

2.0 PROPOSED ACTIONS AND ALTERNATIVES

This section describes each of the alternatives analyzed in detail in this EIS and summarizes the alternatives considered but eliminated from detailed study. The three alternatives analyzed in detail included the Applicants' Proposals as described in the Settlement Agreements (Proposed Actions), the Applicants' Proposals with additional Staff-Recommended Measures (Staff Alternatives), and the No-action Alternatives, which are the baseline against which the other alternatives are compared.

2.1 NO ACTION ALTERNATIVE

Under the No-action Alternative, the Projects would continue to operate under the terms and conditions of the existing licenses, and no new environmental protection, mitigation, or enhancement measures would be implemented. We use this alternative to establish baseline environmental conditions for comparison with other alternatives and to judge the benefits and costs of any measures that might be required under a new license.

2.1.1 Existing Project Facilities

2.1.1.1 Yadkin Project

The Yadkin Project is located on the Yadkin River in the Yadkin-Pee Dee River Basin, which extends from the Blue Ridge Mountains to the Atlantic coast near Georgetown, South Carolina. The existing Yadkin Project consists of four developments on the Yadkin River: High Rock, Tuckertown, Narrows, and Falls.

The High Rock development is the uppermost development at river mile (RM) 253 and includes a 101-foot-high, 936-foot-long, concrete gravity dam. There is a 550-foot-long, gate-controlled spillway and 10, 45-foot-wide (Stoney) floodgates. The 14,400-acre reservoir has a normal pool elevation of 623.9 feet United States Geological Survey (USGS)¹⁰ datum and a usable storage capacity of 217,400 acre-feet. A powerhouse which is integral to the dam, contains three vertical Francis turbine-generator units with a total installed capacity of 33 MW and appurtenant facilities.

The Tuckertown development at RM 244.3 is comprised of a 76-foot-high, 1,370-foot-long, concrete gravity dam with sections of rock fill and earth fill embankment. The 480-foot-long spillway has 11 Taintor gates, 35-feet-wide and 38-feet-high. The 2,560-acre reservoir has a normal pool elevation of 564.7 feet and a usable storage capacity of 6,700 acre-feet. The powerhouse, integral to the dam, contains three Kaplan turbine-generator units with a total installed capacity of 38 MW and appurtenant facilities.

¹⁰Throughout this EIS, all elevations for the Projects are given in USGS datum, unless otherwise noted. The elevations for the Yadkin-Pee Dee River Project were given in NAVD88 in the license application. We have converted these elevations to USGS datum in this document.

Further downstream, the Narrows development at RM 236.5 includes a 201-foot-high, 1,144-foot-long, concrete gravity dam with a 640-foot-long main spillway. There are 22, 25-foot-wide by 12-foot-high (Taintor) flood gates and a trash gate. The 128-foot-long intake structure has four 20-foot by 20-foot openings each with two vertical lift gates and four 15-foot-diameter steel-lined penstocks. A powerhouse located 280 feet downstream of the dam contains four vertical Francis turbine generators with a total installed capacity of 108 MW and appurtenant facilities. There is a 520-foot-long bypass spillway with 10 Stoney gates (35-foot-wide by 28-foot-high) a trash gate, and a 90-foot-long non-overflow gravity section. The 5,355-acre reservoir has a normal pool elevation of 509.8 feet and usable storage capacity of 129,100 acre-feet.

At RM 234, the Falls development includes a 112-foot-high, 750-foot-long, concrete gravity dam. The 526-foot-long spillway has a 441-foot section with 10 Stoney gates (33-foot-wide by 34-foot-high), a 71-foot section with two Taintor gates (25-foot-wide by 19-foot- and 14-foot-high, respectively), and a 14-foot-long trash gate section. The 204-acre reservoir has a normal pool elevation of 332.8 feet and usable storage capacity of 940 acre-feet. A powerhouse, integral to the dam, contains one S. Morgan Smith vertical Francis turbine-generator and two Allis Chalmers propeller type turbine-generators with a total installed capacity of 31 MW and appurtenant facilities.

Primary transmission lines include a four-circuit 13.2-kilovolt transmission line that connects the hydroelectric generating station at the Narrows development directly to Alcoa Inc.'s Badin Works. The approximate length of this transmission line is 8,000 feet. The Falls development includes a single-circuit 100-kilovolt transmission line that connects the hydroelectric generating station at Falls directly to Alcoa Inc.'s Badin Works. The approximate length of this transmission line is 15,000 feet. Both transmission lines are Alcoa Generating-dedicated lines, part of the licensed project, and included in the project boundary.

2.1.1.2 Yadkin-Pee Dee River Project

The existing Yadkin-Pee Dee River Project consists of the Tillery development on the Yadkin River and the Blewett Falls development on the Pee Dee River.

The Tillery development, at RM 218, includes a 1,200-foot-long earthen embankment and 1,550-foot-long, concrete gravity structure with a 758-foot-long, 62-foot-high spillway. There are 18, 34-foot-wide by 24-foot-high radial spillway gates and a 14-foot-wide bottom-drop trash sluice gate. The 5,697-acre reservoir has a normal pool elevation of 278.2 feet and a usable storage capacity of 84,150 acre-feet. In addition, there is a concrete, indoor-outdoor powerhouse, integral to the dam, containing (a) three Francis turbine-generators and one fixed-blade propeller turbine-generator with a total installed capacity of 84 MW; (b) a small Francis turbine powering a "house generator" with an installed capacity of 0.36 MW; and (c) appurtenant facilities.

At RM 188.2, the Blewett Falls development includes a 1,700-foot-long earthen embankment and 1,468-foot-long, concrete gravity ungated spillway dam with 4-foot-

high, wooden flashboards. The 2,866-acre reservoir has a normal pool elevation of 178.1 feet and a usable storage capacity of 30,893 acre-feet. A separate powerhouse located on a 300-foot-long forebay channel west of the dam, contains six S. Morgan Smith turbine-generators, three 3,200-kW units and three 5,000-kW units, each with its own penstock and headgate, for a total installed capacity of 24.6 MW. There is a 900-foot-long tailrace channel that joins the main river about 1,750 feet downstream of the dam. The development also includes appurtenant facilities.

2.1.2 Existing Project Operations

2.1.2.1 Yadkin Project

Alcoa Generating operates the High Rock development in a store-and-release mode (peaking operation), and the Tuckertown, Narrows, and Falls developments in a daily run-of-river mode. The High Rock development provides storage for the three downstream developments, and the Narrows development provides some storage during low flow conditions and emergencies.

High Rock development is operated in accordance with an operating guide that was established in 1968. Within the limitations of available streamflow, the operating guide is designed to maintain higher water elevations in High Rock reservoir from mid-May to mid-September, followed by a fall-winter drawdown to allow for refill during the late winter and spring. The maximum annual drawdown for High Rock is 13 feet, with drawdowns of 5 feet or less typical during the summer months. The maximum annual drawdown is 3 feet at the Tuckertown and Narrows development and 4 feet at the Falls development, with an average daily drawdown of 1 to 2 feet. Table 17 in section 3.3.2.2 shows the licensed drawdowns as compared to the current normal limit of drawdowns at each development of the Yadkin Project.

In 1968, Alcoa Generating and the predecessor company of Progress Energy reached an agreement, which was approved by the Commission under a headwater benefits settlement. Headwater benefits are defined by section 10(f) of the FPA as the additional electric generation at a downstream project (in this case Progress Energy's Yadkin-Pee Dee River Project) made possible by the regulation of the river flow by the upstream project (Yadkin Project). Regulation of river flow is achieved by the use of upstream storage reservoirs that retain water during high inflow periods that might otherwise be spilled rather than used for generation.

According to the 1968 Headwaters Benefits Settlement, Alcoa Generating is to regulate weekly average stream flow from High Rock reservoir to a flow not less than 1,500 cubic feet per second (cfs) during the 10-week period preceding May 15; 1,610 cfs during the period May 15 through July 1; and 1,400 cfs during the period July 1 through September 15.

2.1.2.2 Yadkin-Pee Dee River Project

The Tillery development is operated as a peaking and load-following facility. It is licensed for a 22-foot drawdown, but Progress Energy manages it for drawdowns of not more than 4 feet under normal conditions and voluntarily limits drawdowns to 1 foot from April 15 to May 15 to protect largemouth bass spawning. The Blewett Falls development is operated as a reregulating facility, smoothing out flows released from the upstream developments. The Blewett Falls development is licensed for a drawdown of 17 feet, but generally operates with drawdowns of 2 to 4 feet. The existing license for the Yadkin-Pee Dee River Project requires the release of a continuous minimum flow of 40 cfs from the Tillery development and 150 cfs from the Blewett Falls development.

2.1.3 Project Safety

The Projects have been operating for almost 50 years under the existing licenses issued in 1958 and, during this time, Commission staff has conducted operational inspections focusing on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the licenses, and proper maintenance. In addition, the Projects have been inspected and evaluated every 5 years by an independent consultant, and a consultant's safety report has been submitted for Commission review. As part of the relicensing process, the Commission staff would evaluate the continued adequacy of the proposed Projects' facilities under new licenses. Special articles would be included in any licenses issued, as appropriate. Commission staff would continue to inspect the Projects during the new license terms to assure continued adherence to Commission-approved plans and specifications, special license articles relating to construction (if any), operation and maintenance, and accepted engineering practices and procedures.

2.1.4 Existing Project Boundaries

2.1.4.1 Yadkin Project

Generally, the Yadkin Project boundary follows the normal full pond elevation of the four project reservoirs and includes the project facilities located at each of the four developments and the primary transmission lines at the Narrows and Falls developments. The project boundary does not include any of the project-related recreation facilities.

2.1.4.2 Yadkin-Pee Dee River Project

The Yadkin-Pee Dee River Project boundary generally follows the normal full pond elevation of the two project reservoirs. The seven project-related recreational facilities at Lake Tillery and the five project-related recreational facilities at Blewett Falls reservoir are included in the project boundary.

2.2 APPLICANTS' PROPOSALS (SETTLEMENTS)

2.2.1 Proposed Project Facilities

2.2.1.1 Yadkin Project

Alcoa Generating proposes to make structural changes at each of its four developments that include upgrading generating units over time, which would include aeration technology in some cases. No construction of new project facilities is proposed.

2.2.1.2 Yadkin-Pee Dee River Project

Progress Energy's proposed structural changes are limited to methodologies for aeration following completion of studies at the Tillery and Blewett Falls developments. No construction of new project facilities is proposed.

2.2.2 Proposed Operations

2.2.2.1 Yadkin Project

Alcoa Generating proposes to operate the Yadkin Project similar to its current operation with the following changes.

Required Minimum Instream Flows

Except when operating under the Low Inflow Protocol or the Hydro Project Maintenance and Emergency Protocol, daily average minimum flow from the Falls development would be as follows:

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

Reservoir Elevations

Alcoa Generating would meet operating elevations for each reservoir except as provided under the Low Inflow Protocol or the Hydro Project Maintenance and Emergency Protocol included in appendices A and B of the Yadkin Settlement (Alcoa Generating, 2007a). High Rock reservoir would operate at or above the normal minimum elevation of 619.9 feet, or 4 feet below full pond elevation, from April 1 through October 31 and 613.6 feet, or 10 feet below full pond elevation, from December 1 through February 28 (figure 2).

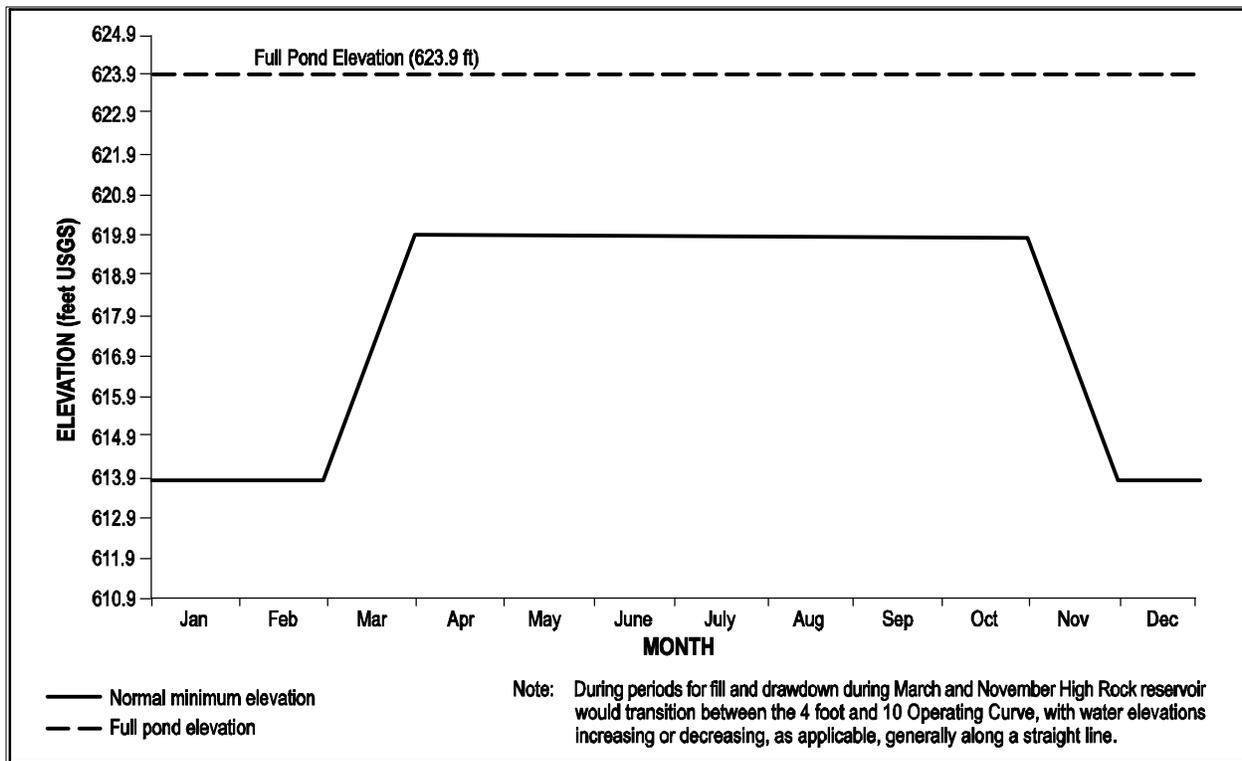


Figure 2. High Rock reservoir operating curve. (Source: Alcoa Generating, 2006a)

The remaining three reservoirs would be operated at or above the following year-round normal minimum elevations: (1) Tuckertown at 561.7 feet, 3 feet below full pond elevation; (2) Narrows reservoir at 504.8 feet, 5 feet below full pond elevation (2 feet beyond the existing maximum drawdown of 3 feet), except as needed to maintain minimum flows; and (3) Falls at 328.8 feet, 4 feet below full pond elevation.

Reservoir Stabilization to Enhance Fish Spawning

From April 15 through May 15 of each year, reservoir water levels at all four project reservoirs would be maintained no lower than 1 foot below the recorded elevation of each reservoir on April 15.

2.2.2.2 Yadkin-Pee Dee River Project

Progress Energy proposes to operate the Yadkin-Pee Dee River Project similar to its current operation with the following changes.

Minimum Instream Flows

A continuous, year-round minimum flow of 330 cfs would be provided at the Tillery development, except for an 8-week period (as early as March 15, and not later than March 22) when minimum flows of 725 cfs would be released. Releasing 725 cfs would begin in 2010, or at the first passage of American shad above Blewett Falls dam, whichever is later.

An additional 1,750 acre-feet (884 cfs over one 24-hour period) of water, beyond the required minimum releases, per year would be released below the Tillery development to enhance recreational boating flows. These additional flows could be increased to 1,950 acre-feet per year (985 cfs over one 24-hour period) if at least 4 days of recreational flows are released within the period May 16 to May 31 or September 1 to September 15.

A continuous minimum flow of 2,400 cfs would be released at the Blewett Falls development from February 1 through May 15. Continuous minimum flows of 1,800 cfs would be released from May 16 through May 31, and 1,200 cfs would be released from June 1 through January 31. Maintenance of minimum flows would have a higher priority than maintenance of reservoir water levels. During two 5-hour periods between October and January each year, flows would be reduced to leakage flow for testing black-start capability of turbines at the Blewett Falls powerhouse. Tests would not be conducted in October if a Stage 1 or greater Low Inflow Protocol event has been triggered.

Flow adjustments to enhance fish spawning conditions downstream of the Blewett Falls development would occur each year during either one 14-day and one 10-day period or five 5-day periods. Flow adjustments would be operated with specific ramping rates and timing of operating units as discussed in detail in section 3.3.3, *Aquatic Resources*.

Compliance with required minimum flows would be fulfilled if flows recorded at the new gage proposed by Progress Energy downstream of the Tillery development near State Highway 731 Bridge and the streamflow gage at Rockingham are within 5 percent of the required minimum release. In addition, periodic flows below minimum levels would be offset by flows in the same month greater than minimum requirements for an equivalent amount of time. If minimum flows are not offset in the same month they occur, greater than minimum flows would occur as soon as practicable in the next month, but no later than the 15th day of that month.

Reservoir Levels

A seasonally based water level management schedule would be implemented at Lake Tillery with fluctuations limited to 3 feet below full pond elevation (278.2 feet) from December 15 through March 1, unless use of reservoir storage is needed to meet demand for electricity. If storage is needed for electrical generation purposes, fluctuations up to 6 feet would be allowed, and elevations would fluctuate on a daily or multi-daily basis. Water fluctuations up to 8 feet may occur during system emergencies, and potentially be greater during Low Inflow Protocol periods.

Lake levels from April 15 to May 15 would be maintained within 1.5 feet of the recorded water surface elevation on April 15. During all other periods of the year, reservoir level fluctuations would be maintained within 2.5 feet of full pool on weekdays, and 1.5 feet of full pool on weekends and holidays. Once in every 5-year period, a maintenance drawdown of up to 15 feet would occur within a September 15 to December 15 timeframe.

Blewett Falls reservoir would be operated as run-of-river when inflows from the Tillery development exceed 7,400 cfs. A year-round water level regime when inflows are less than 7,400 cfs would allow fluctuations of up to 6 feet from full pond elevation (178.1 feet), except for system emergencies and Low Inflow Protocol events. To safely replace flashboards that are down, an additional 2 feet of drawdown would be allowed. Water level fluctuations would be limited to 2 feet from April 15 to May 15, except when additional reservoir storage is necessary to meet minimum flows or if the flashboards fail.

2.2.3 Proposed Environmental Measures

2.2.3.1 Yadkin Project

Under the Yadkin Settlement, Alcoa Generating proposes to continue operating the Yadkin Project with the proposed protection and enhancement measures¹¹ summarized in table 1.

Table 1. Yadkin Project (P-2197) settlement measures. (Source: Alcoa Generating, 2007a)

Article	Measure	Elements
PO-1	Reservoir Operations	<p>Operate High Rock reservoir at or above the normal minimum elevation of 619.9 feet from April 1 to October 31 (4 feet below full pond) and 613.9 feet from December 1 to March 1 (10 feet below full pond), except as needed to maintain minimum flows or as provided under the Low Inflow Protocol or the Hydro Project Maintenance and Emergency Protocol.</p> <p>Operate Tuckertown reservoir at or above the normal minimum elevation of 561.7 feet, 3 feet below full pond (564.7 feet), except as provided in the Hydro Project Maintenance and Emergency Protocol.</p> <p>Operate Narrows reservoir at or above the normal minimum elevation of 504.8 feet, 5 feet below full pond (509.8 feet), except as needed to maintain minimum flows, or as provided under the Low Inflow Protocol or the Hydro Project</p>

¹¹The summary of the measures in the Yadkin and Yadkin-Pee Dee Settlements may differ from the specific language of the settlement agreements. Individual articles include programmatic elements for scheduling and developing plans, monitoring, evaluation, and reporting that we do not list in tables 1 and 2. Characterizations of these measures are our attempt to provide a concise summary of the measures for this draft EIS and are not intended to modify any of the terms of the settlements agreements.

Article	Measure	Elements
		Maintenance and Emergency Protocol.
		Operate Falls reservoir at or above the normal minimum elevation of 328.8 feet, 4 feet below full pond (332.8 feet), except as provided in the Hydro Project Maintenance and Emergency Protocol.
		Maintain reservoir water elevations from April 15 through May 15 of each year no lower than -1.0 feet below the elevation of each reservoir on April 15 at all four project reservoirs.
PO-2	Minimum Streamflows	Provide a daily average minimum flow from the Falls development of 1,000 cfs from June 1 to January 31, 2,000 cfs from February 1 to May 15, and 1,500 cfs from May 16 to May 31, except when operating under the Low Inflow Protocol or the Hydro Project Maintenance and Emergency Protocol.
PO-3	Flow and Reservoir Elevation Monitoring	Develop and file a flow and reservoir elevation monitoring and compliance plan including provisions for monitoring reservoir water elevations and flows from both the Narrows and High Rock developments and providing North Carolina Department of Environment and Natural Resources (DENR) an annual flow monitoring report.
PO-4	Low Inflow Protocol	Operate in accordance with the Low Inflow Protocol included as appendix A of the Yadkin Settlement.
PO-5	Hydro Project Maintenance and Emergency Protocol	Operate in accordance with the Hydro Project Maintenance and Emergency Protocol included as appendix B of the Yadkin Settlement.
WQ-1	Water Quality	Operate in accordance with the conditions of the water quality certification (WQC) submitted by the North Carolina Department of Water Quality (North Carolina DWQ) under section 401 of the Clean Water Act.
WQ-2	DO Monitoring	Conduct DO monitoring pursuant to the DO Monitoring Plan approved by North Carolina DWQ as part of the WQC.
FW-1	Rare, Threatened, and Endangered	Develop and file a rare, threatened, and endangered (RTE) species management plan to address issues regarding the project-related impacts on the bald eagle (<i>Haliaeetus leucocephalus</i>), Yadkin River goldenrod (<i>Solidago plumosa</i>),

Article	Measure	Elements
	Species Management Plan	Schweinitz’s sunflower (<i>Helianthus schweinitzii</i>), and their habitats. Include plans for periodic monitoring of freshwater mussels in tailwaters, with an emphasis on the Falls tailwater area.
FW-2	Transmission Line Corridor Management Plan	Develop and file a transmission line corridor management plan that establishes vegetation and wetland management objectives for the two project transmission line corridors and outlining actions to achieve objectives.
HP-1	Historic Properties Management Provisions	Implement the provisions of the Programmatic Agreement (PA). Develop and file a historic properties management plan (HPMP) within 12 months of license issuance.
REC-1	Recreation Enhancements	<p>Upgrade and improve existing recreational facilities and construct new recreational facilities in accordance with table 37.</p> <p>Remove Part 8 and safety signs from the Rowan County pump station access area to effectively close the site due to safety and security concerns.</p> <p>Operate and maintain a new recreation site proposed for development on High Rock reservoir in Rowan County, and up to 10 dispersed campsites.</p> <p>Develop and file a recreation plan including (1) a map(s) that clearly identifies all existing and proposed recreation sites and public access, in relation to the existing Yadkin Project boundary; (2) an implementation schedule, (3) the length and width of any project-related trail, canoe portage, etc.; (4) a discussion of how the needs of the disabled were considered in the planning and design of the recreation facilities and public access; and (5) identification of appropriate signage.</p>
SMP-1	Shoreline Management Plan	Revise and file the shoreline management plan (SMP) for the Yadkin Project. The Commission reserves the right to require changes to the SMP.

2.2.3.2 Yadkin-Pee Dee River Project

Under the Yadkin-Pee Dee Settlement, Progress Energy proposes to continue operating the Yadkin-Pee Dee River Project with the proposed protection and enhancement measures summarized table 2.

Table 2. Yadkin-Pee Dee River Project (P-2206) settlement measures. (Source: Progress Energy, 2007a)

Article	Measure	Elements
1-1	Minimum Flow Regime	<p>Provide a continuous, year-round minimum flow at the Tillery development of 330 cfs, except for an 8-week period beginning as early as March 15, but not later than March 22, when a minimum flow of 725 cfs shall be provided.</p> <p>Avoid skimming high temperature surface water from the uppermost surface of Lake Tillery for the purpose of meeting minimum flow requirements if high temperature gradients are found to occur in the upper six inches of the reservoir.</p> <p>Release an additional 1,750 acre-feet of water^a per year below the Tillery development above and beyond the required minimum releases to enhance recreational boating flows. Additional flow up to 1,950 acre-feet of water^b per year would be allowed if releases are made for at least four days within the period May 16 to May 31 or September 1 to September 15.</p> <p>Prepare and submit a recreation release plan within 12 months of the license issuance.</p> <p>Provide a continuous, year-round minimum flow at the Blewett Falls development of 2,400 cfs from February 1 through May 15, of 1,800 cfs from May 16 through May 31, and 1,200 cfs from June 1 through January 31, subject to allowable variances.</p>
1-2	Flow Adjustments to Enhance Fish Spawning	<p>Operate the Blewett Falls development to enhance fish spawning conditions downstream during (1) one 14-day and one 10-day period or (2) five 5-day periods between February 1 and May 15 and provide annual report on operations of the Blewett Falls development during the flow adjustment period.</p> <p>Provide specific measures regarding upramp and downramping operations as detailed in section 3.3.3, <i>Aquatic Resources</i>.</p>
1-3	Minimum Flow Variance	<p>Allow a variance for two 5-hour periods between October and January each year to reduce the minimum flow release to just leakage flow for testing black-start capability of turbines at the Blewett Falls powerhouse. Do not allow test in October if a Stage 1 or greater Low Inflow Protocol event has been triggered.</p>

Article	Measure	Elements
1-4	Low Inflow Protocol	Comply with the requirements of the Low Inflow Protocol dated February 2007 and developed as part of the relicensing process.
1-5	Minimum Flow Compliance Monitoring	Maintain a continuous flow monitoring gage below the Tillery development near the Highway 731 Bridge and at the site of the current Rockingham USGS gage, and provide flow data to the public, via the Internet or other appropriate means, updated no less than every two hours.
2-1	Reservoir Elevations	<p>Limit reservoir water level fluctuations at the Tillery development to 3 feet from December 15 through March 1 unless use of reservoir storage is needed to meet demand for electricity. If storage is needed for electrical generation purposes during this period, limit maximum fluctuation to 5 feet on a daily or multi-daily basis. Allow water fluctuations up to 8 feet during system emergencies, except when operating under the Low Inflow Protocol.</p> <p>Limit reservoir water level changes at the Tillery development from April 15 to May 15 to 1.5 feet below the water surface elevation of the reservoir as measured on April 15. During all other times (except flood flow conditions), maintain water level fluctuations to within 2.5 feet of full pool (278.2 feet) on weekdays, and 1.5 feet of full pool on weekends and holidays.</p> <p>Schedule maintenance drawdown of 15 feet in Lake Tillery between September 15 and December 15 once every 5 years.</p> <p>Add a projection of the expected daily water levels for the day on existing 800-899-4435 public messaging service. Provide an annual notice on November 15 for the first 5 years of the License alerting the public to the drawdown limits that apply between December 15 and March 1.</p> <p>From April 15 to May 15, limit water level changes in the Blewett Falls reservoir to 2 feet to enhance bass spawning, except when additional reservoir storage is necessary to meet minimum flow release obligations or if flashboards fail.</p>

Article	Measure	Elements
		Operate the Blewett Falls reservoir as run-of-river when flows greater than 7,400 cfs. Below 7,400 cfs, maintain year-round water level fluctuations up to 6 feet except for system emergencies and Low Inflow Protocol. Allow additional 2 feet of drawdown to safely replace flashboards.
2-2	Water Level Compliance Monitoring	Submit annual reports on reservoir level compliance including hourly readings of water levels recorded at both reservoirs to the Commission.
3-1	Water Quality	Meet DO water quality standards as stipulated by section 401 of the Clean Water Act.
3-2	Water Quality Compliance Monitoring	Provide continuous monitoring of water temperature and DO below the Tillery development. Determine final monitoring location near the Highway 731 Bridge based upon further testing of DO enhancement technologies and resulting patterns of DO concentrations in the Tillery tailwater.
		Conduct post-licensing monitoring of aquatic life below Tillery dam to document the condition of the aquatic community in the Pee Dee River from Tillery dam to its confluence with the Rocky River.
		Monitor water temperature and DO immediately below the end of the Blewett Falls tailrace.
		Participate in any TMDL processes that are required for the Yadkin-Pee Dee River or its tributaries within the project boundary.
4-1	Recreation Facilities	Make improvements to the Stony Mountain, Norwood, Swift Island, and Lilly’s Bridge public access areas in the Tillery development. Relocate to Clarks Creek the unimproved boat access site currently located in the area just south of the Tillery tailrace.
		Provide North Carolina WRC access across project lands and matching funds, up to \$25,000, for a shoreline public fishing area in Stanly County, including an ADA-accessible fishing pier and gravel parking area. Co-fund, with North Carolina WRC, a joint-use boathouse and boat ramp facility for Lake Tillery in vicinity of proposed public fishing access site in Stanly County.

Article	Measure	Elements
4-2	Yadkin-Pee Dee River Trail	<p>Make improvements to the Anson County and Mountain Creek (Grassy Islands) public access areas on the Blewett Falls reservoir. Upgrade the existing canoe portage at the Blewett Falls dam to applicable North Carolina state standards.</p> <p>Provide an electronic link to the flow gage at Rockingham and to the flow gage to be installed downstream of Tillery dam onto a website. Provide information related to recreational boating flows to be released at the Tillery dam on website.</p> <p>Specific recreational sites and elements at each site are described in detail in section 3.3.7, <i>Recreational Resources</i>.</p>
5-2	Lease of Lands	<p>Lease to the state of North Carolina for the term of the new license, and at the present lease rate, lands between Morrow Mountain State Park and the Pee Dee River, including the existing boat launch area at Morrow Mountain State Park.</p>
5-3	Restrictive Covenants	<p>Place a restrictive covenant for conservation purposes on lands near the mouth of the Uwharrie River, including those extending from Dutchman’s Creek downstream to the tip of the peninsula on the south side of the mouth of the Uwharrie River and those at the upper end of the bay, created by the above peninsula, classified as Environmental/Natural Areas in the SMP; on the Grassy Islands area located at the upper reaches of Blewett Falls reservoir; and on the canoe portage route at Blewett Falls.</p> <p>Specific protection measures under restrictive covenants are described in detail in section 3.3.8, <i>Land Use and Aesthetics</i>.</p>
6	Shoreline Management	<p>Implement and enforce the Tillery SMP.</p> <p>Implement shoreline management practices for Blewett Falls prohibiting private access across Project lands, except at the designated public access areas.</p>

Article	Measure	Elements
7	Blewett Falls Sediment Survey	Conduct a sediment survey and gravel recruitment survey in the Blewett Falls tailwater 5 years after license issuance. If results indicate no significant problem related to gravel recruitment, conduct another survey after an additional 10 years.
8	Historic Properties Management Plan	Implement and enforce an HPMP at Tillery and Blewett Falls developments within 12 months of license issuance.

^a 884 cfs over a 24-hour period.

^b 985 cfs over a 24-hour period.

2.2.4 Proposed Project Boundaries

Under the new license, Alcoa Generating proposes to include all of the existing and proposed project-related recreation areas in the project boundary for the Yadkin Project. The proposed boundary would include all of facilities located within the project-related recreation areas as shown on the recreation area maps filed on April 27, 2007, in response to an additional informational request pertaining to the proposed project boundary. Figure 16 in section 3.3.7.1 shows the locations of these recreational facilities.

Progress Energy does not propose changes to the Yadkin-Pee Dee River Project boundary under the new license.

2.3 MODIFICATIONS TO THE APPLICANTS' PROPOSAL

2.3.1 Mandatory Conditions

2.3.1.1 Water Quality Certification

Under section 401 of the Clean Water Act (33 U.S.C. §1341), the Commission may not issue a license for a hydroelectric project unless the state certifying agency has either issued a water quality certification (WQC) for the project or has waived certification by failing to act on a request for certification within a reasonable period of time, not to exceed 1 year.

Yadkin Project - On May 10, 2007, Alcoa Generating applied to North Carolina DWQ for a WQC.¹² North Carolina DWQ received the request on May 10, 2007.

Yadkin-Pee Dee River Project - On May 11, 2007, Progress Energy applied to North Carolina DWQ for a WQC.¹³ North Carolina DWQ received the request on May 11, 2007.

2.3.1.2 Section 18 Agency Fishway Prescriptions

Section 18 of the FPA states that the Commission shall require the construction, maintenance, and operation by a licensee of such fishways as the Secretary of the U.S. Department of Commerce, National Marine Fisheries Service (NMFS) and the U.S. Department of the Interior (Interior, on behalf of FWS) may prescribe.

Yadkin Project - NMFS, by letter filed with the Commission on May 11, 2007, and Interior, by letter filed May 11, 2007, reserved the Commission's authority to require such fishways as may be prescribed by the Department of Commerce or Interior over the term of any new license for the Yadkin Project.¹⁴

Yadkin-Pee Dee River Project - NMFS, by letter filed on May 12, 2007, and FWS, by letter filed on May 11, 2007, prescribed preliminary fish passage prescriptions for the Yadkin-Pee Dee River Project as well as reserved the Commission's authority to require such fishways as may be prescribed Interior or the Department of Commerce over the term of any new license for the Yadkin-Pee Dee River Project.¹⁵

The Commission recognizes that future fish passage needs cannot always be determined at the time of project licensing. Under these circumstances, and upon

¹²For more information, see eLibrary filing titled *Notice of filing of application for Clean Water Act Section 401 Certification for Yadkin Hydroelectric Project of Alcoa Power Generating, Inc. under P-2197*, accession no. 20070514-5101.

¹³For more information, see eLibrary filing titled *Progress Energy submits Section 401 Water Quality Certificate application for Yadkin-Pee Dee River project under P-2206*, accession no. 20070518-0190.

¹⁴For more information, see eLibrary filings titled *Comments of the National Marine Fisheries Service under P-2197* and *US Department of Interior Section 10(j) Recommendations, Terms, and Conditions, and Reservation of Section 18 Authority for the Yadkin Hydroelectric Project under P-2197*, accession nos. 20070512-5001 and 20070511-5034, respectively.

¹⁵For more information, see eLibrary filings titled *Fishway Comments, Prescriptions, Terms, Conditions of the National Marine Fisheries Service under P-2206* and *Comment of Filing of US Fish and Wildlife Service under P-2206*, accession nos. 20070512-5002 and 20070514-5039, respectively.

receiving the specific request, consistent with Commission practice, we recommend the Commission reserve its authority to require such fishways, as may be prescribed by Department of Commerce or Interior for the Projects.

Our analysis of fish passage is presented in section 3.3.3, *Aquatic Resources*. Our final recommendations are presented in section 5.1, *Comprehensive Development and Recommended Alternative*.

2.3.1.3 Section 18 Applicant's Alternative Fishways Prescriptions

The Energy Policy Act of 2005 (EPAAct) provides parties to the Projects' licensing proceeding the opportunity to request trial-type hearings regarding issues of material fact used to support the prescriptions developed under FPA section 18. EPAAct also provides parties the opportunity to propose alternatives to preliminary prescriptions.

In two separate filings on June 11, 2007, in accordance with section 241 of EPAAct, Progress Energy requested a trial-type hearing under section 18 of the FPA and proposed alternative prescriptions under section 33 of the FPA. Progress Energy submitted with its filing an alternative proposal including specific alternatives for each of the upstream and downstream prescriptions offered by NMFS and FWS and summarized in section 3.3.3, *Aquatic Resources* in this EIS.

On June 25, 2007, American Rivers, Coastal Conservation League, and the city of Rockingham jointly filed a notice of intervention, appearances, and responses to Progress Energy's request for trial-type hearings under section 18 of the FPA. These parties argue that many of Progress Energy's disputed issues of material fact for the trial-type hearing are in fact policy or legal arguments and should not be subject to hearing, including:

- NMFS/FWS disputed issue 1 that fish passage at Blewett Falls dam is necessary to maintain all life stages of American shad in the Yadkin-Pee Dee River system;
- NMFS/FWS disputed issue 2 that lack of fish passage at Blewett Falls dam is suppressing the existing American shad population in the Yadkin-Pee Dee River system;
- NMFS/FWS disputed issue 3 that fish passage above Blewett Falls dam would increase the size of the American shad population in the Yadkin-Pee Dee River system;
- NMFS/FWS disputed issue 4 that fish passage at Blewett Falls dam is necessary to maintain all life stages of American eel in the Yadkin-Pee Dee River system;
- NMFS/FWS disputed issue 5 that fish passage of American eel above Blewett Falls dam would increase the size of the American eel population in the Yadkin-Pee Dee River system;
- NMFS disputed issue 6 that fish passage at Blewett Falls dam is necessary to maintain all life stages of blueback herring in the Yadkin-Pee Dee River system;

- NMFS disputed issue 7 that fish passage above Blewett Falls dam would increase the size of the blueback herring population in the Yadkin-Pee Dee River system; and
- NMFS disputed issue 10 that fish passage at Blewett Falls dam is necessary to maintain all life stages of Atlantic and shortnose sturgeon in the Yadkin-Pee Dee River system.

The parties also state that the following disputed issues are triable, but that they are appropriate for stipulation:

- NMFS disputed issue 8 that the upstream migration period for American shad and blueback herring is February 15 through May 15;
- FWS disputed issue 6 that the upstream migration period for American shad is February 15 through May 15;
- NMFS disputed issue 9 that the downstream migration period for American shad and blueback herring is year round; and
- FWS disputed issue 9 that the downstream migration period for American shad is year round.

2.3.1.4 Coastal Zone Management Act

Section 307(c)(3) of the Coastal Zone Management Act requires that all federally licensed and permitted activities be consistent with approved state coastal zone management programs in cases where the project is located within a coastal zone boundary or affects a resource located in the boundaries of the designated coastal zone.

Yadkin Project - In a letter dated December 13, 2006, Alcoa Generating determined that Yadkin Project, as presented in the Yadkin Agreement in Principle, is consistent with South Carolina's Coastal Zone Management Program. The South Carolina Office of Ocean and Coastal Resource Management, in a January 10, 2007, reply, concurred with Alcoa Generating's determination that the project, is consistent with the South Carolina Coastal Zone Management Program. The Yadkin Settlement is consistent with the Agreement in Principle and both the South Carolina Department of Natural Resources (DNR) and the South Carolina Department of Health and Environmental Control are signatories.

Yadkin-Pee Dee River Project - In a letter dated September 14, 2006, Progress Energy determined that the Yadkin-Pee Dee River Project is consistent with the South Carolina Coastal Zone Management Program. The South Carolina Office of Ocean and Coastal Resource Management, in a December 6, 2006, reply, concurred. The final Yadkin-Pee Dee Settlement is consistent with the draft Agreement in Principle, and both the South Carolina DNR and South Carolina Department of Health and Environmental Control are signatories.

2.3.1.5 Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or cause the destruction or adverse modification of the critical habitat of such species.

Yadkin Project – Interior (on behalf of FWS) lists one plant species potentially occurring in the vicinity of the Yadkin Project, the Schweinitz’s sunflower (*Helianthus schweinitzii*), that is federally designated as endangered and therefore protected under the ESA.

Yadkin-Pee Dee River Project – Interior (on behalf of FWS) and NMFS list two species potentially occurring downstream of the Yadkin-Pee Dee River Project that are federally designated as endangered and, therefore, protected under the ESA. These are the shortnose sturgeon (*Acipenser brevirostrum*) and the Carolina heelsplitter (*Lasmigona decorate*).

Our analyses of project effects on these species are presented in section 3.3.5, *Threatened and Endangered Species*.

We conclude that relicensing the Yadkin Project, with the fish and wildlife habitat protection and enhancement measures proposed in the Yadkin Settlement, would be likely to adversely affect the Schweinitz’s sunflower (see section 3.3.5, *Threatened and Endangered Species*).

We conclude that relicensing the Yadkin-Pee Dee River Project, with the fish and wildlife habitat protection enhancement measures proposed in the Yadkin-Pee Dee Settlement, is not likely to adversely affect the shortnose sturgeon or the Carolina heelsplitter (see section 3.3.5, *Threatened and Endangered Species*).

2.3.1.6 National Historic Preservation Act (Section 106)

Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effect of any proposed undertaking on historic properties listed in, or eligible for listing in, the National Register of Historic Places (National Register). Historic properties include districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture. If the agency official determines that the undertaking may have adverse effects on properties listed in or eligible for listing in the National Register, the agency official must afford an opportunity for the Advisory Council on Historic Preservation to comment on the undertaking. The relicensing of the Projects is considered an undertaking, and the Commission acts as the agency official.

As described in section 2.2.3, *Proposed Environmental Measures*, and analyzed in section 3.3.6, *Cultural Resources*, Alcoa Generating and Progress Energy each intend to develop and implement an HPMP to protect historic properties in the Yadkin and Yadkin-Pee Dee River Projects’ area of potential effects (APE), respectively. To meet

the requirements of section 106, the Commission will execute PAs for the protection of historic properties from the effects of the continued operation of the Projects. The terms of the PAs would ensure that Alcoa Generating and Progress Energy would address and treat all historic properties identified within the APE through their proposed HPMPs. Our final recommendations regarding cultural resources and historic properties are presented in section 5.2, *Comprehensive Development and Recommended Alternative*.

2.3.2 Other Recommendations by Agencies and Interested Parties

2.3.2.1 Section 10(j) Recommendations

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project. Section 10(j) also states that, whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purpose and the requirements of the FPA or other applicable laws, the Commission and agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibility of the agency.

Yadkin Project - NMFS and Interior (on behalf of FWS) included 10(j) recommendations in their comments in response to the Commission's ready for environmental analysis notice issued on March 13, 2007.¹⁶ Table 57 in section 5.2, *Fish and Wildlife Agency Recommendations*, lists each of the recommendations subject to section 10(j), and summarizes our recommendation for adoption under the Staff Alternative.

Yadkin-Pee Dee River Project - In response to the Commission's ready for environmental analysis notice issued on March 13, 2007, NMFS and Interior (on behalf of FWS) filed comment letters that included section 10(j) recommendations.¹⁷ Table 57 in section 5.2, *Fish and Wildlife Agency Recommendations*, lists each of the recommendations subject to section 10(j), and summarizes our recommendation for adoption under the Staff Alternative.

2.3.3 Staff's Modification to the Proposed Actions

After evaluating the Proposed Actions, including the terms, conditions, and recommendations filed by agencies and interested entities under sections 10(a), 10(j), 18 of the FPA, we considered what, if any, additional measures would be necessary or appropriate for the continued operation of the Projects. In addition to Alcoa Generating

¹⁶NMFS letter dated May 11, 2007; Interior (FWS) letter dated May 11, 2007.

¹⁷NMFS letter dated May 12, 2007; Interior (FWS) letter dated May 11, 2007.

and Progress Energy’s proposed project-related environmental measures, we evaluate the following staff-identified measures for the Yadkin and Yadkin-Pee Dee River Projects:

2.3.3.1 Yadkin Project

- Develop a sedimentation and flood protection plan that includes (a) specific measures to ensure dredging of sufficient volume and frequency such that the city of Salisbury’s water intake remains clear of sediments, and (b) an assessment of the feasibility of implementing measures proposed by the city of Salisbury or comparable measures that would achieve the same objective to protect the pump station and Grant Creek wastewater treatment facility from flooding.
- Install equipment and implement measures designed to enhance DO conditions in the Yadkin development tailwaters.¹⁸
- Operate the generating units with DO enhancement equipment added on a first-on, last-off basis from no later than May 1 through November 30 of each year subject to review and adjustments based on monitoring.
- Develop and implement a DO monitoring plan for continuous monitoring in all four tailraces from May 1 through November 30 of each year.
- Reserve the Commission’s authority to require the construction and operation of such fishways as may be prescribed by Interior or the Department of Commerce for American shad and American eel.

2.3.3.2 Yadkin-Pee Dee River Project

- Initiate monitoring to determine the specific locations for American eel passage facilities at Blewett Falls dam.
- Monitor eel concentrations downstream of Tillery dam in year 5 of the license, and continue at 5-year intervals until upstream passage is required; study plan should be prepared in consultation with state and federal fishery agencies.
- Modify the timetable for providing fish passage facilities at Blewett Falls dam.
- Prepare and implement a diadromous fish monitoring plan.
- Develop and implement a bald eagle management plan that provides for annual monitoring.
- Develop and implement a goldenrod monitoring plan.

¹⁸This measure and the following two measures designed to address DO in the project tailwaters were included in section 2 of the Yadkin Settlement as measures that were not intended to be included in any license issued for the project.

- Provide additional lighting and feasibility study for overnight campsites at the Pee Dee access area.
- Provide additional vault toilets, trash receptacles, lighting, and feasibility study for overnight campsites at Grassy Islands access area.
- Provide a port-a-john at the Blewett Falls tailrace access area.
- Develop and implement a plan for an additional public access area on the west side of Blewett Falls reservoir that provides for either upgrading Informal SR 1744 access or a new public access area.
- Conduct a recreational boating study, and monitor boating use in the reach downstream of the Tillery dam as part of the proposed recreation flow release plan.

2.4 OTHER ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

2.4.1 Federal Government Takeover

We do not consider federal takeover to be a reasonable alternative for the Projects. Federal takeover of the Projects would require Congressional approval. While that fact alone would not preclude further consideration of this alternative, there is currently no evidence showing that a federal takeover should be recommended to Congress. No federal agency has suggested that federal takeover would be appropriate, and no federal agency has expressed an interest in operating the Projects.

2.4.2 Non-power License

A non-power license is a temporary license the Commission would terminate whenever it determines that another governmental agency will assume regulatory authority and supervision over the lands and facilities covered by the non-power license. At this time, no agency has suggested a willingness or ability to do so. No party has recommended non-power licenses for the Projects, and we have no basis for concluding that they should no longer be used to produce power. Thus, we do not consider a non-power license a realistic alternative to relicensing in this circumstance.

2.4.3 Project Retirement

Project retirement could be accomplished with or without dam removal. Either alternative would require denying the relicensing applications and surrender or termination of the existing licenses with appropriate conditions. The Projects provide viable, safe, and clean renewable sources of power to the region. Project retirement would foreclose these sources of power. No party has suggested project retirement, and we have no basis for recommending it. Therefore, project retirement is not a reasonable alternative to relicensing the Projects with appropriate enhancement measures.