Hydro Project Maintenance and Emergency Protocol (HPMEP, Appendix B), occur during any adjusted spawning flow period, the Licensee shall communicate to the Downstream Licensee any resulting changes in its daily generation/flow release schedule for the remainder of that adjusted spawning flow period.

The Parties agree that the Licensee will not be required to attempt to match Yadkin Project outflow to inflow during any adjusted spawning flow period(s), nor will the Licensee be required to provide an instantaneous minimum flow release from the Yadkin Project during any adjusted spawning flow period(s).

The Parties understand and agree that the Licensee's participation in enhancement of downstream spawning will take place within the confines of the other requirements of the New License relating to management of flows and reservoir water elevations, and would not result in any modification of those flow and reservoir management requirements. Specifically, nothing in this section will require or cause the Licensee to fall below its FERC-prescribed Project Minimum Flows as described in Article PO-2 or to have to modify its reservoir operations as prescribed in Article PO-1.

If state and federal agencies and the Downstream Licensee are unable to come to an agreement on what measures are to be undertaken by the Downstream Licensee to achieve Flow Adjustment for Enhancement of Downstream Spawning, the Licensee will be under no obligation to meet the commitments outlined in this section.

2.1.2 Low Inflow Protocol

The Parties to the Relicensing Settlement Agreement that also have designated roles and responsibilities under the LIP (Appendix A) hereby agree to uphold their respective LIP commitments. In the event that a Party or Parties do not uphold their respective LIP commitments, then any Party, including the Licensee may (but is not required to) invoke the dispute resolution process described in Section 1.3.8 of this Agreement to attempt to resolve issues regarding LIP commitments

Assuming the U.S. Geological Survey (USGS) has necessary rights for the License term, the Licensee shall continue to provide 100% funding support during the License term for the maintenance of the following USGS standard flow gages that are used in the LIP to determine the Three-Month Rolling Average Flow:

- Yadkin River at Yadkin College (02116500)
- South Yadkin River near Mocksville (02118000)
- Abbotts Creek at Lexington (02121500)

Any substantial increase in funding support due to changes in these flow gages are subject to review by the Licensee with the North Carolina Department of Environment and Natural Resources (NCDENR). The Licensee may review and propose changes in the contractor, location, or equipment associated with these gages. Any changes proposed by the Licensee will require agreement of NCDENR.

2.2 Water Quality

2.2.1 Tailwater Dissolved Oxygen Enhancement Schedule

The Licensee shall install equipment and implement measures designed to enhance Yadkin Project (Project) tailwater dissolved oxygen (DO) conditions as specified in the schedule in Table WQ-1.

Table WQ-1. Dissolved Oxygen Enhancement and Monitoring Schedule

Year	DO Enhancement Action	Monitoring/Reporting
2007 ¹		- Continuous DO/temperature monitoring 5/1-11/30 at existing stations in all four tailwaters. - File Draft DO Monitoring Plan and Quality Assurance Project Plan (QAPP) with the North Carolina Division of Water Quality (NCDWQ) as part of 401 Application.
2008 ²	Narrows Unit 2 - Addition of two aeration valves by 03/31/08.	- Continuous DO/temperature monitoring 5/1-11/30 at existing stations in all four tailwaters. - File Final DO Monitoring Plan and QAPP for approval by NCDWQ and the Commission.

ATTACHMENT XIV

Year	DO Enhancement Action	Monitoring/Reporting
2009	Narrows Unit 1 - Addition of two aeration valves by 12/31/09.	- Implement NCDWQ/FERC approved DO Monitoring Plan. - File annual DO monitoring data report with NCDWQ by March 31.
2010	Narrows Unit 3 - Addition of two aeration valves by 12/31/10. High Rock Unit 3 - Install "through the blade" aerating turbine by 12/31/10.	- Monitoring/reporting in accordance with DO Monitoring Plan.
2011	High Rock Unit 2 - Install a "through the blade" aerating turbine by 12/31/11.	- Monitoring/reporting in accordance with DO Monitoring Plan. - Initiate special study (up to 2 years) to evaluate the effectiveness of the aeration at Narrows on DO levels being discharged from Falls (2011-2012).
2012	High Rock Unit 1 - Install a "through the blade" aerating turbine by 12/31/12.	- Monitoring/reporting in accordance with DO Monitoring Plan. - Complete second year of 2-year study of effectiveness of aeration at Narrows on DO at Falls by 12/31/12 and prepare Study Report.
2013		- Monitoring/reporting in accordance with DO Monitoring Plan. - File 2-year Narrows/Falls DO Study Report with NCDWQ by 3/1/13. - If 2-year study does not demonstrate compliance at Falls, file an Action Plan for DO (DOAP) enhancement at Falls with NCDWQ by 12/31/13. - Initiate special study (up to 2 years) to evaluate the effectiveness of aeration at High Rock on DO levels being discharged from Tuckertown (2013-2014).
2014	Falls Unit 1 - Install aeration valves or other appropriate aeration technology, if needed, in accordance with Falls Action Plan by 12/31/14.	- Monitoring/reporting in accordance with DO Monitoring Plan. - Complete second year of 2-year study of High Rock/Tuckertown DO by 12/31/14 and prepare Study Report.
2015	Falls Unit 2 - Install aeration valves or other appropriate aeration technology, if needed, in accordance with Falls Action Plan by 12/31/15.	- Monitoring/reporting in accordance with DO Monitoring Plan. - File 2-year High Rock/Tuckertown DO Study Report with NCDWQ by 3/1/15. - If 2-year study does not demonstrate compliance at Tuckertown, file an Action Plan for DO enhancement at Tuckertown by 12/31/15.
2016	Falls Unit 3 - Install aeration valves or other appropriate aeration technology, if needed, in accordance with Falls Action Plan by 12/31/16. Tuckertown - Install aeration technology, if needed, at Tuckertown in accordance with Tuckertown Action Plan by 12/31/16.	- Monitoring/reporting in accordance with DO Monitoring Plan.

- Notes:
- 1 Actions to be taken under the current License for the Yadkin Project.
 - 2 The schedule shown starting in 2008 assumes an effective date of the New License for the Yadkin Project of or before May 1, 2008. If the effective date of the New License is after May 1, 2008, the schedule will be adjusted such that the 2008 schedule would begin within the year following the effective date of the New License, as provided in a revised schedule that has written approval from NCDWQ.

2.2.2 Tailwater Dissolved Oxygen Enhancement Operations

As DO enhancement equipment or measures are installed or implemented on the schedule in Table WQ-1, the Licensee shall operate the generating units with DO enhancement equipment added on a “first-on-last-off” basis, subject to unit availability, from no later than May 1 of each year through November 30 of each year. If DO enhancement equipment or measures are not associated with generating equipment, once completed, that equipment or those measures shall be operated or implemented as designed from no later than May 1 of each year through November 30 of each year.

If at any time during the term of the New License, the Licensee can demonstrate through studies and/or monitoring that DO conditions have improved, the Licensee may consult with the North Carolina Division of Water Quality (NCDWQ) regarding the possibility of reducing the period of DO enhancement operations (May 1 – November 30). Should any such consultation result in an agreement between the Licensee and the NCDWQ to modify the operation of the Project for purposes of DO enhancement, the Licensee shall consult with the NCDWQ to develop a plan to revise DO enhancement operations. The Licensee shall include with the plan, an implementation schedule, documentation of consultation, copies of comments and recommendations on the plan after it has been prepared and provided to NCDWQ, and specific descriptions of how NCDWQ’s comments are accommodated by the plan. The Licensee shall file the plan with the Commission within 30 days of receiving NCDWQ’s written approval of the plan.

2.2.3 Dissolved Oxygen Monitoring

Within six months of the effective date of the New License, the Licensee shall file with NCDWQ a Dissolved Oxygen Monitoring Plan (DO Monitoring Plan) and Quality Assurance Project Plan (QAPP) for the Project. The DO Monitoring Plan and QAPP will be developed in consultation with NCDWQ and other appropriate state and federal resource agencies.

The primary component of the DO Monitoring Plan will be the operation of four (4) continuous DO/temperature monitors (one in each tailwater), for the period May 1 through November 30 of each year. The Plan shall include a schedule for preparing an annual DO and temperature data report. The annual report shall be filed with NCDWQ and the Downstream Licensee no later than March 31 of the following year.

The Plan shall also include provisions for conducting two studies as part of the overall DO enhancement schedule (Table WQ-1) designed specifically to investigate the effectiveness of aeration technology installed and operating at Narrows on the DO conditions in the Narrows and Falls tailwaters, and the effectiveness of aeration technology installed and operating at High Rock on DO conditions in the High Rock and Tuckertown tailwaters. At the completion of each of the two studies, the Licensee shall prepare a study report which shall be filed with NCDWQ in accordance with the schedule in the DO Monitoring Plan. If the study results demonstrate that the Falls and/or Tuckertown tailwaters do not meet state dissolved oxygen standards as a result of Project operations, the Licensee shall prepare a DO Action Plan (DOAP) for the Falls and Tuckertown developments, respectively. The resulting DOAP(s), if needed, will be filed with NCDWQ in accordance with the schedule shown in Table WQ-1.

The Licensee shall file the DO Monitoring Plan with the Commission within 30 days of receiving NCDWQ’s written approval of the plan. The Licensee shall include with the DO Monitoring Plan

an implementation schedule, documentation of consultation, copies of comments and recommendations on the plan after it has been prepared and provided to NCDWQ, and specific descriptions of how NCDWQ's comments are accommodated by the plan.

2.2.4 Additional Dissolved Oxygen Enhancement Actions

If at any time during the term of the New License, after all the DO enhancement equipment and measures outlined in Table WQ-1 have been installed and implemented, all of the planned unit upgrades have been completed and the upgraded units are operational, and at least two additional years of monitoring have been completed, the Licensee is notified by the NCDWQ that based on the results of monitoring under the DO Monitoring Plan, state water quality standards are not being met as a result of the Licensee's hydroelectric operations, the Licensee shall consult with the NCDWQ to develop a plan to implement corrective actions. The Licensee shall file a Dissolved Oxygen Corrective Action Plan (DOCAP) for NCDWQ approval within one year of initiating consultation with the NCDWQ. The Licensee shall include with the DOCAP an implementation schedule, documentation of consultation, copies of comments and recommendations on the plan after it has been prepared and provided to NCDWQ, and specific descriptions of how NCDWQ's comments are accommodated by the plan. The Licensee shall file the plan with the Commission within 30 days of receiving NCDWQ's written approval of the plan.

2.2.5 Total Maximum Daily Load Process

The Licensee agrees to participate in the High Rock Total Maximum Daily Load (TMDL) process for High Rock Reservoir initiated by the State of North Carolina in 2005. The Parties agree that the Licensee will contribute up to \$50,000 in in-kind services for planned water quality sampling efforts, upon notification that the Yadkin-Pee Dee River Basin Association has received federal or state grants of at least \$50,000, for which the Licensee's contribution will be used as the required "matching funds".

If, during the term of the New License, other TMDL processes are required for the Yadkin River or its tributaries, within the Project Boundary of the Yadkin Project, the Licensee will participate in these processes.

2.3 Recreation

2.3.1 Recreation Facility Improvements

The Parties agree that the Licensee will develop a Recreation Plan that at a minimum will include the recreation facility enhancements described in Appendix C.

2.3.2 Operations and Maintenance Funding Commitments

The Parties agree that the Licensee will contribute \$30,000 annually to the U.S. Forest Service (USFS) for the purposes of assisting with the operation and maintenance of six public recreation sites in Uwharrie National Forest that provide direct access to the Yadkin Project reservoirs (Badin Lake Campground, Cove Boat Ramp, Kings Mountain Point, Deep Water Trail Access, Holt's Cabin, Badin Lake Hiking Trail). The use of these funds by the USFS for any purpose other than the operation, maintenance, or construction of new facilities at the recreation sites

Attachment XV

N.C. OAH Order Granting
Petitioner's Motion for
Preliminary Injunction
Stay of Certification
09 EHR 3078 in the Office of
(May 27, 2009)

Filed

STATE OF NORTH CAROLINA
 COUNTY OF STANLY

2009 MAY 27 AM 11:51
 IN THE OFFICE OF
 ADMINISTRATIVE HEARINGS
 09 EHR 3078

STANLY COUNTY, NORTH CAROLINA,

Office of
 Administrative Hearings

Petitioner,

v.

NORTH CAROLINA DEPARTMENT OF
 ENVIRONMENT AND NATURAL
 RESOURCES, DIVISION OF WATER
 QUALITY,

ORDER GRANTING
 PETITIONER'S MOTION FOR
 PRELIMINARY INJUNCTION/
 STAY OF CERTIFICATION

Respondent,

ALCOA POWER GENERATING, INC.,

Respondent-Intervenor.

THIS MATTER came on for hearing on May 20, 2009 before the undersigned Administrative Law Judge Joe L. Webster upon Petitioner Stanly County's Motion for Temporary Restraining Order and Preliminary Injunction, seeking to stay the effectiveness of the North Carolina Section 401 Water Quality Certification (No. 003173) issued by Respondent North Carolina Department of Environment and Natural Resources, Division of Water Quality ("Respondent") to Respondent-Intervenor Alcoa Power Generating, Inc. ("APGI") on May 7, 2009 (the "Section 401 Certification") pending the outcome of this contested case. Petitioner's Motion was made pursuant to N.C. Gen. Stat. § 150B-33(b)(6), 26 NCAC 03 .0115 and Rule 65 of the North Carolina Rules of Civil Procedure. Notice of the Motion was provided to Respondent and to APGI. Petitioner, Respondent and APGI were represented by counsel at the hearing, and all parties had the opportunity to present arguments, authorities and exhibits supporting their positions. The undersigned Administrative Law Judge also permitted the submission of a written *amicus curiae* statement by the Governor of the State of North Carolina. Based on the Motion, the attachments thereto, the representations of counsel at the hearing, the

exhibits presented at the hearing and the submissions of the parties, the undersigned finds that Petitioner has met its burden of establishing the facts necessary for the issuance of a preliminary injunction/stay, in that:

A. Petitioner has demonstrated a likelihood of success on the merits of its claim that Respondent erred in one or more of the ways contemplated by N.C. Gen. Stat. § 150B-23(a) when it did not exercise the full scope of its jurisdiction in deciding that certain water quality impacts in Badin Lake were beyond the scope of its Section 401 water quality certification review. This is demonstrated by, among other things, the deposition testimony of John Dorney and the May 6, 2009 Hearing Officer Report on the Public Hearing for Alcoa 401 Water Quality Certification for FERC Re-license.

B. Petitioner has demonstrated a likelihood of success on the merits of its claim that Respondent erred, in one or more of the ways contemplated by N.C. Gen. Stat. § 150B-23(a), in the manner in which it determined the scope of its jurisdiction under the Section 401 water quality certification program. This is demonstrated by, among other things, the deposition testimony of John Dorney.

C. Petitioner has demonstrated a likelihood of success on the merits of its claim that the nature of the prolonged compliance schedule included in the Section 401 Certification for coming into compliance with North Carolina's dissolved oxygen standards does not comply with Respondent's obligations under the Federal Clean Water Act, and that Respondent therefore erred in one or more of the ways contemplated by N.C. Gen. Stat. § 150B-23(a). This is demonstrated by, among other things, the language of the Section 401 Certification.

D. Petitioner has demonstrated that it will suffer irreparable harm if an injunction/stay is not issued, given the effect of the issuance of a final Federal Energy Regulatory

Commission (“FERC”) license to APGI even if there is future modification of the Section 401 Certification, and the impact of that issuance on the effectiveness of these proceedings.

E. Petitioner has demonstrated that the environment will suffer irreparable harm in the absence of an injunction/stay.

F. The undersigned has taken into account that Respondent stated on the record, both in its Responsive Pleading and oral argument that the Respondent Division of Water Quality (DWQ) believes the 401 Certification was issued in accordance with all substantive requirements and the DWQ does not concede any error. Respondent DWQ also believes its decision was made for the right reasons and addresses the necessary elements. (Transcript, p. 76)

G. Petitioner has demonstrated that it has no adequate remedy at law and that money damages are not adequate to compensate for the irreparable injury that will be suffered in the absence of an injunction/stay.

H. Petitioner has demonstrated that the balance of hardships and equities weighs heavily in favor of the issuance of the injunction/stay.

I. The undersigned acknowledges the statements concerning the public interest made at the hearing and in submissions, including the Respondent’s statement that the public interest may be best served by a stay and the statement by the Governor of the State of North Carolina, as *amicus curiae*, that the public interest should serve as an important factor in the undersigned’s consideration of Petitioner’s Motion. The undersigned finds it unnecessary to address these statements in that he has determined that Petitioner has met the standards and requirements of N.C. Gen. Stat. § 150B-33(b)(6) and Rule 65 of the North Carolina Rules of Civil Procedure. The issuance of the injunction/stay is based solely on N.C. Gen. Stat. § 150B-33(b)(6) and Rule 65 of the North Carolina Rules of Civil Procedure.

NOW THEREFORE, pursuant to N.C. Gen. Stat. § 150B-33(b)(6) and Rule 65 of the North Carolina Rules of Civil Procedure, it is hereby ORDERED that:

1. Petitioner's Motion is granted and the undersigned hereby issues a preliminary injunction staying the effectiveness of the Section 401 Certification for all purposes.
2. The preliminary injunction/stay shall remain in place until the undersigned holds a full hearing on Petitioner's claims in this contested case proceeding and makes a final determination on the merits of those claims.
3. Accordingly, the Section 401 Certification issued on May 7, 2009 is not yet effective to demonstrate APGI's compliance with Section 401 of the Federal Clean Water Act until such time as the undersigned determines whether the Section 401 Certification should be affirmed, modified or voided as a result of Petitioner's claims.
4. No bond is required pursuant to Rule 65(c) of the North Carolina Rules of Civil Procedure because Petitioner is a County of the State of North Carolina.
5. This preliminary injunction/stay is effective immediately.
6. Respondent shall immediately notify FERC of this injunction/stay.

ENTERED this 27th day of May, 2009, nunc pro tunc for April 26, 2009 at 9:00 a.m.



Joe L. Webster
Administrative Law Judge

A copy of the foregoing was mailed to:

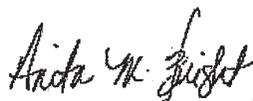
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This the 27th day of May, 2009.



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Attachment XVI

Jack Betts, *The Water is Shifting Under Alcoa*,
The News and Observer, June 2, 2009,
[http://www.newsobserver.com/opinion/
columns/story/1551070.html](http://www.newsobserver.com/opinion/columns/story/1551070.html)

Raleigh News & Observer

The water is shifting under Alcoa

BY JACK BETTS - The Charlotte Observer

Published: Tue, Jun. 02, 2009 09:49AM

Modified Tue, Jun. 02, 2009 06:56AM

RALEIGH -- A lawyer from the state Attorney General's Office surprised a lot of folks the other day in an administrative law hearing. He asked Judge Joe Webster if he could summarize the views of Gov. Bev Perdue on a request by Stanly County to stop a state permit the Alcoa Power Generating Inc. wants. The company needs the permit to renew its Federal Energy Regulatory Commission license to operate hydroelectric dams on the Yadkin River.

What surprised folks was not that the governor opposes Alcoa's getting the new license. Perdue made her views known last year.

What surprised folks at the May 20 hearing was that Perdue took a position that, in effect, is at odds with a permit issued by her administration. The Department of Environment and Natural Resources on May 7 issued a clean water certification, a key document Alcoa needs in order to renew its license.

Getting that permit in early May was a major victory for Alcoa, which once employed about 1,000 workers at its Badin aluminum plant. But when the company shut down the smelter, support for the company -- and its federal license to run the dams -- began to dwindle.

The state's official support began to unravel last year when then-Gov. Mike Easley and Lt. Gov. Perdue began opposing renewal. Perdue doesn't think Alcoa should get a license to use public waters to generate unregulated power and sell it on the open market -- unless it comes with a lot of jobs.

So it was that Special Deputy Attorney General Faison Hicks asked Judge Webster if Perdue could express her view "of the significant public interests that are at stake here," Hicks wrote the next day. Perdue, he said, relied on experts in her administration to decide permits, but since the permit was issued, "the governor believes that an important development has occurred."

That development, he said, was that Stanly County "has raised questions going directly to the welfare of our environment, the life of the Yadkin River and, ultimately, the health and safety of the people of this state." She was concerned about "cancer-causing toxins that even Alcoa agrees reside in sediments at the bottom of Badin Lake as a result of Alcoa's past activities." Alcoa says they're not a threat. Stanly County disputes that, and Perdue was aware of the state's recent fish study showing toxins in the tissue of a significant percentage of Badin Lake fish, Hicks said.

Perdue, he went on, wasn't thinking only of procedural rules and technicalities. She's also thinking about "common sense decision-making and ordinary prudence" -- and, he added, she believes the public interest "should reign supreme" in this case.

That's high-toned language for a governor to use, through a spokesman, in a legal proceeding, to take issue with a state permit issued by her administration, without challenging the decision to issue the permit.

The larger issue, Perdue told me Thursday, is how the state takes care of its waterways, and whether the state should endorse a company's use of the water for its own commercial purposes without a significant benefit such as a substantial number of jobs.

One reason Alcoa got its 50-year permit in 1958, she said, was its workforce at the Badin plant. That benefit no longer exists. And questions about environmental issues further undermine the company's request, she said.

"I believe private use of the state's waters has to be tied to providing jobs," she said, "and it's not right" to grant a license to Alcoa without such a tie.

"Alcoa in my mind has not shown much of a good-faith effort in terms of either hiring people or making sure the water quality is well-taken care of," she went on.

Perdue is likely to sign legislation, if the General Assembly approves it, creating a Yadkin River Trust that might eventually purchase and operate the Yadkin River hydroelectric dams. While Alcoa has protested the creation of such an entity as a "taking" of a legitimate business, under federal law such dam projects on public waters can be "recaptured" at a fair price -- though it has never happened. If it did, Alcoa argues, it would send the wrong message about doing business here.

Perdue sees a different message: "We want jobs, but the state has to derive for the people some sort of benefit -- and (for Alcoa) to sell it (power) off in the market without a benefit to the people of this state sends the wrong message."

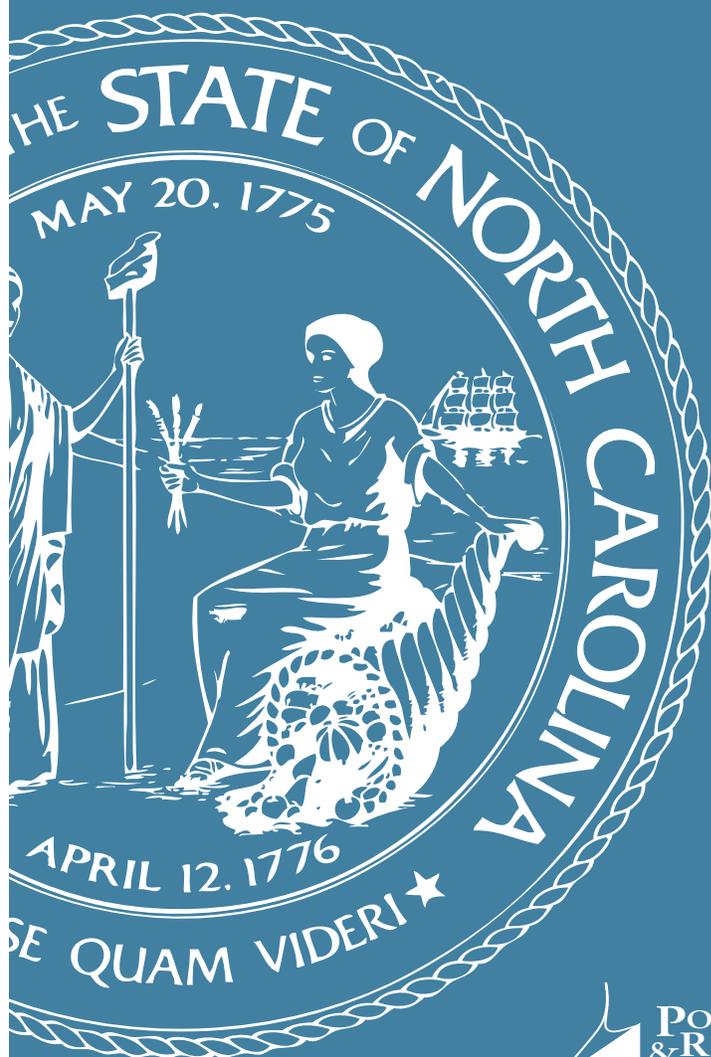
Attachment XVII

N.C. Economic Development Board
Strategic Plan 2008 Update (Sept. 25, 2008)

N.C. Economic Development Board Strategic Plan 2008 Update

September 25, 2008

Prepared by the Interagency Economic Development Group



ATTACHMENT XVII

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The Interagency Economic Development Group (IEDG) is a team composed of staff from state agencies and organizations charged with the duty of assisting the Economic Development Board (EDB) in implementing and annually updating the economic development strategic plan and providing policy recommendations for Board consideration. In accordance with General Statute 143B-434, as staff lead, the Department of Commerce convenes the IEDG as needed to collect updates from the organizations that are responsible for implementing the goals of the strategic plan and/or to provide information as needed by the Board for future planning considerations.

Since its first policy roundtable discussion, the IEDG has worked to assess the status of the plan's goals and to begin developing recommendations for future policy actions. In 2008, Policy Team staff in Commerce's Division of Policy, Research and Strategic Planning Division worked closely with the IEDG members in preparing the annual Strategic Plan Update Executive Summary for presentation at the September EDB meeting.

The following IEDG representatives offered their expertise and support in the preparation of this executive summary:

- **Department of Commerce** (*Gene Byrd, Meihui Bodane, Michael Haley, Chris Harder, Teresa Johnson, Beth Lucas, Vickie Miller, Lynn Minges, Gloria Nance-Sims, Jack Newman, Sara Nienow, Liz Parham, David Rhoades, Mark Roberts, Libby Smith, Rodney Swink, Aaron Syrett*)
- **Department of Transportation** (*Missy Dickens, Alpesh Patel, Donald Voelker*)
- **Department of Environment and Natural Resources** (*Gary Hunt, Bruce Nicholson*)
- **Department of Cultural Resources** (*Maryanne Friend, Wayne Martin*)
- **E-NC Authority** (*Angie Bailey, Ashley Crane, Cary Edgar, Jane Smith Patterson*)
- **North Carolina Association of County Commissioners** (*Rebecca Troutman*)
- **North Carolina Board of Science and Technology** (*John Hardin*)
- **North Carolina Community College System** (*Willa Dickens, Glynda Lawrence, Maureen Little*)
- **North Carolina Rural Center** (*Brett Altman, Julie Haigler Cubeta, Leslie Scott*)
- **North Carolina Utilities Commission** (*Bill Gilmore*)
- **School of Government at University of North Carolina, Chapel Hill** (*Will Lambe, Tyler Mulligan*)
- **Small Business & Technology Development Center** (*Scott Daugherty*)
- **University of North Carolina System** (*Leslie Boney*)

In 2007, the North Carolina Economic Development Board and its partners continued to make substantial progress and realize successes through the implementation of action steps from the Economic Development Strategic Plan. This update highlights this progress and identifies the seventeen priority action steps the Board will focus on during 2008 – 2009.

The report consists of five sections. First, it provides a general overview of the state's economy and demographic and macroeconomic trends impacting North Carolina. The state's performance against a set of key economic indicators also is summarized. The Board's overall progress on the strategic plan over the last six years is outlined. Next, strategic plan priority action steps for 2008 – 2009 are identified. Each action step is described and accompanied by the Board's planned activity for accomplishing it. The majority of this update is dedicated to providing a summary of activities undertaken in 2007 related to the seven goals of the strategic plan. A conclusion regarding the Board's progress in 2007 and its direction in 2008 – 2009 is provided. Finally, two appendices, with further detailed information, are provided. The first appendix describes the priority action steps and the second provides detailed information on the progress of all the action steps.

In 2009, the State will see a change in Governor, Administration, and North Carolina Economic Development Board membership. To this end, efforts were made to identify ways to resolve outstanding action items within the current plan and to begin preparing for new leadership and a new Economic Development Strategic Plan, one that reflects the current needs of our 21st century economy and better positions the state to realize promising opportunities on the horizon.

Despite lackluster performance at the national level in 2007, North Carolina's economy is strong according to many measures. The state continues to attract people and businesses and the productivity of its labor force continues to grow. The state's economic strength is evident in the increase of Gross Domestic Product, its growing labor force and its expanding export market. The following is a summary of demographic and macroeconomic trends and North Carolina's performance on key economic indicators.

Demographic and Macroeconomic Trends Affecting North Carolina

Globalization: Every region of the world has experienced the impacts of globalization. North Carolina experienced a steep decline of jobs in traditional manufacturing industries due in part to cheaper labor costs abroad. Economists anticipate that this trend will continue. However, globalization has had some positive impact on North Carolina's economy. In recent years, North Carolina has shown significant job growth in a number of knowledge-based industries such as biotechnology, information technology, pharmaceuticals, and advanced manufacturing.

Demographic Changes: North Carolina's population is growing rapidly. Currently, the state ranks 10th in the country, with a population of about 9.1 million. Between 2000 and 2007, the state experienced a 12.6 percent growth rate. Migrants from other states and countries contribute significantly to North Carolina's population growth. Migration from rural to urban areas (or at least to rural areas in close proximity to urban areas) is also a demographic trend. Urban and suburban areas are growth centers for jobs, especially those associated with high-growth knowledge-based industries. Finally, the nation as a whole is aging. As "baby-boomers" get older they will require more services, such as health care and social assistance.

National Economy: The United States as a whole is experiencing economic uncertainty. The pace of economic growth slowed in 2007 and there are strong indications that it will slacken further during 2008. The ongoing problems in the housing and financial markets and the high price of oil will trim the growth of GDP¹. North Carolina shows signs of remaining competitive relative to comparison states and the United States as a whole.

Summary of Key Economic Indicators

Gross Domestic Product: North Carolina's Gross Domestic Product (GDP) growth exceeds that of the United States and most comparison states. Despite the continued restructuring of the state's economic base away from labor-intensive industries toward knowledge-based industries, manufacturing in North Carolina is still the largest contributor to State GDP. In 2007, North Carolina's GDP was just under \$400 billion, an increase in real GDP of 2.2 percent from 2006. The growth in real GDP for the United States as a whole over the same period was 2 percent.

Earnings: Adjusted for inflation, earnings in North Carolina are below the national average. The median household income in North Carolina (using a three-year average: 2004-2006) was \$42,061, compared to \$47,790 nationally. The state's highest average weekly wages are in North Carolina's three urban economic development regions: Charlotte, Piedmont Triad and Research Triangle.

Labor Force: The state's expanding workforce and the availability of jobs are indicators of a healthy economy. In 2007, North Carolina's labor force exceeded 4.5 million, with employment slightly more than 4.3 million. North Carolina's labor force grew 9.5 percent from 2000 to 2007, faster than the national average (7.5 percent).

¹ Congressional Budget Office. The Budget and Economic Outlook: Fiscal Years 2008 to 2018. Washington, DC: Congress of the United States, January 2008.

Exports: An important indicator of a state's successful involvement in the global economy is the amount of goods and services it exports to foreign markets. A key driver of a state's GDP is the value of its exports. In 2007, the total value of exports leaving North Carolina ports was \$23.4 billion, an increase of 9.7 percent from 2006. North Carolina's 2007 exports represent 2 percent of all exports out of the United States. The five largest destination countries of North Carolina exports are: 1) Canada, 2) Japan, 3) China, 4) Mexico, and 5) France.

Labor Productivity: Productivity represents the amount of output (GDP) per unit of input (employment). Not only is labor productivity growth closely tied to earnings growth, educational attainment and standard of living, it also provides a measurement of a state's competitive position over time. In 2007, North Carolina's labor productivity (\$77,922) was below the national average of \$78,519. Both the United States and North Carolina experienced an increase in labor productivity of less than 1 percent between 2006 and 2007.

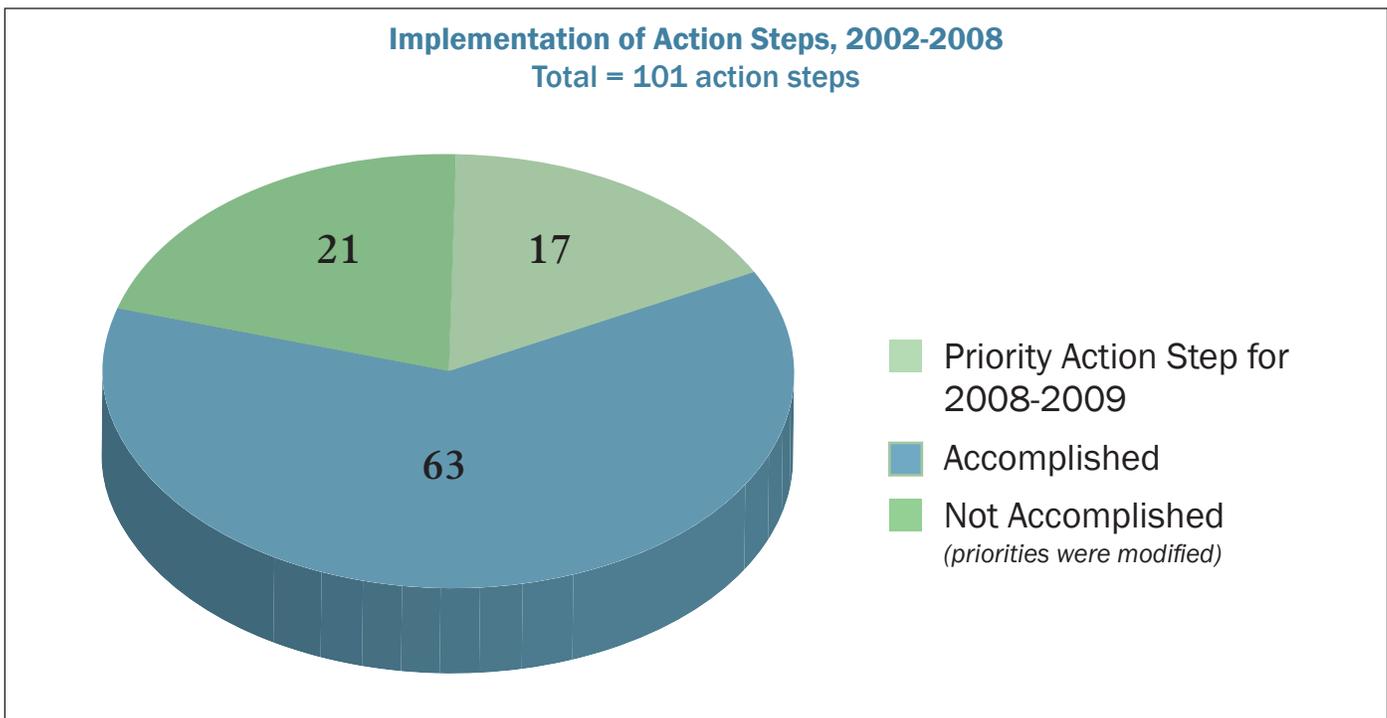
Occupational Mix: Popular occupations in North Carolina have relatively low wages. In 2007, the five occupations in North Carolina with the highest employment were: office and administrative support (699,087), sales (668,768), production (422,676), management (384,983), and food preparation (368,251). Of these five occupations, only management occupations earned more than \$30,000 annually.

Capital Investment: Capital investment is key indicator of the state's economy. In 2007, North Carolina attracted \$547 million in venture capital funding, up from \$510 million in 2006. However, the state's share of venture capital investments to Gross Domestic Product was 0.14 percent, below the U.S. average of 0.22 percent. Investment by new and expanding business in North Carolina averaged \$5.8 billion annually between 2000 and 2007. However, the vast majority of this investment is concentrated in the Charlotte, Piedmont Triad and Research Triangle regions.

Industry Mix: In general, the manufacturing sector continues to lose jobs, but remains significant in terms of overall state employment. Knowledge-intensive industries such as financial services, professional and technical services and health care/social assistance are experiencing significant growth. North Carolina's largest industries were manufacturing, retail trade, and health care/social assistance. In 2007, these industries accounted for more than 42 percent of private sector employment in the state.

During the past year, the state has made good progress in accomplishing a number of the action steps in the strategic plan. Since 2002, North Carolina agencies and organizations have worked hard to accomplish sixty-three of the one hundred and one original action steps and only seventeen are currently under way. Approximately twenty-one of the actions steps were not accomplished, in part, due to modifications in policy priorities.

The table below illustrates the success of the Economic Development Board's strategic plan.



Of the one hundred and one (101) action steps in the North Carolina Economic Development Strategic Plan, there are seventeen (17) action steps that have not yet been accomplished. The following is a brief description of each remaining action step, and the corresponding recommended actions that the Board can take to help achieve each goal. (Note: Two of the actions steps, found in Goal 2 of the Strategic Plan, have been consolidated below due to their relationship to one another.) These remaining action steps will be the priorities for the Board during the next year.

For more detailed information please see the North Carolina Economic Development Board Strategic Plan Priority Action Steps 2008-2009 located in the Appendix.

- **Maintain support for enrollment growth for the University of North Carolina System, the North Carolina Community College System and the North Carolina Public School system.**

Recommended Action: In preparation for the 2009 legislative session, the N.C. Economic Development Board will send a letter supporting continued full funding for enrollment growth to the Chairs and Members of the House and Senate appropriations committees, other relevant committee chairs and members, and key legislators.

- **Advocate and support the North Carolina Community College System's recommendations to provide additional funding for equipment needs by crafting a letter to the Governor and the General Assembly, as well as, assembling the support of all stakeholders through the N.C. Economic Development Board.**

Recommended Action: In preparation for the 2009 legislative session, the N.C. Economic Development Board will send a letter supporting additional funding for equipment needs for the North Carolina Community Colleges to the Chairs and Members of the House and Senate appropriations committees, other relevant committee chairs and members, and key legislators.

- **Develop a mechanism within state government to provide coordination and assistance to existing public and private sector science and technology resources to make the best use of those resources for advancing economic development and job growth throughout the state by increased funding for the North Carolina Office of Science and Technology. Science, technology, and economic development, which are interrelated and vital to North Carolina's future economic success, and require coordinated attention at the state level.**

Recommended Action: In preparation for the 2009 legislative session, the N.C. Economic Development Board will send a letter supporting increased recurring state appropriations for the basic operations of the N.C. Office of Science and Technology and the Board of Science and Technology to the Chairs and Members of the House and Senate appropriations committees, other relevant committee chairs and members, and key legislators.

- **Catalyze and support expanded innovation activities from all of North Carolina's universities through appropriate follow-up to the University's economic development plan. This has been integrated into the strategic priorities of the UNC System, providing staffing to the function at a system level and on each campus.**

Recommended Action: The N.C. Economic Development Board will encourage the UNC System to re-examine technology transfer structures and staffing at all public universities, to determine how they will maximize technology transfer for creation of jobs in North Carolina, and to complete a comprehensive plan to increase university innovation and maximize job creation by technology transfer.

- **Taking into account mission studies mandated by the legislature in this area, complete regional resource analyses across the state to understand regional strengths and opportunities; align university initiatives and expertise with the needs of regional economic development clusters; and develop strategies and tactics to address knowledge-based job creation in each region.**

Recommended Action: The N.C. Economic Development Board will encourage the North Carolina Department of Commerce (DOC) and The University System (UNC) to fully implement the 2007 UNC/DOC Memorandum of Agreement. The UNC/DOC MOA outlines the collaborative relationship between DOC and the universities at the state and regional levels. The MOA includes other key partners in economic development to be included in regular meetings and discussions in the regions and at the state level. The MOA implementation is currently underway in several of the regions.

- **Strengthen the overall R&D capacity of all North Carolina Universities and research institutions by enhancing key administrative support functions and processes that currently constrain their competitive R&D position.**

Recommended Action: The N.C. Economic Development Board should encourage broader flexibility under the State Personnel Act.

- **Fund an initiative to promote economic growth in North Carolina through the identification and development of emerging technologies. For example, nanotechnology—the science of the very small— will fundamentally transform science, technology, and society, from microscopic computer chips to cancer-fighting vaccines.**
- **As such, it holds tremendous potential for North Carolina and the nation. Nanotechnology will be the basis of manufacturing technology in the future. Developing a coordinated response to the challenges and opportunities presented by this and other emerging technologies will greatly expand the opportunity for all North Carolinians to obtain and retain challenging and economically rewarding employment.**

Recommended Action: In preparation for the 2009 legislative session, the N.C. Economic Development Board will send a letter supporting recurring funding to support implementation of components of the nanotechnology research efforts, to the Chairs and Members of the House and Senate appropriations committees, other relevant committee chairs and members, and key legislators.

- **Strengthen the overall R&D capacity of the 16-institution University of North Carolina by providing resources and incentives for faculty development.**

Recommended Action: In preparation for the 2009 legislative session, the N.C. Economic Development Board will send a letter supporting recurring sources of competitive research funding to support UNC faculty research in sectors deemed critical to North Carolina's long term economic future.

- **As part of a regional strategy, systematically promote the state's University Millennium Campuses and support the development of new ones as sites for growing and attracting new technology-based businesses.**

Recommended Action: The N.C. Economic Development Board will encourage the UNC System to undertake a significant, high profile ad campaign to promote industry/university research parks.

- **Increase knowledge of federal Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) awards throughout the state and strengthen application assistance for entrepreneurs to increase their success rate in receiving such awards.**

Recommended Action: Recurring state incentive funding for SBIR/STTR applicants and matching funding for SBIR/STTR recipients via the One North Carolina Small Business Program is needed. In preparation for the 2009 legislative session, the Economic Development Board will send a letter supporting recurring sources of funding for the One NC Small Business Program to the Chairs and Members of the House and Senate appropriations committees, other relevant committee chairs and members, and key legislators. The letter will also advocate increased funding for the Small Business and Technology Development Center (SBTDC) to expand its efforts to improve statewide knowledge of SBIR/STTR opportunities and strengthen application assistance.

- **Identify a dedicated source of funding for the One North Carolina Fund.**

Recommended Action: In preparation for the 2009 legislative session, the N.C. Economic Development Board will send a letter to the Chairs and Members of the House and Senate appropriations committees supporting recurring funding for the One North Carolina Fund.

- **Identify development hubs with regional significance (beyond the three largest metropolitan areas) and develop strategies to strengthen them and make them more competitive.**

Recommended Action: Currently a development hubs study is underway through a joint effort between North Carolina State University and University of North Carolina-Chapel Hill to define development hubs, examine North Carolina's resources, and identify best practices around the nation. Upon the completion of the study, in January 2009, members from various divisions of Commerce will work with the N.C. Economic Development Board to formulate and implement policies to support this economic development concept.

- **Request new funding to recapitalize the Main Street Financial Incentive Fund with its 10:1 leverage to increase the number of buildings rehabilitated in downtowns.**

Recommended Action: In preparation for the 2009 legislative session, the N.C. Economic Development Board will send a letter to the Chairs and Members of the House and Senate appropriations committees supporting new funding to recapitalize the Main Street Financial Incentive Fund, which will increase the number of buildings rehabilitated in downtown and spur investment and create jobs.

- **Expand the Department of Commerce's successful Small Town Main Street Program statewide.**

Recommended Action: In preparation for the 2009 legislative session, the N.C. Economic Development Board will send a letter to the Chairs and Members of the House and Senate appropriations committees supporting expansion of the Small Town Mainstreet Program. Because there is growing interest in small towns and micropolitan areas, dedicated funding from the General Assembly is needed to successfully expand the program.

- **Continue promoting participative and comprehensive approaches to economic development by making a refined 21st Century Communities Initiative available to thirty-seven counties by 2010.**

Recommended Action: In preparation for the 2009 legislative session, the N.C. Economic Development Board will send a letter to the Chairs and Members of the House and Senate appropriations committees supporting the 21st Century Communities program and encourage dedicated funding for the successful expansion of the program.

- **Continue to develop and implement an e-agriculture strategy to increase the rate at which farm operators and employees utilize Internet resources.**

Recommended Action: The N.C. Economic Development Board will continue its support for e-NC Authority and encourage the 2009 General Assembly to provide additional funding for development of an agricultural portal that would focus on the needs and use of the Internet as it applies to the economics of agriculture.

This section of the report provides an update of actions undertaken and accomplishments realized during the past year.

GOAL 1:**DEVELOP AN OUTSTANDING EDUCATION SYSTEM AND A HIGHLY QUALIFIED WORKFORCE.**

Providing support to industry and statewide economic development is a core mission of North Carolina's education and workforce development entities. North Carolina's workforce development organizations are recognized as national leaders in economic and workforce development. Continued support for North Carolina's education and workforce development system is necessary in order to build a workforce with the skills necessary for highly skilled occupations, to obtain livable wages, and to attract and retrain workers for high-growth industries in the new economy. To that end, much progress was made in 2007 in several workforce development- and education-related actions steps of the strategic plan.

The North Carolina Community College System (NCCCS) enrollment growth was fully funded (\$8.8 million) by the General Assembly in 2007, facilitating the accommodation of 2,296 additional full-time students. An additional \$2 million was appropriated to an enrollment growth reserve for colleges that experienced growth greater than 5 percent. The reserve was distributed, however, it was approximately \$10 million short of what was needed to accommodate new growth in 2007-2008.

In 2007-2008, the New and Expanding Industry Training (NEIT) program trained 17,087 workers and served 187 companies—92 existing North Carolina companies expanding and 95 new companies. The total expenditures for the program were over \$7.36 million or \$407.01 per trainee. The Focused Industry Training (FIT) program trained 6,729 workers and served 466 companies. The program convened 675 skill classes and workshops providing 20,002 hours of instructional training. The Customized Industry Training (CIT) program trained 1,498 workers and served 54 companies. The total expenditures for the program were \$723,000 or \$483 per trainee.

As part of the NCCCS Strategic Plan for 2007-2009, a process was undertaken to examine changing population trends and gaps that may exist in the ability to fill needs as a result of these changes in state demographics.

The NCCCS BioNetwork continues to connect community colleges across North Carolina, providing specialized training, curricula and equipment, to develop a world-class workforce for the biotechnology, pharmaceutical and life sciences industries. In June 2007, the BioNetwork released an economic impact study, "The Economic Contributions of the NCCCS BioNetwork Initiative". The purpose of the report was to determine the socioeconomic impact of the BioNetwork. The report concluded that "money invested in the community college system reaps a great return—in greater industry wages, tax benefit and return, and educational capital." In 2007, the BioNetwork funded 28 grants to twenty community colleges across the state worth \$2 million for a number of programs, curriculum development, and resources.

In 2007, the N.C. Department of Commerce's Division of Workforce Development and the Governor's Office announced a planning grant opportunity to support the development of Regional Skills Partnerships in the allied health sector. The planning grants were designed to address workforce issues of the allied health sector for the purpose of increasing the sector's competitiveness and creating employment and career advancement opportunities for workers. The partnerships promote system change through realignment of public and private resources, expanded integration of services, leadership through workforce intermediaries, and development of career pathways for low income / entry-level workers.

The allied health sector was selected because it is one of the fastest growing sectors in the state's economy. The category of allied health included healthcare professionals with a wide range of credentials—from high school graduates working as pharmacy technicians to physical therapists with doctoral training. The healthcare sector has been one of the key drivers in North Carolina's economic growth. As manufacturing employment in the state has declined, healthcare and social assistance occupations, as a percentage of the state's workforce, increased from 10% to 13% of the total workforce. Between 1999 and 2005, allied health employment in North Carolina grew by 46%. By contrast, total healthcare employment grew by 20% and total employment in the state grew by 0.2%. More than 69% of the total job growth in the healthcare sector during this time was due to allied health jobs.

The Economic Development Partnership Committee—a subcommittee of the North Carolina Commission on Workforce Development—provides oversight of the Allied Health Regional Skills Partnership grant program. A core team oversees direct guidance for the project. This team includes representatives from the Governor's Office, the N.C. Department of Commerce, the North Carolina Community College System, the Employment Security Commission, the UNC Cecil G. Sheps Center, and the North Carolina Hospital Association. Planning grants have been awarded to 7 partnerships across the state to address allied health employment and skills development related issues.

GOAL 2:

INVEST IN SCIENCE, TECHNOLOGY, AND UNIVERSITY OUTREACH.

In December 2007, a memorandum of agreement was signed between the University of North Carolina and the Department of Commerce, which aims to increase the connectivity of campuses to regional development infrastructures. Additional emphasis on these issues will come as campuses develop their responses to UNC Tomorrow, with the report's emphasis on assisting regional economic development and community engagement.

Technology transfer services have been strengthened over the past five years on less research-intensive campuses through contracts with university-based spin-off companies, and the University is currently developing a plan to strengthen technology transfer efforts on all campuses. These initiatives were implemented based on discussions with the Council of Research Administrators, a group comprised of representatives from the various university campuses, and convened by the Vice President of Research. These measures aim to increase the amount of university innovation through technology transfer and commercialization and to promote economic development activities.

The Small Business and Technology Development Center (SBTDC) has been designated by the Governor as the North Carolina Federal and State Technology Partnership (FAST) representative and plays a lead statewide role in promoting participation in the federal Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) R&D Award Program.

The SBTDC has taken the lead in supporting the creation of six structured early-stage angel capital funds located across the state. The funds will make investments of from \$50,000 to \$125,000 in early-stage technology and other high-growth potential businesses. Four of the six funds are now operational.

The SBTDC's success in this area has been noticeable, as it hosted the highly successful national 2007 SBIR/STTR conference held for the first time in North Carolina.

The University system has benefited from an expansion of funding for the Area Health Education Centers (AHEC) to help address critical needs for health care workers and other needs.

With support from the General Assembly and Golden LEAF Foundation, North Carolina State University and North Carolina Central University have continued to develop their programs to do research and train graduates in critical areas of biotechnology.

The University System's President's Advisory Committee on Efficiency and Effectiveness (PACE) Commission recommendations have aimed to reduce inefficiencies and redundancies.

The N.C. Biotechnology Center launched a Centers of Innovation initiative in 2007. Planning grant applications have been solicited and four awards have been made. Applicants will develop business plans and create and sustain Centers of Innovation in targeted areas of bio-science (Marine –Bio science, Medical Devices, Natural Products and Bio-nano). Approved plans will receive multi-year funding support.

Since the inception of the One North Carolina Small Business Incentive and Matching Fund Programs in early 2006, the Board of Science and Technology has issued more than 160 grants to North Carolina small businesses, totaling more than \$10 million. The North Carolina small businesses receiving the grants project to create more than 100 jobs in the state and to patent, license, and sell technologies and products worth more than \$1 billion.

GOAL 3:

ENSURE A COMPETITIVE ENVIRONMENT FOR THE RECRUITMENT AND RETENTION OF BUSINESS, CAPITAL INVESTMENT, AND JOBS CREATION.

In 2007 – and for the sixth time in seven years – North Carolina ranked first in Site Selection magazine's annual state business climate analysis. State and private agencies took significant steps in 2007 to maintain and enhance the competitive business environment for industries locating in North Carolina.

The General Assembly approved an extension of the Job Development Investment Grant (JDIG) program until 2010. In 2007, this discretionary grant program awarded 14 grants to new and existing companies. If performing as expected, these companies will create 5,574 new jobs, retain 3,653 existing jobs, and invest \$525 million in North Carolina. The General Assembly also approved the creation of the Job Maintenance and Capital Development (JMAC) grant program. This program assists expanding businesses with substantial capital improvements and maintenance of high-quality jobs.

There continues to be a groundswell of state support for developing the military and defense industries. Most recently, the N.C. Department of Commerce (DOC) estimated that the military and Coast Guard presence in the state have a \$23.4 billion impact on the state's economy each year. As a result of the 2005 Base Realignment and Closing (BRAC) decisions, this impact is anticipated to increase to over \$26 billion by 2013. Non-profit planning organizations are doing community needs assessments to prepare for the sudden influx of population in the Fayetteville and Jacksonville areas. Members of the armed services, state agencies, community leaders, and other organizations with military-related missions such as the North Carolina Military Foundation, the North Carolina Military Business Center, and the Defense and Security Technology Accelerator (DSTA) are assisting these planners.

The DOC launched its newly designed website in 2007. This comprehensive redesign provides a new platform to build the state's brand among business audiences, communicate news to relevant stakeholders, and explain in-depth the wide spectrum of economic development programs underway in the state. The website features the Economic Development Intelligence System (EDIS) as a method of collecting a wide variety of information about counties, Economic Development Partnerships, and the state as a whole.

Another significant undertaking by the DOC is the implementation of a Customer Relationship Management (CRM) system. This software will allow the department to keep track of and share information about new and expanding businesses internally, provide better customer service to existing business, and to customize and direct marketing activities.

GOAL 4:

CREATE STRONG METROPOLITAN GROWTH CENTERS THAT GENERATE REGIONAL BUSINESS DEVELOPMENT, SHARED PROSPERITY, AND A HIGH QUALITY OF LIFE, IN PARTNERSHIP WITH SURROUNDING AREAS.

North Carolina continues to help its communities develop the infrastructure, cultural amenities, and social capacity that attract business and investment and ensure a high quality of life.

The Division of Community Assistance (DCA), within the N.C. Department of Commerce (DOC), continues to serve 57 communities designated as North Carolina Main Street communities and 22 NC Small Town Main Street communities. The North Carolina Main Street Program Annual Conference saw record attendance at the January 2008 conference that has held in Rocky Mount, N.C. Approximately 350 attendees represented Main Street, Small Town Main Street, and communities of all sizes that are interested in downtown revitalization attended the education sessions and annual awards ceremony. Sessions on municipal wiring, wayfinding, diversifying the main street budget, and real cost design solutions were among just a few of the lessons learned.

The Office of Urban Development in the DCA has successfully expanded the small town downtown revitalization initiative statewide. In 2007, the General Assembly funded a Small Town Main Street staff position for western North Carolina, enabling the program to provide downtown development assistance to smaller communities across the state. The Small Town Main Street program now has four staff positions – two in the west and two in the east – and continues to add new towns annually. In August 2007, six towns were selected to participate in the program, and an additional six communities were designated in September 2008.

In November 2007, the North Carolina Economic Development Board approved a development hubs study, proposed by the Division of Policy, Research, and Strategic Planning at in the DOC, be undertaken. Currently this study is underway through a joint effort between North Carolina State University and University of North Carolina-Chapel Hill to define development hubs, examine North Carolina's resources, and identify best practices around the nation. Upon the completion of the study, in January 2009, members from various divisions of DOC will work with the N.C. Economic Development Board to formulate and implement policies to support this economic development concept.

GOAL 5:

DEVELOP THRIVING RURAL AREAS THAT MAINTAIN A HIGH QUALITY OF LIFE; ACHIEVE ONE NORTH CAROLINA BY MOBILIZING THE STATE'S RESOURCES TO CREATE STRONG REGIONAL PARTNERSHIPS AND PROGRAMS THAT FOSTER BROADER ECONOMIC DEVELOPMENT OPPORTUNITIES IN RURAL NORTH CAROLINA.

The state's economic development agenda places a large emphasis on improving the quality of life in rural areas of North Carolina. This goal encompasses improvements in physical infrastructure, technical assistance, and better access to state programs.

The North Carolina General Assembly took significant steps to support economic growth and quality of life in rural communities during its 2007 session. It authorized \$138.5 million to support rural development through infrastructure and job creation. The North Carolina Rural Economic Development Center, charged with administering the funds, has allocated \$100 million appropriation for Clean Water Partners Grants to meet the water and wastewater needs of rural communities. As of August 2008, more than \$62 million in grants has been awarded to the localities across the state to provide access to clean water or repair aging wastewater systems. Over the next several months, the Rural Center will continue to invest and address critical water and sewer problems in the rural areas. The expected result of the Clean Water Partners Grants will be to serve over 200 communities and leverage over \$200 million dollar.

In 2006, the General Assembly appropriated \$244,699 for the 21st Century Communities program to employ three full-time staff for the central, eastern, and western regions to provide planning and technical assistance to current and future program participants. In 2007, six counties were selected to participate in the program, and in 2008 another five new counties were chosen, raising the total to thirty-one. The program anticipates that with the refining of selection elements of the competitive process and an increase in capacity (staffing), that designation and participation of thirty-seven counties by 2010 is an attainable benchmark. Because of the growing interest in the 21st Century Communities program, continued legislative support and funding are encouraged to successfully expand the program.

The N.C. Department of Commerce's Small Cities Community Development Block Grant (CDBG) program set aside \$1,000,000 in funds for fiscal year 2007 and 2008 to help implement the Small Business Entrepreneurial Assistance Program to help create and retain jobs within the state's most distressed communities. It is anticipated that thirty new jobs will be created as a result. While the 2007 program was available to the state's most distressed communities (Tier 1 and 21st Century Communities), the 2008 program will be open to all local governments eligible under North Carolina CDBG program. Tier 1 counties and 21st Century Communities participants will receive extra points during application scoring for their designation as a distressed community.

The Infrastructure category under CDBG provides funds for public water and/or public sewer. In 2007, CDBG funds provided 54,504 linear feet of water and sewer improvements to eligible local governments and assisted 286 households in those communities.

Placed Based Economic Development (PBED) is a recognized economic development strategy that capitalizes on local assets – natural, cultural, historic, human community and built – to create jobs, economic development and entrepreneurial opportunities in communities. In early 2007 a group of interagency representatives began meeting in an effort to better define the state's role in supporting PBED and working on strategies for interagency collaboration. Currently this group is partnering with the N.C. Department of Commerce's 21st Century Communities Program in an effort to better identify viable PBED projects and align their agencies' collective resources more effectively.

GOAL 6:

DEVELOP A COMPETITIVE, REGIONALLY BASED INFRASTRUCTURE AND PROMOTE SUSTAINABLE ECONOMIC DEVELOPMENT.

As North Carolina competes in a competitive global market, the need for solid infrastructure and sustainable economic growth has increased. The N.C. General Assembly approved several pieces of legislation in 2007 to promote sustainable development and infrastructure maintenance and improvement.

The General Assembly established the Green Business Fund to attract and maintain sustainable businesses in the state. In 2008, the Green Business Fund allocated \$1 million for the first round of grants. A total of 85 small businesses filed applications seeking nearly \$7 million in funds. Thirteen businesses from across North Carolina received awards, totaling \$950,000. The N.C. Department of Commerce's Board of Science and Technology administers the program.

The e-NC Authority works to expand access to technology across the state. As of late 2006, 82 percent of North Carolina households have access to high-speed Internet service if they choose to subscribe. However, five counties still have less than 50 percent access and another 21 counties have less than 70 percent access. During the 2007 legislative session, the e-NC Authority received an appropriation of \$1.21 million for the expansion of high-speed Internet service in the four least-connected counties in the state - Gates, Greene, Jones and Warren counties, where less than 50 percent of households had access to high-speed Internet service. After this deployment, only 17 counties

in North Carolina will have connectivity levels below 70 percent. The expected target is to eliminate the digital divide and increase the number of rural citizens who have access to high-speed Internet technology from 77 percent to 95 percent by Fall 2009.

The e-NC Authority also promotes technology access in the state through the development of community websites, technology training, and the operation of seven business Telecenters across the state. Since 2001, the Business & Technology Telecenter program has created 1,490 jobs, at a cost of \$4,049 per job. Collectively, the seven program sites have leveraged \$11.9 million in private financing.

GOAL 7:

MAINTAIN AND STRENGTHEN TOURISM, FILM, AND SPORTS INDUSTRIES; PRESERVE, PROTECT, AND PROMOTE OUR STATE'S CULTURAL, NATURAL, AND HERITAGE ASSETS.

The North Carolina Division of Tourism, Film and Sports Development continued its mission to unify and lead the state in developing the State as a major destination for leisure travel, group tours, meetings and conventions, sports events and film production.

In 2007, the Tourism Division delivered several publications highlighting travel and sporting opportunities. The publications included: The Official 2007 North Carolina Travel Guide; The Official 2007 North Carolina Golf Guide; and the North Carolina Calendar of Events.

Through its Community Development and Heritage Tourism programs, the Tourism Division continued efforts to develop tourism across the state, particularly in rural, less advantaged areas.

The state's Film Office reported that spending by film, television and commercial production companies increased to \$160.2 million in North Carolina in 2007, a 61 percent increase from 2006. This figure includes wages, goods and services used by commercial production companies. North Carolina introduced a film incentive program in 2007 that provides a tax credit for productions filmed in the state. A minimum of \$250,000 in-state spending qualifies productions for a 15 percent tax credit.

The North Carolina Department of Cultural Resources (DCR), "Homegrown Handmade: Art Roads and Farm Trails" book, companion to the website of the same name, became available May 2008. The self-driving trails cover 76 counties. This publication is a partnership of the DCR, North Carolina Cooperative Extension, and Golden LEAF Foundation.

Although the nation's economy faced many challenges during the past year, North Carolina continued its tenure as one of the best places to do business and demonstrated its resilience by continuing to grow its workforce and expand export markets in the global economy.

In 2007, many of the North Carolina Economic Development Strategic Plan objectives and action steps were achieved or continued to progress. This update provides a measurement of progress on existing objectives, summarizes new economic trends, and details recent events that have influenced the state's agencies ability to fulfill the action steps corresponding to the board's stated objectives.

During the past year, the North Carolina Economic Development Board made a committed effort to focus on the challenges of achieving greater shared prosperity across our state. To this end, the Board and Department of Commerce partnered to support a development hubs study, being conducted through a joint collaboration between North Carolina State University and the University of North Carolina – Chapel Hill.

During 2008 and 2009, The N.C. Economic Development Board, Department of Commerce and economic development partners will continue to work on those strategic objectives which have not yet been fully achieved.

NORTH CAROLINA ECONOMIC DEVELOPMENT STRATEGIC PLAN PRIORITY ACTION STEPS FOR 2008-2009

GOAL 1: DEVELOP AN OUTSTANDING EDUCATION SYSTEM AND A HIGHLY QUALIFIED WORKFORCE

OBJECTIVE 1.1: SUPPORT CONTINUED FULL FUNDING FOR ENROLLMENT GROWTH IN THE UNIVERSITY OF NORTH CAROLINA, THE NORTH CAROLINA COMMUNITY COLLEGE SYSTEM AND K-12 PUBLIC EDUCATION.

Action Step 1.1.1: Maintain support of the University of North Carolina, the North Carolina Community College System (NCCCS), and the North Carolina Public School system in regards to continued full funding for enrollment growth.

- a. **Responsibility:** N.C. Economic Development Board, the North Carolina Community College System, and the University of North Carolina
- b. **Deadline:** 2009 Legislative Session
- c. **Funding:** NA
- d. **Expected Outcome/Return on Investment:** Recommendations made by the Economic Development Board will result in the continued full funding of enrollment growth in all public education systems.

What Has Been Accomplished: A State Education Lottery was established in 2005 to provide funds for school construction, smaller class sizes, college scholarships, and pre-kindergarten programs.

Also in 2005, the legislature appropriated \$2 million for the Community College Enrollment Reserve fund, which will aid the community colleges in providing technical training for regional job development. During the 2006 legislative session, the General Assembly outlined the goals of the community college system in HB 583 - which identified the community college system as the lead state agency for workforce development training, literacy, and adult education.

One of the major efforts the N.C. Commission on Workforce Development is developing for 2008 is a valuing education campaign. The intent of this campaign is to underscore the importance of education in the 21st century economy. More jobs are requiring degrees and technical knowledge than in previous generations. This campaign in part recognizes that continued funding for higher education in North Carolina is critical for the success of the state's economy.

NCCCS enrollment growth was fully funded (\$8.8 million) by the North Carolina General Assembly in 2007 facilitating the accommodation of 2,296 additional full-time students. An additional \$2 million was also appropriated to an enrollment growth reserve for colleges that experienced growth greater than 5 percent. The reserve was distributed but was approximately \$10 million short of what was needed to accommodate new growth in 2007-2008.

What Remains to be Done: In preparation for the 2009 legislative session, the N.C. Economic Development Board will send a letter advocating its support for continued full funding for enrollment growth to the chairs and members of the House and Senate appropriations committees, other relevant committee chairs and members, and key legislators.

Milestone Targets: Letter will be sent prior to the convening of the 2009 session.

OBJECTIVE 1.4: FUND AN INCREASE IN STATE-OF-THE-ART TRAINING EQUIPMENT TO MEET THE NEEDS OF EMPLOYEES AND EMPLOYERS SEEKING TO THRIVE IN THE NEW ECONOMY.

Action Step 1.4.1: Advocate and support the NCCCS's recommendations to provide additional funding for equipment needs by crafting a letter to the Governor and the General Assembly, as well as, assembling the support of all stakeholders through the N.C. Economic Development Board.

- a. **Responsibility:** N.C. Economic Development Board Chair
- b. **Deadline:** 2009 Legislative Session
- c. **Funding:** General Fund
- d. **Expected Outcome/Return on Investment:** Clearly expressed support leading to passage of legislation that creates equity in funding for high-demand courses.

What Remains to be Done: In preparation for the 2009 legislative session, the N.C. Economic Development Board will send a letter advocating its support for additional funding for equipment needs for the state's community colleges to the chairs and members of the House and Senate appropriations committees, other relevant committee chairs and members, and key legislators.

Milestone Targets: Letter will be sent prior to the convening of the 2009 session.

GOAL 2: INVEST IN SCIENCE, TECHNOLOGY, AND UNIVERSITY OUTREACH

OBJECTIVE 2.1 ALLOCATE RESOURCES AND MAKE INVESTMENTS TO CREATE AN ENVIRONMENT THAT PROMOTES THE EFFECTIVE TRANSFER OF SCIENTIFIC AND TECHNOLOGICAL KNOWLEDGE AND RESOURCES TO PROMOTE THE ECONOMIC GROWTH AND DEVELOPMENT OF NORTH CAROLINA.

Action Steps 2.1.1 and 2.1.2: Develop a mechanism within state government to provide coordination and assistance to existing public and private sector science and technology resources to make the best use of those resources for advancing economic development and job growth throughout the state by increased funding for the N.C. Board of Science and Technology. Science, technology, and economic development, which are interrelated and vital to North Carolina's future economic success, and require coordinated attention at the state level.

- a. **Responsibility:** N.C. Board of Science and Technology
- b. **Deadline:** June 30, 2009
- c. **Funding Source:** State appropriations (cf. 2.1.2)
- d. **Expected Outcome/Return on Investment:** The creation of opportunities for more efficient and effective leveraging of existing and new resources to support technology-based economic development to create jobs and turn innovative ideas into marketable products.

For example, it will work with partners across the state to facilitate and support:

- External research funding to North Carolina's colleges, community colleges, universities, and industry;
- The amount of federal SBIR/STTR research commercialization funding awarded to North Carolina organizations;
- Commercialization of intellectual property from universities and laboratories and growth of entrepreneurial companies;
- Growth and diversification of private and venture investment across North Carolina;
- Activities to attract and leverage private investment in North Carolina companies; and
- Economic development through the promotion of technology-based solutions to current and future business issues, serving both technology and non-technology firms in the state.

What Has Been Accomplished: The N.C. Board of Science and Technology continues to fulfill this function, as it has since its creation in 1963. However, the Board's funding level has remained constant for several years, thus severely limiting its ability to serve in an agenda-setting, coordinating, facilitating role.

What Remains to Be Done: The N.C. Board of Science and Technology should receive increased recurring state appropriations for basic operational purposes.

Milestone Targets: Letter will be sent prior to the convening of the 2009 session.

Action Step 2.1.3: Catalyze and support expanded innovation activities from all of North Carolina's universities through appropriate follow-up to the University System's economic development plan. This has been integrated into the strategic priorities of the UNC System, providing staffing to the function at a system level and on each campus. Incenting Universities to embrace a culture of innovation and entrepreneurship that transfers seamlessly to the State's economy by:

- i. Strengthening technology transfer services at all campuses;
 - ii. Establishing a statewide, distributed support network of key technology transfer partners;
 - iii. Providing additional resources to University technology-transfer organizations;
 - iv. Developing new metrics for university innovation and economic development;
 - v. Developing a consolidated database of UNC university research; and
 - vi. Supporting the creation of multiple early-stage seed capital funds across the state.
- a. **Responsibility:** University of North Carolina (Vice President for Research and Sponsored Programs; Small Business and Technology Development Center (SBTDC))
 - b. **Deadline:** June 2009
 - c. **Funding Source:** Accelerate NC SBTDC expansion budget requests and private investment funding
 - d. **Expected Outcome/Return on Investment:** Increase in level of technology transfer activities and value; statewide business creation and enhanced competitiveness

What Has Been Accomplished: North Carolina universities are emerging as centers of regional entrepreneurship. The University of North Carolina's Board of Governors added a seventh strategic directive to its long-range plan in 2006 to emphasize the university's role in transforming the state economy through "basic and applied research, innovation and creativity, transfer of knowledge, application of best practices, and high quality degree programs." In May 2006, the Board of Governors adopted a report by the Special Committee on 'Economic Development and the Role of The University'. This report provides a framework for economic and community development activities on university campuses.

Technology transfer services have been strengthened over the past five years on less research-intensive campuses through contracts with university-based spin-off companies, and the University is currently developing a plan to strengthen technology transfer efforts on all campuses. These initiatives were implemented based on discussions with the Council of Research Administrators, a group comprised of representatives from the various university campuses, and convened by the Vice President of Research. These measures aim to increase the amount of university innovation through technology transfer and commercialization and to promote economic development activities.

The Small Business Technology Development Center (SBTDC) has taken the lead in supporting the creation of six structured early-stage angel capital funds located across the state. The funds will make investments of from \$50,000 to \$125,000 in early-stage technology and other high-growth potential businesses.

What Remains to Be Done: The UNC System should systematically re-examine technology transfer structures and staffing at all public universities to determine how they will maximize technology transfer for creation of jobs in North Carolina.

Milestone Targets: UNC System should complete a comprehensive plan to increase university innovation and maximize job creation by technology transfer by June 2010.

Action Step 2.1.4: Taking into account mission studies mandated by the legislature in this area, complete regional resource analyses across the state to understand regional strengths and opportunities; align university initiatives and expertise with the needs of regional economic development clusters; and develop strategies and tactics to address knowledge-based job creation in each region by:

- i. Creating the best possible / most robust set of tax and incentive policies available to start, grow, and attract technology-based businesses;
- ii. Undertaking a comprehensive review of the Umstead Act, with the goals of proposing amendments to it to improve the ability of the University of North Carolina to commercialize its technologies while protecting the state's private enterprises from unfair competition; and
- iii. Building strong regionally focused partnerships between universities, economic development organizations and businesses.
 - a. **Responsibility:** N.C. Board of Science and Technology; North Carolina Chamber; University of North Carolina; N.C. Department of Commerce; N.C. Department of Revenue
 - b. **Deadline:** June 2009
 - c. **Funding Source:** Current resources
 - d. **Expected Outcomes/Return on Investment:** Increased commercialization of University technologies. Increase in the number of high-technology companies.

What Has Been Accomplished: Several proposals passed during the 2006 legislative session aimed to boost North Carolina's position in science and technology. Specifically, the 2006 General Assembly included a provision in its budget to reduce the sales tax on R&D equipment to promote technology-based growth in North Carolina.

During the 2005 legislative session the General Assembly voted to amend the Umstead Act with HB 1539. This bill authorized the Board of Governors of the University of North Carolina to establish a panel to determine whether the university system has the authority to undertake an activity in competition with a nongovernmental entity. This measure aims to improve the ability of the University of North Carolina to commercialize its technologies while protecting private enterprises from unfair competition.

The University System has benefited from an expansion of funding for the Area Health Education Centers (AHEC) to help address critical needs for health care workers and other needs.

With support from the General Assembly and Golden LEAF Foundation, North Carolina State University and North Carolina Central University have continued to develop their programs to do research and train graduates in critical areas of biotechnology.

What Remains to Be Done: The N.C. Department of Commerce (DOC) and the University System (UNC) need to fully implement the 2007 Memorandum of Agreement pursuant to which there will be more effective collaboration between these agencies and others at both the state and regional levels.

Milestone Targets: Each region convenes quarterly meetings of DOC and UNC regional representatives.

OBJECTIVE 2.2 ALLOCATE RESOURCES AND MAKE INVESTMENTS TO SUPPORT THE CREATION OF NEW KNOWLEDGE AND TECHNOLOGY THAT WILL SUSTAIN AND ENHANCE NORTH CAROLINA'S COMPETITIVENESS AS A LEADING TECHNOLOGY STATE.

Action Step 2.2.1: Strengthen the overall R&D capacity of all North Carolina Universities and research institutions by enhancing key administrative support functions and processes that currently constrain their competitive R&D position.

- i. Seeking opportunities to streamline internal operations and find ways to most effectively administer operations;
- ii. Continuing to allow the University to retain 100% of its indirect cost recovery;
- iii. Widening the flexibility of the University under the State Personnel System for UNC;
- iv. Modifying State purchasing regulations such that UNC can be empowered to use State purchasing contracts when advantageous from a cost, quality, and/or service perspective;
- v. Granting the University authority to choose alternative vendors when lower costs, higher quality, or superior service are available; and
- vi. Easing existing restrictions on construction and leasing arrangements for University buildings that are constructed or acquired through self-liquidating sources.
 - a. **Responsibility:** General Assembly; University President and Board of Governors; Institution Chancellors and Boards of Trustees
 - b. **Deadline:** June 2010
 - c. **Funding Source:** Current resources; required financial investment for this step would be minimal.
 - d. **Expected Outcome/Return on Investment:** Enhanced ability of UNC to construct research facilities to do research in areas of economic competitiveness, thus increasing the impact of University-based research on state economic recovery, growth, and development

What Has Been Accomplished: The University's President's Advisory Committee on Efficiency and Effectiveness (PACE) Commission recommendations have aimed to reduce inefficiencies and redundancies. The UNC system still retains 100% of its indirect cost recovery.

What Remains to Be Done: Broader flexibility under the State Personnel Act is still needed.

Action Step 2.2.2: Fund an initiative to promote economic growth in North Carolina through the identification and development of emerging technologies. For example, nanotechnology—the science of the very small— will fundamentally transform science, technology, and society, from microscopic computer chips to cancer-fighting vaccines. As such, it holds tremendous potential for North Carolina and the nation. Nanotechnology will be the basis of manufacturing technology in the future. Developing a coordinated response to the challenges and opportunities presented by this and other emerging technologies will greatly expand the opportunity for all North Carolinians to obtain and retain challenging and economically rewarding employment.

- a. **Responsibility:** N.C. Board of Science and Technology (coordinating); University of North Carolina (UNC); the North Carolina Chamber; N.C. Biotechnology Center; and Department of Commerce (DOC)
- b. **Deadline:** June 2010
- c. **Funding Source:** State appropriations Note: The UNC System is using current year non-recurring funding to pay for research in areas related to economic development priorities. In addition, NC State is using current year non-recurring funding to support 10 industry clusters ranging from value-added agriculture to medical technologies and devices. Recurring funding for both of these programs is a University priority budget request for FY2008/09

- d. **Expected Outcome/Return on Investment:** The creation of a strategic plan which assesses the states assets and ROI comparable to state investment in Biotechnology. Development of capabilities core to the retooling of existing manufacturing industries as well as the development of new generations of science and technology businesses and clusters statewide. Position North Carolina aggressively to secure federal research funding and technology leadership in these technologies

What Has Been Accomplished: In the spring of 2005, the N.C. Board of Science and Technology formed the Governor's Task Force on Nanotechnology and North Carolina's 21st Century Economy. The task force issued its first report in April 2006 and is working to implement a series action steps that will improve the environment for technological innovation and the application of nanotechnology in North Carolina. Also in 2005, the General Assembly authorized the Defense Technology Innovation Center in Fayetteville to create collaborations with the military, entrepreneurs, and innovators to produce technology solutions and business development. The NC Biotechnology Center launched a Centers of Innovation initiative in 2007. Planning grant applications have been solicited and four awards have been made. Applicants will develop business plans and create and sustain Centers of Innovation in targeted areas of bio-science (Marine-Bio science, Medical Devices, Natural Products and Bio-nano). Approved plan will receive multi-year funding support.

What Remains to Be Done: Find recurring funding to support implementation of components of the nanotechnology research efforts.

Milestone Targets: Increase university research funding levels in targeted economic development areas by \$30 million in recurring funds by June 2010.

Action Step 2.2.3: Strengthen the overall R&D capacity of the 16-institution University of North Carolina by providing resources and incentives for faculty development.

Priorities include:

- i. Investing in competitive faculty salaries, increasing them to the 80th percentile of peer institutions;
- ii. Investing in state-of-the art research and development facilities and equipment across all regions of the state;
- iii. Increasing opportunities and incentives for faculty collaboration with universities, industry, government, and non-profits; and
- iv. Reviewing and revising promotion and tenure guidelines to reflect the increasing importance of collaboration, entrepreneurship, and scholarly community assistance.
 - a. **Responsibility:** General Assembly; University President and UNC Board of Governors; Institution Chancellors and Boards of Trustees
 - b. **Deadline:** June 2010
 - c. **Funding Source:** State appropriations would fund salaries, incentives, facilities, and equipment
 - d. **Expected Outcome/Return on Investment:** Enhanced competitive advantage for the University System, thus increasing the impact of University-based research on State economic recovery, growth, and development

What Has Been Accomplished: In 2006, community college and university faculty received a 6 percent, with a one-time 2 percent bonus for community college faculty and staff. The higher pay raises, along with \$79 million for new professors and staff, are intended to attract high-quality faculty and meet projected enrollment increases at North Carolina universities. The new budget also invested in research initiatives at state universities. The University of North

Carolina at Chapel Hill medical school used/is using \$2.5 million to expand its translational medicine program, which connects basic research with applied pharmaceutical development. Biotechnology programs at North Carolina Central University and North Carolina State University will receive \$4.5 million, and the N.C. Biotechnology Center and its regional offices are getting a \$2.5 million budget increase. The new North Carolina Research Campus in Kannapolis will have \$6.7 million through UNC and Rowan-Cabarrus Community College Training Center and Greenhouse to fund its first year of operations, and Fayetteville State University will be able to begin capital planning on a new science and technology complex with a new allocation. The budget also provided \$20 million for a new competitive grant program for state universities to attract faculty, purchase equipment, and undertake allied health projects. In 2007 a memorandum of agreement was signed between the University of North Carolina and the Department of Commerce, which aims to increase the connectivity of campuses to regional development infrastructures.

What Remains to Be Done: The North Carolina Community College System and the University of North Carolina (UNC) System both face significant retention issues with their faculty over the next decade as more schools compete to hire their brightest faculty and retirements outstrip new faculty availability. Increased capital expenditures for research facilities will be pitted against increased space for teaching facilities, as overall student enrollment increases by an estimated 40% over the next decade. The Economic Development Board should send a letter advocating its support for recurring sources of competitive research funding to support UNC faculty research in sectors deemed critical to North Carolina's long term economic future.

Milestone Targets: Each region convenes quarterly meetings of the N.C. Department of Commerce (DOC), UNC regional representatives.

Action Step 2.2.4: As part of a regional strategy, systematically promote the state's University Millennium Campuses and support the development of new ones as sites for growing and attracting new technology-based businesses by allocating a portion of the state's marketing resources to heighten awareness of the state's science and technology initiatives, including its University research parks; also consider ways the State capital budget can serve as a strategic investment tool for creating new and enhancing existing industry-university research parks.

- a. **Responsibility:** DOC, University of North Carolina System
- b. **Deadline:** June 2010
- c. **Funding Source:** 20% of the state's marketing resources should be used to promote these critical research centers
- d. **Expected Outcome/Return on Investment:** Significant increase in inquiries by prospective tenant companies and measurable increase in company commitments to research park locations; increased collaboration among universities, industry, and non-profits; increase in number of research parks; strengthening of university-industry collaborations, enhanced opportunities for technology transfer and business creation

What Has Been Accomplished: This action step is in progress and the University of North Carolina continues to receive support for the millennium campus initiative.

What Remains to Be Done: A significant, high profile ad campaign should be launched to promote industry-university research parks.

Milestone Targets: By June 2010, 8 UNC campuses will have functional millennial campuses.

Action Step 2.2.5: Increase knowledge of SBIR and STTR awards throughout the state and strengthen application assistance for entrepreneurs to increase their success rate in receiving such awards.

- a. **Responsibility:** University of North Carolina (Small Business and Technology Development Center)
- b. **Deadline:** June 2009
- c. **Funding Source:** State appropriations and possible federal funding under the Federal and State Technology Partnership (FAST) Program
- d. **Expected Outcome/Return on Investment:** Enhanced awareness of funding opportunities; improved quality of funding proposals; increased success rate of proposals and businesses relying on these programs for early-stage funding; increase in the number of strategic linkages between businesses and research institutions

What Has Been Accomplished: The Small Business and Technology Development Center (SBTDC) has been designated by the Governor as the North Carolina Federal and State Technology Partnership (FAST) representative. The SBTDC is the state's lead organization for the promotion and support of small business access to SBIR and STTR programs. It provides a robust range of services to entrepreneurs and university researchers aimed at increasing awareness of these programs and boosting the number of successful applications for awards. Examples of the SBTDC's services include major statewide conferences, numerous workshops, and individualized proposal assistance. Combined, these steps have raised awareness of SBIR and STTR awards throughout the state and increased the application success of regional entrepreneurs. The SBTDC's success in this area has been noticeable, as it was selected to host the national 2007 SBIR/STTR conference held for the first time in North Carolina. To increase the number of these awards as well as the competitiveness of North Carolina businesses in receiving them, the One North Carolina Small Business Fund, initiated in 2006 by the Board of Science and Technology, has issued more than 160 grants to North Carolina small businesses, totaling more than \$10 million. The North Carolina small businesses receiving the grants project to create more than 100 jobs in the state and to patent, license, and sell technologies and products worth more than \$1 billion.

What Remains to Be Done: Recurring state matching funding for recipients of SBIR and STTR awards is needed. The SBTDC should seek federal funding under the FAST program as it becomes available.

Milestone Targets: Continue to monitor and report on SBIR and STTR activity in North Carolina.

GOAL 3: ENSURE A COMPETITIVE ENVIRONMENT FOR THE RECRUITMENT AND RETENTION OF BUSINESSES, CAPITAL INVESTMENT, AND JOB CREATION

OBJECTIVE 3.1: DEVELOP AND MAINTAIN NORTH CAROLINA'S NATIONALLY SUPERIOR BUSINESS CLIMATE THAT CONSISTS OF AFFORDABLE BUSINESS COSTS, FAIR REGULATION, AND AN EQUITABLE TAX SYSTEM.

Action Step 3.1.3: Identify a dedicated source of funding for the One North Carolina Fund.

- a. **Responsibility:** Governor, Department of Commerce, Economic Development Board and General Assembly
- b. **Deadline:** December 31, 2009
- c. **Funding Source:** General Fund or other dedicated funding source
- d. **Expected Outcome/Return on Investment:** Recurring funds for the One North Carolina Fund

What Has Been Accomplished: While the North Carolina General Assembly often has given the N.C. Department of Commerce the authority to offer a higher level of support to companies, it has been unable to persuade the General Assembly of the need for a dedicated funding source.

What Remains To Be Done: Continue to inform members of the General Assembly of the programs successes and to encourage recurring funding.

Milestone Targets: The 2009 General Assembly will approve dedicated funding for the One North Carolina Fund. The N.C. Economic Development Board will work with the N.C. Department of Commerce and others to promote this legislation.

GOAL 4: CREATE STRONG METROPOLITAN GROWTH CENTERS THAT GENERATE REGIONAL BUSINESS DEVELOPMENT

OBJECTIVE 4.1 - PROMOTE A STATE GROWTH FRAMEWORK THAT STIMULATES URBAN DEVELOPMENT WITH BENEFICIAL REGIONAL ECONOMIC INFLUENCES.

Action Step 4.1.2: Identify development hubs with regional significance (beyond the three largest metropolitan areas) and develop strategies to strengthen them and make them more competitive.

- a. **Responsibility:** Department of Commerce Division of Policy, Research, and Strategic Planning, and the Office of Urban Development, and other government and non-profit development agencies. State agencies and legislature identify and allocate or reallocate resources to strengthen hubs
- b. **Deadline:** 2009
- c. **Funding Source:** State agencies reallocate existing resources and legislature appropriate new funds
- d. **Expected Outcome/Return on Investment:** Strengthened “economic engines” in mid-sized development areas that will generate more jobs for multi-county regions that they serve

What Has Been Accomplished: A presentation on development hubs was presented at the August 2004 board meeting and the idea of development hubs has been discussed at several occasions since then but has not been able to reach a consensus on what the key ingredients of a successful hub would be.

What Remains To Be Done: During the November 2007 Board meeting, Division of Policy, Research, and Strategic Planning staff proposed a development hubs study which the Board approved. The study is now underway by a joint effort of North Carolina State University and UNC-Chapel Hill to define development hubs, examine North Carolina’s resources, and identifies best practices around the nation.

Milestone Targets: Upon the completion of the study in January 2009, members from various divisions of Commerce will work with the N.C. Economic Development Board to formulate and implement policies to support this economic development concept.

OBJECTIVE 4.3 - STRENGTHEN CENTRAL CITIES TO REESTABLISH THEIR ROLE AS THE ECONOMIC CORE AND ENGINE OF METROPOLITAN AREAS.

Action Step 4.3.2: Request new funding to recapitalize the Main Street Financial Incentive Fund with its 10:1 leverage to increase the number of buildings rehabilitated in downtowns.

- a. **Responsibility:** Department of Commerce’s Division of Community Assistance (DCA)
- b. **Deadline:** May, 2009 (contingent upon General Assembly budget)
- c. **Funding:** 1.0 million from General Fund to leverage millions from private sources

- d. **Expected Outcome/Return on Investment:** Increased number of buildings being rehabilitated in Main Street community downtowns, increased job creation, business development. The Main Street Financial Incentive Fund used a \$1 million appropriation in 1989 to leverage \$22 million in private investment

What Has Been Accomplished: There is a proven track record of dramatically increasing number of buildings rehabilitated in downtowns to spur investment and create jobs. The economic impact of Main Street is evidenced by the reinvestment in its 57 designated communities. Since 1980, North Carolina Main Street downtowns have seen more than \$1.1 billion of new investment and experienced a net gain of more than 12,500 jobs. These central business districts have also benefitted from the renovation of 2,900 buildings and have seen a net gain of 3,000 businesses.

What Remains To Be Done: DCA has an interest in pushing for this program and has periodically put this item in their expansion budget request but it has not made it to the high priority list nor has it made it into the Governor's budget.

Milestone Targets: A self-help initiative, North Carolina Main Street provides services but no funding to local programs. As the North Carolina Main Street program continues to accept new communities, continued legislative support and funding are essential to maintaining and enhancing the current level of assistance, helping these communities return their downtowns to economic viability, while making them vibrant places to live, work and play and creating a better quality of life for all.

Action Step 4.3.3: Expand the N.C. Department of Commerce's successful Small Town Main Street Program statewide.

- a. **Responsibility:** Department of Commerce's Division of Community Assistance (DCA) and Office of Urban Development
- b. **Deadline:** Ongoing
- c. **Funding:** Legislative appropriation to maintain this program is needed. The initial pilot version of this program was funded with a grant from the Z. Smith Reynolds Foundation. That grant supported the implementation of the program in Eastern North Carolina, but is not intended to maintain or expand the program
- d. **Expected Outcome/Return on Investment:** The program will increase the number of small towns involved with downtown development and increased reinvestment within small town downtowns

What Has Been Accomplished: The 2006 session of the N.C. General Assembly granted the funding for creation of a position for Western North Carolina to reach western small towns in downtown development. The 2007 Governor's budget request for a second staff position in the Western Regional office was approved. The Small Town Main Street program now has four staff positions – two in the west and two in the east – and continues to add new towns annually. In September 2008, an additional six towns were designated N.C. Small Town Main Street communities.

What Remains To Be Done: DCA needs two positions in Central North Carolina to provide the same services as in the East and West, but in a more cost-effective manner. A Central office would cut travel time and expense. DCA received much interest in their assistance and has a growing number of Piedmont towns seeking help. A central office location would be critical to more efficiently serving these towns.

Milestone Targets: With the growing interest in Small Town Main Street Program from the many communities needing assistance, continued legislative support and funding are critical to providing services to all the communities seeking help.

GOAL 5: RURAL DEVELOPMENT - DEVELOP THRIVING RURAL AREAS THAT MAINTAIN A HIGH QUALITY OF LIFE**OBJECTIVE 5.3 - BUILD SOCIAL CAPACITY TO ENHANCE COMMUNITY LIVABILITY.**

Action Step 5.3.2: Continue promoting participative and comprehensive approaches to economic development by making a refined 21st Century Communities Initiative available to 50 percent of rural communities.

- a. **Responsibility:** N.C. Department of Commerce
- b. **Deadline:** 2010
- c. **Funding Source:** General Assembly and the Department of Commerce
- d. **Expected Outcome/Return on Investment:** Begun in 2001, the 21st Century Communities initiative creates collaboration between DOC and selected counties affected by national economic slowdowns and by near- and long-term changes in the state's economic base. The initiative furthers the coordination among the public, private, and non-profit sectors engaging in economic, cultural, environmental, and community development planning and projects

What Has Been Accomplished: Through 2006, the N.C. Department of Commerce's successful 21st Century Communities Program has selected twenty counties. The N.C. General Assembly appropriated funds for the amount of \$244,699 to employ three full-time staff dedicated to the program providing collaborative planning and technical assistance to current and future communities of the program. During 2007, staff has been selected and is housed in three regional offices (Raleigh, Washington, and Asheville) of the Division of Community Assistance. In 2007, six counties were chosen to participate in the program, and in 2008 another five new counties were added, raising the total to thirty-one.

What Remains To Be Done: As there is a growing interest in the 21st Century Communities program, continued legislative support and funding are encouraged to successfully expand the program.

Milestone Targets: With continued legislative support and funding, the program anticipates that with the refining of selection elements of the competitive process and an increase in capacity (staffing), designation and participation of thirty-seven counties by 2010 is an attainable benchmark.

OBJECTIVE 5.5 - UTILIZE AGRICULTURE AND NATURAL RESOURCES FOR ECONOMIC DEVELOPMENT.

Action Step 5.5.5: Continue to develop and implement an e-agriculture strategy to increase the rate at which farm operators and employees utilize Internet resources.

- I. Develop a web-based portal for channeling timely information to farm operators.
 - II. Provide access to resources & information needed for value-added business development.
 - III. Target innovative methods for increasing farm operator and employee Internet usage
- a. **Responsibility:** e-NC, N.C. Department of Agriculture, N.C. Community College System, N.C. Cooperative Extension Service
 - b. **Deadline:** 2009
 - c. **Funding Source:** existing sources: e-NC, Ag Advancement Consortium, Rural Center, NCDA&CS

- d. **Expected Outcome/Return on Investment:** Increased rate of farm Internet usage, increased capacity to provide information to farm operators and producers via the Internet, increased capacity for producers to access federal programs on the web

What Has Been Accomplished: The e-NC Authority has made significant strides to ensure that people in rural areas have access to high-speed Internet services. Currently 80.02 percent of rural households in North Carolina have the ability to access high-speed Internet services. This is a considerable improvement over data from 2004. The e-NC Authority is in active communication with partner organizations on this project, and is considering the development of an agricultural portal that would focus on the needs and use of the Internet as it applies to the economics of farming.

What Remains To Be Done: The e-NC Authority is seeking funding support for the Business & Technology Telecenter program comprised of seven technology resource centers located in Tier 1 communities across the state – Alleghany, Anson, Cherokee, Martin, Northampton, Rockingham and Rutherford counties. These centers serve to build digital literacy, develop jobs through entrepreneurship training, and allow access to major technical resources. They build local wealth while providing resources to help rural communities in the transition to a 21st century, knowledge-based economy.

Milestone Targets: To continue to support these centers, the e-NC Authority would like to have legislative support for a sustaining fund of \$50,000 annually, for a total of \$350,000 across the seven sites.

GOAL 6: DEVELOP COMPETITIVE, REGIONALLY-BASED INFRASTRUCTURE AND PROMOTE SUSTAINABLE ECONOMIC DEVELOPMENT

All the action steps were either successfully accomplished or could not be due to changes in policy priorities. For more information, refer to the Strategic Plan Action Step Progress Sheet in the Appendices.

GOAL 7: MAINTAIN AND STRENGTHEN TOURISM, FILM, AND SPORTS INDUSTRIES; PRESERVE, PROTECT, AND PROMOTE OUR STATE'S CULTURAL, NATURAL, AND HERITAGE ASSETS

All the action steps were either successfully accomplished or could not be due to changes in policy priorities. For more information, refer to the Strategic Plan Action Step Progress Sheet in the Appendices.

ECONOMIC DEVELOPMENT BOARD STRATEGIC PLAN — ACTION STEP PROGRESS

Action Step	Action Status	Progress Update
GOAL 1: DEVELOP AN OUTSTANDING EDUCATION SYSTEM AND A HIGHLY QUALIFIED WORKFORCE		
Objective 1.1 Support continued full funding for enrollment growth in the University of North Carolina, the North Carolina Community College System, and K-12 public education.		
Action Step 1.1.1 Maintain support of the University of North Carolina, the North Carolina Community College System, and the North Carolina public school system in regards to continued full funding for enrollment growth.	Ongoing	Priority Action Steps for 2008-2009
Objective 1.2 Coordinate and improve the quality of K-16 public education to prepare students for the further education and enhanced work opportunities.		
Action Step 1.2.1 Support existing programs and create expanded choices for work-based learning opportunities for all students such as community service, job shadowing, internships, and apprenticeships that are tied to curriculum objectives.	Accomplished	This action step was previously accomplished, in part, by the continued implementation of the Learn and Earn program, the new position of the DPI Director of Joint High School / Community College Programs, and updates to DPI curriculum.
Action Step 1.2.2 Continue to implement the recommendations developed by the 2002 Commission On Closing the Minority Student Achievement Gap.	Accomplished	DPI created an implementation plan in 2006 for the recommendations of the Advisory Commission on Raising Achievement and Closing Gaps. To promote its objectives DPI hosts an annual conference for approximately 3,500 public school personnel. The conference continues to reflect the goals of the department in improving the quality of public education for all children in North Carolina.
Action Step 1.2.3 Implement the Subcommittee on the Workforce Delivery System's recommendations.	Accomplished	Several of the recommendations from the Subcommittee on Workforce Delivery System have been implemented: the Governor created an alliance; regional skills partnerships were undertaken by the Commission on Workforce Development; and the community college system is actively engaged with local workforce development boards.
Objective 1.3 Support and advocate for an adjusted funding formula for occupational extension continuing education in the North Carolina Community College System.		
Action Step 1.3.1 Provide \$4.2 million to a Customized Training program, based on combining the existing NEIT and FIT programs at the community college level that would implement strategic applied training programs and services that result in the recovery and retention of jobs and new investments in response to local market needs.	Accomplished	This was accomplished via continued recurring funding for these programs. The community college training programs were consolidated into the Customized Training Program to provide flexibility for the NCCCS to enhance training for the purpose of stimulating additional capital investment, creation of new jobs, and retention of existing jobs in North Carolina.

Action Step 1.3.2 Contract with independent consultant to analyze and prioritize course offerings based on local industry needs and the level on demand for certain programs/degrees.	Accomplished	As part of an ongoing effort, the NCCCS continues to work with development consultants to analyze and prioritize course offerings and training programs based on local, regional, and statewide industry needs. As part of the NCCCS Strategic Plan for 2007-2009, a process was undertaken to examine changing population trends and gaps that may exist in the ability to fill needs as a result of these changes in state demographics.
Objective 1.4 Fund an increase in state-of-the-art training equipment to meet the needs of employees and employers seeking to thrive in the new economy.		
Action Step 1.4.1 Advocate and support the North Carolina Community College System's recommendations to provide additional funding for equipment needs by crafting a letter to the Governor and the General Assembly, as well as, assembling the support of all stakeholders through the Economic Development Board.	Ongoing	Priority Action Steps 2008-2009
Action Step 1.4.2 Provide adequate funding for the NCCCS equipment requests.	Accomplished	Additional funding for equipment was provided by the General Assembly for several community college programs, including: nursing; allied health; and biotechnology.
Objective 1.5 Position North Carolina as an international leader in science, math, and technology-based education and increase the number of scientists, engineers, and technicians produced through increased investment in North Carolina's public schools, the North Carolina Community College System, the University of North Carolina, and private universities.		
Action Step 1.5.1 Create a statewide Task Force organized by Education Cabinet, comprised of individuals from the Department of Commerce, the Department of Public Instruction, the North Carolina Community College System, the University System, private universities, the Commission on Workforce Development, and the business community to return recommendations to the Education Cabinet and the Economic Development Board.	Not Accomplished	Priorities were modified
Action Step 1.5.2 Make changes in the existing workforce training process to correct barriers to technology-oriented training (NC Community College System FTE limits and competitiveness) and fast track the development of critically needed technology-trained workers.	Accomplished	To accommodate technology-oriented training the NCCCS has taken significant measures to fast track the development of critically needed skilled workers. Funds were allocated for an online teaching and learning platform for distance education, an online helpdesk, an expansion of the NC Information highway and two new centers for the development of distance education centers.

Action Step 1.5.3 Support continued funding (\$7.1 million) for the NCCCS BioNetwork Program. The BioNetwork Program produces a continuous stream of trained high-tech workers and provides dislocated workers with skills needed in the new economy.	Accomplished	The General Assembly appropriated recurring funds to provide the program with dedicated resources. The NCCCS BioNetwork continues to connect community colleges across North Carolina, providing specialized training, curricula and equipment, to develop a world-class workforce for the biotechnology, pharmaceutical and life sciences industries.
Objective 1.6 Advocate and support the development of regional skills alliances that are public/private ventures to ensure workers have the training they need to meet the demands of the current and future workplace.		
Action Step 1.6.1 Under the direction of the Commission on Workforce Development, in cooperation with the state community college system, local community colleges, workforce development boards, and regional economic development partnerships will be the development of a regional skills alliance implementation plan. This plan will include an identification of best practices, an identification of system capacity building needs and strategies related to the development and management of skills alliances, an identification of the sector-based skills alliances to be developed in each region, and an implementation timeline.	Accomplished	In 2007, the Department of Commerce's Workforce Division and the Governor's Office announced a planning grant opportunity to support the development of Regional Skills Partnerships in the allied health sector. The planning grants were designed to address workforce issues of the allied health sector for the purpose of increasing the sector's competitiveness and creating employment and career advancement opportunities for workers. Planning grants have been awarded to 7 partnerships across the state to address allied health employment and skills development related issues.
Action Step 1.6.2 The Commission on Workforce Development and the Workforce Development and Education Committee, along with the entire Economic Development Board, will reach agreement on a regional skills alliance implementation plan.	Accomplished	The Economic Development Partnership Committee—a subcommittee of the North Carolina Commission on Workforce Development—provides oversight of the Allied Health Regional Skills Partnership grant program. A core team has oversight for the project that includes representatives from the Governor's Office, Commerce, North Carolina Community College System, Employment Security Commission, UNC Cecil G. Sheps Center, and the North Carolina Hospital Association.
Action Step 1.6.3 Implement the plan to develop industry-led regional skills alliances.	Accomplished	Planning grants have been awarded to 7 partnerships across the state to address allied health employment and skills development related issues.
GOAL 2: INVEST IN SCIENCE, TECHNOLOGY, AND UNIVERSITY OUTREACH		
Objective 2.1 Allocate resources and make investments to create an environment that promotes the effective transfer of scientific and technological knowledge and resources to promote the economic growth and development of North Carolina.		
Action Step 2.1.1 Develop a mechanism within state government to provide coordination and assistance to existing public and private sector science and technology resources to make the best use of those resources for advancing economic development and job growth throughout the state.	Ongoing	Priority Action Steps for 2008-2009

Action Step 2.1.2 Increase funding for the Board of Science and Technology. Science, technology, and economic development are interrelated and vital to North Carolina's future economic success, and they require coordinated attention at the state level. Increasing the resources of the Board will enable it to develop programs, identify opportunities, and strengthen science and technology as a foundation for North Carolina's economic development.	Ongoing	This action step has been combined with action step 2.1.1. (see 2008 ED Strategic Plan Update for specifics)
Action Step 2.1.3 Catalyze and support expanded innovation activities from all of North Carolina's universities through appropriate follow-up to the university system's recently completed Technology Development Initiative.	Ongoing	Priority Action Steps for 2008-2009
Action Step 2.1.4 Taking into account mission studies mandated by the legislature in this area, complete regional resource analyses across the state to understand regional strengths and opportunities; align university initiatives and expertise with the needs of regional economic development clusters; and develop strategies and tactics to address knowledge-based job creation in each region.	Ongoing	Priority Action Steps for 2008-2009
Action Step 2.1.5 Establish new, and refine existing, information technology platform, policy, and capacity priorities to enable the state and its businesses to remain competitive in a rapidly changing IT/ communications environment. Ensure that strategic IT infrastructures across the state have consistent ongoing funding appropriate to their mission and sufficient to leverage the strategic advantage of these assets.	Not Accomplished	Priorities were modified.
Action Step 2.1.6 Adopt and fund in sequence the strategies detailed in New Jobs Across North Carolina: A Strategic Plan for Growing the Economy Statewide through Biotechnology January 2004	Not Accomplished	Priorities were modified.
Action Step 2.1.7 Support legislation that would enable, on an ongoing basis, the allocation of funds (e.g. from the escheats fund) for the purpose of creating science and technology related jobs in NC.	Not Accomplished	Priorities were modified.
Objective 2.2 Allocate resources and make investments to support the creation of new knowledge and technology that will sustain and enhance North Carolina's competitiveness as a leading technology state.		
Action Step 2.2.1 Strengthen the overall R&D capacity of all North Carolina universities and research institutions by enhancing key administrative support functions and processes that currently constrain their competitive R&D position.	Ongoing	Priority Action Steps for 2008-2009

<p>Action Step 2.2.2 Fund an initiative to promote economic growth in North Carolina through the identification and development of emerging technologies. For example, nanotechnology—the science of the very small— will fundamentally transform science, technology, and society, from microscopic computer chips to cancer-fighting vaccines. As such, it holds tremendous potential for North Carolina and the nation. Nanotechnology will be the basis of manufacturing technology in the future. Developing a coordinated response to the challenges and opportunities presented by emerging technologies will greatly expand the opportunity for all North Carolinians to obtain and retain challenging and economically rewarding employment.</p>	Ongoing	Priority Action Steps for 2008-2009
<p>Action Step 2.2.3 Strengthen the overall R&D capacity of the 16-institution University of North Carolina by providing resources and incentives for faculty development.</p>	Ongoing	Priority Action Steps for 2008-2009
<p>Action Step 2.2.4 As part of a regional strategy, systematically promote the state's University Millennium Campuses and support the development of new ones as sites for growing and attracting new technology-based businesses.</p>	Ongoing	Priority Action Steps for 2008-2009
<p>Action Step 2.2.5 Increase knowledge of SBIR and STTR awards throughout the state and strengthen application assistance for entrepreneurs to increase their success rate in receiving such awards.</p>	Ongoing	Priority Action Steps for 2008-2009
<p>Objective 2.3 Allocate resources and make investments to increase public understanding of science and technology and their relationship to economic prosperity. Mobilize broad-based public leadership support for science, technology, and university outreach objectives and their role in economic prosperity.</p>		
<p>Action Step 2.3.1 Conduct and publish statewide assessments on public understanding of science and technology and their importance to the North Carolina economy.</p>	Not Accomplished	Priorities were modified.
<p>Action Step 2.3.2 Based upon the assessments of Action Step 2.3.1, develop recommendations for appropriate outreach programs targeted at educating the public and policy leaders (at the state level as well as in the seven Economic Development Regions) on technology-based economies, emphasizing best practices and key elements that produce the widest prosperity and economic benefit.</p>	Not Accomplished	Priorities were modified.

GOAL 3: ENSURE A COMPETITIVE ENVIRONMENT FOR THE RECRUITMENT AND RETENTION OF BUSINESS, CAPITAL INVESTMENT, AND JOBS CREATION		
Objective 3.1 Develop and maintain North Carolina's nationally superior business climate that consists of affordable business costs, fair regulation, and an equitable tax system.		
Action Step 3.1.1 Review the W.S. Lee Act to determine the effectiveness of the Act and to recommend changes.	Accomplished	2007 was the final year of the William S. Lee program which was replaced by the Article 3J Credits for Growing Businesses program. The Department of Commerce provided a program evaluation to the General Assembly and helped created the new 3J program which replaces WSL.
Action Step 3.1.2 Develop legislative proposals for effective incentives.	Accomplished	In 2007, the "Article 3J Tax Credits for Growing Businesses" legislation replaced the William S. Lee tax credit program. Changes in the tax credit program included converting to a three-tier approach; revising tax credit rates, thresholds, and qualification requirements; and abolishing certain provisions in the original act. These changes aim to enhance North Carolina's economic competitiveness by helping the state attract new businesses and continue the state's economic growth.
Action Step 3.1.3 Find a dedicated source of funding for the One North Carolina Fund.	Ongoing	Priority Action Steps for 2008-2009
Action Step 3.1.4 Extend North Carolina's new Job Development Incentive Grant (JDIG).	Accomplished	In the 2007 legislative session the sunset for the Job Development Incentive Grant (JDIG) program was extended to 2010.
Action Step 3.1.5 Continue to fund the Site Infrastructure Fund for infrastructure and workforce training of large, high-multiplier industrial projects that locate in North Carolina.	Not Accomplished	Priorities were modified
Action Step 3.1.6 Reduce the corporate income tax rates to five percent, phased in over the next six to eight years.	Not Accomplished	Priorities were modified
Objective 3.2 Enable effective recruitment of both new economy and enduring traditional companies to North Carolina.		
Action Step 3.2.1 Implement the Economic Development Intelligence System through phase 5 in order to establish an economic intelligence capability within the Department of Commerce.	Accomplished	This action step has been moved to Goal 6 of the strategic plan.
Action Step 3.2.2 Recognize, support and quantify the effect that the Military has on North Carolina's economy. Encourage the development of industry in North Carolina directly related to the needs of the Military community.	Accomplished	Several organizations recently have been created to facilitate more recruitment and retention of military and defense companies. These efforts are being aided by the changes as a result of the 2005 Base Realignment and Closures (BRAC) decisions. The Department of Commerce recently estimated the impact of the military in North Carolina at \$23.4 billion annually.

Action Step 3.2.3 Foster development of several mega-sites across the state.	Not Accomplished	Priorities were modified
Objective 3.3 Develop a model program of existing industry services.		
Action Step 3.3.1 Commission a benchmark study of other states' existing industry efforts, obtaining data to reveal the impact of various communication methodologies and their outcomes.	Accomplished	In 2004, the Economic Development Board and Duke Energy sponsored a comparative study of other states' growth strategies in order to develop recommendations for North Carolina economic development. Entitled the Ticknor Report, this study was endorsed by the Board through a formal resolution in February 2005. As a result of this study, the Department of Commerce received funding to finish the EDIS project, update the commerce website, and to hire additional staff.
Action Step 3.3.2 Help develop a marketing strategy for the Existing Industry ServiCenter, which may include tools like toll-free numbers, pro bono billboard advertising and public service announcements and other communications efforts with ServiCenter partners and their audiences.	Accomplished	The Business ServiCenter in the Department of Commerce received full funding in 2004 to implement a marketing strategy that would advertise its resources to business clients. By 2006 the Business ServiCenter was fully staffed and actively promoting its services to communities across the state. This service has continued to attract clients through regional trade shows, magazine ads, brochures, presentations to community development groups, and meetings with regional chambers of commerce. To increase its accessibility the Business ServiCenter allows anyone in North Carolina to make a toll-free call to a customer representative - including one Spanish speaking representative - who can address the needs of information startups and small business owners. Six business counselors make field visits and speak with economic development officials in local communities. As of 2006, the Business ServiCenter received 3,000 to 3,500 contacts from local businesses per month.
Objective 3.4 Develop an effective, coordinated statewide marketing/branding program.		
Action Step 3.4.1 Review the current marketing efforts by state agencies and the regional partnerships.	Accomplished	A marketing council has been created between the Marketing Division of the Department of Commerce and the regional partnerships. This group meets monthly to coordinate marketing efforts. Additionally, a marketing matrix has been developed to properly monitor the activities of each group.
Action Step 3.4.2 Integrate North Carolina's current brand strategy into a wider range of marketing products.	Accomplished	A branding campaign was developed by the N.C. Technology Association (NCTA) to provide a clear, unified message to the nation and world that positions or "brands" North Carolina in the eyes of business and industry leaders as a premier location for knowledge-driven, technology-based industrial development. DOC's Marketing Division is currently using the new logo "North Carolina - The State of Minds" in all advertisements, promotional materials, graphics and other signage.

Action Step 3.4.3 Identify new funding sources, as well as underutilized current funding sources, for marketing.	Accomplished	Recurring funds of \$500,000 are now available in the Department of Commerce Marketing Division budget to execute state-level marketing programs.
Action Step 3.4.4 Orchestrate a limited, low-cost outreach campaign to advertise North Carolina's recent efforts in economic development.	Accomplished	With the new Commerce website now online, the state can distribute more information to the site-selection community at a lower cost.
Action Step 3.4.5 Advocate for adequate levels of funding for the N.C. Department of Commerce so that the Department may fulfill its obligations as the state's lead economic development agency.	Accomplished	The Board has encouraged the General Assembly to provide financial support for Commerce activities such as the EDIS system, the new department website, and the business ServiCenter.
GOAL 4: CREATE STRONG METROPOLITAN GROWTH CENTERS THAT GENERATE REGIONAL BUSINESS DEVELOPMENT, SHARED PROSPERITY, AND A HIGH QUALITY OF LIFE, IN PARTNERSHIP WITH SURROUNDING AREAS.		
Objective 4.1 Promote a state growth framework that stimulates urban development with beneficial regional economic influences.		
Action Step 4.1.1 Coordinate state investments toward existing downtowns and promote sound urban and regional development.	Not Accomplished	Priorities were modified.
Action Step 4.1.2 Identify development hubs with regional significance (beyond the three largest metropolitan areas) and develop strategies to strengthen them and make them more competitive.	Ongoing	Priority Action Steps for 2008-2009
Objective 4.2 Promote more efficient use of existing buildings, sites, facilities, and infrastructure.		
Action Step 4.2.1 Provide additional State incentives and local options to promote Brownfield redevelopment under the Brownfield Property Reuse Act of 1997 [G.S. 130A-310.30], redevelopment of brown buildings, and productive reuse of "White Elephant" buildings.	Accomplished	Division of Community Assistance at Commerce has worked with Department of Environment and Natural Resources (DENR) on a joint Brownfield redevelopment program. As of September 2007, there are 121 active eligible projects and 40 pending eligible projects. Division of Waste Management at DENR is planning a statewide Brownfield workshop in Raleigh for October 2008 for developers and local governments.
Objective 4.3 Strengthen central cities to reestablish their role as the economic core and engine of metropolitan areas.		
Action Step 4.3.1 Expand and improve State Development Zone (SDZ) incentives.	Accomplished	During the 2006 legislative session the 3J tax credit program was approved which created Urban Progress Zones and Agrarian Zones to replace the existing State Development Zones. As part of North Carolina's Article 3J tax credits program, the Agrarian Growth Zone and the Urban Progress Zone programs provide economic incentives to stimulate new investment and job creation in economically distressed areas.
Action Step 4.3.2 Request new funding to recapitalize the Main Street Financial Incentive Fund with its 10:1 leverage to increase the number of buildings rehabilitated in downtowns.	Ongoing	Priority Action Steps for 2008-2009

Action Step 4.3.3 Expand the Department of Commerce's successful small towns improvement program statewide.	Ongoing	Priority Action Steps for 2008-2009
Action Step 4.3.4 Provide tax credits for homeowners that purchase and/or renovate downtown housing.	Accomplished	There are several programs providing tax credits for downtown housing. The Mill Rehabilitation Credit established in 2006 supports housing investment in downtown. As of February 2008, a total of 12 proposed projects are currently under review. North Carolina is one of the top four states in use of Historic Preservation Tax Credits to provide tax incentives to encourage rehabilitation of historic houses and buildings in large and small cities and towns across the state.
Action Step 4.3.5 Establish an Urban Development Incentive Fund within the North Carolina Department of Transportation, similar to the Industrial Access Fund, to provide money for parking, sidewalks, and other public improvements necessary to solidify private development commitments.	Not Accomplished	Priorities were modified.
Action Step 4.3.6 Promote school site standards to make it easier to build and rehabilitate public schools in central cities.	Accomplished	The Department of Public Instruction's School Planning Section has prepared numerous guide and reference publications on various aspects of K-12 school facility planning and design. These publications are updated periodically and new versions are placed on this web site. State educational planners, architects, engineers, and schools of education and architecture are partnered in the development of these publications. The staff of School Planning provides workshops and presentations on facility design, planning, and management to a wide variety of groups with interest in building and renovation of educational facilities in central cities.
Objective 4.4 Provide local governments with a more complete set of development tools.		
Action Step 4.4.1 Continue to develop legislative proposals that allow local governments to finance development projects through alternative revenue producing methods.	Accomplished	In 2004, North Carolina became the 49th state in the nation to approve the use of self-financing bonds for local development purposes. This amendment provides a significant finance tool for local governments.
Action Step 4.4.2 Develop a legislative proposal to give local governments broader authority to defer increases in tax value for redeveloped property beyond that currently available for Brownfield projects.	Not Accomplished	Priorities were modified.
Action Step 4.4.3 Develop a legislative proposal to give local governments explicit authority to use local funds for downtown housing.	Not Accomplished	Priorities were modified.

GOAL 5: DEVELOP THRIVING RURAL AREAS THAT MAINTAIN A HIGH QUALITY OF LIFE; ACHIEVE ONE NORTH CAROLINA BY MOBILIZING THE STATE'S RESOURCES TO CREATE STRONG REGIONAL PARTNERSHIPS AND PROGRAMS THAT FOSTER BROADER ECONOMIC DEVELOPMENT OPPORTUNITIES IN RURAL NORTH CAROLINA

Objective 5.1 Explore strategies that would increase localities' ability to pay for infrastructure and services.

Action Step 5.1.1 Evaluate funding formulas that utilize ability to pay (ATP) measures and suggest how the General Assembly and local governments can streamline and alter programs with problematic funding formulas.	Not Accomplished	Priorities were modified.
Action Step 5.1.2 Encourage the Local Government Commission to provide outreach and technical assistance to municipal governments through cash management workshops, fiscal management assessments, and recommendations for strengthening accountability and fiscal controls.	Accomplished	The School of Government at UNC-Chapel Hill and the Local Government Commission work together on a regular basis to provide technical assistance via workshops and training programs
Action Step 5.1.3 Increase the capacity of local governments to effectively communicate with the General Assembly regarding needs and ability to pay, and increase awareness of existing funding programs such as CDBG and others.	Accomplished	NC Association of County Commissioners serves as the counties' advocate before the executive, legislative and judicial branches of state government and often holds regular district meetings across the state to update county officials on important issues and funding programs. In addition to the Annual Conference and Town Hall Day, NC League of Municipalities offers regular regional meetings across the state in the Spring and Fall covering legislative matters and dealing with risk management, as well as programs in conjunction with the UNC School of Government to educate local officials.
Action Step 5.1.4 Increase the capacity of major local investors to communicate with the League of Municipalities, Association of County Commissioners, the School of Government, and Local Government Commission about fiscal management difficulties that are encountered when working with local governments.	Not Accomplished	Priorities were modified.

Objective 5.2 Provide comparable infrastructure to make rural North Carolina competitive for economic development.

Action Step 5.2.1 Increase rural competitiveness and sustainability by creating a dedicated source of funding for rural water and sewer improvements, updating and maintaining the existing rural water and sewer database to assist with local planning, and establishing an incentive program for rural local governments to support regional water and sewer initiatives. Designate a significant portion of the water and sewer funds for initiatives that are regional in scope and directly support the broader "economic development center."	Accomplished	During its 2007 session, the North Carolina General Assembly authorized \$138.5 million to aid rural development through infrastructure and job creation. The North Carolina Rural Center, charged with administering the funds, has allocated \$100 million appropriation for Clean Water Partners Grants for FY08-09 to meet the water and wastewater needs of rural communities. North Carolina communities will share a total of \$596,000 in Community Development Block Grants in 2008 to connect 208 families to public water and/or sewer lines. Grants ranged from \$35,000 to \$75,000, depending on the number of houses being connected, their location and the area's topography.
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Action Step 5.2.2 Provide natural gas service to four remaining unconnected counties in North Carolina.	Not Accomplished	Priorities were modified.
Action Step 5.2.3 Increase access to rural areas by funding and implementing the NC Department of Transportation's Strategic Highway Corridor Initiative. Prioritize the completion of interstate corridor projects that help connect communities in rural areas to regional economic centers.	Accomplished	The Strategic Highway Corridors Initiative, adopted by the N.C. Department of Transportation is a long term planning vision for the State to support and improve 55 critical highway facilities that move people and goods across regions and throughout the state. The Strategic Highway Corridors Initiative is being implemented in a project by project and incremental fashion within the DOT's ongoing planning and project development processes. DOT adopted a vision map of these corridors as part of the adoption of the 2004 Statewide Transportation Plan.
Action Step 5.2.4 Continue to ensure that rural communities have affordable access to information/Internet technology and other related advances.	Accomplished	The e-NC Authority continues to expand high-speed internet access to rural counties across the state.
Objective 5.3 Build social capacity to enhance community livability.		
Action Step 5.3.1 Continue promoting citizen involvement in the design and implementation of economic development projects by providing statewide access to programs that support broad-based collaboration.	Accomplished	An extensive effort has been made to include individuals and communities in state economic development initiatives. The Small Town Main Street Program, the 21st Century Community Program, CDBG Small Business and Entrepreneurial Assistance Program, and several Rural Center programs have intensified focus on local involvement in rural development.
Action Step 5.3.2 Continue promoting participative and comprehensive approaches to economic development by making a refined 21st Century Communities Initiative available to 50 percent of rural communities.	Ongoing	Priority Action Steps for 2008-2009
Action Step 5.3.3 Emphasize technical assistance to enhance the organizational capacity of rural local governments to engage in economic development. Programmatic efforts would include infrastructure, small town development (e.g. the Main Street Program and the Small Towns Development Program) and leadership development. Establish a training program that include a focus on defining the regional center concept and demonstrates the benefits of building the region, as opposed to the town or county.	Accomplished	The Department of Commerce's Community Planning Assistance help local governments to enhance the economic development capacity of small towns through three community development programs: Community Planning; NC Main Street program; and 21st Century Community Program.
Action Step 5.3.4 Develop a core set of community livability/readiness indicators that can be used to inventory and benchmark rural communities within the context of regional centers	Not Accomplished	Priorities were modified.

Objective 5.4 Stimulate and support entrepreneurial activities.		
Action Step 5.4.1 Create and support a Micro enterprise State Association/Network that would enhance existing agencies' capacity to serve rural communities and conduct research on the impact of small business on the state's economy.	Accomplished	While the network has not been formally established yet, the New Opportunities for Workers (NOW) program from NC Rural Center has created a joint effort of the Rural Dislocated Worker Initiative and the Institute for Rural Entrepreneurship. It also involves collaboration with the Commission on Workforce Development, the N.C. Department of Commerce's Division of Employment and Training, the community college system's N.C. Small Business Center Network and N.C. REAL Enterprises. Together they devised a program of training and encouragement for dislocated workers who dream of starting and running a business.
Action Step 5.4.2 Utilize technology applications to make entrepreneurial training and assistance available on-line.	Accomplished	The e-NC Authority works with e-NC Business & Technology Telecenters and e-Communities statewide to develop model programs and value-added products that enhance economies in their regions. This partnership also provides assistance with new technologies for citizens and businesses and conducts research to prototype programs that can support the sustainability of these Telecenters' efforts. Seed and matching funds will be made available through a competitive grants program to support the development of initiatives and their extension to other communities and Telecenters across the state.
Action Step 5.4.3 The Department of Public Instruction should continue promoting entrepreneurship as a viable career pathway across all 11 established pathways and make youth entrepreneurship training programs available to all students through on-site and on-line instruction. The Department of Public Instruction should explore the feasibility of providing seamless entrepreneurial training from K-12 to expose students at an early age to entrepreneurship as a potential career/life path.	Accomplished	In 2007 the N.C. Department of Public Instruction participated in a joint partnership with Jr. Achievement, 4-H Youth Organization, NC Rural Center and NC REAL to sponsor a statewide Business Plan competition called "Hop On the Bus" for North Carolina students (grade 9-12) to gain knowledge of entrepreneurship. There were 196 participants and the top five finalists were presented awards at the 2007 Entrepreneurship Summit. 2008 Hop on the BUS! will take place again during the 2008 fall semester. At the 2007 Entrepreneurship Summit, a joint venture among the Department of Public Instruction, community colleges, university system and private universities were announced. This group committed to working together in the newly originated North Carolina Consortium for Entrepreneurship Education. The consortium will develop and implement a curriculum that incorporates entrepreneurial skills beginning in kindergarten and continuing through adult education programs.

Action Step 5.4.4 Enlist entrepreneurial service providers to participate on Rapid Response Teams that work with displaced factory workers.	Accomplished	In its initial meetings with the employer management teams, the Rapid Response Teams include information on entrepreneurial resources. These meetings are held in advance of employee services and employee orientation sessions provided by the local Rapid Response teams. The local teams also include information on North Carolina Rural Entrepreneurship through Action Learning (NC Real), New Opportunities for Workers by Institute for Real Entrepreneurship (NOW) and the Community College's Small Business Centers in their employee presentations and handout materials.
Action Step 5.4.5 Continue providing financial institution lending for business start-ups, expansions and modernization through additional investments in the NC Rural Center's Capital Access Program and Department of Commerce programs.	Accomplished	Since its inception in October 2002 until the end of the Capital Access Program II in February 2008, the program allowed over \$70 million in loans to be made available that served more than 1,100 businesses. The Capital Access Program helped to create or retain almost 12,000 jobs in North Carolina. The \$6.8 million Rural Venture Fund was created in late 2007 as part of a broader effort to boost entrepreneurship in the state. It was capitalized by investments from the N.C. General Assembly, Golden LEAF and the Rural Center.
Objective 5.5 Utilize agriculture and natural resources for economic development.		
Action Step 5.5.1 Coordinate the utilization of existing public and private infrastructure and resources to assist entrepreneurs in the production of value-added agricultural commodities and products.	Accomplished	In 2006, the N.C. Department of Agriculture along with other state agencies hosted a series of entrepreneurial and business development training sessions for agribusiness service providers. A web site was developed as a training tool and resource guide for future agribusiness entrepreneurs. In collaboration with other agencies, the Department of Agriculture and the Department of Commerce continue to provide assistance to agricultural products processors in rural North Carolina.
Action Step 5.5.2 Continue to provide business, marketing and technical assistance to entrepreneurs in value-added agricultural commodities, natural resources and products.	Accomplished	As an emerging catalyst for rural economies, agri-product incubators continue to be developed and supported at North Carolina's community colleges. In 2006 the Department of Agriculture, working primarily with Advantage West, established a value-added food business incubator in Asheville. The N.C. Department of Commerce, through the Community Development Block Grant program, is supporting a kitchen incubator in Ashe County and another incubator in Pender County.

Action Step 5.5.3 Assist additional value-added agricultural products processors with expanding or locating in rural areas of North Carolina.	Accomplished	As an emerging catalyst for rural economies, agri-product incubators continue to be developed and supported at North Carolina's community colleges. In 2006 the Department of Agriculture, working primarily with Advantage West, established a value-added food business incubator in Asheville. The Department of Commerce, through the Community Development Block Grant program, is supporting a kitchen incubator in Ashe County and another incubator in Pender County.
Action Step 5.5.4 Continue to support the establishment of satellite agri-products incubators in rural areas of the state at existing facilities such as community colleges and county business incubators and continue to advocate for program funding.	Accomplished	As an emerging catalyst for rural economies, agri-product incubators continue to be developed and supported at North Carolina's community colleges. In 2006 the Department of Agriculture, working primarily with Advantage West, established a value-added food business incubator in Asheville. As a result of this project more small food business incubators are being planned and have opened throughout North Carolina. The Department of Commerce, through the Community Development Block Grant program, is supporting a kitchen incubator in Ashe County and another incubator in Pender County.
Action Step 5.5.5 Continue to develop and implement an e-agriculture strategy to increase the rate at which farm operators and employees utilize Internet resources.	Ongoing	Priority Action Steps for 2008-2009
Action Step 5.5.6 Continue to promote the diverse roles of agriculture in our economy, culture and environment and agriculture's contributions to improving the quality of life.	Accomplished	In an effort to promote environmental sustainability, the Department of Agriculture continues to offer a variety of programs that support alternatives for farm families who wish to practice farmland preservation. Agriculture Commissioner Steve Troxler has identified himself as an advocate of federal and state incentive programs targeted at farm operators who conserve and restore wildlife habitats, streams and rural landscapes. In recognition of the potential of agriculture-based tourism in rural areas of North Carolina, the Department of Agriculture has maintained an agritourism office in Raleigh since 2003.
Action Step 5.5.7 Encourage state economic development agencies to allocate significant additional points in funding formulas for projects that commit to the sustainable use and protection of critical natural resources. Give priority to proposals that address the needs of the broader region, and will impact multiple counties.	Not Accomplished	Priorities were modified

GOAL 6: DEVELOP A COMPETITIVE REGIONALLY BASED INFRASTRUCTURE AND PROMOTE SUSTAINABLE ECONOMIC DEVELOPMENT		
Objective 6.1 Streamline the environmental permitting process for economic development projects to ensure competitiveness with neighboring states.		
Action Step 6.1.1 Implement statewide the Department of Environment and Natural Resource's streamlined process to coordinate environmental reviews and permitting for economic development projects.	Accomplished	The One-Stop Permit Program and the Express Permit Program are operating in each region designated by the Department of Environment and Natural Resources. One Stop Permit Coordinators serve as a single point of contact to help businesses, local governments, citizens and others identify potential environmental requirements and guide applicants through the permitting process. The Express Permit Program offers quicker permit decisions and certification than the standard program and provides consultation to help clients identify necessary environmental requirements. Over 1,500 permits have been issued through the Express Permit Program since the program was piloted in 2004.
Action Step 6.1.2 Implement the Economic Development Information System through phase 5, including a Geographic Information System (GIS) component to aid in the site selection process by identifying the optimum amalgamation of infrastructure needs and environmentally compatible buildings and sites.	Accomplished	In December 2007, EDIS was released to the public. The Policy, Research & Strategic Planning Division, along with the Business and Industry Division, are working to redesign the entire Buildings and Sites/ Certified Sites programs and systems.
Action Step 6.1.3 Develop an interagency leadership plan for North Carolina to balance successfully mobility, natural and cultural resource protection, community values and economic vitality at the confluence of our missions.	Accomplished	The Interagency Leadership Team (ILT), a consortium of state and federal agencies, has met quarterly since 2004 to discuss ways to align the goals of economic development and environmental sustainability. In 2005, the ILT issued a strategic plan, its mission statement stating that the state transportation system "should be planned hand-in-hand with economic development and the protection and enhancement of our State's cultural and natural resources".
Objective 6.2 Support a system of regionally based inter-modal transportation that promotes economic development throughout North Carolina.		
Action Step 6.2.1 Expand airports in order to promote increased commercial carrier service to enhance economic development in all regions of North Carolina.	Accomplished	In the fall of 2006, the Department of Transportation and North Carolina State University released a report which quantified the impact of airports on the state economy. The results of this report will affect future resource allocation.

<p>Action Step 6.2.2 Make improvements to ports in order to expand ocean carrier service to enhance economic development opportunities, including passenger service, and provide North Carolina's business and industry more cost efficient options for the import and export of their goods.</p>	<p>Accomplished</p>	<p>North Carolina's regional infrastructure has been strengthened by the growth of the state port system. Ongoing construction and redevelopment projects managed by the North Carolina Ports Authority promise to deliver a statewide economic impact of \$14.4 billion in jobs, taxes and industry over the span of ten years - beginning in 2006. These projects include the expansion and development of the Port of Wilmington and the Port of Morehead City Radio Island. Planning is also underway on the North Carolina International Port - a major international port container terminal.</p>
<p>Objective 6.3 Support policy initiatives to stimulate multi-county business/industrial parks supported by regional infrastructure with shared tax revenues.</p>		
<p>Action 6.3.1 Continue to develop legislative proposals that allow the creation of additional infrastructure financing sources for economic development projects through alternative revenue producing methods.</p>	<p>Accomplished</p>	<p>In 2004, North Carolina became the 49th state in the nation to approve the use of self-financing bonds for local development purposes. This amendment provides a significant finance tool for local governments.</p>
<p>Action Step 6.3.2 Encourage private investment in advanced telecommunications infrastructure and services through changes in state and local tax policies and regulations.</p>	<p>Accomplished</p>	<p>In August 2007, the General Assembly approved legislation to extend the e-NC Authority for five additional years. The Authority works to expand access to technology across the state. As of late 2006, 82 percent of North Carolina households have access to high-speed Internet service if they choose to subscribe. However, five counties still have less than 50 percent access and another 21 counties have less than 70 percent access. This progress has been achieved primarily through the use of grants to private companies to stimulate investment in small markets.</p>
<p>Objective 6.4 Foster sustainable economic development through maximum utilization of existing by-products and smart growth strategies.</p>		
<p>Action Step 6.4.1 Determine the best approach to recruit and support companies that utilize agriculture and industry-generated by-products in manufacturing.</p>	<p>Accomplished</p>	<p>The promotion of businesses that use industrially generated by-products in manufacturing is a successful effort run jointly by the N.C. Department of Commerce and the N.C. Department of Environmental and Natural Resources. Through the Recycling Business Assistance Center (RBAC), these two departments have actively recruited by-product recycling industries to the state. Since 2004, RBAC has awarded grant funding totaling \$1.06 million to recycling companies operating in North Carolina. This investment has leveraged an additional \$13.3 million in matching funds from private sector recycling companies.</p>

GOAL 7: MAINTAIN AND STRENGTHEN TOURISM, FILM, AND SPORTS INDUSTRIES; PRESERVE, PROTECT, AND PROMOTE OUR STATE'S CULTURAL, NATURAL, AND HERITAGE ASSETS		
Objective 7.1 Ensure expansion and continued development of cultural and heritage tourism, craft, and film industries in North Carolina.		
<p>Action Step 7.1.1 Promote and increase marketing budget for all forms of leisure and business tourism to maintain and expand NC's national and regional tourism market share, to create jobs, and to encourage related economic development.</p>	<p>Accomplished</p>	<p>The N.C. Division of Tourism, Film, and Sports Development has realized only modest budget increases in recent years and those have not kept up with inflation and increased media rates and marketing costs. The division's current budget for tourism and film marketing is currently fixed at \$13.6 million. This budget ranks North Carolina 22nd among all state tourism and film budgets. Meanwhile, neighboring states which compete directly with North Carolina in targeting consumers to visit their states have realized budget increases.</p>
<p>Action Step 7.1.2 Implement incentives for tourism product development.</p>	<p>Not Accomplished</p>	<p>Priorities were modified.</p>
<p>Action Step 7.1.3 Implement incentives for filmmaking.</p>	<p>Accomplished</p>	<p>Sunset for Film Tax credit was extended during the 2008 Legislative Session.</p>
<p>Action Step 7.1.4 Integrate existing research data into decision-making processes for Tourism, Film, and Cultural Resources.</p>	<p>Accomplished</p>	<p>In early 2007, the updated Tourism Satellite Account was completed. Results show that travel and tourism in NC is a \$23 billion industry. The Division of Tourism plans to update the study again in 2009 (using 2007 data).</p>
<p>Action Step 7.1.5 Foster greater marketing collaboration and cross-promotion between activities in the Department of Transportation, the Department of Cultural Resources, and the Department of Commerce's Tourism, Film, and Sports Development Division.</p>	<p>Accomplished</p>	<p>In 2005 the NC Civil War Trails Program was created to promote the state's historical heritage and generate tourism revenues. This marketing collaboration between NCDOT, NCDCCR, and NCDOC is an ongoing project that takes advantage of the common goals and shared resources of several state agencies.</p>
Objective 7.2 Protect and promote our natural, cultural, artistic, and heritage assets.		
<p>Action Step 7.2.1 Maintain the state rehabilitation tax credit for historic preservation and increase county, municipal, and private understanding of preservation programs.</p>	<p>Accomplished</p>	<p>With increased state revenues, legislative funds have been applied toward the repair and renovation of state historic sites. Through supportive legislation from the General Assembly, the Historic Preservation Office now charges a fee to process applications for state rehabilitation tax credits and uses the additional revenue to hire extra staff, which will reduce backlogs and enable the office to work more efficiently. SB 352, a bill to offer income tax credits for the rehabilitation of historic mills, was approved in 2006.</p>

Action Step 7.2.2 Inventory and objectively compare North Carolina's cultural resources as economic assets to those competitor states that are "Best in Class."	Accomplished	The "Creative Economy: The Arts Industry in North Carolina" report identified that in 2006 arts industry wages alone infused more than \$3.9 billion into North Carolina's economy, according to research by Regional Technology Strategies (RTS). Creative sector employment is estimated at more than four percent of total employment in North Carolina.
Action Step 7.2.3 Increase state funding for cultural sites so that they can remain in good physical condition, be adequately staffed, and promoted to the general public.	Accomplished	The N.C. Department of Cultural Resources received additional institutions during the 2008 session, the Graveyard of the Atlantic and Southeast Center for Contemporary Art, and funds for restoration of the CSS Neuse, construction of the North Carolina History Education Center at Tryon Palace and new Western Regional Records Center.
Action Step 7.2.4 Create a greater level of private support for cultural amenities by reinstating the Governor's Business Council on the Arts and Humanities.	Not Accomplished	Priorities were modified.
Action Step 7.2.5 Increase per capita funding for the North Carolina Arts Council from the 2003 level of \$0.60 to \$1.50.	Accomplished	The North Carolina Arts Council received increased per capita funding from \$.60 to just over \$1.00.
Objective 7.3 Develop and utilize cultural resources to support broader economic development.		
Action Step 7.3.1 Develop a plan to strengthen existing, strategically, important state and other cultural organizations and demonstrate the link between cultural resources and economic development.	Accomplished	Increased collaboration between the N.C. Department of Cultural Resources and the N.C. Department of Commerce through both the 21st Century Communities Program and the Place-based Economic Development Initiative.
Action Step 7.3.2 Creation of a state program to underwrite bonds for the construction and development of cultural, heritage, and tourism destinations.	Not Accomplished	Priorities were modified.
Action Step 7.3.3 Fully develop North Carolina's Heritage and Cultural Tourism Programs.	Accomplished	The N.C. Department of Cultural Resources has expanded its assets to include a contemporary arts center in Winston Salem and a shipwreck museum in Hatteras. The literary Trails of North Carolina Mountains travel guide and the Homegrown Handmade: Art Roads and Farm Trails travel guide, covering 76 counties with 1300 sites were published. A national Gullah-Geechee Commission was established by Congress and includes North Carolina representation. The General Assembly appropriated \$32,500 in FY 2008 to establish a North Carolina African American Heritage Commission to preserve African American history, arts and culture, to support African American heritage education in K-12 schools, to catalog, preserve, assess and interpret all aspects of African American history, arts and culture.



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Attachment XVIII

The Estimated Economic Impact
of Closure of Alcoa's Aluminum
Smelting Facility in North Carolina
N.C. Department of Commerce
Division of Policy, Research and Strategic Planning
(Aug. 26, 2009)

The Estimated Economic Impact of Closure of Alcoa's Aluminum Smelting Facility in North Carolina
Department of Commerce, Division of Policy, Research and Strategic Planning
August 26, 2009

1. Introduction

In August 2002, Alcoa Badin Works, located in Badin, North Carolina (Stanly County), curtailed its aluminum smelting operations. Under full capacity, the Badin, NC facility operated two potlines and produced 60,000 metric tons per year (MTPY) of aluminum. The purpose of this study is to estimate the lost economic impact associated with the closed Alcoa Badin Works aluminum smelting facility on the North Carolina economy. This analysis focuses on the estimated economic impacts of two scenario facilities, one "conservative" and one "average" in terms of production capacity.

2. Methodology and Key Assumptions

Economic Impact Software

The N.C. Department of Commerce relied on IMPLAN to complete this economic impact analysis. IMPLAN 2.0 is an economic impact software system developed by the Minnesota IMPLAN Group (MIG). Impacts are estimated using data on inputs needed to produce products or services for 500+ industries. IMPLAN allows the user to develop local-level input-output models that can estimate the total economic impact of a specific project. Total economic impacts include the direct, indirect, and induced effects. Direct effects are the impacts that an initial investment, hiring event, or change in output have upon the economic area. Indirect effects are the change in demand that regional suppliers will experience because of the initial project investment. Induced effects are the changes in household purchasing due to changes in compensation. The IMPLAN model used to evaluate economic impacts contains data for all 100 counties in the state and North Carolina as a whole.

Analysis Scenarios and Input Data

Since Alcoa Badin Works is out of production, and because limited historical data exists related to its operations and capital investment, this study estimates the impacts of two hypothetical scenarios. The first scenario is based on employment, capital investment and production capacity figures obtained for Alcoa's Mt. Holly, South Carolina smelting facility. Production capacity at the Mt. Holly facility is 229,000 MTPY of aluminum¹, slightly above the median production capacity (205,000 MTPY) for all ten of Alcoa's U.S. smelting operations. This scenario assumes Alcoa builds a new smelting facility at an "average" production capacity. In addition to being an "average" production facility, the Mt. Holly, SC site was chosen for several reasons:

- It is the only Alcoa smelting facility in the U.S., including Alcoa Badin Works, where the research team was able to obtain data on employment², capital investment³, and production capacity.
- As of March 31, 2009, the facility was operating at full capacity, one of only two U.S. facilities.
- The Mt. Holly, SC facility and the former facility in Badin, NC share the same primary industry: North American Industry Classification System (NAICS) code 331312 – Primary Aluminum Production; IMPLAN industry code 172 – Aluminum Refining and Primary Aluminum Production.

¹ Smelting capacity figures were obtained from Alcoa's website: http://www.alcoa.com/primary_na/en/alcoa_primary_na/capacity.asp

² Employment data for Alcoa's Mt. Holly site was obtained from two sources. The first source was the online profile for Alcoa's Mt. Holly Smelter (http://www.alcoa.com/locations/usa_mt_holly/en/about/profile.asp). The second source was Harris Infosource (<http://www.harrisinfo.com/>). Alcoa lists the facility's employment at 600; Harris lists it at 620.

³ Capital investment data for Alcoa's Mt. Holly site was obtained from the online profile for Alcoa's Mt. Holly Smelter (http://www.alcoa.com/locations/usa_mt_holly/en/about/profile.asp). The profile lists the original capital investment at more than \$340 million in 1980. This figures was inflated to 2009 dollars (\$887.4 million)

Table 1 - Economic Impact Scenarios

Scenario	Likely Impact	Employment	Investment (2009 dollars)	Capacity (MTPY)
Mt. Holly, SC Scenario	Average	610	\$887,400,000	229,000
Old Badin, NC Scenario	Conservative	160	\$232,506,550	60,000

Sources: Alcoa; Harris; N.C. Dept of Commerce

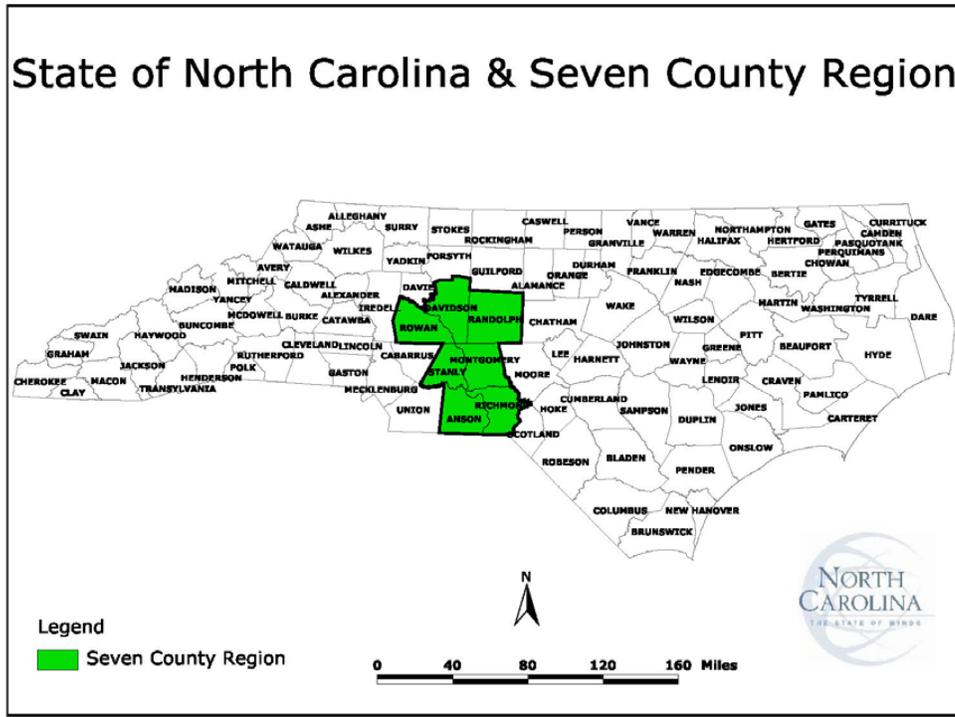
A conservative scenario is based on the production capacity (60,000 MTPY) of Alcoa Badin Works, the smelting facility that used to exist in North Carolina. This scenario assumes Alcoa builds a new smelting facility at the production capacity that existed prior to the plant being curtailed. Because current and historical employment and capital investment data is not available for the Badin, NC facility, the research team used ratios derived from the Mt. Holly site to estimate input figures.⁴ Following are the calculations and assumptions used to determine employment and capital investment for the Badin, NC facility:

- The production capacity per worker for the Mt. Holly, SC facility is 375 MTPY (229,000 MTPY/610 workers). Employment is derived by dividing the Badin, NC production capacity reported by Alcoa by the per worker production capacity from the Mt. Holly, SC facility. Annual employment for the Badin, NC facility is estimated at 160 workers (60,000 MTPY/375 workers).
- At the Mt. Holly, SC facility the ratio of capital investment per metric ton produced is \$3,875 (\$887,400,000/229,000 MTPY). Badin, NC investment is derived by multiplying the Badin, NC production capacity as reported by Alcoa by the investment/metric ton figure (60,000 MTPY*\$3,875). Investment for the Badin, NC facility is estimated at \$232,506,550.

Analysis Regions

This study estimates impacts for North Carolina as a whole and a seven county region near the Badin, NC site. The seven counties are: Stanly, Anson, Richmond, Montgomery, Randolph, Davidson and Rowan.

⁴ It is very likely that the employment and capital investment inputs derived for the Badin, NC scenario (conservative scenario) are low. A case could be made that the size of smelting facilities does not increase proportionally and are subject to high initial capital costs and employment requirements.



3. Employment Impacts

Employment, or the number of people with jobs, is an important indicator of economic health. When employment is growing, companies experience demand for their products and expand their workforce. An aluminum smelting facility in North Carolina would have significant impact on employment in the seven-county region and the state as a whole. For analysis purposes, employment impacts are estimated separately for facility construction (one-time capital investment) and facility operations (ongoing under full operational capacity).

Facility Operations (Ongoing)

According to the IMPLAN model, the annual total employment impact (direct + indirect + induced) in North Carolina associated with facility operations could range from 571 under a “conservative” smelting production capacity scenario to upwards of 2,100 under an “average” scenario (Table 2). These estimates include jobs directly associated with facility operations, indirect jobs associated with the change in demand for regional suppliers, as well as jobs induced by increased consumer spending. Direct jobs alone range from 160 to 610. Annual employment impacts for the seven-county region are slightly lower than the state, ranging from 469 under the “conservative” production capacity scenario to 1,790 under the “average” scenario.

	Badin Scenario - Prod = 60K MTPY (Conservative)	Mt. Holly Scenario - Prod = 229K MTPY (Average)
Total Region Employment	469	1,790
Direct Employment	160	610
Indirect Employment	188	718
Induced Employment	121	461
Total State Employment	571	2,176
Direct Employment	160	610
Indirect Employment	247	941
Induced Employment	164	625

Source: IMPLAN Model, August 2009.

Facility Construction (One-Time Capital Investment)

In addition to recurring employment, a smelting facility in North Carolina would also have a significant one-time employment impact associated with the construction of the plant and the required capital investments. According to the impact model, the one-time total employment impact (direct + indirect + induced) associated with capital investment in North Carolina could range from 3,352 under a “conservative” scenario to more than 12,700 under an “average” scenario (Table 3). Most of the employment impacts would likely occur in the seven-county region.

	Badin Scenario - Prod = 60K MTPY (Conservative)	Mt. Holly Scenario - Prod = 229K MTPY (Average)
Total Region Employment	3,038	11,596
Total State Employment	3,352	12,793

Source: IMPLAN Model, August 2009

4. Economic Contribution

The lost output, value-added, and employee compensation associated with the closed Alcoa smelting facility results in a significant economic loss for both the state of North Carolina and the seven-county region.

Output, a general measure of economic health, is the total value of all of the goods and services produced in an economy. For an aluminum producer like Alcoa this would be sales plus/minus change in inventory. Consumption from households and companies, government and business spending, investment, and exports out of the region all stimulate output. The estimated total output (direct + indirect + induced) associated with aluminum smelting operations ranges from \$223 million a year under the “conservative” production model to more than the \$850 million associated with the “average” production model (Table 4). One-time output impacts associated with the construction of a smelting facility ranges from \$368 million to just under \$1.5 billion (Table 5). Regional output impacts for both facility operations and capital investment are slightly lower than the estimated statewide impacts. According to IMPLAN annual output per worker associated with aluminum smelting in North Carolina is \$919,801.

Table 4 - Estimated Annual Economic Impacts - Operations (2009 dollars)		
	Badin Scenario - Prod = 60K MTPY (Conservative)	Mt. Holly Scenario - Prod = 229K MTPY (Average)
Total Output		
Region	\$196,533,488	\$749,283,912
State	\$223,503,653	\$852,107,661
Total Value Added		
Region	\$64,553,129	\$246,108,808
State	\$71,711,276	\$273,399,238
Total Employee Compensation		
Region	\$26,625,819	\$101,510,935
State	\$32,079,352	\$122,302,527

Source: IMPLAN model, August 2009.

Value added is the difference between an establishment’s total output and the cost of its intermediate inputs. It is a measure of the contribution to Gross Domestic Product (GDP) made by an individual producer; the difference between the cost of materials and labor to produce a product and the sale price of a product. Total value added (direct + indirect + induced) associated with the scenario smelting operations range from just under \$72 million a year under the “conservative” production model to more than the \$273 million associated with the “average” production model (Table 4). One-time value added impacts associated with the construction of a smelting facility range from \$174 million to \$663 million (Table 5).

Table 5 - Estimated Economic Impacts - Capital Investment (2009 dollars)		
	Badin Scenario - Prod = 60K MTPY (Conservative)	Mt. Holly Scenario - Prod = 229K MTPY (Average)
Total Output		
Region	\$319,067,474	\$1,217,774,298
State	\$368,568,311	\$1,406,702,513
Total Value Added		
Region	\$131,941,269	\$503,575,901
State	\$173,838,836	\$663,484,939
Total Employee Compensation		
Region	\$82,718,053	\$315,707,251
State	\$111,465,596	\$425,427,058

Source: IMPLAN model, August 2009.

Employee compensation is wage and salary payments as well as benefits, including health and life insurance, retirement payments, and any other non-cash compensation. It includes all income to workers paid by employers. Under the “conservative” model, the 571 annual jobs created or retained from smelting operations results in more than \$32 million in annual (direct + indirect + induced) employee compensation (Table 4). This number increases to \$122 million in the “average” production scenario. Employee compensation impacts associated with capital investment are significantly higher, but non-recurring (Table 5). According to IMPLAN annual earnings per worker associated with aluminum smelting in North Carolina is \$91,847.

Attachment XIX

Aff. J. Keith Crisco,
North Carolina Secretary of Commerce

IN THE UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Alcoa Power Generating, Inc.) P-2197-073
)
Yadkin Hydroelectric Project) Application for a New Major License

STATE OF NORTH CAROLINA)
) ss.:
COUNTY OF WAKE)

J. KEITH CRISCO, being first duly sworn, deposes and says as follows:

1. I am the duly appointed and duly sworn Secretary of the North Carolina Department of Commerce and have been at all times relevant to this Affidavit.

2. I make this Affidavit on personal knowledge and, if called upon to do so, could competently testify under oath to the matters stated herein.

3. That document entitled “The State of North Carolina’s 21st Century Plan for the Use of the Yadkin River Resources,” (the “Plan”) to which this Affidavit is a part, is composed of information that was gathered, collected and written by the members of my professional staff at the North Carolina Department of Commerce.

4. Attachment XVIII to the Plan is likewise information that was developed and written by the members of my professional staff at the North Carolina Department of Commerce.

5. The information contained and written in the items referred to in paragraphs 3-4 of this Affidavit were gathered, collected and written by these members of my professional staff while acting in their official capacities as employees and staff members of the North Carolina Department of Commerce.

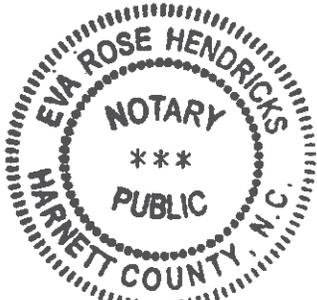
6. At all times while these persons were gathering, collecting and writing the information set forth in the 21st Century Plan, they were acting at my direction and under my supervision and control, in the normal course of their professional duties.

7. The documents, records, memoranda, reports, data compilations and other sources of information that were used, relied upon and/or included by my staff members in the preparation of the Plan and Attachment XVIII to the Plan are data compilations that were and are kept by the North Carolina Department of Commerce in the regular course and conducted of its business and official activities, and it is the regular practice of the North Carolina Department of Commerce to make, generate and write memoranda, reports, records and other data compilation similar to that contained in the Plan.

8. The documents, records, memoranda, reports, data compilations and other sources of information that were used, relied upon and/or included by my staff members in the preparation of the Plan and Attachment XVIII to the Plan are also the types of data compilations that I and the professional staff at the North Carolina Department of Commerce regularly rely upon in creating official documents, records, memoranda and reports for the North Carolina Department of Commerce for use in its official duties and business on behalf of the State of North Carolina.

9. The Plan and Attachment XVIII to the Plan are typical of data compilations and data analyses that are regularly prepared by members of my professional staff at the North Carolina Department of Commerce for use in the Department's execution of its official duties and business on behalf of the State of North Carolina.

10. To the best of my knowledge, the contents of the Plan are true and correct.





J. Keith Crisco

Subscribed to and sworn before me
this 3rd day of September 2009.



Notary Public

My commission expires: Nov. 5, 2012

